Land at Llandow

Appraisal of Agricultural Issues

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1. Introduction

1.1 Instruction

1.1.1 Reading Agricultural Consultants Limited (RAC) is instructed by the Vale of Glamorgan Council to validate the report prepared by Kernon Countryside Consultants (KCC) on behalf of the developers, a consortium of national house builders, which investigates the impact of the proposed development of land at the former Llandow airfield on agriculture and soil resources. The KCC agricultural assessment considers the potential impacts of the loss of agricultural land in terms of agricultural land quality, local farm businesses and agri-environment schemes.

1.1.2 The majority of the land will be used for "*residential development of some 2,750 homes of mixed density*" and "*English and Welsh speaking primary schools, a village centre and several small 'local centres', a possible park and ride scheme, health and leisure facilities and significant areas of public open space including playing pitches covering some 17 hectares*." In addition "*the proposals also include provision to retain and enhance 18 hectares of woodland and 'informal open space' of ecological value, together with the retention of as much existing hedgerow as possible built development*." (Ref. 10)

1.1.3 A verification survey has been undertaken of the Agricultural Land Classification (ALC) survey and report carried out by KCC (with the site originally surveyed in October 2001). A verification survey does not involve a complete re-survey of the land, but rather seeks to determine whether the principal components and broad classifications are correct in the report. The ALC has been assessed according to the MAFF (1988) Agricultural Land Classification of England and Wales, revised guidelines for grading the quality of agricultural land.

2. Legislation, Policy and Guidance

2.1 Legislative Framework

2.1.1 The Legislative Framework has not been addressed by the KCC report, but is important because it provides the context and background to Planning Policy and best practice guidance.

2.1.2 In 2006 the European Commission (EC) adopted a comprehensive 'Thematic Strategy' (Ref. 1) specifically dedicated to soil protection. The Strategy included a proposal for a 'Soil Framework Directive' (Ref. 2) to promote the sustainable use of soil and protect soil as a natural resource. This was to be achieved by controlling the major threats of erosion, organic matter decline, contamination, salinisation, compaction, soil biodiversity loss, sealing (i.e. built development covering soil), landslides and flooding. Once agreed by

Members of the EU, it would have been for each Member State to devise and implement new national policy on soil protection. Thus, an EU Soil Framework Directive would have required the UK Government to revise its legislation and, consequently, planning policy regarding agricultural land and soil.

2.1.3 However, Environment Ministers have thus far been unable to reach agreement on EC proposals for an EU Soil Framework Directive.

2.1.4 At a national level, although there remains no specific legislation for the protection of soil and agricultural land, the Environment Strategy (Ref. 3) and First Action Plan (Ref. 4) were published by the Welsh Assembly Government (WAG) in 2006, and set out a 20-year vision for the Welsh environment. The Environment Strategy set out 39 outcomes across five themes including, amongst those for the sustainable use of resources, that soils are managed to safeguard their ability to support plants and animals, store carbon and provide other important ecosystem services.

2.1.5 In order to deliver this outcome, the first Environment Strategy Action Plan indicated that WAG would develop a soil action plan focused on:

- Good soil management in agriculture and forestry;
- Integration of soil protection into guidance on land-use planning policy and its implementation;
- Developing an appropriate set of indicators for soils in Wales;
- Working with CCW and the Environment Agency to ensure wastes and pollutants deposited on land, historically or currently, do not impair long-term soil functions;
- A risk-based approach to managing soil resources; and
- Promoting education and access to information on soil.

2.1.6 A consultation draft of the Welsh Soils Action Plan was issued in 2008. The following actions are of particular relevance to this assessment:

- WAG will continue to provide a scrutiny service during the preparation of Local Development Plans, including the need to check that the impact on the national soil resource is properly taken into account;
- WAG is committed to retaining the ALC system to retain the best and most versatile land; making ALC information widely available to all parties involved in the planning system, and undertaking detailed fieldwork where proposed development is considered to be potentially damaging to the national agricultural interest;
- WAG will identify and consider options for capturing data on soil loss to development, quantifying area and impact upon loss of function.

2.2 Planning Policy

National Planning Policy

2.2.1 The KCC assessment correctly identifies the national planning policy guidance regarding development related to agricultural land as set out in Planning Policy Wales (2002) (Ref. 5) and Technical Advice Note (Wales) 6 (TAN6), Agricultural and Rural Development (2000) (Ref.6). It recognises the important fact that the best and most versatile agricultural land (i.e. that classified as Grades 1, 2 and 3a in the ALC) should be conserved as a finite resource for the future and that considerable weight should be given to protecting such land from development because of its special importance.

2.2.2 Paragraph 2.8.1 of PPW states that the best and most versatile land should only be developed if there is an overriding need for the development, and either previously developed land or lower quality agricultural land is unavailable, or available lower quality land has a recognised environmental value which outweighs the agricultural considerations.

2.2.3 The guidance states that where significant development of agricultural land is unavoidable, poorer quality land in Grades 3b, 4 and 5 should be used in preference to higher quality land, except where this would be inconsistent with other sustainability considerations.

Local Planning Policy

2.2.4 The Vale of Glamorgan Adopted Unitary Development Plan sets out planning policy guidance on development involving agricultural land in Policy ENV2. This includes the need to protect, and possibly enhance, the intrinsic quality and quantity of soil "*as a national resource for the future*." The UDP reiterates and adds weight to national policy but has not been identified in the KCC assessment.

Guidance

2.2.5 Guidance on classifying agricultural land is contained in 'Agricultural Land Classification of England and Wales, Revised guidelines and criteria for grading the quality of agricultural land', prepared by the then Ministry of Agriculture, Fisheries and Food (MAFF) in 1988 (Ref. 7).

2.2.6 Agricultural land in England and Wales is graded between 1 and 5, depending on the extent to which physical or chemical characteristics impose long-term limitations on agricultural use. Grade 1 land is excellent quality agricultural land with very minor or no limitations to agricultural use, and Grade 5 is very poor quality land, with severe limitations

due to adverse soil, relief, climate or a combination of these. Grade 3 land is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land).

3. Assessment Methodology and Significance Criteria

3.1 Scope of the Assessment

3.1.1 The issues addressed in the KCC assessment are the magnitude and significance of any loss of agricultural land (especially that classified as 'best and most versatile agricultural land') to the national agricultural land resource; and the magnitude and significance of effects on farm enterprises affected. This is the appropriate scope for this type of proposal

3.2 Extent of the Study Area

3.2.1 For most of the key issues identified, the study area is restricted to the site of the Proposed Development. There may, however, be the potential for effects on neighbouring farmland during the construction and operational phases.

3.2.2 The red line area extends to about 189.5 ha of which approximately 10.5 ha was unsurveyed in the KCC study. RAC have extrapolated the possible ALC grading over much of that unsurveyed area, but some 2 ha within the red line have been left as unsurveyed due to doubt and uncertainty concerning the actual land use. The KCC study estimated the total area of non-agricultural land to be about 92 ha, but RAC considers that there have been some changes to the extent of agricultural land around the motor racing track since the KCC survey in 2001 such that the extent of non-agricultural land is now about 99 ha. Further differences in areal measurements between the KCC and RAC studies are probably due to slight differences in map scale.

3.2.3 The agricultural land within the RAC study area extends to approximately 88.5 ha of the application site which is currently used for agricultural purposes. Of the 187.5 ha in the overall scheme, some 53%, or 99 ha, is non-agricultural land, comprising the former Second World War airfield which is currently used for a variety of purposes including trading estates, a caravan park, motor racing circuit, go-karting and a model aircraft club.

3.2.4 However, the KCC report estimates that there are approximately 86.8 ha of agricultural land out of a total site area of 179 ha, equating to 51.5% of the application site being non-agricultural land. The reason for the difference between the RAC and KCC estimation of agricultural land is given in para 3.2.2.

3.3 Method of Baseline Data Collation

3.3.1 To verify the KCC ALC survey, a site visit was made and several traverses were conducted on foot across the agricultural land in representative areas. Nine soil profiles were examined using an Edelman (Dutch) auger and spade. The locations of observations are indicated on Figure RAC 1. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120 cm or any impenetrable layer: soil texture; significant stoniness; colour (including local gley and mottle colours); consistency; structural condition; free carbonate; and depth. Six topsoils were sampled for laboratory analysis of particle size analysis, pH and the nutrients phosphorous, potassium, and magnesium. Results are given in Appendix 1.

3.3.2 In order to verify the KCC farmer survey, a farm impact questionnaire was completed by RAC during a site visit on 10th September 2008. One farmer was interviewed over the telephone.

