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Classification Survey

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1. Introduction

1.1 Overview

- 1.1.1 National Grid Electricity Transmission plc (here on referred to as National Grid) is making an application for development consent to reinforce the transmission network between Bramford Substation in Suffolk, and Twinstead Tee in Essex. The Bramford to Twinstead Reinforcement ('the project') would be achieved by the construction and operation of a new electricity transmission line over a distance of approximately 29km (18 miles), the majority of which would follow the general alignment of the existing overhead line network.
- 1.1.2 This Agricultural Land Classification (ALC) Report has been produced to support the application for development consent and the accompanying Environmental Statement (ES) under the Planning Act 2008.

1.2 Purpose of this Document

- 1.2.1 This appendix sets out the rationale for, approach to and the results of, the ALC surveys conducted for the proposed grid supply point (GSP) substation, four cable sealing end (CSE) compounds and the underground cable sections of the project.
- 1.2.2 This report includes the desk study information and the site survey results to assess the land grade according to the ALC system.

1.3 Structure of this Report

- 1.3.1 The structure of this report is as shown in Table 1.1 below.

Table 1.1 – Structure of this Report

Section	Content
1: Introduction	Purpose and structure of the report
2: Methodology	Details of the data sources used and how the surveys were undertaken
3: Dedham Vale East CSE compound	ALC results for the Dedham Vale East CSE Compound
4: Dedham Vale West CSE compound	ALC results for the Dedham Vale West CSE Compound
5: Stour Valley East CSE compound	ALC results for the Stour Valley East CSE Compound
6: Stour Valley West CSE compound	ALC results for the Stour Valley West CSE Compound
7: GSP substation	ALC results for the GSP substation
8: Section E Underground cables	ALC results for the underground cable in Section E: Dedham Vale Area of Outstanding Natural Beauty (AONB).
9: Section G Underground cables	ALC results for the underground cable in Section G: Stour Valley.
Annex A	Provides the auger bore descriptions and ALC calculations.
Annex B	Provides the particle size distribution data.

2. Methodology

2.1 Introduction

- 2.1.1 The Ministry of Agriculture, Fisheries and Food (MAFF) guidelines (1998) contain a system of grading land quality for land use planning. It divides farmland into five grades, according to the degree of limitation imposed upon land use by the inherent physical characteristics of climate, site and soils.
- 2.1.2 Grade 1 land is excellent quality agricultural land with very minor or no limitation to agricultural use, and Grade 5 is very poor quality land, with severe limitations due to adverse soil characteristics, relief, climate, or a combination of these. Grade 3 land is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land). Grades 1,2, and 3a are defined as the best and most versatile (BMV) land.
- 2.1.3 Use of the ALC methodology is supported by Natural England Technical Advice Note 049 (TAN049) (Natural England, 2012).

2.2 Desk Study

- 2.2.1 Desk study information has been gathered from the following sources:
- Ordnance Survey (OS) mapping and aerial photography (Google, 2021) to establish topography and any visible changes in soil colour which may represent changes in soil characteristics;
 - Soilscape mapping showing the distribution of main soil types using the Land Information System (LandIS) website (Cranfield University and Department for Environment, Food and Rural Affairs (Defra), 2021);
 - Provisional ALC mapping (Defra, 2022b); and
 - Climatic data and LandIS Soil Site Report (National Soil Resources Institute, 2021 a-d).
- 2.2.2 Climatological data for ALC are provided for 5km intersections by the Meteorological Office, in collaboration with the National Soil Resources Institute. The data from these points can be interpolated, providing climate data for specific sites. Climate can impose an overall limitation on ALC grade and has an important influence on the interactive limitations of soil wetness and soil droughtiness.

2.3 Site Survey

Scope of the Site Surveys

- 2.3.1 No detailed existing ALC information was available from the desk study for areas within the Order Limits. Therefore, an initial site survey was undertaken in December 2021 to identify the ALC grade at the locations where there is anticipated to be the greatest disturbance to soil during construction, comprising the CSE compounds and the GSP substation. Further surveys were undertaken on parts of the underground cable sections in October 2022.

- 2.3.2 Whilst it had been anticipated that the full length of undergrounding sections would be surveyed, the outbreak of Avian influenza (with confirmed cases in the region) resulted in severely restricted access and a limit on the areas that could be surveyed. It had also been planned that a number of soil pits would be dug at the end of the auger survey once the range and distribution of the key soil types was understood and additional profile characteristics recorded and samples for texture analysis taken; the access restrictions meant this activity also could not be undertaken.
- 2.3.3 The locations of the field surveys are shown on Figure 11.3: Detailed Agricultural Land Classification Mapping (**application document 6.4**).
- 2.3.4 Soil surveys have not been undertaken in the overhead line sections, as the working footprint of these areas would be limited, for example to the pylon bases and the access tracks. It should also be noted that the location of these features could move within the parameters set by the Limits of Deviation. See ES Chapter 4: Project Description (**application document 6.2.4**) for further details, and thus localised surveys may not be relevant later in the project development.

Methodology

- 2.3.5 Where undertaken, the ALC survey was carried out in accordance with published guidelines (MAFF, 1988) and involved examination of the soil's physical properties at a density of approximately one auger per hectare. The locations of each of the auger points were recorded using a handheld Global Positioning System (GPS) unit to enable these to be located for future verification, if necessary.
- 2.3.6 At each location, the soil profile was examined to a maximum depth of 1.2m, where practicable, by hand with the use of a 5cm diameter Dutch soil auger. A small number of soil pits were also excavated with an insulated spade in order to examine the physical soil profile characteristics of the main representative soil types, including subsoil structure. The locations of soil pits were determined by a soil scientist as characterising representative soil types within the survey area. The soil profile at each auger or soil pit location was described using the Soil Survey Field Handbook (Hodgson, 1997) and each soil profile was ascribed an ALC grade following the MAFF guidelines (1988). Full auger descriptions showing the calculated ALC grade are presented in Annex A.: Auger Bore Descriptions and ALC Calculations
- 2.3.7 The MAFF guidelines (1988) require that the following factors be investigated:
- Climate: Average annual rainfall (AAR) and accumulated temperature (AT0) above 0°C between January and June;
 - Site: Gradient, micro relief, and flooding;
 - Soils: Texture, structure, depth, stoniness, and chemical toxicity: and
 - Interactive Factors: Soil wetness, soil droughtiness and liability to erosion.
- 2.3.8 The main parameters used in the assessment of an overall climatic limitation are AAR as a measure of overall wetness, and AT0 as a measure of the warmth in the growing season. Climate may impose an overall limitation on ALC grade and has an important influence on the interactive limitations of soil wetness and soil droughtiness.

- 2.3.9 Samples were collected at each site and sent to an accredited laboratory for particle size distribution analysis in order to confirm soil texture. The data sheets are included as Annex B: Particle Size Distribution Data Sheets.
- 2.3.10 The area of land surveyed for the GSP substation and CSE compounds was more extensive than the actual proposed footprint of the infrastructure to allow scope for micro-siting without the need for additional surveys in these locations.

2.4 Limitations

- 2.4.1 There are no limitations associated with the surveys undertaken for the CSE and GSP locations.
- 2.4.2 For the surveys within the cable undergrounding sections there are two limitations:
- Avian influenza meant that the entire cable route could not be surveyed due to land access restrictions; and
 - Access restrictions meant that the descriptions of some characteristics which were to be collected from soil pits at the end of the auger survey could not be undertaken. The ALC grade at each point for this survey element has been assessed based on the available survey information and will represent the likely land grade. The soil pit descriptions would add more detail in particular in relation to structure and the potential presence of slowly permeable layers, both of which can result in a lower grade assessment.
- 2.4.3 In the absence of the above information, it is considered that the assessment based on the available information will not have under-assessed land grade and thus the likely presence of BMV land.

3. Dedham Vale East CSE Compound

3.1 Site Location

- 3.1.1 The site is located to the south of Polstead Heath and to the northeast of Polstead. The site is bounded by woodland to the north and south, with further agricultural fields to the east. Millwood Road bounds the site to the west, with a junction with Polstead Road situated directly adjacent to the study site.
- 3.1.2 The surveyed site covers an area of approximately 6ha as shown on Figure 11.3: Detailed Agricultural Land Classification Mapping (**application document 6.4**).
- 3.1.3 The land use at the time of the survey was arable (post-harvest).

3.2 Desk Study Results

Climate

- 3.2.1 Interpolated climatological data for the site is set out in Table 3.1.

