Chapter 8

LAND USE AND AGRICULTURE

8

8 Land use and agriculture

Introduction

8.1 Terence O'Rourke Ltd undertook the assessment of overall land use impacts and Richard Stock undertook the assessment of agriculture impacts. The findings of the agriculture assessment are summarised in this chapter and the full report is included as technical appendix F. The references and data sources used in the assessment are shown in table 8.1.

Defra, 2009, Safeguarding our Soils – A Strategy for England
Defra, 2009, Construction Code of Practice for the Sustainable Use of Soils on Construction Sites
Department for Communities and Local Government, 2012, National Planning Policy Framework
MAFF, 2000, Good Practice Guide for Handling Soils
MAFF, 1988, Agricultural Land Classification of England and Wales. Revised Guidelines and Criteria for Grading the Quality of Agricultural Land
Natural England, 2012, Technical Information Note TIN 049 Agricultural land classification: protecting best and most versatile land
South Cambridgeshire District Council, 2013, Proposed Submission Local Plan
South Cambridgeshire District Council, 2007, Development Control Policies Development Plan Document
Table 8.1: References and data sources

Legislation and policy

National policy

8.2 The National Planning Policy Framework (NPPF; 2012) sets out a number of relevant policy statements in relation to land use and agriculture. Paragraph 75 states that *"planning policies should protect and enhance public rights of way and access"*, while paragraph 112 states that *"local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality."*

8.3 Paragraph 109 of the NPPF puts the protection and enhancement of soils as a priority in the conservation and enhancement of the natural environment. The inherent quality of soil, as distinct from its agricultural value, is recognised in the government's *Safeguarding our Soils – A Strategy for England* (2009), which seeks to encourage the more sustainable management of soil resources.

8.4 Defra also published the *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites* in 2009. This is a practical guide to assist the construction industry in protecting soil resources and achieving good soil management at all stages of the construction process.

Local policy

8.5 Policy NE/17 of South Cambridgeshire District Council's adopted Development Control Policies Development Plan Document (2007) relates to the protection of high quality agricultural land. It states that planning permission for development that would lead to the irreversible loss of best and most versatile agricultural land will not be granted unless the land is allocated for development and

sustainability considerations and the need for development are sufficient to override the need to protect the agricultural value of the land.

8.6 Emerging policy is provided by the council's Proposed Submission Local Plan (2013). Policy NH/3 Protecting Agricultural Land is similar to the adopted policy NE/17 discussed above.

Methodology

Baseline

8.7 A desk-based study was undertaken by Terence O'Rourke Ltd to establish the existing land uses on the application site. A detailed soil and agricultural land classification survey of the application site has been undertaken by Richard Stock, including 241 auger borings, 11 soil pits and nine topsoil samples for laboratory analysis of soil texture[1]. The characteristics assessed for each auger boring and soil pit include soil texture, depth, colour and stoniness, with observations on consistency, rock type and the presence of roots also recorded. Moisture balance calculations were made on 70 representative soil profiles to confirm if soil droughtiness is a limiting factor.

8.8 The sampling was carried out in accordance with Natural England's (2012) Technical Information Note TIN 049 *Agricultural Land Classification: protecting best and most versatile land.* The assessment of agricultural land quality was undertaken in accordance with the former Ministry of Agriculture, Fisheries and Food's (MAFF, 1988) *Agricultural Land Classification of England and Wales. Revised Guidelines and Criteria for Grading the Quality of Agricultural Land.*

8.9 The agricultural land classification system 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 may affect the range of crops that can be grown, the level of yield, the consistency of yield and the cost of obtaining it. The main factors influencing agricultural production are climate, site and soils. These factors result in varying degrees of constraint on agricultural production and the grade or subgrade of the land is determined by the most limiting factor present. The grades and subgrades are described in table 8.2. Grades 1, 2 and 3a are collectively classed as 'best and most versatile agricultural land'.

[1] It should be noted that the sampling was undertaken on a wider survey area than is now included within the application boundary.