3.3.3 The extent of existing agri-environment schemes has been established from an interview with the participating farmer with further contact made with WAG to determine the nature of the scheme. I would put these 2 after the ALC method

3.3.4 Soil Wetness Class (WC) was inferred from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling and/or poorly permeable subsoil layers at least 15 cm thick.

3.3.5 Soil droughtiness was investigated by the calculation of moisture balance equations. Crop-adjusted Available Profile Water (AP) is estimated from texture, stoniness and depth, and then compared to a calculated moisture deficit (MD) for the standard crops wheat and potatoes. The MD is a function of potential evapotranspiration and rainfall. Grading of the land can be affected if the AP is insufficient to balance the MD. When a profile is found with significant stoniness, sufficient to prevent penetration of a hand auger, then it is assumed, for the purposes of calculating droughtiness, that similar levels of stoniness continues to the full 1.2 m depth considered.

4. Baseline Conditions

4.1 Agricultural Land Quality and Soil Types

4.1.1 The application site extends to about 189.5 ha, with the boundary shown in red on Figure RAC 1, of which about 2 ha has not been assessed leaving a net area of about 187.5 ha. The land forms a more or less flat plain whose land-use pattern is dominated by the layout of the former World War II airfield. The land is criss-crossed by old runways and has two main industrial areas as well as a motor racing circuit. The agricultural land

along the northern side has a fairly conventional layout, but in the central and southern parts the fields are fitted around the layout of the old airfield.

4.1.2 The site is principally bounded by other agricultural land, but has a railway line along the western edge. Existing use of the agricultural land is largely arable with some pasture, and the land was under maize, grass and cereal stubble at the time of survey. There are several small areas of woodland within the site boundary. The altitude of the site varies from 75 to 93 m above Ordnance Datum (aOD), with the majority of the site having an altitude around 80-85 m.

4.2 Climatic Factors

4.2.1 Local climatic factors have been interpolated by RAC and KCC from the Meteorological Office's standard 5 km grid point data set for the centre of the site. Climatic factors derived by RAC and KCC are given in Table 1.

Table 1: Local climatic factors and altitude data derived by RAC and KCC

	RAC	KCC
Grid reference		SS 9570 7190
Altitude	80m AOD	95 m AOD
Average annual rainfall (AAR)	1,115 mm	1,131 mm
Accumulated temperature > 0°C (AT0)	1,473 day°	1,456 day°
Field Capacity Day regime (FCD)	224 days	226 days
Average moisture deficit, wheat (MDw)	76 mm	73 mm
Average moisture deficit, potatoes (MDp)	60 mm	57 mm

4.2.2 At first glance there would seem to be little difference between the values given in Table 1 by KCC and RAC. The RAC figures show slightly lower rainfall, slightly warmer temperatures, a slightly shorter FCD regime and slightly larger moisture deficits. The difference in these figures is largely due to the different altitudes which have been used; 80m by RAC and 95m by KCC.

4.2.3 The key figure is the Field Capacity Day regime (FCD). This is the median duration of field capacity and is described in the 1988 MAFF guidelines in the following manner:-

> *"FCD is a meteorological parameter which estimates the duration of the period when the soil moisture deficit is zero. Soils usually return to field capacity (zero deficit) during the autumn or early winter and the field capacity period, measured in days, ends in the spring when evapotranspiration exceeds rainfall and a moisture deficit begins to accumulate."*

4.2.4 The significance of the number of FCDs comes in the assessment of soil wetness class (WC) and workability limitation, and this is further described in the MAFF guidance as follows:

> *"The influence of climate on soil wetness is assessed by reference to median field capacity days (FCD). FCD ranges are specified within which similar soils are expected to have similar degrees of wetness limitation. The spatial distribution of FCD has been mapped at a scale of 1:1 million by the SSLRC (Jones and Thomasson, 1985) and there is also a gridpoint dataset."*

4.2.5 Within the assessment of ALC there is a critical boundary at 225 FCDs between differing ranges of workability limitation, and it is therefore necessary to determine the precise placement of the 225 FCD line in relation to the land at Llandow.

4.2.6 The 225 FCD line is shown on the 1:1 million scale map mentioned above, a portion of which is shown in Figure RAC 2. It can be seen that the entire site at Llandow falls below the 225 FCD line and therefore has less than 225 FCDs. However, given the very small map scale a more precise determination would be desirable, and therefore examination has been made of the gridpoint dataset.

4.2.7 Table 2 shows interpolations from the gridpoint dataset of the climatic factors for the coordinates used by KCC, which are at the centre of the site, at altitudes of 75m, 85m and 95m, the last being the altitude used in the KCC report. The method of interpolation is that specified in MAFF (1988).

Table 2: Local climatic factors derived by RAC at various altitudes

Altitude	75m	85m	95m
AAR	1097	1114	1131
AT0	1479	1467	1456
FCD	222	224	226
WHT	78	75	73
POT	63	60	57

4.2.8 It can be seen that the figure of 225 FCDs is only exceeded at the highest altitude of 95m. Examination of the Ordnance Survey maps of the site reveal that the highest altitude is 93m at the north-east extremity, and that 80-85 m better represents the altitude at the centre of the site where the coordinates are placed.

4.2.9 Further interpolations were calculated for various locations around the site in order to determine the location of the 225 FCD line from the gridpoint dataset. The location of the 225 FCD line determined in this manner is shown by the blue line on Figure RAC 1. This line crosses the site somewhat north of centre with the line being oriented approximately WNW to ESE. From this it can be seen that only the northern third of the site can be considered to fall above the 225 FCD line. The implications of this to the ALC classification are discussed below in paras 4.4.5 to 4.4.9.

4.3 Soil Parent Materials and Soil Types

4.3.1 The soil parent material is drift over limestone. The soil series has been mapped as Ston Easton on the 1968 map which is described in the 1972 Soil Survey of England and Wales publication, 'Soils of the Vale of Glamorgan' authored by C B Crampton (Ref. 10); the definitive work on the soils of the area. The description of the Ston Easton series, as given by Crampton, is attached as Appendix 2. Although lying over limestone these soils are non-calcareous, and are generally moderately deep over rock, becoming shallow over rock in places, though droughtiness would appear to be moderated by the wet climate. These soils are well drained and structured and are inherently good soils for agriculture.

4.3.2 The importance of the Ston Easton series to the Vale of Glamorgan is reflected in the very wide extent mapped as this soil unit and the fact that it is the first soil series to be described in the 'Soils of the Vale of Glamorgan'. On the western side of the site Dyffryn and Sigingstone soils are mapped, being wet soil in shallow valleys and a transitional type between Ston Easton and Dyffryn respectively. However these soils are localised to a narrow shallow valley feature, are found mostly under woodland and developed land, and are not of agricultural importance, though where they do occur on agricultural land that land is of inferior quality.

4.3.3 The KCC report gives a reasonable description of the soil types and parent materials present, though the soils are described as clayey. Crampton describes the Ston Easton soils as being well drained silty clay loams, and three of the four typical profiles described by Crampton have silty clay loam topsoil, with the fourth being clay and described as an intergrade to another series. It would therefore be fair to say that the Ston Easton series is for soils of heavy loam rather than clay, though some clays do occur as intergrades.

4.4 ALC and Main Limitations on the Agricultural Land

4.4.1 The MAFF (1988) classification of agricultural land recognises five grades from 1, excellent quality, to 5, very poor quality, with grade 3 divided into two subgrades, 3a and 3b. Grades 1, 2 and Subgrade 3a are recognised as 'best and most versatile' quality agricultural land.

4.4.2 KCC describe the land quality found on the Provisional ALC map (MAFF 1977) (Ref. 8) correctly as being non-agricultural with surrounding land being Grade 2. RAC accepts that the introduction of agro-climatic factors, and other factors, to the ALC classification system in the 1988 revision have indeed acted to downgrade much of the land previously taken to be Grade 2 in south Wales, and elsewhere.

4.4.3 KCC state that a survey they conducted near Cardiff airport showed soils on similar parent material to be clayey in texture as shown by laboratory determination of particle size distribution. However, no similar supporting laboratory analysis has been given for the soils at Llandow. Also, the KCC report gives no map to show the locations of their soil observations and pits and it is therefore impossible to determine the locations of their described soil profiles.

4.4.4 The six topsoil samples taken in this verification survey which were subject to particle size analysis, and which were taken from widely spaced locations across the site, all show heavy clay loam or heavy silty clay loam textures, and not clay texture (see Appendix 1).