Table 3.1 – ALC Climate Data (National Grid Reference (NGR) TL985399)

Parameter	Data
Altitude (m)	70
Average Annual Rainfall (AAR) (mm)	597
Accumulated Temperature (AT0) (day degrees)	1397
Moisture deficit for wheat (mm)	117
Moisture deficit for potatoes (mm)	112
Field Capacity Days (FCD)	107

- 3.2.2 The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

The Site

- 3.2.3 Gradient, microrelief and flooding can pose limitations to agricultural productivity on a site. The site is relatively flat with no noticeable microrelief. As such neither pose a limitation to the agricultural land grade.
- 3.2.4 The entire site is within Flood Zone 1, defined as having a low probability of flooding on the Flood Map for Planning (Environment Agency, 2021c). As such it is not considered that flood risk poses a limitation to the agricultural land grade.

Parent Materials

- 3.2.5 The underlying geology is shown to comprise London Clay Formation. The entire site is covered with drift deposits described as Diamicton, a poorly sorted deposit (British Geological Survey (BGS), 2021b).

Soils

- 3.2.6 Background information on the soils likely to be present has been taken from the Soil Survey of England and Wales (1983) 1:250 000 soil map. This shows the soils present at the site to comprise soils of the Hornbeam 3 Association. The Hornbeam 3 Association (582d) is described as deep fine loamy over clayey and clayey soils with slowly permeable subsoils, and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy over clayey soils, and calcareous in places.

3.3 Site Survey Results

- 3.3.1 Topsoil depths ranged from 29 to 39cm, most likely representative of the average plough layer across the agricultural fields. There was no evidence of gleying across any of the sampled profiles. All profiles reached a minimum depth of 90cm, though none were sampled up to the 120cm point due to the heavy textures encountered.
- 3.3.2 Topsoil texture was recorded as a medium silty clay loam across the site. Subsoil profiles were described as light silty clay loams at auger locations 1 and 2, silty clays at locations 3 and 4, and clay loam and clay at locations 5 and 6 respectively.

3.4 Interactive Factors

- 3.4.1 Five of the six auger locations exhibited a moisture-based limitation. The texture of the topsoil, combined with the presence of a slowly permeable layer, result in three of these profiles (auger locations 1, 2, and 6) being defined as Wetness Class II. This limited the overall land grade in these profiles to Grade 2. Whilst auger locations 3 and 4 have similar topsoil textures and profile depths, the changes in subsoil texture mitigate any limitations due to wetness, but instead produce a droughtiness limitation, limiting the land grade to Grade 3a and Grade 2 respectively.

3.5 Conclusion

- 3.5.1 The detailed ALC survey has confirmed the presence of BMV land across all the land at the proposed Dedham East CSE Compound as Grade 2 (very good) agricultural land and 3a (good) agricultural land. ES Chapter 11: Agriculture and Soils (**application document 6.2.11**) provides the ALC grade by area.

4. Dedham Vale West CSE Compound

4.1 Site Location

- 4.1.1 The site is located to the north of Leavenheath and to the east of Assington. The site is surrounded by agricultural fields, with the B1068 running to the south-east.
- 4.1.2 The site covers an area of approximately 7ha as shown on Figure 11.3: Detailed Agricultural Land Classification Mapping (**application document 6.4**).
- 4.1.3 The land use at the time of the survey was arable (post-harvest).

4.2 Desk Study Results

Climate

- 4.2.1 Interpolated climatological data for the site is set out in Table 4.1.

Table 4.1 – ALC Climate Data (NGR TL985399)

Parameter	Data
Altitude (m)	70
Average Annual Rainfall (AAR) (mm)	597
Accumulated Temperature (AT0) (day degrees)	1397
Moisture deficit for wheat (mm)	117
Moisture deficit for potatoes (mm)	112
Field Capacity Days (FCD)	107

- 4.2.2 The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

The Site

- 4.2.3 Gradient, microrelief and flooding can pose limitations to agricultural productivity on a site. The site is relatively flat with no noticeable microrelief. As such neither pose a limitation to the agricultural land grade.
- 4.2.4 The entire site is within Flood Zone 1, defined as having a low probability of flooding on the Flood Map for Planning (Environment Agency, 2021c). As such it is not considered that flood risk poses a limitation to the agricultural land grade.

Parent Materials

- 4.2.5 The underlying geology is shown to comprise London Clay Formation. The entire site is covered with drift deposits described as Diamicton, a poorly sorted deposit (BGS, 2021b).

Soils

- 4.2.6 Background information on the soils likely to be present has been taken from the Soil Survey of England and Wales (1983) 1:250 000 soil map. This shows the soils present at the site to comprise soils of the Hornbeam 3 Association. The Hornbeam 3 Association (582d) is described as deep fine loamy over clayey and clayey soils with slowly permeable subsoils, and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy over clayey soils, and calcareous in places.

4.3 Site Survey Results

- 4.3.1 The ALC survey confirmed the general characteristics described above. Topsoil thickness ranged from 31 to 52cm and is likely to be representative of the ploughed layer across the arable fields. There was no evidence of gleying in any of the sampled profiles.

4.4 Interactive Factors

- 4.4.1 All but one auger location were calculated to be Wetness Class I, with auger location 6 categorised as Wetness Class II.
- 4.4.2 Four of the auger locations (1–4) were recorded as having no limiting factors for agricultural use and were therefore classified as Grade 1. The remaining three auger locations demonstrated a limiting interaction in soil droughtiness, with auger locations 6 and 7 being graded as Grade 3a, and auger point 5 as Grade 2.
- 4.4.3 Whilst depth didn't contribute as a direct limiting factor, it did have an impact on the droughtiness levels in both auger location 6 and 7, with the restricted profile depths limiting the Moisture Balance for wheat, and therefore limiting the agricultural land classification grade to Grade 3a.

4.5 Conclusion

- 4.5.1 The detailed ALC survey has confirmed the presence of BMV land across the area required for the Dedham Vale West CSE Compound as Grade 2 (very good) agricultural land and 3a (good) agricultural land. ES Chapter 11: Agriculture and Soils (**application document 6.2.11**) provides the ALC grade by area.

5. Stour Valley East CSE Compound

5.1 Site Location

- 5.1.1 The site is located to the south-west of Workhouse Green and north of Bures Green. The site is bounded by agricultural tracks and is surrounded by further agricultural land on three sides with an area of woodland to the south.
- 5.1.2 The site covers an area of approximately 5ha as shown on Figure 11.3: Detailed Agricultural Land Classification Mapping (**application document 6.4**).
- 5.1.3 The land use at the time of the survey was arable (post-harvest) with pasture in the southern part.

5.2 Desk Study Results

Climate

- 5.2.1 Interpolated climatological data for the site is set out in Table 5.1.

Table 5.1 – ALC Climate Data (NGR TL985399)

Parameter	Data
Altitude (m)	70
Average Annual Rainfall (AAR) (mm)	597
Accumulated Temperature (AT0) (day degrees)	1397
Moisture deficit for wheat (mm)	117
Moisture deficit for potatoes (mm)	112
Field Capacity Days (FCD)	107

- 5.2.2 The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

The Site

- 5.2.3 Gradient, microrelief, and flooding can pose limitations to agricultural productivity on a site. The site was moderately flat with a predominately south-west facing aspect. Gradient posed a limiting factor for auger location 4, limiting the ALC Grade to 3b at this location.
- 5.2.4 The entire site is within Flood Zone 1, defined as having a low probability of flooding on the Flood Map for Planning (Environment Agency, 2021c). As such it is not considered that flood risk poses a limitation to the agricultural land grade.

Parent Materials

- 5.2.5 The underlying geology is shown to comprise Crag Group Sand. Across the entire site this is covered with superficial sand and gravel deposits from the Kesgrave Catchment Subgroup (BGS, 2021b).

Soils

- 5.2.6 Background information on the soils likely to be present has been taken from the Soil Survey of England and Wales (1983) 1:250 000 soil map. This shows that the site lies on the boundary between two major soil associations, the Luxford Association, and the Hornbeam 3 association. Most of the site appears to comprise of the Luxford Association (571x), and is characterised by deep well-drained fine loamy, coarse loamy and sandy soils, locally flinty and in places over gravel. The Hornbeam 3 Association (582d) is described as deep fine loamy over clayey, and clayey soils with slowly permeable subsoils and slight seasonal waterlogging, with some slowly permeable seasonally waterlogged fine loamy over clayey soils. Calcareous subsoils are present in places.

