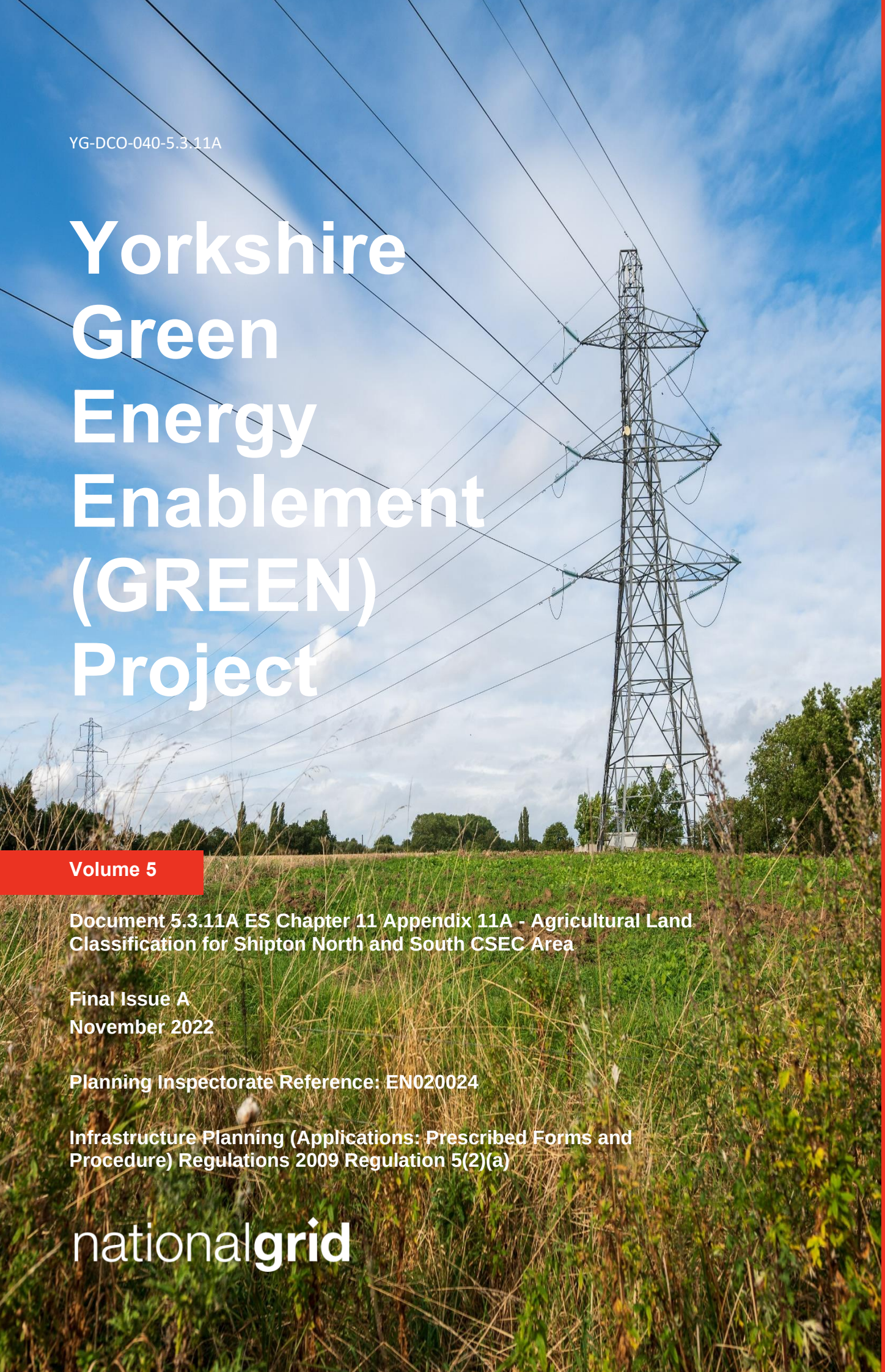
YG-DCO-040-5.3.11A

Yorkshire Green Energy Enablement (GREEN) Project



Volume 5

Document 5.3.11A ES Chapter 11 Appendix 11A - Agricultural Land Classification for Shipton North and South CSEC Area

Final Issue A

November 2022

Planning Inspectorate Reference: EN020024

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 Regulation 5(2)(a)

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Version history			
Date	**Version**	**Status**	**Description/changes**
01/11/2022	A	Final	First Issue

1. Agricultural Land Classification for the Shipton North and South CSEC Area

1.1 Introduction

Background

1.1.1 Agricultural Land Classification studies have been undertaken to provide an accurate baseline for areas of permanent development or where long-term soil disturbance is likely to take place as part of the Yorkshire Green Energy Enablement Project (referred to as the Project or Yorkshire GREEN). These survey locations were agreed through consultation with Natural England and have informed the Environmental Impact Assessment for **Chapter 11 Agriculture and Soils (Volume 5, Document 5.2.11).**

Site description

1.1.2 This appendix covers the areas where the Shipton North and South Cable Sealing End Compounds (CSEC) are proposed; the survey boundary (referred to in this document as 'the Site') can be seen on in **Figure 11.4, Volume 5, Document 5.4.11.**