4.4.5 KCC make the conclusion that the land at Llandow is Subgrade 3b due to a workability limitation with clay topsoil textures and 226 FCDs. In the MAFF (1988) ALC system workability limitations of mineral soils are made according to Table 6 in the guidelines, reproduced as Appendix 3. With reference to this table it will be seen that the leftmost column divides the table into five main sections which correspond to the wetness classes from I to V. As the vast majority of the agricultural soils at Llandow are well drained WCI, all but the first WC grouping can be disregarded in relation to the bulk of the land.

4.4.6 Within WCI the second column makes four divisions into rows according to topsoil texture. The soil texture names are abbreviated with heavy silty clay loam (HZCL) and heavy clay loam (HCL) forming the third line and clay (C) being on the fourth line together with sandy clay (SC) and silty clay (ZC). On the right of the table are divisions into five columns according to the number of FCDs, with the fourth column being for 176-225 FCDs and the fifth column being for >225 FCDs, which is the critical division that gives importance to the 225 FCD line.

4.4.7 In Table 6 the coincidence of wetness class, FCD group and topsoil texture determines the ALC Grade or Subgrade. For clay topsoil with WCI drainage and in either the 176-

225 or >225 FCD groups the ALC grade is 3b. This is the interpretation made in the KCC appraisal.

4.4.8 However, for HZCL and HCL topsoil with WCI drainage (as determined by the laboratory analysis of the RAC samples), the ALC grade is 3a for land with 176-225 FCDs and 3b for land with >225 FCDs. As it has been shown that much of the site has 225 FCDs or less and has HZCL or HCL topsoil the correct ALC grade for the bulk of the agricultural land south of the 225 FCD line should be 3a, which is 'best and most versatile' land.

4.4.9 RAC has reinterpreted the ALC map produced by KCC taking into account the 225 FCD line and topsoil textures of HCL or HZCL, together with some modifications to the grading of the KCC Grades 4 and 5 land and alteration of the land use around the motor racing circuit. The south-easternmost field has also been downgraded to Subgrade 3b due to shallowness over rock. The reinterpreted map is given as Figure RAC 3.

4.4.10 The areas of the various ALC grades as given in the KCC report and suggested by RAC are shown in Table 3. To fully verify these areas a full re-survey of the site would be necessary, and therefore these figures should be treated as provisional. However, it is estimated that land of best and most versatile quality (Grades 1, 2, and 3a) is found over 51 ha or 57% of the agricultural land in the application site and that the higher protection offered land of this quality in the planning guidance should therefore apply.

Table 3: ALC Areas and grades

ALC Grade	Description	Area (ha)	% of total area
KCC Figures			
3b	Moderate quality	84	47
4	Poor quality	1.2	0.6
5	Very poor	1.6	0.9
Non-agricultural / Urban		92	51.5
Total		178.8	100
RAC Figures			
Subgrade 3a	Good quality	51	27
Subgrade 3b	Moderate quality	36	19
Grade 4	Poor quality	1.5	1
Total agricultural		88.5	47
	Best and most versatile	51	27
Non agricultural		99	53
Total Area		187.5	

4.5 Local Farm Businesses

4.5.1 The KCC report describes the farm businesses affected by the proposed development and an outline is presented here for ease of reference. There are four blocks of land under separate occupation within the application site, as shown on Figure RAC4:

- Messrs Evans, Marcross Farm, who occupy land to the south-east of the application site surrounding, and in the centre of, the car racing circuit. The farmed area extends to 53.4 ha (132 acres) of arable and grassland;
- Mr James, Land off Sutton Road, who occupies 10.5 ha (26 acres) of permanent pasture;

- Mr Ford, Tynycaia Farm, who occupies 15.7 ha (39 acres) of grassland, stubble turnips and habitat area; and

- Mr Williams, Garth Grabben Farm, who occupies 8.9 ha (22 acres) of permanent pasture.

4.5.2 The farms are held under an assortment of tenures and various farming systems. They are described in detail in order to gain a thorough insight into the farming operations on the application site.

4.5.3 The land occupied by **Messrs Evans** forms part of a larger holding based at Marcross Farm, some 3 miles distant. Marcross Farm is principally a dairy farm milking 160 Holstein/Friesian cows with 120 followers and 20 beef store cattle. The arable land grows wheat and maize for feeding to the dairy herd. The farm totals some 140-160 ha, dependent upon any short-term land rental, and currently employs four full-time workers and one part-time worker.

4.5.4 The land farmed by Messrs Evans at Llandow is occupied under four separate tenures.

- Marcross Holdings, a family-run company, owns the southeast area (approximately 32 ha including non-agricultural land) which consists of the car racing circuit, cart racing track, camping site, caravan store and grassland. The 8 ha of grass in the middle of the racetrack are used for silage production, contrary to the KCC assertion that the area is no longer used for agriculture. This accounts for some of the difference in agricultural land area on the application site (para 3.2.4). The permanent pasture to the south of the racetrack is used for grazing. This is the only field with a piped water source. The aforementioned diversification enterprises are all operated by Messrs Evans and are located on land occupied on an informal basis.

- Two arable fields (approximately 20 ha) to the north-east of the racetrack which are jointly owned by Mr T Evans of Marcross and his brother Mr EJ Evans who left the family business some four years ago. This is occupied on an informal basis.

- The land to the north-west of the racing circuit is rented on a long-term Agricultural Holdings Act Tenancy from Robert Thomas Investments and is in arable production, currently maize and wheat. The tenancy is a three-generation tenancy with one generation, Mr T Evans' son, still to run.

- A small field adjoining the wooded area to the west is also owned by Robert Thomas Investments but is tenanted under a 5-year Farm Business Tenancy. This

field is permanent pasture. The two portions of land rented from Robert Thomas Investments amounts to approximately 22 ha.

4.5.5 **Mr Andrew James** farms 10.5 ha of permanent pasture which is grazed by store cattle between April and October. All stock is taken off the four fields over winter and housed in the steel portal-framed building. Three of the fields are owned by Mr James whilst the field to the north-east is owned by his mother and rented on a lifetime tenancy. His mother's land has a narrow strip of woodland alongside the road within which is hardstanding for storage of silage bales and a wooden-framed pole barn which stores straw. Mr James obtained consent some 10 years ago for a bungalow adjacent to the farm building and laid footings for the dwelling some time ago. He currently lives in Bridgend. Mains water is supplied to the building plus three water troughs in fields owned by Mr James. He also rents another 14 ha of grass keep at Pleasant View Farm adjacent to the application site. Mr James has full-time employment off the farm. The bungalow and additional rented grass keep were not mentioned in the KCC report.

4.5.6 **Mr Williams, Garth Grabben Farm**, rents some 9 ha of grassland on an 11-month grazing licence from Messrs Stone who own the adjoining Grove Farm which is also let. He has been a tenant of the land for the past 11 years. The five fields are used for grazing suckler cows and their calves plus a bull. At the time of the site visit there were 21 Hereford suckler cows and their calves running with a Blonde d'Aquitaine bull. There is a small derelict milking shed and a derelict wooden pole barn in the field opening to the road. A water trough is sited adjacent to the derelict building. Garth Grabben Farm is some 15 miles from Llandow and extends to some 121 ha of permanent pasture with a small area of stubble turnips. There are 70 suckler cows with their progeny taken through to finishing and 800 ewes which produce 400 breeding mule ewes for onward sale or retaining in the flock to produce finished lambs. The farm business has become more sheep orientated since the KCC report was written.

4.5.7 **Mr James Ford, Tynycaia Farm** farms a total of 121 ha, 66 ha of which is owner occupied, 14 ha farmed on a 5-year Farm Business Tenancy and with another 31 ha rented as grass keep some 5 miles distant which has been taken on since the KCC report was written. The land within the application site comprises some 15.7 ha split into a block of three adjoining pasture fields and another field to the extreme north-east of the application site laid to stubble turnips which has no water supply. The farm entered in the Tir Gofal environmental scheme three years ago. The farm has increased sheep numbers from 440 to 700 ewes. Suckler cow numbers have been reduced to 30 with the calves finished on the farm or sold as stores. There are a total of 25 ha of wheat, spring barley and a barley/pea mix, with the remainder in grassland. All the utilised farm buildings and farm dwelling are located on the opposite side of Sutton Road to the application site, which also includes some derelict pig sties.