5.3 Site Survey Results

- 5.3.1 Soil characterisation and the ALC survey confirmed many of the characteristics above, specifically in relation to the Luxford association. Topsoil depths ranged from 10 cm to 35 cm; 10 to 14 cm topsoil depth recorded in the pasture fields, and 30 to 35cm recorded in the arable fields which is likely to represent the general plough depth. Evidence of gleying was found at one auger location in the deep subsoil (80 to 110cm) of auger location 5.
- 5.3.2 Topsoil textures were recorded as silty loams (auger location 1) and sandy loams (auger locations 4 and 5), with points 2 and 3 being described as sandy clay loams. Overall topsoil structure was recorded as fine to medium sub-angular blocky.

5.4 Interactive Factors

- 5.4.1 Four of the five auger locations were calculated to be of Wetness Class I and, whilst wetness was not a limitation the profiles were limited by other factors as detailed below. Auger location 1, however, was found to be limited by wetness and was categorised as Wetness Class II and graded as Grade 2 land.
- 5.4.2 Two of the five auger locations (auger locations 1 and 4) could only be sampled to a depth of <70cm, which could have a possible effect on the associated droughtiness limitation calculation in relation to the Moisture Balance for wheat (due to the inability to account for the full 120cm profile). However, the droughtiness calculations and resultant land grade for these two locations confirmed that droughtiness was not a limitation even at the shallower soil depth recorded. The ALC grade for auger location 4 was limited by the gradient of the land, limiting the overall grade to Grade 3b.

5.5 Conclusion

- 5.5.1 The detailed ALC survey has confirmed the presence of BMV land at the Stour Valley East CSE Compound as Grade 2 (very good) agricultural land. ES Chapter 11: Agriculture and Soils (**application document 6.2.11**) provides the ALC grade by area.

6. Stour Valley West CSE Compound

6.1 Site Location

- 6.1.1 The site is located to the west of Alphamstone and to the south-east of Twinstead. Henny Back Road runs along the western boundary.
- 6.1.2 The site covers an area of approximately 5ha as shown on Figure 11.3: Detailed Agricultural Land Classification Mapping (**application document 6.4**).
- 6.1.3 The land use at the time of the survey was arable (post-harvest). There are areas of woodland to the north and east of the site, with further agricultural land to the south.

6.2 Desk Study Results

Climate

- 6.2.1 Interpolated climatological data for the site is set out in Table 6.1.

Table 6.1 – ALC Climate Data (NGR TL985399)

Parameter	Data
Altitude (m)	70
Average Annual Rainfall (AAR) (mm)	597
Accumulated Temperature (AT0) (day degrees)	1397
Moisture deficit for wheat (mm)	117
Moisture deficit for potatoes (mm)	112
Field Capacity Days (FCD)	107

- 6.2.2 The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

The Site

- 6.2.3 Gradient, microrelief, and flooding can pose limitations to agricultural productivity on a site. The site is relatively flat with no noticeable microrelief. As such neither pose a limitation to the agricultural land grade.
- 6.2.4 The entire site is within Flood Zone 1, defined as having a low probability of flooding on the Flood Map for Planning (Environment Agency, 2021c). As such it is not considered that flood risk poses a limitation to the agricultural land grade.

Parent Materials

- 6.2.5 The underlying geology is shown to comprise London Clay Formation. The entire site is covered with drift deposits described as Diamicton, a poorly sorted deposit (BGS, 2021b).

Soils

- 6.2.6 Background information on the soils likely to be present has been taken from the Soil Survey of England and Wales (1983) 1:250 000 soil map. This shows the soils present at the site to comprise soils of the Luxford and Hornbeam 3 soil associations. The Luxford Association (571x) is described as deep well-drained fine loamy, coarse loamy and sandy soils, locally flinty and in places over gravel. The Hornbeam 3 Association (582d) is described as deep fine loamy over clayey, and clayey soils with slowly permeable subsoils and slight seasonal waterlogging, with some slowly permeable seasonally waterlogged fine loamy over clayey soils. Calcareous subsoils are present in places.

6.3 Site Survey Results

- 6.3.1 The ALC survey confirmed many of the characteristics above, specifically in relation to the Hornbeam 3 association. Topsoil depths ranged from 20cm to 32cm which is likely to represent the general plough depth. There was no evidence of gleying at any of the auger locations.
- 6.3.2 Topsoil textures were characterised as silty clay at auger locations 1 and 2, and a silty clay loam at the rest of the auger locations.
- 6.3.3 Auger points 1, 2, and 5 were sampled to the full 120cm depth, with locations 3 and 4 stopped at 70 and 97cm respectively due to obstructions.

6.4 Interactive Factors

- 6.4.1 Four of the sampled profiles exhibit a moisture determined limitation, one limited by droughtiness, one by wetness, and two by both. These four profiles show the presence of a slowly permeable layer, which results in all four soil profiles being defined as Wetness Class III. This wetness class combined with the soil texture would limit all four profiles to Grade 3a (whilst auger point 3 hit stone at 70cm it is considered that the general subsoil characteristics are likely to be similar and so this point, whilst shown as Grade 3b has been mapped within the area of Grade 3a land).
- 6.4.2 Due to a difference in hand characterised texture identifying a primarily loamy sand subsoil, auger location 5 had no interactive factor limitations and was classified as Grade 1.
- 6.4.3 The substantial differences between auger locations 1–4 and location 5 can possibly be explained by the site being located on the boundary between two major soil associations. It is considered therefore that auger locations 1–4 represented soils from the Hornbeam 3 Association, whereas auger location 5 represented the Luxford Association.

6.5 Conclusion

- 6.5.1 The detailed ALC survey has confirmed the presence of BMV land at the Stour Valley West CSE Compound as Grade 1 (excellent) agricultural land and 3a (good) agricultural land. ES Chapter 11: Agriculture and Soils (**application document 6.2.11**) provides the ALC grade by area.

7. GSP Substation

7.1 Site Location

- 7.1.1 The site is located to the north-east of Wickham St Paul, and to the south-west of Sudbury. It is bounded by the Butler’s Wood to the north, Waldegrave Wood to the south, the A131 to the east and is surrounded by agricultural land on all other sides.
- 7.1.2 The site covers an area of approximately 7ha as shown on Figure 11.3: Detailed Agricultural Land Classification Mapping (**application document 6.4**). There is an agricultural drain/ditch that crosses the site and flows along its northern boundary, in a westerly direction. This drainage ditch is crossed in two places within the site boundary by existing tracks.
- 7.1.3 The land use at the time of the survey was arable (post-harvest).

7.2 Desk Study Results

Climate

- 7.2.1 Interpolated climatological data for the site is set out in Table 7.1.

Table 7.1 – ALC Climate Data (NGR TL985399)

Parameter	Data
Altitude (m)	70
Average Annual Rainfall (AAR) (mm)	597
Accumulated Temperature (AT0) (day degrees)	1397
Moisture deficit for wheat (mm)	117
Moisture deficit for potatoes (mm)	112
Field Capacity Days (FCD)	107

- 7.2.2 The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

The Site

- 7.2.3 Gradient, microrelief and flooding can pose limitations to agricultural productivity on a site. The site is relatively flat with no noticeable microrelief. As such neither pose a limitation to the agricultural land grade.
- 7.2.4 The entire site is within Flood Zone 1, defined as having a low probability of flooding on the Flood Map for Planning (Environment Agency, 2021c). As such it is not considered that flood risk poses a limitation to the agricultural land grade.

Parent Materials

- 7.2.5 The underlying geology is shown to comprise London Clay Formation. The entire site is covered with drift deposits described as Diamicton, a poorly sorted deposit (BGS, 2021b).

Soils

- 7.2.6 Background information on the soils likely to be present has been taken from the Soil Survey of England and Wales (1983) 1:250 000 soil map. This shows the soils present at the site to comprise soils of the Oak 2 Soil Association. These are described as slowly permeable, seasonally waterlogged, fine loamy over clayey and fine silty over clayey soils. It is also noted that some soils have a chalky subsoil.

7.3 Site Survey Results

- 7.3.1 The ALC survey confirmed the general characteristics described above. Topsoil thickness ranged from 32cm to 42cm which is likely to represent the general plough depth. All profiles exhibited evidence of gleying in the subsoil, with one profile also showing evidence of gleying in the topsoil. The topsoil had a clay loam texture, with one profile recorded as having a silty clay loam texture, with the subsoil texture ranging from clay loam to heavy silty clay loam.
- 7.3.2 Augering at three of the survey locations was stopped between 70-80cm below ground level due to obstructions, likely to be larger stone material and reflective of the poorly sorted nature of the drift deposits.
- 7.3.3 An assessment of the detailed soil characteristics and how they influence soil wetness and droughtiness limitations to ALC grade is presented below.