Grade	Definition
1: Excellent quality	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
2: Very good quality	Land with minor limitations that may 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
3: Good to moderate quality	Land with moderate limitations that 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	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	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 that can be grazed or harvested over most of the year
4: Poor quality	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
5: Very poor quality	Land with severe limitations, which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops

Table 8.2: Agricultural land classification grades (MAFF, 1988)

8.10 The importance of the identified land uses has been classified using the criteria in figure 8.1.

Impact assessment

8.11 The impact assessment identified potential effects that may arise as a result of the proposed development. The following issues were considered:

- The quantity and quality of agricultural land that would be affected
- Sustainable use of soil resources
- Impact on agricultural holdings
- Loss of existing land uses and provision of new land uses

8.12 The potential for effects on land uses off site was scoped out of the assessment, as it was considered that a development of the nature and scale proposed would not affect surrounding land uses. Therefore, only on site land uses are considered in this chapter. The potential for effects on agricultural production at the regional, national and global levels is examined in the community, social and economic effects assessment in chapter 5.

8.13 There are no standard significance criteria for assessing effects on land use and agriculture, so the significance of effects has been determined using criteria developed from best practice techniques and expert knowledge. Measures of receptor importance and the magnitude of change, as shown in figures 8.1 and 8.2, were combined to determine the degree of effect using the matrix shown in figure 8.3. The degree of effect was then used to determine whether the effect

was significant. Effects that are moderate or above are considered to be significant in EIA terms.

8.14 It should be noted that, in the absence of a good practice assessment framework, no attempt has been made to quantify the magnitude of effect on soils. These effects were instead addressed by reference to Defra's (2009) *Code of Practice for the Sustainable Use of Soils on Construction Sites* and MAFF's (2000) *Good Practice Guide for Handling Soils.*

Baseline

Land uses on the application site

8.15 The principal land use on the application site is agriculture. A small parcel of land to the west of Hinxton Grange and north of the avenue is currently grassland, which is used for grazing sheep, horses and llamas. This area forms the parkland setting of Hinxton Grange and does not form part of a farm business. The only other non-agricultural elements on site are access tracks and areas of planting associated with Hinxton Grange and sections of several roads that fall within the application boundary.

Soils and agricultural land

8.16 The application site has been classified in accordance with the criteria contained in MAFF's (1988) guidance. A breakdown of the individual grades on site is set out in table 8.3 and shown on figure 8.4. Approximately 49% of the site is classified as best and most versatile agricultural land, with a relatively even split between grade 2 and subgrade 3a.

Grade	Area	Percentage of site
Grade 2	24	22.1%
Subgrade 3a	29	26.6%
Subgrade 3b	38	34.9%
Grade 4	9	8.2%
Non-agricultural	9	8.2%
Total	**109**	**100%**

Table 8.3: Agricultural land classification of the application site
Note: Figures are rounded

8.17 The dominant soil profile across the site typically comprises medium loamy topsoil (medium clay loam, sandy clay loam and medium sandy loam) overlying similar texture upper subsoil over rubbly chalk drift, which overlies hard chalk at variable depths. In general, the soils are only very slightly stony at the surface, comprising mainly medium small rounded chalk and subangular flints.

8.18 On this site, the grade is not limited by climate, site or soil and the land is free draining. The principal limitation relates to droughtiness, which is largely defined by the depth and texture of the soil layers over hard chalk. Where topsoil is directly over hard chalk, the land is classified as grade 4. In general, where there is a shallow depth of upper subsoil over hard chalk, or a greater depth of weathered chalk, the land is grade 3b. Where the topsoil and upper subsoil are at least 55 cm deep, the land is grade 3a and where these are deeper than around 75 cm the land is grade 2.

Agricultural holdings

8.19 The majority of the land on the application site is owned and farmed by Russell Smith Farms. There is a cluster of smaller ownerships around Hinxton Grange. All the agricultural land on site is used to conduct agricultural trials on a rotational basis.