4.5.8 The field adjoining Sutton Road and the railway track, within the application site, has been established with a habitat strip to encourage birds under the Tir Gofal scheme and a woodland area has been established to the extreme north-west of the field. The field to the immediate south has been registered, under the same scheme, as semi-improved grassland which only allows a light grazing and prohibits the application of artificial fertiliser. The remaining field in this block is largely unusable for livestock because it is mostly marsh and readily floods in wetter periods. It is thought that most of the water from the nearby Llandow Trading Estate drains into this field and the adjoining wooded area. RAC is informed that when there is a period of prolonged rainfall, the excess water drains from this field onto the railway track and flows alongside the line, flooding areas in the vicinity of Llandow. The block of land farmed by Mr Ford within the Proposal Site is 25% owned by him with the remainder owned by family members, to whom he pays a rent.

4.6 Agri-Environment Schemes

4.6.1 As mentioned by KCC, only one of the holdings within the application site is entered into an agri-environment scheme. Tynycaia Farm has 15.7 ha under the Tir Gofal scheme, which is the higher level of the agri-environment schemes available to Welsh farmers and pays farmers to improve the environmental and ecological value of their land and preserve areas of archaeological significance. Applications are selected according to the degree of environmental benefit offered.

4.6.2 Each agreement is individual to the farm and this particular agreement has allowed the farmer to undertake a number of capital works involving fencing and tree planting. The stubble from the arable crops has to be left overwinter to encourage birds and other wildlife and a habitat strip comprising various seed producing species has been established alongside the railway line. One field is being traditionally managed to allow it to revert to semi-improved grassland in order to allow a greater diversity of plant and grass species to be re-established, thereby increasing biodiversity. KCC fails to mention that the remaining field is marshland for most of the year with an attendant diversity of plant species which in turn encourages a diversity of insect and bird species. This agreement is in the third year of a 10-year agreement, with a five-year break clause, which ends in 2015.

5. Assessment of Impacts, Mitigation and Residual Effects

5.1 Construction

Loss of Agricultural Land

5.1.1 KCC state that there will be a loss of approximately 84 ha of Subgrade 3b agricultural land. Since KCC determine that there is no 'best and most versatile agricultural land' on the Site, then the loss of the land would be described as "slight adverse." However, KCC have slightly underestimated the area of agricultural land and the grade of that land and consequently the weight to be placed on the loss of such land must be significantly greater than stated in the KCC appraisal. The proposed development will involve the permanent loss to agricultural use of approximately 88.5 ha out of a total area within the Proposed Site of 187.5 ha. This equates to approximately 47% of the Site.

Mitigation

5.1.2 KCC propose that two of the farmers could purchase or rent additional land in the area to replace any land lost to the proposed development. Whilst this may be appropriate, it would be impossible for Mr Ford, Tynycaia Farm to replace land which is in close proximity to the farm buildings. In addition he would only receive 25% of any compensation due to the nature of the land ownership. This would hinder his ability to purchase replacement land in the vicinity. He is therefore left with the less flexible option of renting extra land.

5.1.3 Whilst it is possible for all the farmers to rent or purchase extra land in the area, it is likely that the rent will increase due to the extra demand. In addition, there is no guarantee that land will become available to suit requirements in either quantity or quality.

5.2 Loss of Soil Resources

5.2.1 In the conclusion of their report KCC state "*little weight need be afforded to the loss of this poor quality agricultural land."* RAC's soil analysis shows a significant area (c.51 ha) of Subgrade 3a agricultural land, which far from being "*poor quality*" is considered to be best and most versatile land. The weight afforded to the loss of this land should therefore be greater.

Mitigation

5.2.2 Since KCC consider that the soil is of poor quality it does not suggest any mitigation measures.

Residual Effects

5.2.3 Since KCC consider the land at the former airfield is of low quality it does not regard the loss of the land to be any other than of minor significance. However, Subgrade 3a land is relatively uncommon in Wales and the loss of 51.5 ha of such land is to be considered as of **major significance**.

5.3 Loss of Farm Holdings

5.3.1 The proposed development will involve the loss of land from the holdings depicted in Table 4. Tynycaia Farm has rented extra land since the KCC report was written hence the reason that the KCC report states that 17% of the farm will be lost.

Table 4: The Likely Effect of the Proposal Upon the Farms within the Site

Farm/Holding	Current size (ha)	Land in Proposal Site (ha)	% of holding land lost
James, Sutton Road	10.5	10.5	100
Marcross Farm	140-160	53.4	33-38
Garth Grabben Farm	121	9	7.4
Tynycaia Farm	121 (66 owned)	15.7	13 (23.8 of owned land)

5.3.2 KCC assess the loss of land to a farm business in a slightly different manner to RAC. The main difference is KCC's notion that the loss of a part-time holding is, at worst, a slightly adverse impact upon the farm business. RAC considers that the likely effects of the proposed development upon the agricultural businesses can be assessed against the following criteria, which have been tested many times at public inquiry:

Table 5: Significance Criteria for Effects Upon Farm Holdings

Significance	**Definition**
Major adverse	The impact of the proposal would be likely to render the whole farm non-viable
Moderate adverse	The viability of the unit or enterprise should not be threatened, but significant changes in the day-to-day management may be required
Minor adverse	The viability of the unit or enterprise is not threatened: minor changes would be required of the enterprise, and the type and range

Significance	Definition
	of enterprise is unaffected
Neutral	The financial impact would be insignificant in relation to net farm income, and no alteration to the farming system would be needed to absorb the physical impact
Beneficial	The potential viability of the unit or enterprise could be enhanced by, for example, an increase in the area of land farmed, a reduction to severance, or the removal of traffic from access routes

5.3.3 This table must be qualified to take account of situations where large proportions of a farm business are lost or where some of the land has been severed from the main holding, making accessibility a problem with a consequence of having to significantly change the existing farm system to accommodate the change in accessibility. Likewise, allowances need to be made for likely changes to the economic impacts of proposed developments.

5.3.4 The magnitude of change has been identified as high for Mr James' holding. The loss of the entire holding will have a major effect upon his business and can be described as being a **major adverse** impact. The proposed development will mean that he also loses his cattle building and handling facilities. It would clearly not be a slight adverse impact as suggested in the KCC report since the whole farm will disappear under the proposed development.

5.3.5 The loss of at least a third of the land farmed by Marcross Farm will have a significant effect upon the farm business. The farm will have to grow less arable crops or rent extra land to replace the lost fields. Whilst the land is some 3 miles from Marcross Farm, which would not allow daily access by the dairy herd, its loss will have significant financial effects for the business. The loss of the arable land will mean that extra straw will need to be purchased; extra manure will need to be spread on the grassland at Marcross Farm which could potentially lead to groundwater contamination problems and the cost of changing the housing system from a straw-based one to cubicles to reduce the amount of straw required. The change to a cubicle system is already in progress. Mr Evans anticipates that he will be able to retain the cow numbers at the present level but predicts that he may need to rent in extra land to satisfy requirements. This would be another additional cost which could be increased if the other three farmers on the application site are also looking for other land to rent to replace lost fields.

5.3.6 The Site Proposal would have a **moderate adverse** effect on the business at Marcross Farm due to the loss of a large proportion of the farmland and the attendant financial implications. However, it is anticipated that the business will be able to continue functioning. This is in agreement with the KCC assessment.

5.3.7 Garth Grabben Farm will lose approximately 7.4% of its available land. Since the land is approximately 15 miles from the main farm and the land is used by a small proportion of the holding's cattle, it is unlikely to have a major effect upon the functioning of the farm. Since the fields are held on a grazing licence, there is no security of tenure. Mr Williams will be aware that his tenure could have been ceased at any time over the last 11 years and presumably would have made contingency measures for this event.

5.3.8 The Site Proposal would have a **minor adverse** effect on the business at Garth Grabben Farm as agreed with KCC.

5.3.9 Tynycaia Farm is likely to lose 23.8% of the owned land to the proposed development. This land is in close proximity to the farm buildings and consequently is likely to have a major effect upon the farm business. The stock numbers will need to be reduced and the farm will become less versatile. Mr Ford will have the option of renting extra land but this will, inevitably, be further away than the land in the application site and he could be competing against other farmers on the application site who may also be looking for land to rent to replace lost fields.

5.3.10 RAC and KCC agree that the Site Proposal would have a **moderate adverse** effect on the business at Tynycaia Farm.

Mitigation

5.3.11 KCC acknowledge that the proposals would result in the loss of Mr James' holding off Sutton Road, but do not suggest any mitigation measures. It can only be assumed that they believe that he will either rent or buy replacement land. RAC understands that he wishes to remain farming and this is why he has taken on extra land in the neighbourhood on a grass keep basis. Other than financial compensation to the current owners and tenants, there is no effective mitigation available for the loss of farm holdings. Since the land farmed by Garth Grabben Farm is tenanted on a short-term basis, it is unlikely that there will be any compensation for its loss to the tenant.