7.4 Interactive Factors

- 7.4.1 The profiles all exhibit a wetness limitation. The texture of the topsoil, combined with the presence of a slowly permeable layer, result in the soil profiles all being defined as Wetness Class III. This limits the site to Grade 3a in all but one profile. At auger location 4, whilst the texture is similar to the other profiles, the topsoil is calcareous and this reduces the influence of the wetness limitation, meaning that this profile would be assigned to Grade 2 in the absence of any other limitation.
- 7.4.2 The moisture deficit associated with potatoes, as set out in the ALC Guidelines (MAFF, 1988) results in a droughtiness limitation, limiting the land grade to Grade 3a across the entire site.
- 7.4.3 The droughtiness calculations would be affected by the fact that augering at three locations was limited by stones. However, as exposing the soil profile to 1.2m below ground level at the other auger locations, where the soil characteristics in terms of texture were very similar, did not result in a different land grade, it is considered that the assessment made based on the available data remains correct.

7.5 Conclusion

- 7.5.1 The detailed ALC survey has confirmed the presence of BMV land at the GSP substation. The whole survey area (100%) has been graded as 3a (good) agricultural land. ES Chapter 11: Agriculture and Soils (**application document 6.2.11**) provides the ALC grade by area.

8. Section E Underground Cables

8.1 Site Location

8.1.1 The eastern section of the underground cable route runs from Posted Heath to Leavenheath through the Dedham Vale AONB.

8.2 Desk Study Results

Climate

8.2.1 Interpolated climatological data for the site is set out in Table 8.1.

Table 8.1 – ALC Climate Data (NGR TL985399)

Parameter	Data
Altitude (m)	70
Average Annual Rainfall (AAR) (mm)	597
Accumulated Temperature (AT0) (day degrees)	1397
Moisture deficit for wheat (mm)	117
Moisture deficit for potatoes (mm)	112
Field Capacity Days (FCD)	107

8.2.2 The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

The Site

8.2.3 Gradient, microrelief and flooding can pose limitations to agricultural productivity on a site. Along this section of the route there will be areas where topography, gradient and flood risk pose a limitation to land grade, for example within the River Box floodplain and valley slopes.

Parent Materials

8.2.4 The underlying geology is shown to primarily comprise of the London Clay Formation. This is then overlain with a variety of superficial deposits, changing with proximity to the River Box, including Lowestoft Formation Diamicton and Lowestoft Formation sand and gravel, as well as areas of Kesgrave Catchment subgroup (sand and gravel; BGS, 2021b).

8.2.5 Where the route crosses the River Box the underlying geology is shown to be Thanet Formation and Lambeth Group, overlain by alluvium (BGS, 2021b).

Soils

- 8.2.6 Background information on the soils likely to be present has been taken from the Soil Survey of England and Wales (1983) 1:250 000 soil map. Using desk based available data the majority of the soils along the proposed route would be classified as freely draining slightly acid loamy soils, often associated with neutral and acid pastures and deciduous woodlands (Cranfield University and Defra, 2021).

Provisional ALC

- 8.2.7 Available Provisional ALC data shows that the undergrounded cable route through the Dedham Vale AONB passes through land provisionally mapped as Grade 2 and Grade 3, demonstrating the high likelihood of the presence of BMV land. Land which lies outside the Order Limits which has been surveyed in detail, for example to the east of the Dedham Vale East CSE Compound, is shown as comprising Grades 2 and 3a, highlighting the potential for BMV land to be present.

9. Section G Underground Cables

9.1 Site Location

- 9.1.1 The surveyed undergrounded cable route is located to the north of Alphamstone and runs to the south of Workhouse Green and Ansell's Grove, through the Stour Valley. Areas that would lie beneath the route of the trenchless crossings have not been surveyed, as the topsoil would not be disturbed in these locations other than isolated areas at the drill pits.
- 9.1.2 A partial survey of sixteen auger borings was conducted, covering approximately 8.2ha across 1.6km of the underground cable route. The locations of the auger borings are shown on Figure 11.3: Detailed Agricultural Land Classification Mapping (**application document 6.4**).
- 9.1.3 The surveyed area includes nine agricultural enclosures with 80% in use as pasture. The area west of Henny Back Road was permanent rough grassland, predominantly used for conservation and with overgrown bramble vegetation with localised natural regeneration of volunteer oak. To the east of Henny Road, auger locations 82-84 were within grazed horse paddocks following outdoor pigs. Auger locations 77-81 had recently been reseeded to a temporary grass break. Auger locations 89-90 were located in a mixed deciduous and conifer plantation which formed 20% of the survey area.

9.2 Desk Study Results

Climate

- 9.2.1 Interpolated climatological data for the site is set out in Table 9.1.

Table 9.1 – ALC Climate Data (NGR TL88031 36262)

Parameter	Data
Altitude (m)	70
Average Annual Rainfall (AAR) (mm)	587
Accumulated Temperature (AT0) (day degrees)	1403
Moisture deficit for wheat (mm)	117
Moisture deficit for potatoes (mm)	112
Field Capacity Days (FCD)	105

- 9.2.2 The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

The Site

- 9.2.3 Gradient, microrelief and flooding can pose limitations to agricultural productivity on a site. Topography was undulating throughout the survey area with moderate slopes and a variable aspect falling from 71m Above Ordnance Datum (AOD) at Henny Back Road to 31m at Henny Road. Boring 87 was located in the base of a valley feature with steeply sloping land to the east and west.

- 9.2.4 Gradients at auger locations 80, 86 and 87 were 7-11° and will limit agricultural operations locally and impose a limitation to no more than Grade 3b.
- 9.2.5 The majority of land is predominantly designated in Flood Risk Zone 1 with a low probability of flooding. An area of Flood Zone 3 borders the River Stour. The soils in this area are limited by a wetness and workability limitation to no more than Grade 3a.

Parent Materials

- 9.2.6 The underlying geology is shown to predominantly comprise London Clay Formation. Elevated areas, such as to the south of Lorkins Lane and east of Moat Lane are overlain by sedimentary Diamicton deposits of the Lowestoft Formation, composed of sand and gravel. The steeply sloping land adjacent (auger locations 86 and 87) is overlain with more recent Kesgrave sand and gravel deposits (BGS, 2021b).
- 9.2.7 The underlying geology at auger location 68 is shown to be underlain by the Lewes Nodular Chalk Formation, formed between 84-96 million years ago in the Cretaceous Period. (BGS, 2021b).
- 9.2.8 The low-lying land within the valley features are comprised of alluvium clay, sand and silt deposits close to watercourse, transitioning to river terrace and head deposits of clay, sand and gravel deposits with increasing elevation on the valley sides.

Soils

- 9.2.9 Background information on the soils likely to be present has been taken from the Soil Survey of England and Wales (1983) 1:250 000 soil map. This shows the soils present to comprise predominately of soils in the Ludford Association, which are described as freely draining, moderately stony and slightly acid profiles with light to medium textured topsoil overlying sandy subsoils.
- 9.2.10 There are also areas of soils within the Fladbury 1 Soil Association, typically found in lower elevations in the floodplain and riparian margins, which consist of medium to heavy clay loam topsoil over imperfectly to poor drained subsoils, as well as Hornbeam 3; described as deep fine loamy over clayey and clayey soils with slowly permeable subsoils and slight seasonal waterlogging, some slowly permeable seasonally waterlogged fine loamy over clayey soils.

9.3 Site Survey Results

- 9.3.1 The ALC survey confirmed the general characteristics described above. Topsoil thickness ranged from 18cm to 32cm, with the shallower depths representative of pasture land. The greater depths were recorded within rough grassland and may be representative of historic ploughing.
- 9.3.2 Eight of the 16 profiles (auger locations 69, 79, 81, 82, 87, 88, 89 and 90) exhibited evidence of gleying in the subsoil, with two profiles (auger locations 81 and 89) also showing evidence of gleying at the topsoil-subsoil boundary.
- 9.3.3 Topsoil textures ranged from sandy loam to sandy clay loam, with one profile recorded as having a peaty loam texture (auger point 90) and another a loamy medium sand (auger location 91).

- 9.3.4 Augering at five of the survey locations was stopped between 50-90cm below ground level due to obstructions, likely to be larger stone material and reflective of the poorly sorted nature of the drift deposits. Augering at point 68 was stopped at 100cm below ground level due to obstructions, likely to be due to the heavy clay nature of the floodplain soils.
- 9.3.5 An assessment of the detailed soil characteristics and how they influence soil wetness and droughtiness limitations in relation to ALC grade is presented below.

9.4 Interactive Factors

- 9.4.1 Three of the profiles (auger locations 68, 81 and 89) exhibit a wetness limitation. The texture of the topsoil, combined with the presence of a slowly permeable layer, result in the soil profiles all being defined as Wetness Class III. This limits these locations to no more than Grade 3a.
- 9.4.2 The moisture deficit associated with wheat and potatoes, as set out in the ALC Guidelines (MAFF, 1988), results in a droughtiness limitation at eight auger points. The combination of profile textures, stone content and available depth has limited four of these locations to Grade 2, three to Grade 3a, and one to Grade 3b.