Importance of land uses

8.20 The identified land uses, and their importance according to figure 8.1, are set out in table 8.4.

Receptor	Importance
Best and most versatile agricultural land (grades 2 and 3a)	High
Grades 3b and 4 agricultural land	Low
Farm business	Medium
Access tracks	Low
Parkland area and landscape planting	Low
Roads	Low to medium
Table 8.4: Land use receptor importance	

Future baseline

8.21 In the absence of the proposed development, the site is likely to remain in its current agricultural use.

Effects during construction

8.22 Construction effects will primarily relate to the progressive loss of agricultural land within the application site over 10 to 15 years. The footprint of the built development will permanently remove the area from agricultural use and the areas of public open space will also effectively be sterilised from agricultural use. Approximately 10.9 ha of land in the south of the main site will continue in agricultural use and it is proposed that some surplus topsoil could be redistributed over these fields to a maximum of 400 mm, which could improve their agricultural land quality.

8.23 The proposed development will involve the loss of approximately 33 ha of best and most versatile land. With reference to figures 8.1 and 8.2, the loss of the best and most versatile agricultural land will be a large change to a receptor of high importance, leading to a very substantial, significant adverse effect. In addition, approximately 38 ha of lower grade land will also be lost. This will be a small change to a receptor of low importance, leading to slight adverse effect that will not be significant.

8.24 The most valuable soil material is topsoil, which will be preserved. The subsoil, where it exists, will either be lifted and used to reinstate landscape areas or will remain in situ, where it will be used to engineer a platform for construction. Defra's (2009) *Code of Practice for the Sustainable Use of Soils on Construction Sites* identifies this as a recognised soil function. During construction of each phase of development, the topsoil and some subsoil will be lifted from the working area and temporarily stored. Some of the topsoil that is lifted from the development footprint will be used to create the proposed landscaped bunds in the west and south of the main site and the east of the bus / cycle interchange

site. After construction is completed in each phase, additional topsoil and subsoil will be used to create the landscape areas within the built environment.

8.25 Without mitigation in the form of a materials management plan, the soils could be severely damaged or lost through poor practice and unconfined movement of vehicles. The method of soil handling, the soil handling condition and storage can cause structural damage during lifting, transport and storage of soils. Measures to address this potential for damage are set out in the 'mitigation' section below.

8.26 The proposed development will lead to the phased loss of the farmable area from the agricultural land holding, with a consequent impact on income. Russell Smith Farms' total land holding extends to approximately 1,130 ha, so the proposed development will lead to the loss of around 10% of the land holding. The application site and the immediate surrounding area, covering approximately 250 ha, have been used for crop trials for many years on a rotational basis. At the time of the agricultural land survey, approximately 100 ha were let to an outside organisation for crop trial work. The use of an equivalent area for the development of the proposed park for AgriTech will not have any impact on the structure or viability of the farm business, but will increase the farm rental income. Overall, a change of negligible magnitude is predicted to the farm business, leading to a negligible effect that will not be significant.

Effects post-construction

8.27 Post-construction, the proposed development will introduce a new employment land use to the application site in the form of an AgriTech technology park. The intended focus on the development and commercialisation of new technologies to improve efficiency in agriculture and the food chain means that this is considered to be a land use of national importance. The introduction of this new land use will be a change of large magnitude and will lead to a very substantial, significant beneficial effect.

8.28 The proposed development will also introduce new informal public open space, community and bus / cycle interchange land uses to the application site. The introduction of these locally important land uses will be a change of large magnitude and will give rise to a moderate, significant beneficial effect.

Mitigation

8.29 A materials management plan has been developed, focusing on topsoil as the most valuable soil resource. Topsoil and subsoil, as required, will be lifted from the construction footprint and operational areas, such as internal roads for construction traffic and construction compounds, in order to protect it from damage, and will either be used to construct the proposed landscape bunds or stored in designated areas. It will subsequently be used to reinstate the proposed landscape areas, which extend to approximately 10 ha, as required. Surplus topsoil will be spread on the two fields in the south of the main site to increase the topsoil depth to a maximum of 400 mm (limit recommended by Defra, 2009). The topsoil in the proposed green spaces will be protected in situ.