5.3.12 The proposed development would not involve the severing of any land on the four holdings.

Residual Effects

5.3.13 KCC consider that the effects upon the four holdings will be direct and permanent and be of **slight to moderate adverse** significance following the implementation of mitigation measures. Whilst agreeing with KCC on most of the conclusions, RAC considers that the loss of Mr James holding would be a **major adverse** effect rather than the slight adverse effect proposed by KCC.

5.4 Loss of Land in Agri-Environment Schemes

5.4.1 The proposed development will directly affect one block of land within the Tir Gofal agri-environment scheme at Tynycaia Farm. The land entered into the Tir Gofal scheme with specific agreements will be lost. KCC fails to mention that, under such circumstances, the grants which have been paid over the agreement period will have to be repaid, possibly with interest, and all the wildlife benefits accrued will be lost.

6. Summary

6.1.1 The agricultural land on the application site is classified as entirely Subgrade 3b (i.e. moderate quality) agricultural land or lower by KCC, but the verification survey conducted by RAC indicates that a significant portion of the site should be classified as Subgrade 3a, good quality agricultural land. Some 51 ha or 57% of the agricultural land on the site may be of best and most versatile quality, and consequently the impact is likely to be **major adverse**. Conversely, KCC consider the land at the Site to be of poor quality and consequently of minor significance with an attendant minor adverse impact.

6.1.2 The analysis of the four potentially affected farms is broadly similar under the RAC and KCC surveys. However, RAC considers that the loss of the entire holding owned by a part-time farmer off Sutton Road would have a major adverse impact upon the business. The farm is obviously trying to expand by taking on extra rented land in the neighbourhood and the proposals would jeopardise the business.

6.1.3 The land in the middle of the race track is farmed by Mr T Evans of Marcross Farm whereas KCC state that it is used by the racetrack for non-agricultural purposes.

6.1.4 The land farmed by Mr Ford is entered in to a Tir Gofal agri-environment agreement. One of the fields is being converted to semi-improved grassland whilst another is very wet and unusable for large periods of the year. KCC fails to mention that the latter field drains onto the railway line in exceptional weather since there is a lack of other options for the surplus water to drain away.

6.1.5 The land farmed by Mr Ford, Tynycaia Farm within the application site is only partially owned by him and so any compensation paid would not present him with the ability to purchase as much land as intimated in the KCC report. Also any land purchased would be much more inconvenient than the land opposite the farmstead which would be taken under the proposed development.

7. References:

1 European Commission (EC) (2006). *Soil Thematic Strategy* (COM (2006) 231).

2 EC (2006). *Proposal for a Soil Framework Directive* (COM (2006) 232).

3 Welsh Assembly Government (2006). Environment Strategy for Wales.

4 Welsh Assembly Government (2006). Environment Strategy for Wales First Action Plan.

5 Welsh Assembly Government (2002). Planning Policy Wales.

6 Welsh Assembly Government (2000). Technical Advice Note (TAN) 6: Agricultural and Rural Development.

7 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.*

8 Ministry of Agriculture, Fisheries and Food (1977). 1:250,000 scale provisional ALC Map – Wales.

9 Crampton, C. B. (1972). Soils of the Vale of Glamorgan. SSEW Harpenden, accompanying monograph to Sheets 262 and 263.

10 http://www.llandownewydd.co.uk/project/index.html

11 SSEW 1969. 1:63,360 scale Soil Map: Sheet 262 - Bridgend.

12 METEOROLOGICAL OFFICE (1989). Climatological data for Agricultural Land Classification.

Appendix 1: Soil Laboratory Analytical Data

Laboratory analytical data

Determinand	Site 2	Site 3	Site 5	Site 6	Site 8	Site 9	Units
Sand 2.00-0.063mm	22	19	23	18	26	19	% w/w
Silt 0.063-0.002mm	49	48	49	52	45	50	% w/w
Clay <0.002mm	29	33	28	30	29	31	% w/w
Texture	HCL	HZCL	HCL	HZCL	HCL	HZCL	

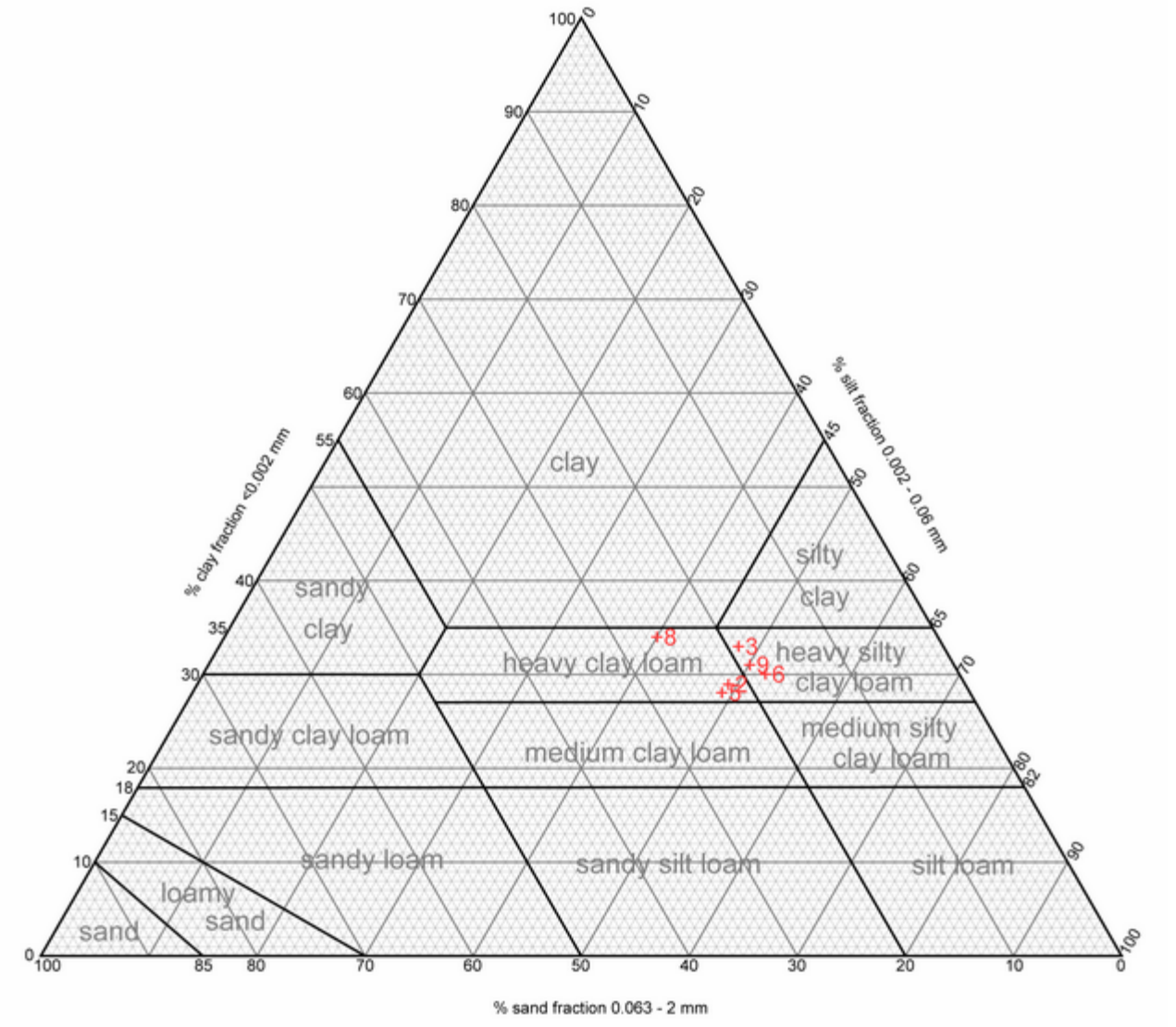
HCL – heavy clay loam

HZCL – heavy silty clay loam

Determinand	Site 2	Site 3	Site 5	Site 6	Site 8	Site 9	Units
Soil pH	7.9	7.5	8.0	5.9	6.1	7.0	
Phosphorus (P)	35	43	46	10	7	11	mg/l (av)
Potassium (K)	229	238	289	50	74	52	mg/l (av)
Magnesium (Mg)	77	157	64	91	113	111	mg/l (av)

Determinand	Site 2	Site 3	Site 5	Site 6	Site 8	Site 9	Units
Phosphorus (P)	3	3	4	1	0	1	ADAS index
Potassium (K)	2+	2+	3	0	1	0	ADAS index
Magnesium (Mg)	2	3	2	2	3	3	ADAS index

Figure A1.1: Limiting percentages of sand silt and clay fractions for particle-size class



Appendix 2: Ston Easton Series

From: Crampton 1972.