9.5 Conclusion

- 9.5.1 The partial detailed ALC survey has confirmed the presence of BMV land within Section G: Stour Valley of the underground cable route. ES Chapter 11: Agriculture and Soils (**application document 6.2.11**) provides the ALC grade by area.

Annex A: Auger Bore Descriptions and ALC Calculations

Code	Location				
10044940	GSP Substation				
Date(s)		Surveyor(s)		Company	
24-Nov-21		BL/AS		Arcadis	
Weather		Relief		Land use and vegetation	
Dry, sunny		Flat ground - no gradient or microtopographical limitations		Arable	
NGR			Altitude		
TL98543993			70m		
MAFF prov		MAFF detailed		Flooding	
Grade 2		None available		Entire site within Flood Zone 1 - low probability of flooding	
AAR	ATO	MDw	MDp	FCD	Climate grade
597	1397	117	112	107	Grade 1 potential Flat site so no local climatic limitations
Bedrock		Superficial deposits			
London Clay Formation - Clay, Silt And Sand. Sedimentary Bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period.		Lowestoft Formation - Diamicton. Superficial Deposits formed up to 2 million years ago in the Quaternary Period.			
Soil data		Soil association(s)			
SSEW 1:250 000 mapping		Oak 2 Slowley permeable seasonally waterlogged fine loamy over clayey and fine silty over clayey soils. Some similar soils with slowly permeable subsoils and slight seasonal waterlogging. Some clayey soils with chalky subsoil.			

Point	What3Words	Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix		Mottle 1		Mottle 2		Texture	Stones		Struture	Calc.	Mn C	SPL	Drought			Wet	Classification		Point notes
						Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour	%		Type	MBw					MBp	Gd	WC		Grade	Limitation	
1	nets.paper.highlighted	70	0	N/A	Arable	0	42	42	10YR 3/3	Very fine, 1%	2.5YR 5/8	N/A	N/A	cl	2	Hard	Fine sub-angular blocky	1%	N	Y	38.4	-10.4	3a	III	3a	Wetness + droughtiness		
2	router.shut.otter	70	0	N/A	Arable	0	33	33	10YR 4/3	N/A	N/A	N/A	N/A	cl	2	Hard	Fine sub-angular blocky	N	N	Y	38.3	-17.4	3a	III	3a	Wetness + droughtiness		
						33	120	87	10YR 6/2	Fine, 35%	7.5YR 5/8	N/A	N/A	hzcl	2	Hard	Medium to coarse sub-angular blocky	N	N									
3	flaunting.send.expel	70	0	N/A	Arable	0	32	32	10YR 4/3	N/A	N/A	N/A	N/A	cl	1	Hard	Fine sub-angular blocky	1%	N	Y	-11.6	-17.3	3a	III	3a	Wetness + droughtiness		
						32	70	38	Gley 1 / 10Y	Fine, 50%	7.5YR 5/8	N/A	N/A	cl	1	Hard	Medium to coarse sub-angular blocky	N	Y									
4	reaction.sprouting.videos	70	0	N/A	Arable	0	36	36	10YR 4/3	N/A	N/A	N/A	N/A	cl	1	Hard	Fine sub-angular blocky	5%	Y	Y	-10.8	-14.1	3a	III	3a	Wetness + droughtiness	STOP (hard stone)	
						36	70	34	Gley 1 / 10Y	Fine, 50%	7.5YR5/8	N/A	N/A	cl	2	Hard	Coarse sub-angular blocky	N	Y									
5	lasts.crucially.dizziness	70	0	N/A	Arable	0	34	34	10YR 4/3	N/A	N/A	N/A	N/A	mzcl	1	Hard	Fine sub-angular blocky	N	Y	Y	0.5	-13.7	3a	III	3a	Wetness + droughtiness		
						34	79	45	2.5Y 5/2	Fine, 50%	7.5YR5/8	N/A	N/A	zcl	5	Hard	Coarse sub-angular blocky	N	Y									

Code		Location			
10044940		Dedham Vale East Cable Sealing End Compound			
Date(s)		Surveyor(s)		Company	
24-Nov-21		BL/AS		Arcadis	
Weather		Relief		Land use and vegetation	
Dry, sunny		Flat ground - no gradient or microtopographical limitations		Arable	
NGR				Altitude	
TM00103962				70m	
MAFF prov		MAFF detailed		Flooding	
Grade 2		None available		Entire site within Flood Zone 1 - low probability of flooding	
AAR	ATO	MDw	MDp	FCD	Climate grade
597	1397	117	112	107	Grade 1 potential Flat site so no local climatic limitations
Bedrock			Superficial deposits		
Red Crag Formation - Sand. Sedimentary Bedrock formed approximately 2 to 4 million years ago in the Quaternary and Neogene Periods.			Lowestoft Formation - Diamicton. Superficial Deposits formed up to 2 million years ago in the Quaternary Period.		
Soil data			Soil association(s)		
SSEW 1:250 000 mapping			The Hornbeam 3 (582d) association is described as deep fine loamy over clayey and clayey soils with slowly permeable subsoils, and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy over clayey soils, and calcareous in places.		

Point	What3Words	Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix		Mottle 1		Mottle 2		Texture	Stones		Struture	Calc.	Mn C	SPL	Drought			Wet	Classification		Point notes
						Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour	%		Type	MBw					MBp	Gd	WC		Grade	Limitation	
1	wager.clocking.rots		0	N/A	Arable	0	33	33	7.5YR 3/3	Fine	7.5YR 5/8	N/A	N/A	mzcl	5	vs-s	fine to medium sub-angular blocky coarse sub-angular blocky	N	N	y	11.9	10.8	1	II	2	wetness	hit stone	
2	messaging.grumbles.vowed		0	N/A	Arable	0	35	35	7.5YR 3/3	Fine	7.5YR 5/8	N/A	N/A	mzcl	5	vs-s	fine to medium sub-angular blocky coarse sub-angular blocky	N	N	y	11.2	10.0	1	II	2	wetness		
3	rollers.evaporate.scope		0	N/A	Arable	0	30	30	7.5YR 2.5/2	Fine	10YR 6/6	N/A	N/A	mzcl	2	vs-s	fine sub-angular blocky coarse sub-angular blocky	N	N	n	1.2	4.1	3a	I	3a	droughtiness		
4	stealthier.boomers.averages		0	N/A	Arable	0	29	29	7.5YR 3/3	N/A	N/A	N/A	N/A	mzcl	1	s	fine sub-angular blocky coarse sub-angular blocky	N	Y	n	8.56	3.314	2	I	2	droughtiness	some chalk fragments	
5	protects.disprove.wicked		0	N/A	Arable	0	30	30	7.5YR 4/4	N/A	N/A	N/A	N/A	mzcl	1	vs	fine sub-angular blocky fine sub-angular blocky	N	N	n	42.1	17.99	1	I	1	none		
6	heaven.remark.policy		0	N/A	Arable	0	39	39	7.5YR 4/3	Fine	7.5YR 6/8	N/A	N/A	mzcl	1	vs	fine to medium sub-angular blocky coarse sub-angular blocky	N	N	y	21.7	10.42	2	II	2	wetness + droughtiness	became massive	

Code		Location			
10044940		Stour Valley East Cable Sealing End Compound			
Date(s)		Surveyor(s)		Company	
24-Nov-21		BL/AS		Arcadis	
Weather		Relief		Land use and vegetation	
Dry, sunny		Flat ground - no gradient or microtopographical limitations		Arable	
NGR				Altitude	
TL90593676				70m	
MAFF prov		MAFF detailed		Flooding	
Grade 2		None available		Entire site within Flood Zone 1 - low probability of flooding	
AAR	ATO	MDw	MDp	FCD	Climate grade
597	1397	117	112	107	Grade 1 potential Flat site so no local climatic limitations
Bedrock			Superficial deposits		
Crag Group - Sand. Sedimentary Bedrock formed approximately 0 to 5 million years ago in the Quaternary and Neogene Periods.			Kesgrave Catchment Subgroup - Sand And Gravel. Superficial Deposits formed up to 3 million years ago in the Quaternary Period.		
Soil data			Soil association(s)		
SSEW 1:250 000 mapping			Luxford and Hornbeam 3 soil associations. The Luxford (571x) association is described as deep well-drained fine loamy, coarse loamy and sandy soils, locally flinty and in places over gravel. Whereas the Hornbeam 3 (582d) association is described as deep fine loamy over clayey, and clayey soils with slowly permeable subsoils and slight seasonal waterlogging, with some slowly permeable seasonally waterlogged fine loamy over clayey soils. Calcareous subsoils in places.		