8.30 The materials management plan calculates that all the topsoil retained from the development will be used sustainably on site. It is recommended that a detailed trial pitting survey be undertaken in advance of each phase of development. This will establish the precise depths and textures of the topsoil and subsoil that will be encountered, which can be used to determine the soil requirements for each phase of development. It will identify any topsoil surplus, which can be made available for additional use on the retained agricultural land.

8.31 It is envisaged that the subsoil on site will predominantly remain in situ and will fulfil a recognised soil function in providing a platform for construction. The subsoil in operational areas will be managed to ensure as far as possible that it is protected from loss or damage and will be used to reinstate areas where the indigenous subsoil is absent or sparse.

8.32 Soils will be handled using hydraulic excavators, articulated dump trucks and low ground pressure bulldozers. This equipment will be used in accordance with MAFF's (2000) *Good Practice Guide for Handling Soils* (version 04/00), with particular reference to the following:

- Sheet 1: Soil stripping with excavators and dump trucks
- Sheet 2: Building soil storage mounds with excavators and dump trucks
- Sheet 3: Excavation of soil storage mounds with excavators and dump trucks
- Sheet 4: Soil replacement with excavators and dump trucks
- Sheet 14: Building soil storage mounds with bulldozers and dump trucks (to allow the option of constructing the topsoil stores with a bulldozer where the tracks are able to apply light pressure to the store surface, discouraging infiltration of surface water and slumping of the silty soil types)
- Sheet 19: Soil decompaction with bulldozer drawn tines (to allow for decompaction of the soil bund footprints, if required, and to loosen the underlying chalk before soil reinstatement)

8.33 Site traffic will only travel on internal roads, which will be prepared by lifting the topsoil and, where required, the subsoil. Topsoil and subsoil will be stored on adjacent land and reinstated on completion of construction work after the underlying chalk has been loosened. This measure will protect the soil structure in the landscape areas to maintain soil functions. Soils will only be handled, where practicable, when they are in a dry and friable condition, which is when they are least susceptible to lasting damage by compaction and smearing. It is anticipated that appropriate conditions will be based on soil and weather criteria.

8.34 Topsoil and, where applicable, subsoil will be stored to maximum heights of 3 m and 5 m respectively. Soil types will be stored 'like on like', i.e. topsoil on topsoil and subsoil on subsoil. Therefore, the footprint of subsoil stores will be prepared by first lifting and separately storing the topsoil. The soil stores will be built with a slightly convex top, to shed surface water, and stable side batters. Soil stores that are to remain in situ for more than three months will be seeded with a low maintenance grass seed mix. The stores will be managed by cutting at least three times per year and, if growth is excessive, the arisings will be

removed. Weed growth will be controlled by cutting or spraying with approved herbicide and weeds will not be allowed to go to seed.

8.35 Soil stores will only be trafficked during construction or deconstruction, or by maintenance machinery. They will not be driven on at any other time. Areas of the proposed development identified for green infrastructure will be kept free from significant construction traffic movements to avoid compaction of the topsoil in these areas. The materials management plan and proposed methods of soil handling and storage will be implemented through a construction environmental management plan.

Residual effects

8.36 The significant residual effects are summarised in table 8.5. While it is not possible to mitigate the loss of agricultural land directly, the measures set out above will ensure that the soil resource is protected and its functions are maintained as far as practicable.

Topic	Significant residual effect	Receptor importance	Impact magnitude	Nature	Duration	Degree of effect	Level of certainty
Land use and agriculture	Loss of best and most versatile agricultural land	High	Large	Adverse	Long term	Very substantial	Absolute
	Introduction of new employment land use in the form of an AgriTech technology park	High	Large	Beneficial	Long term	Very substantial	Absolute
	Introduction of new informal public open space, community and bus / cycle interchange land uses	Low	Large	Beneficial	Long term	Moderate	Absolute

Table 8.5: Significant residual effects

Cumulative effects

8.37 As set out in chapter 3, the potential for cumulative effects with a number of consented and proposed developments in the area needs to be assessed. None of the other development sites in the area is currently in agricultural use, so there will be no significant cumulative effects on agricultural land.