CHAPTER III

Brown Earths and Calcareous Soils

BROWN EARTHS

These soils are the most extensive in the Vale and are distributed among the subgroups shown below.

TABLE 7

Brown Earths: Subgroups and Soil Series

Subgroup	*Series*
Sols bruns calcimorphes	Ston Easton Lulsgate Wenvoe
Sols bruns acides	Radyr Castleton Neath Eardiston Ruthin
Sols lessives	Nordrach Tickenham Stormy Down Bromyard
Gleyed brown earths	Worcester Sigingstone Tynings Miskin Middleton Marshfield

SOLS BRUNS CALCIMORPHES

Non-calcareous soils above limestone at moderate or shallow depths and lacking marked textural B horizons are distinguished in France as *sols bruns calcimorphes.* They are represented in Glamorgan by soils of the Lulsgate and

Wenvoe series over Carboniferous Limestone and limestone conglomerate, and by the Ston Easton series over Lower Lias limestone.

STON EASTON SERIES

Formerly described as the Glamorgan series (Robinson and Hughes 1936) the well drained silty clay loams of moderate depth over Lower Lias limestone interbedded with shales are now correlated with the Ston Easton series of Somerset (Findlay 1965). They occupy much of the coastal belt of Lower Lias rocks west of Barrywhere shales diminish in the succession (Frontispiece). The parent material is of mixed origin, only part being from the strata below; foreign stones are contributions from Irish Sea drift and mineralogical analyses (Crampton 1961) suggest some addition of aeolian material carried from the coastal sands. Calcium carbonate is absent from the fine earth of most profiles though limestone fragments can occur throughout.

The mapping unit includes a range of soils similar to that described in the Ston Easton-Somerton complex of the Mendip flanks (Find lay 1965). The predominant Ston Easton soils are seldom deeper than 60 cm and have dark greyish brown A horizons above yellowish brown B horizons with a tendency for the clay content to increase in the subsoil. More definite textural B horizons are developed)n pockets of deeper soils or where Ston Easton soils grade into the Nordrach series. Inclusions of shallow, more clayey, calcareous soils correlated with the Somerton series (Findlay 1965) occur locally as do shallow, clayey non-calcareous soils, regarded as Ston Easton-Somerton intergrades. Both are commoner in the east where the soils generally have a higher clay content and some are transitional to gleyed brown earths of the Sigingstone series. Variation in the series near Llantwit Major is reflected in the detailed map of Rosedew Farm where three phases are distinguished (Fig. 7). The soils are shallower on ridge crests and less silty near the cliffs to the west of the farm where more coarser textured wind-blown material has been incorporated (Crampton 1961).

The soils are of considerable agricultural value and have a history of arable and pasture farming to before Roman times (p. 57). Inland the soils are used for mixed farming with an emphasis on dairying, more corn being grown in the coastal areas of lower rainfall. Because of their fine texture a good tilth is difficult to obtain after wet weather, particularly on the more clayey soils of the east. Crops grown in Ston Easton soils are amongst the most susceptible in the region to damage from wireworms, larvae of the click beetle *(Agriotes* spp.), when old pastures are ploughed (Fig. 8).

The four profiles given below to illustrate the mapping unit were selected from ten sampled and described in detail. Of the two Ston Easton profiles the first has a neutral reaction and no suggestion of a textural B horizon, and the second is deeper, slightly acid and has an increase in clay content above the rock. Profile ST 17/6344 of the Somerton series is shallower, more clayey and calcareous while ST 06/9675 is representative of intergrades between the two series which are clayey but non-calcareous. The last two profiles are both in the east of the Vale.

Descriptions of representative profiles

PROFILE NO.: SS 96/9372, Ston Easton series; (analysis p. 76).

Location/: Boverton Farm, Llantwit Major (grid ref. SS 993672).

Slope: level. *Altitude:* 45 m (150 ft) O.D.

Land use: arable.

Horizons:

cm	
0-33 Ap	Dark greyish brown (10 YR 4/2) silty clay loam with limestone fragments; blocky structure; labile; abundant roots; earthworms present; merging boundary.
33-43 B	Yellowish brown (10 YR 5/4) silty clay loam with limestone fragments; blocky structure; labile; roots common; worm channels common containing material from above; sharp boundary.
43+ C	Shale.

PROFILE NO.: SS 97/7413, Ston Easton series; (analysis p. 76).

Location/: Sigingstone, 3 miles SSW of Cowbridge (grid ref. SS 974713).

Slope: level. *Altiude:* 80 m (260 ft) O.D.

Land use: ley pasture.

Horizons:

cm	
0-20 Ap	Dark greyish brown (10 YR 4/2) silty clay loam; friable to labile; subangular blocky structure; abundant roots; earthworms; limestone fragments; merging boundary.
20-38 Bl	Yellowish brown (10 YR 5/4) silty clay loam; labile; medium blocky structure; roots and earthworms, with organic matter in channels; limestone fragments; merging boundary.
38-60 B2t	Yellowish brown (10 YR 5/4) silty clay loam to silty clay; labile; medium blocky structure; roots; earthworms; many limestone fragments; sharp boundary.
60+ C	Shattered limestone.

PROFILE NO.: ST 17/6344, Somerton series; (analysis p. 76).

Location: Yniston Farm, Leckwith (grid ref. ST 163744).

Slope: level. *Altitude:* 65 m (220 ft) O.D.

Land use: ley pasture.

Horizons:

cm	
0-20 Ap	Dark grey (10 YR 4/1) (dry) silty clay loam; blocky structure; hard; abundant roots; merging boundary.
20-30 B	Light yellowish brown (10 YR 6/4) (dry) clay; stony with small limestone fragments; blocky structure; hard; sharp boundary.
30+ C	Lias limestone.

PROFILE NO.: ST 06/9675, Ston Easton-Somerton intergrade; (analysis p. 76).

Location: Mill Wood, W of Barry (grid ref. ST 096675).

Slope: 2°. *Aspect:* SSE. *Altitude:* 60 m (200 ft) O.D.

Land use: oak woodland.

Horizons:

cm	
4-0 L,F,H	Litter layer, merging into amorphous organic matter; snails; earthworm larvae; saprophytic nematode larvae; wood-lice; narrow boundary.
0-15 A	Very dark brown (10 YR 2/2) clay; labile; subangular blocky structure; abundant roots; earthworms; merging boundary.
15-30 B	Yellowish brown (10 YR 5/4) clay; labile; medium blocky structure; many roots and some earthworms, with organic matter in channels; some small limestone fragments; sharp boundary.
30+ C	Weathered limestone.

Appendix 3: Table 6 from MAFF (1988)