Point	What3Words	Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Texture	Stones		Structure	Calc.	Mn C	SPL	Drought			Wet	Classification		Point notes
						Top	Btm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour		%	Type					MBw	MBp	Gd		WC	Grade	
1	identity.intrigues.cookers		7	South-west	Arable	0	35	35	10YR 4/4	N/A	N/A	N/A	N/A	zl	2	vs	fine sub-angular blocky coarse sub-angular blocky fine granular	5-10%	N/A	y	21.3	33.9	1	II	2	wetness	becomes sz with depth
						35	56	21	10YR 4/4	N/A	10YR 8/5	zl	2	vs	5-10%	N/A											
						56	70	14	10YR 6/6	N/A	N/A	ls	5	vs-s	NC	N/A											
2	remains.spenders.reliving		1	South-west	Arable	0	30	30	7.5YR 4/4	N/A	N/A	N/A	N/A	scl	1	vs	fine to medium sub-angular blocky coarse sub-angular blocky coarse sub-angular blocky	5-10%	N/A	n	21.1	7.6	2	I	2	droughtiness	
						30	52	22	7.5YR 4/4	Fine	5YR 5/8	scl	1	vs-s	5-10%	N/A											
						52	110	58	10 YR 4/6	N/A	N/A	zc	15	vs-s	5-10%	N/A											
3	hurtles.areas.cabinets		1	South	Arable	0	30	30	7.5YR 4/4	N/A	N/A	N/A	N/A	scl	1	vs	fine to medium sub-angular blocky coarse sub-angular blocky coarse sub-angular blocky	1%	N/A	n	-26.8	3.0	3b	I	3b	droughtiness	
						30	55	25	7.5YR 4/4	N/A	N/A	zc	5	vs-s	5-10%	N/A											
						55	120	65	10YR 6/6	N/A	N/A	zc	15	vs-s	5-10%	N/A											
4	eventful.marching.donation		10	South-west	Pasture	0	10	10	10YR 3/2	N/A	N/A	N/A	N/A	sl	1	vs-s	fine sub-angular blocky fine to medium sub-angular blocky fine granular	NC	N/A	n	24.9	32.1	2	I	3b	gradient	stopped by stones
						10	46	36	10YR 4/3	N/A	N/A	ls	1	vs-m	NC	N/A											
						46	65	19	10YR 5/8	N/A	N/A	s	5	vs-m	NC	N/A											
5	hockey.sheepish.tuck		5	South-west	Pasture	0	14	14	10YR 4/3	N/A	N/A	N/A	N/A	sl	1	vs	fine sub-angular blocky fine to medium sub-angular blocky medium sub-angular blocky/fine grain massive			y	62.4	14.43	1	I	1	none	
						14	45	31	10YR 4/6	N/A	N/A	sl	5	vs													
						45	80	35	10YR 5/6	N/A	N/A	s	0														
						80	110	30	G1 6/N	N/A	N/A	c	0														

Code		Location			
		Stour Valley Cable Section			
Date(s)		Surveyor(s)		Company	
30-Nov-22				LDC	
Weather		Relief		Land use and vegetation	
		Undulating, isolated areas of limiting gradient		A mixture of pasture, rough grass and horse paddock	
NGR		Altitude			
TL8803136262		31 m -70 m			
MAFF prov		MAFF detailed		Flooding	
Grade 2 and Grade 3		None available		The land is predominantly in Flood Risk Zone 1 with a low probability of flooding. An Area of Flood Zone 3 borders the River Stour.	
AAR	ATO	MDw	MDp	FCD	Climate grade
587	1403			105	Grade 1 potential Flat site so no local climatic limitations
Bedrock		Superficial deposits			
London Clay formation across the majority of the surveyed area. These rocks were formed between 48-56 million years ago in the Paleogene Period. Auger boring 68 is shown to be underlain by the Lewes Nodular Chalk Formation, formed between 84-96 million years ago in the Cretaceous Period.		drift deposits tend to be complex and variable, reflecting the surface relief on site. Elevated areas of the cable route are overlain by sedimentary Diamicton deposits of the Lowestoft Formation laid down 423-480 thousand years ago, composed of sand and gravel to the south of Twinstead Road. The steeply sloping land adjacent is overlain with more recent Kesgrave sand and gravel deposits of 2-11,800 age. Lower lying land within wide valley features were composed of alluvium clay, sand and silt deposits close to watercourse, transitioning to river terrace and head deposits of clay, sand and gravel deposits with increasing elevation on the valley sides.			
Soil data		Soil association(s)			
SSEW 1:250 000 mapping		Ludford - Deep well drained fine loamy, coarse loamy and sandy soils locally flinty and in places over gravel. Slight risk of water erosion. Hornbeam 3 - Deep fine loamy over clayey and clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy over clayey soils. Fladbury 1 - Stoneless clayey soils, in places calcareous variably affected by groundwater and frequently in riparian margins. Flat land with a risk of flooding.			

Point	OS Grid Reference	Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Texture	Stones		Structure	Calc.	Mn C	SPL	Drought			Wet	Classification		Point notes
						Top	Btm	Thick		Munsell colour	Form	Munsell colour	Form		Munsell colour	%					Type	MBw	MBp		Gd	WC	
68	589604, 236717				PGR	0	32		10 YR 4/3	AB	7.5 YR 4/6	AB	7.5 YR 6/2	mcl	<1	fl gvl				Y			III	3a	wetness		
77	588723, 236493				PGR	0	32		10 YR 4/3					mcl	<1	fl gvl				N			I	2	drought		
78	588624, 236470				PGR	0	42		10 YR 4/3					scl	1-2	fl gvl				N			I	2	drought		
79	588526, 236448				PGR	0	25		10 YR 4/3					scl	3-5	fl gvl				N			I	2	drought		
80	588431, 236421		3-7		PGR	0	22		10 YR 4/3	M	7.5 YR 3/4	M	7.5 YR 4/6	scl	5-10	fl gvl				N			I	3a	drought & slope		
81	588332, 236399				PGR	0	25		10 YR 4/3	M	7.5 YR 6/2	M	7.5 YR 6/8	scl	5-10	fl gvl				Y			III	3a	wetness		
82	588234, 236374				Horse Paddock	0	25		10 YR 4/3					mscl	3-5	fl gvl				Y			I	2	drought		
83	588138, 236350				Horse Paddock	0	20		10 YR 3/2		7.5 YR 7/1		7.5 YR 5/6	mscl	3-5	fl gvl				N			<II	3a	stone & drought		
84	587911, 236166				Horse Paddock	0	18		10 YR 3/2					msl	5-10	qb fl gvl				N			I	3a	stone & drought		
85	587988, 236247				RGR	0	28		10 YR 3/2					msl	5-10	qb fl gvl				N			I	3b	drought		
86	587904, 236161				RGR	0	23		10 YR 3/2					msl	20+	qb fl gvl				N			III	3b	stone		
87	587825, 236100		7-11		RGR	0	33		10 YR 3/2	FW	7.5 YR 6/2			scl	3-5	qb fl gvl				N			III	3b	slope		
88	587731, 236073		7-11		RGR	0	24		10 YR 3/2					msl	5-10	qb fl gvl				Y			III	3b	slope		
89	587646, 236051				RGR	0	23		10 YR 3/2	AB	7.5 YR 4/2	AB	7.5 YR 4/6	sl o mcl	<1	gvl				Y			III	3a	wetness		
90	587527, 236036				Woodland	0	29		10 YR 2/2					pl	<1	fl				Y			WT/I	non ag	flood risk		
91	587435, 236013				Woodland	0	21		10 YR 4/2					lms	3-5	fl				N			I	non ag	flood risk		

Annex B: Particle Size Distribution Data



Analysis Results (SOIL)