8.38 The Wellcome Trust Genome Campus, former Spicer site, Babraham Research Campus, Granta Park, Sawston Trade Park and Chesterford Research Park developments will lead to the introduction of new or additional employment land uses in the local area, many of which will be related to research and development, in addition to the new employment use introduced by the proposed park for AgriTech at Hinxton. Overall, the introduction of these regional-level uses will be a large change, leading to a substantial, significant, beneficial cumulative effect.

8.39 The 8 Greenacres, Duxford scheme will introduce new public open space to the area, while the Granta Park scheme includes a new amenity building containing recreational uses to enhance the existing uses available on site, and the Sawston Trade Park scheme includes an ancillary hub containing uses such as a gym and a crèche. Together with the public open space and community uses proposed at Hinxton, this will be a large change leading to a moderate,

significant, beneficial cumulative effect. The Lion Works, Whittlesford, electricity supply connection and possible off site wastewater rising main schemes do not include any land uses also proposed at Hinxton, so there is no potential for significant cumulative post-construction effects with these developments.

Importance of receptor – Land use

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Magnitude of change – Land use

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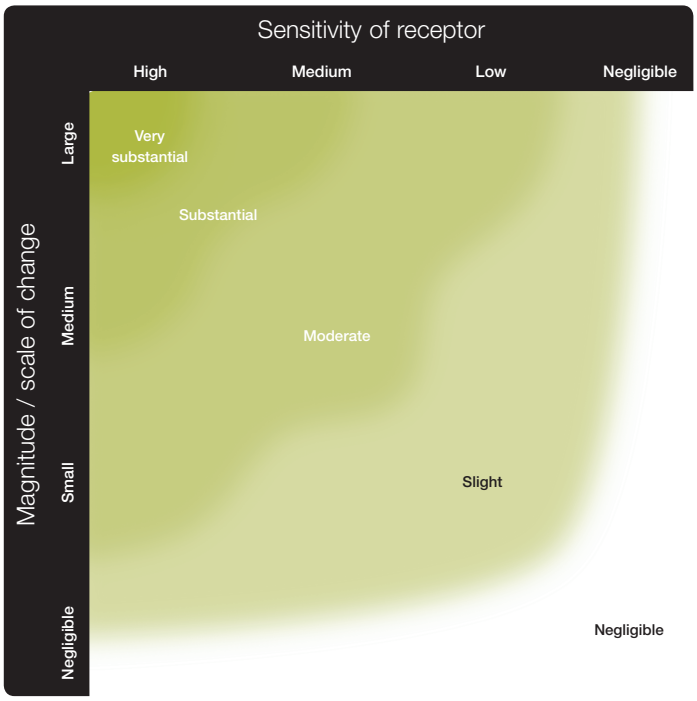
Determination of significance matrix – Land use



Professional judgement can be used to vary the category where specific circumstances dictate, for example due to the vulnerability or condition of the receptor. For example, a summer-only land use is much less likely to be affected by winter construction activities than a year-round land use.

The reason for and nature of any variation will be made clear in the assessment.

Degrees of effect

Very substantial:
A land use of at least national importance will be unable to continue or will be facilitated as a direct result of the proposals. A large loss of best and most versatile land.

Substantial:
There will be at least a noticeable change in a land use of at least regional importance, or it may be unable to continue or will be facilitated as a result of the proposals. A medium loss of best and most versatile land. An existing farm business is rendered unworkable.