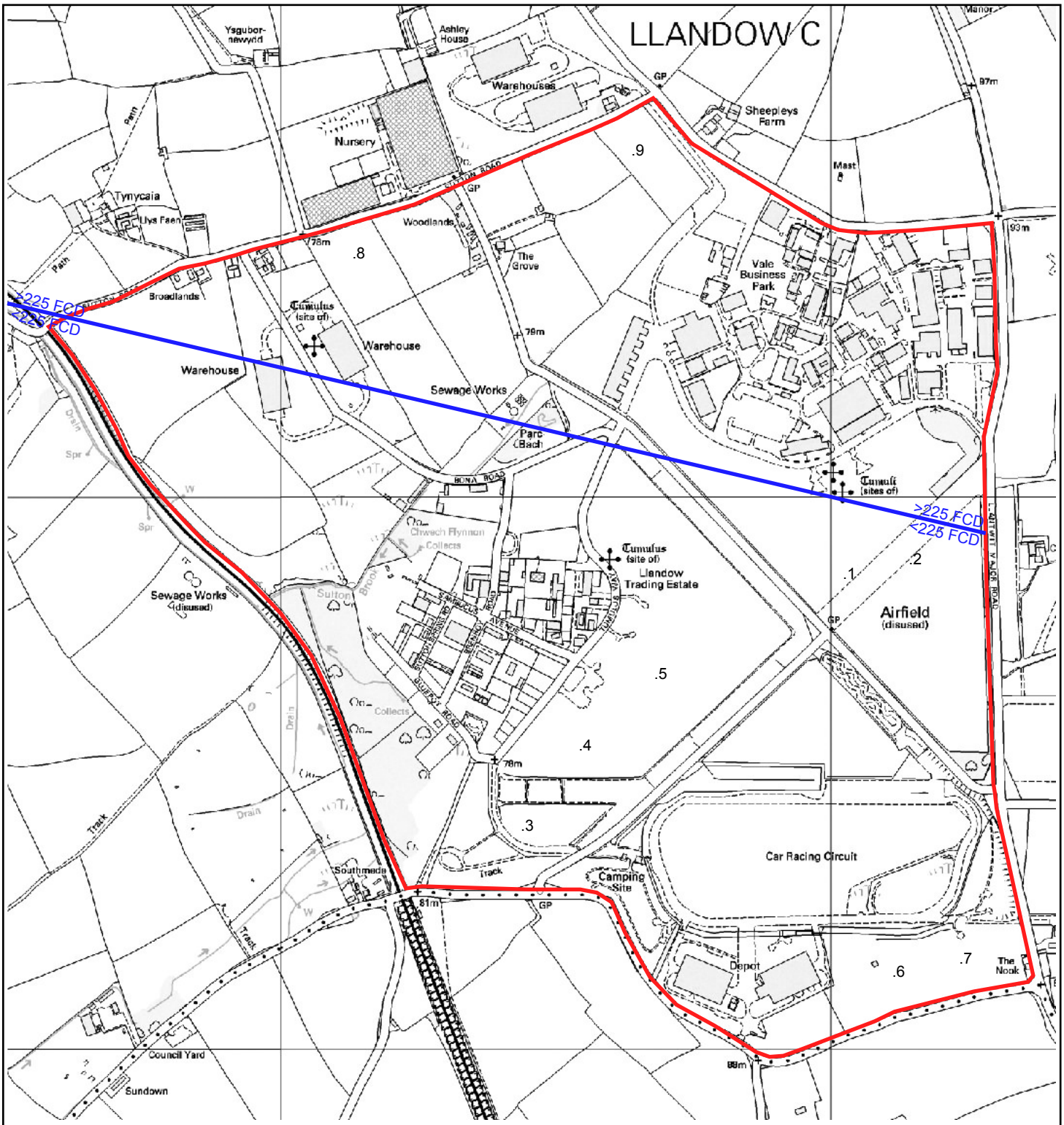
Table 6 Grade according to soil wetness -mineral soils

Wetness Class	Texture[1] of the top 25 cm	Field Capacity Days				
		<126	126-150	151-175	176-225	>225
	S[2] LS[3] SL SZL	1	1	1	1	2
	ZL MZCL MCL SCL	1	1	1	2	3a
I	HZCL HCL	2	2	2	3a	3b
	SC ZC C	3a(2)	3a(2)	3a	3b	3b
	S[2] LS[3] SL SZL	1	1	1	2	3a
	ZL MZCL MCL SCL	2	2	2	3a	3b
II	HZCL HCL	3a(2)	3a(2)	3a	3a	3b
	SC ZC C	3a(2)	3b(3a)	3b	3b	3b
	S[2] LS SL SZL	2	2	2	3a	3b
	ZL MZCL MCL SCL	3a(2)	3a(2)	3a	3a	3b
III	HZCL HCL	3b(3a)	3b(3a)	3b	3b	4
	SC ZC C	3b(3a)	3b(3a)	3b	4	4
	S[2] LS SL SZL	3a	3a	3a	3b	3b
	ZL MZCL MCL SCL	3b	3b	3b	3b	3b
IV	HZCL HCL	3b	3b	3b	4	4
	SC ZC C	3b	3b	3b	4	5
	S LS SL SZL	4	4	4	4	4
	ZL MZCL MCL SCL	4	4	4	4	4
V	HZCL HCL	4	4	4	4	4
	SC ZC C	4	4	4	5	5
Soils in Wetness Class VI -Grade 5						

[1] For naturally calcareous soils with more than 1 % $CaCO_3$ and between 18% and 50% clay in the top 25 cm, the grade, where different from that of other soils, is shown *in brackets* (see page 11).

[2] Sand is not eligible for Grades 1, 2 or 3a (see page 11).

[3] Loamy sand is not eligible for Grade 1 (see page 11).



NORTH

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Scale 1: 10,000 01/Oct/08

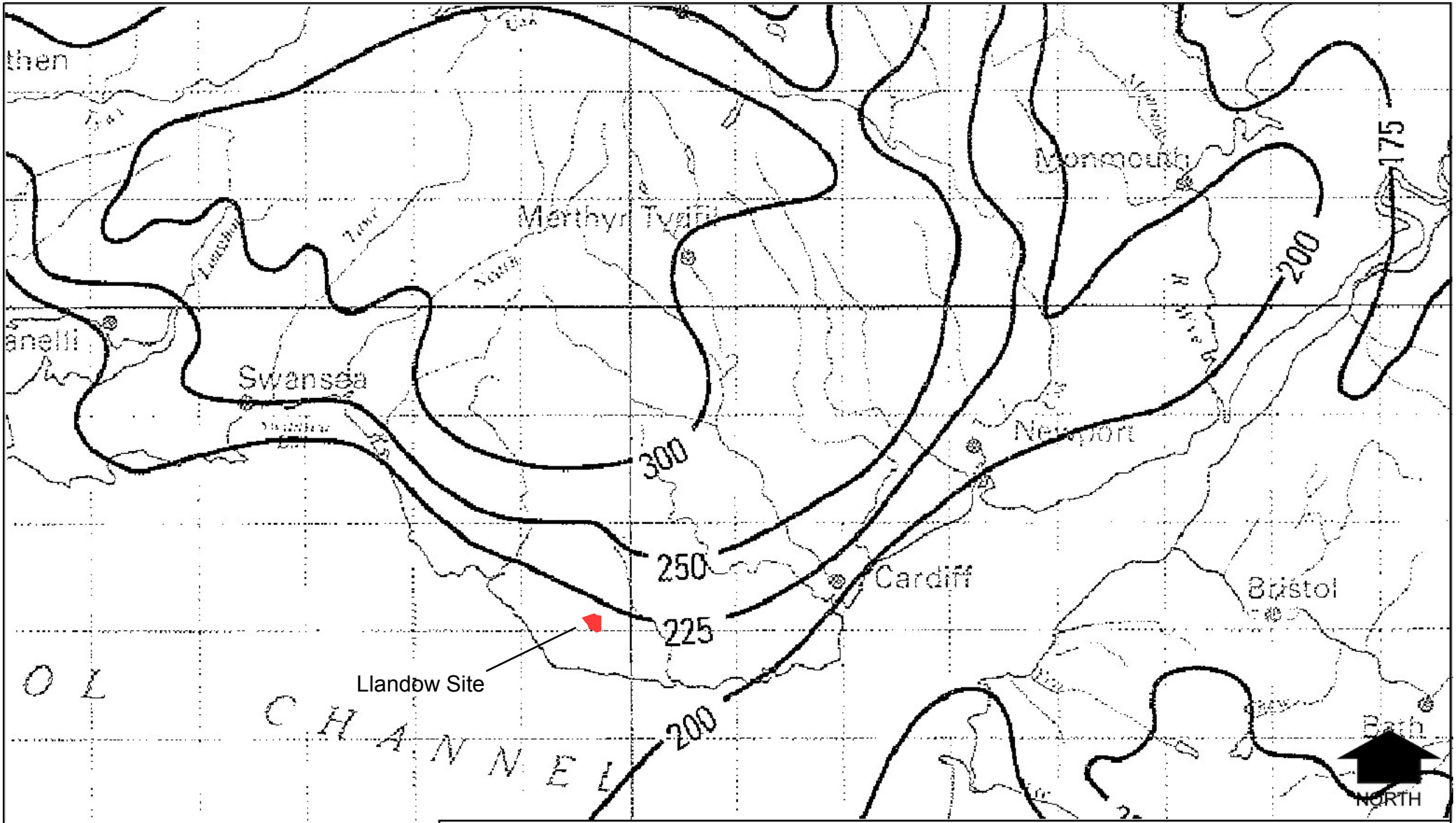
Figure RAC 1: Location of Observations and 225 FCD Line

Site: Llandow New Settlement

Client: Vale of Glamorgan

Reading Agricultural Consultants

 Races Farm, Aston Street, Aston Tirrold, Didcot, Oxon. OX11 9DJ Tel. 01235 851515 Fax. 01235 851511 www.readingagricultural.co.uk



Original map by Jones and Thomasson, SSLRC (1985)