Customer ARCADIS
ELSMONT
ASH ROAD
STROUD
GL5 3NZ

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

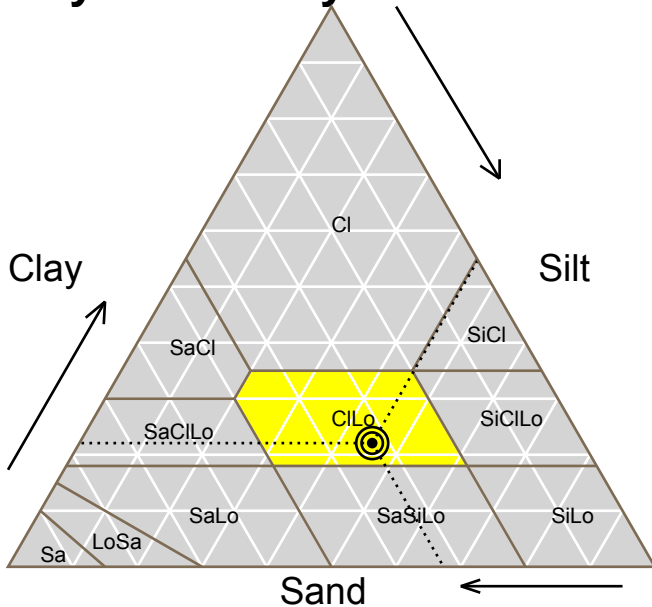
Sample Ref SS-03-TS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/01

Crop

Physical Analysis



Analysis	Result (%)
Sand	32.66
Silt	45.26
Clay	22.08
Very Fine Sand	10.25
Fine Sand	14.49
Medium Sand	7.86
Coarse Sand	0.06
Very Coarse Sand	< 0.01
Stones >2mm	7.20
Soil Type	CI Lo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

Customer ARCADIS
ELSMONT
ASH ROAD
STROUD
GL5 3NZ

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

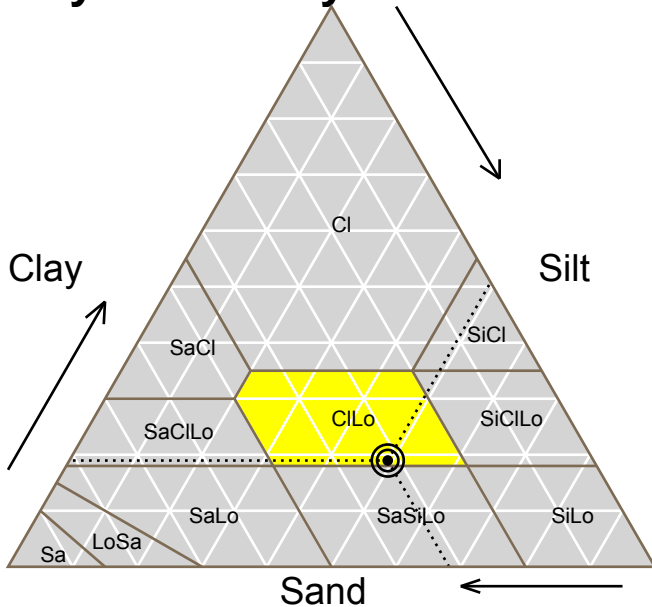
Sample Ref SS-03-SS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/02

Crop

Physical Analysis



Analysis	Result (%)
Sand	31.81
Silt	49.22
Clay	18.97
Very Fine Sand	13.39
Fine Sand	9.44
Medium Sand	8.10
Coarse Sand	0.88
Very Coarse Sand	< 0.01
Stones >2mm	7.80
Soil Type	ClLo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

Customer ARCADIS
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STROUD
GL5 3NZ

Distributor ARCADIS (UK) LTD
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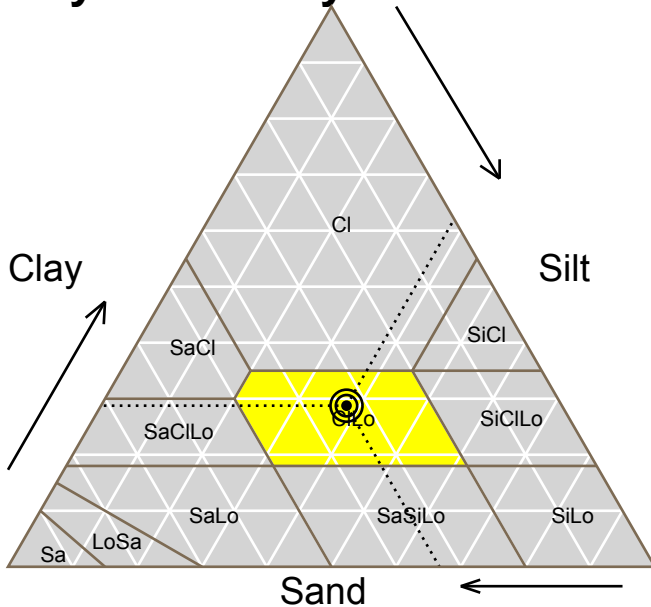
Sample Ref CSE-02-01-TS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/03

Crop

Physical Analysis



Analysis	Result (%)
Sand	33.29
Silt	37.95
Clay	28.76
Very Fine Sand	8.48
Fine Sand	13.52
Medium Sand	10.47
Coarse Sand	0.82
Very Coarse Sand	< 0.01
Stones >2mm	9.90
Soil Type	ClLo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

Customer ARCADIS
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STROUD
GL5 3NZ

Distributor ARCADIS (UK) LTD
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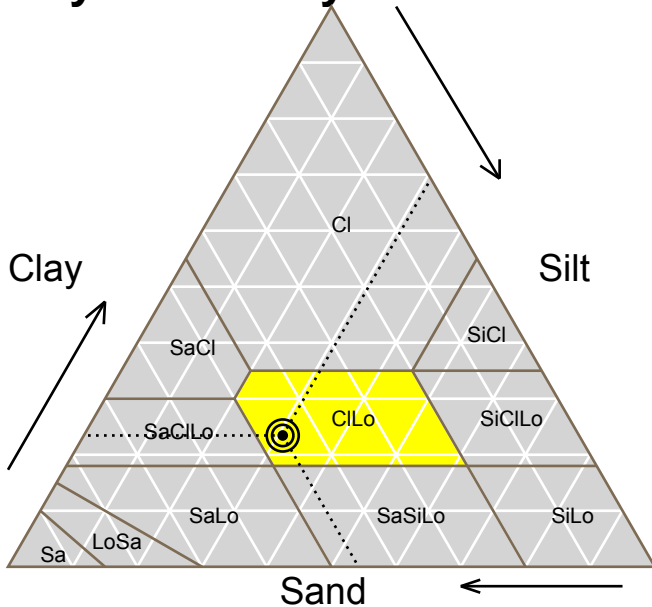
Sample Ref CSE-02-01-SS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/04

Crop

Physical Analysis



Analysis	Result (%)
Sand	45.81
Silt	30.75
Clay	23.44
Very Fine Sand	7.51
Fine Sand	21.58
Medium Sand	15.13
Coarse Sand	1.60
Very Coarse Sand	< 0.01
Stones >2mm	7.60
Soil Type	CI _{Lo} Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

Customer ARCADIS
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STROUD
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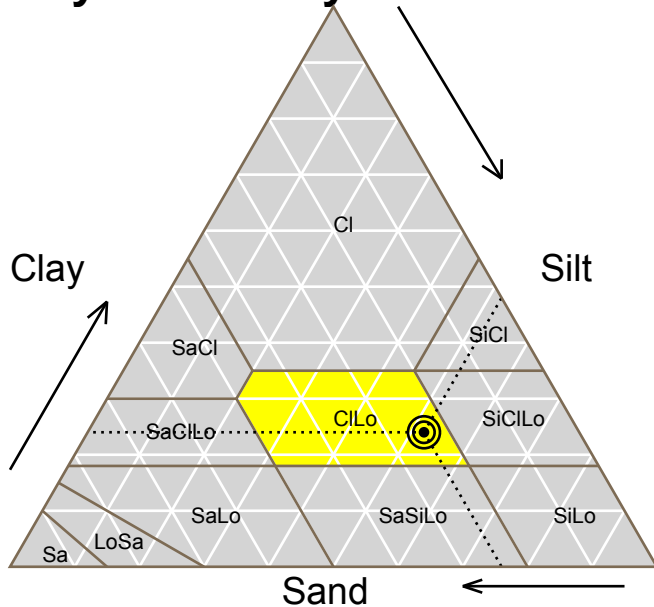
Sample Ref CSE-03-01-TS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/05

Crop

Physical Analysis



Analysis	Result (%)
Sand	24.00
Silt	51.99
Clay	24.01
Very Fine Sand	9.45
Fine Sand	10.19
Medium Sand	4.35
Coarse Sand	0.01
Very Coarse Sand	< 0.01
Stones >2mm	12.40
Soil Type	ClLo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