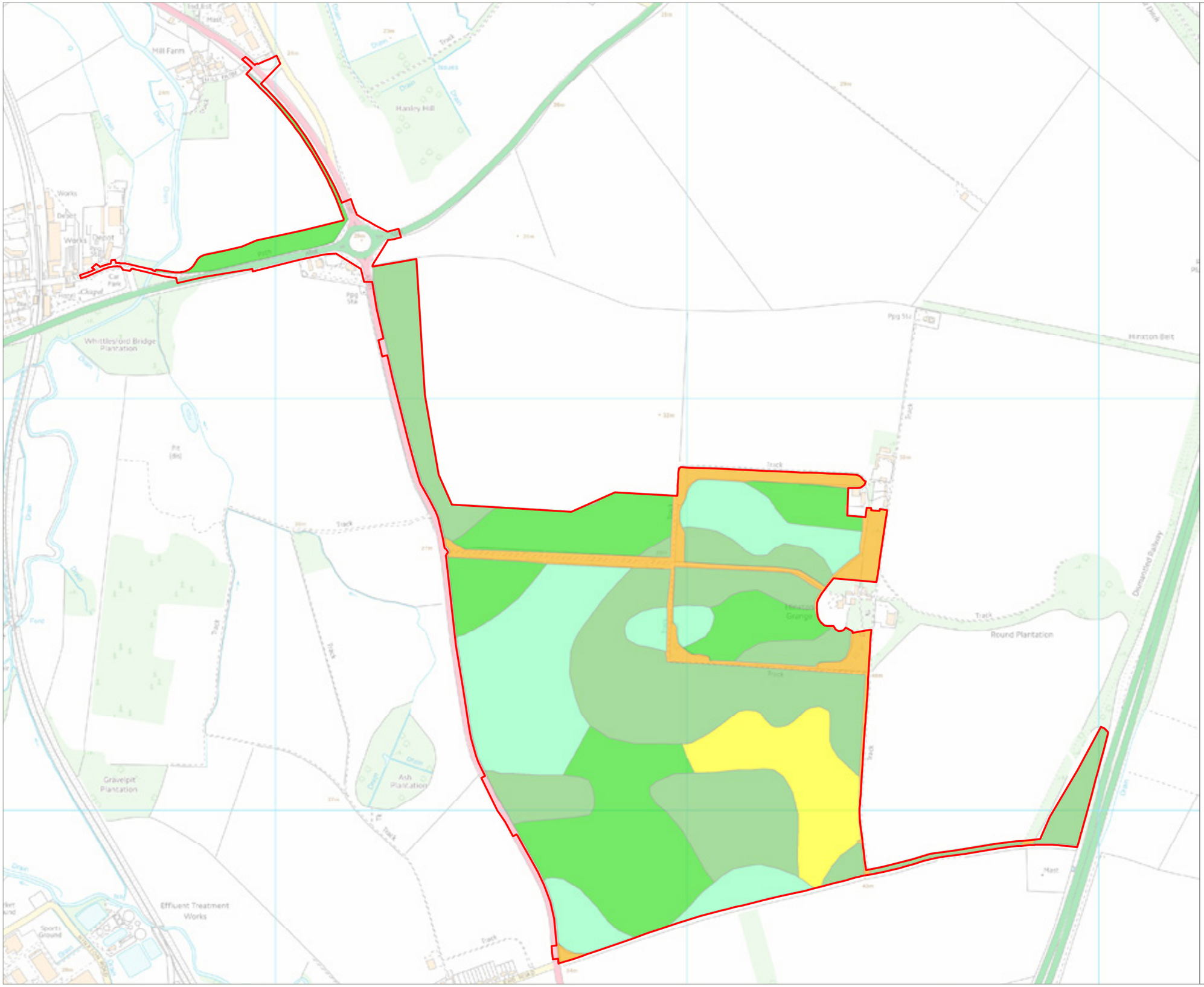
Moderate:
There will be at least a noticeable change in a locally significant land use, or it may be unable to continue or will be facilitated as a result of the proposals. Alternatively, there will be a small change in a nationally important land use. A small loss of best and most versatile land. A large loss of lower quality land. A significant effect on a farm business, but farming can continue in the same way.

Slight:
Small changes will occur in land uses of no more than local significance. A small or medium loss of lower quality land. Limited effects on an existing farm business.

Negligible:
The change will be negligible, and/or the land use is not sensitive to the type of development proposed.

Significance

If the degree of effect is moderate or above, then the effect is considered to be significant.



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