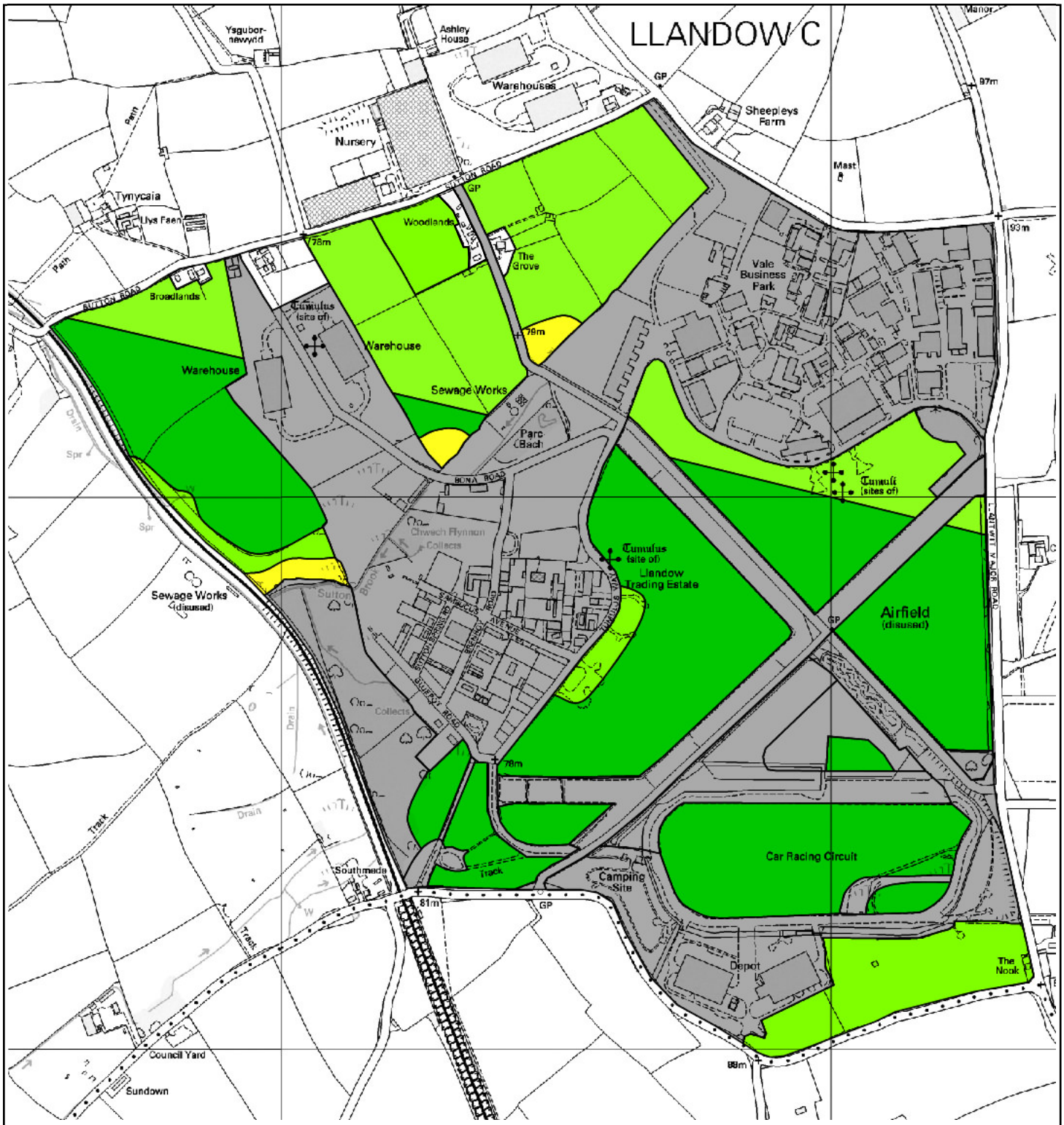
Scale 1: 500,000 01/Oct/08

Figure RAC 2: Extract of 1:1 million FCD map

Site: Llandow New Settlement

Client: Vale of Glamorgan Council

Reading Agricultural Consultants



	Grade 1 - excellent quality		36 ha	Subgrade 3b - moderate quality
	Grade 2 - very good quality	Best and most versatile land	1.5 ha	Grade 4 - poor quality
51 ha	Subgrade 3a - good quality			Grade 5 - very poor quality
	Not Present		99 ha	Non-agricultural
			2 ha	Not Surveyed

NORTH

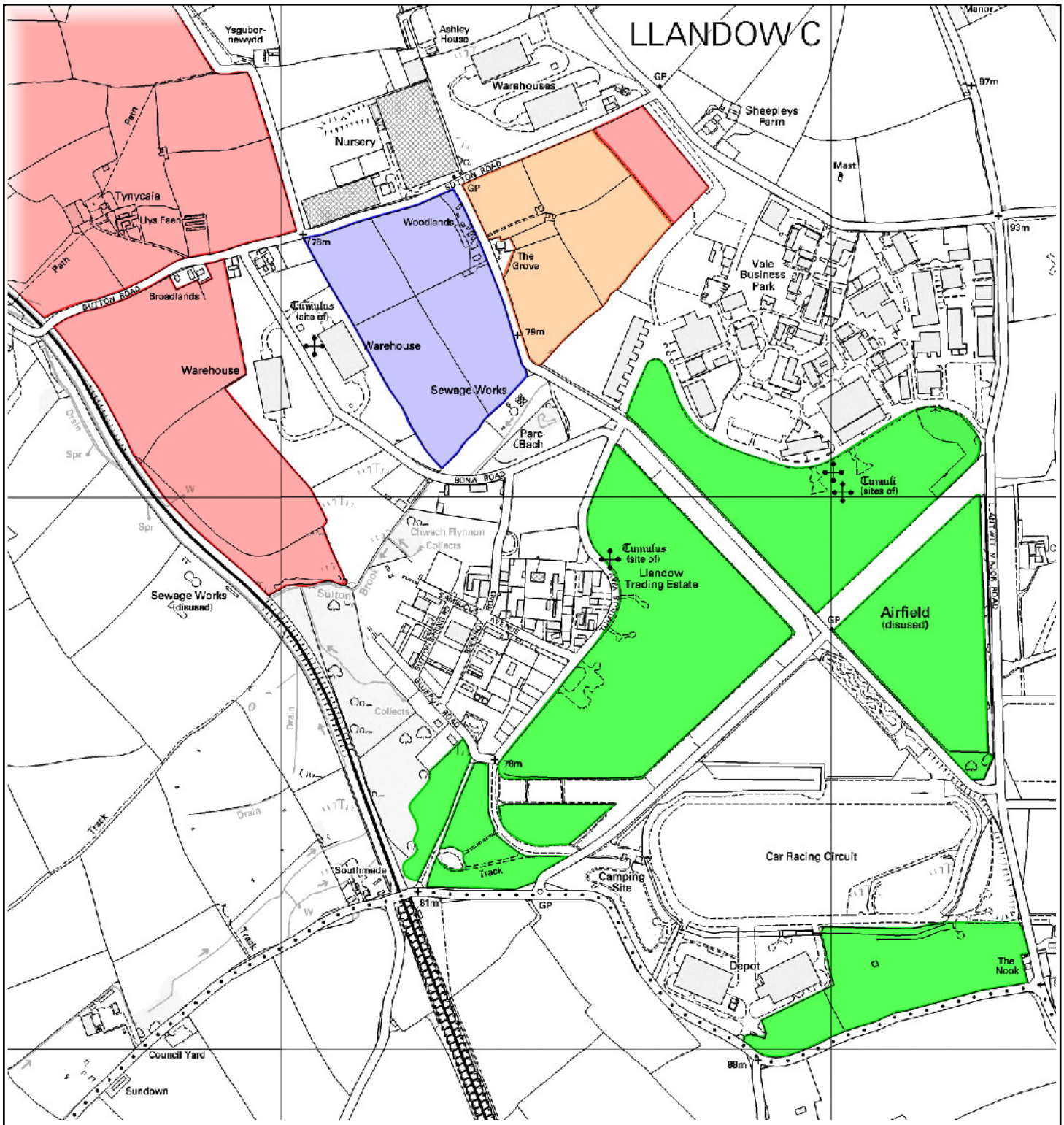
Scale 1: 10,000 01/Oct/08

Figure RAC 3: Suggested ALC Grade

Site: Llandow New Settlement

Client: Vale of Glamorgan

Reading Agricultural Consultants



Scale 1: 10,000 01/Oct/08

Figure RAC 4: Farm Holdings

Site: Llandow New Settlement

Client: Vale of Glamorgan