Customer ARCADIS
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Distributor ARCADIS (UK) LTD
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STROUD
GLOS
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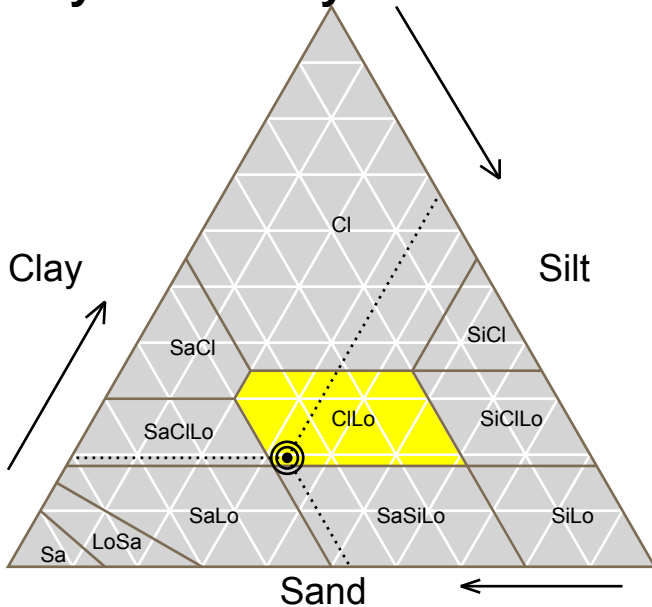
Sample Ref CSE-03-01-SS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/06

Crop

Physical Analysis



Analysis	Result (%)
Sand	47.11
Silt	33.44
Clay	19.45
Very Fine Sand	12.99
Fine Sand	19.43
Medium Sand	11.07
Coarse Sand	3.35
Very Coarse Sand	0.28
Stones >2mm	11.60
Soil Type	CI Lo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

Customer ARCADIS
ELSMONT
ASH ROAD
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GL5 3NZ

Distributor ARCADIS (UK) LTD
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STROUD
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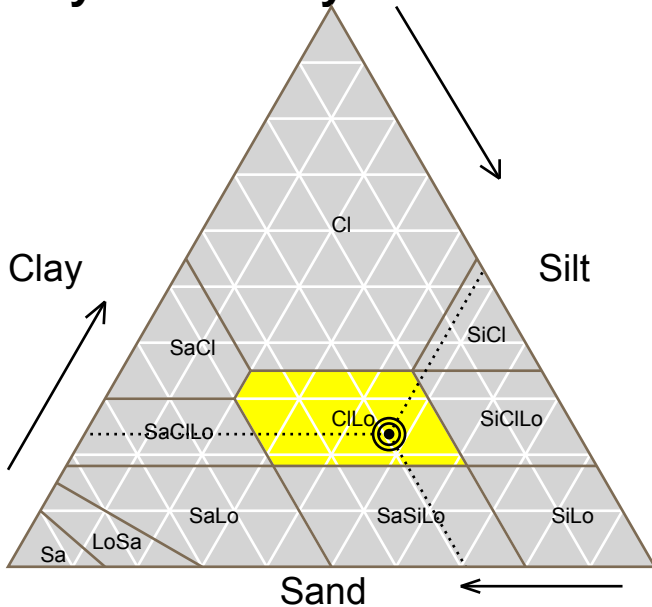
Sample Ref CSE-04-02-TS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/07

Crop

Physical Analysis



Analysis	Result (%)
Sand	29.25
Silt	47.07
Clay	23.68
Very Fine Sand	11.04
Fine Sand	12.10
Medium Sand	6.10
Coarse Sand	0.01
Very Coarse Sand	< 0.01
Stones >2mm	13.60
Soil Type	ClLo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

Customer ARCADIS
ELSMONT
ASH ROAD
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Distributor ARCADIS (UK) LTD
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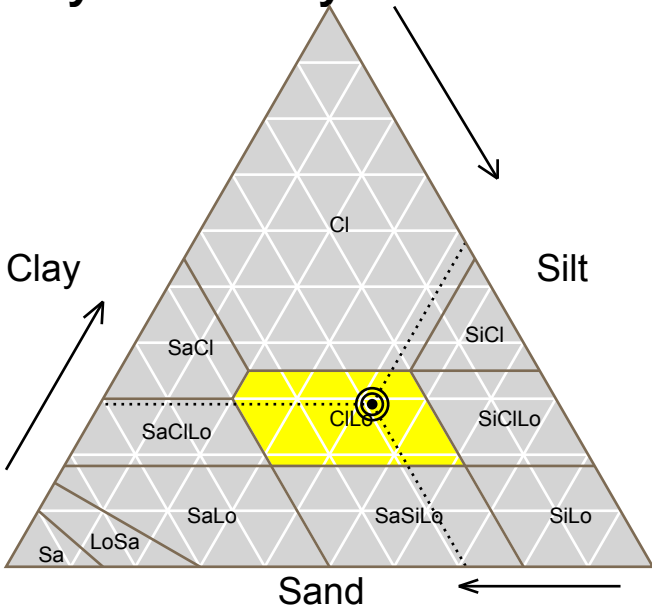
Sample Ref CSE-04-02-SS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/08

Crop

Physical Analysis



Analysis	Result (%)
Sand	28.88
Silt	42.10
Clay	29.02
Very Fine Sand	9.97
Fine Sand	10.50
Medium Sand	8.06
Coarse Sand	0.35
Very Coarse Sand	< 0.01
Stones >2mm	8.10
Soil Type	CLo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

Customer ARCADIS
ELSMONT
ASH ROAD
STROUD
GL5 3NZ

Distributor ARCADIS (UK) LTD
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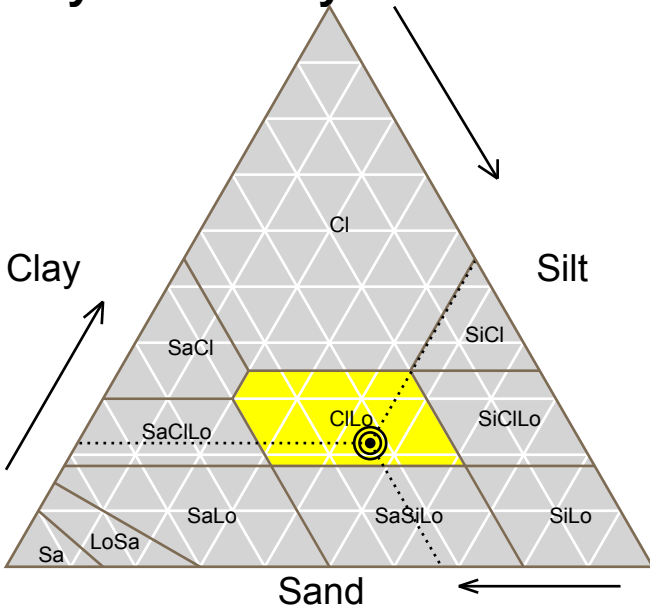
Sample Ref SS-03-TS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/01

Crop

Physical Analysis



Analysis	Result (%)
Sand	32.66
Silt	45.26
Clay	22.08
Very Fine Sand	10.25
Fine Sand	14.49
Medium Sand	7.86
Coarse Sand	0.06
Very Coarse Sand	< 0.01
Stones >2mm	7.20
Soil Type	CI Lo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

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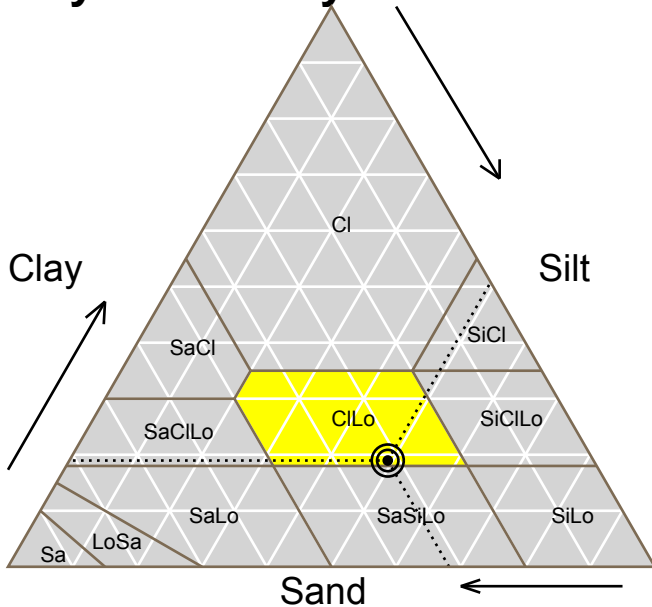
Sample Ref SS-03-SS

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Sample No G05767/02

Crop

Physical Analysis



Analysis	Result (%)
Sand	31.81
Silt	49.22
Clay	18.97
Very Fine Sand	13.39
Fine Sand	9.44
Medium Sand	8.10
Coarse Sand	0.88
Very Coarse Sand	< 0.01
Stones >2mm	7.80
Soil Type	ClLo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium

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National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
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