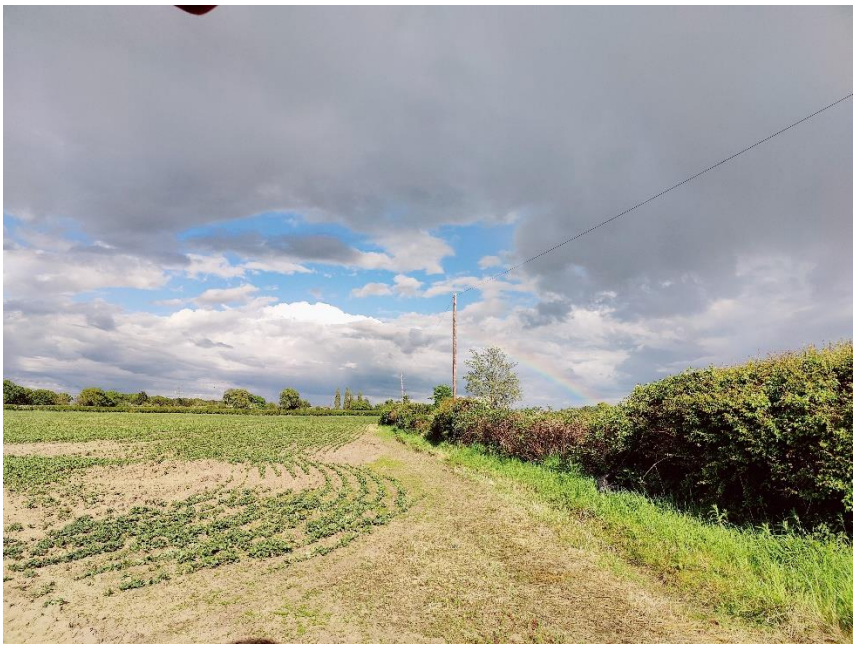
1.1.3 The Site is located within two administrative areas, the north two fields in North Yorkshire County Council and the southern field in the City of York and lies to approximately 8 km north of York, approximate central grid reference SE 565 598.

1.1.4 The Site comprises three agricultural fields covering an area of approximately 22 ha. Surrounding land use includes further agricultural fields to the north, south, east and west of the Site. Areas of non-agricultural land were noted during the survey, these included a small area of woodland situated at the boundary between the southern and northern two fields.

1.1.5 The entire site is typically flat lying, with the elevation ranging from 15 to 18 m ASL.

1.1.6 Plate 1 shows a view of the Site conditions on the day of the survey. The weather was overcast with sunny intervals and one short rain shower.

Plate 1 - Site condition on the day of the survey (southern field)



Definitions

1.1.7 The **Agricultural Land Classification** (ALC) system was devised by the Ministry of Agriculture, Fisheries and Food (MAFF) (1988)[1] and is the standard method for determining the quality of agricultural land in England and Wales according to its versatility, productivity and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage; i.e. ALC assesses land quality based upon the type and level of agricultural production the land can potentially support. The ALC grade is based on the most limiting factor to agricultural production, this may be a climatic limitation, site limitation (climate, gradient, risk of flooding, microrelief), soil limitation (texture and structure, depth, stoniness, chemical), or an interactive limitation (soil wetness, droughtiness, erosion). The ALC places land into one of five grades: Grade 1 (excellent); Grade 2 (very good); Grade 3 (good to moderate) which is divided into Subgrades 3a (good) and 3b (moderate); Grade 4 (poor); and Grade 5 (very poor).

1.1.8 **Best and Most Versatile** (BMV) agricultural land is defined as land of excellent to good agricultural quality (ALC Grades 1, 2 and Subgrade 3a) and is afforded a degree of protection in the National Planning Policy Framework (NPPF), 2021[2].

1.1.9 **Soil series** are the lowest category in the soil classification system and are precisely defined based upon particle-size distribution, parent material (substrate) type, colour, and mineralogical characteristics. **Soil Associations** are groupings of related soil series.

[1] MAFF, October 1988, Agricultural Land Classification of England and Wales: Revised criteria for grading the quality of agricultural land (ALC011)

[2] Ministry of Housing, Communities and Local Government, 2021, National Planning Policy Framework, https://www.gov.uk/government/publications/national-planning-policy-framework--2

1.2 Desk study

Information Sources

1.2.1 Information about the soils and agricultural land present on the Site was obtained from the published sources outlined in **Table 1.1**. This information assists in preparing the surveyor on likely site conditions prior to commencement of the survey.

Table 1.1 - Data sources used to inform the agriculture and soils assessment

Organisation	Data Source	Data Provided
The Soil Survey of England and Wales	Soils and their Use in Northern England and accompanying 1:250,000 map Sheet 1[3] .	Mapped soil associations and details of soil characteristics.
MAFF (now DEFRA)	Provisional ALC 1:250,000 mapping Yorkshire and The Humber (ALC003) [4].	Mapped ALC distributions - agricultural land quality data.
Natural England	Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale map Yorkshire and The Humber (ALC015)[5].	1:250,000 scale mapping predicting the likelihood of BMV agricultural land.
Google	Google Maps incorporating Streetview[6] and Google Earth Pro[7].	Aerial and street level imaging of the Project.
Department of the Environment, Farming and Rural Affairs (Defra)	The Government's geographic information website: Multi-Agency Geographical Information for the Countryside MAGIC.gov.uk [8.]	Administrative area boundaries, Provisional and Post-1988 ALC data, and aerial imaging available to view digitally and overlay.
Cranfield University (Knox *et al.)*	Report: Research to develop the evidence base on soil	Soil erosion criteria to inform soil sensitivity classifications.

[3] Soil Survey of England and Wales (1984). Soils and their Use in Northern England and accompanying 1:250,000 map Sheet 1. National Soil Resources Institute; Cranfield.
[4] MAFF (1993). 1:250,000 Provisional Agricultural Land Classification Sheet, Yorkshire and the Humber (ALC003) (online). Available at: https://data.gov.uk/dataset/952421ec-da63-4569-817d-4d6399df40a1/provisional-agricultural-land-classification-alc (Accessed 30 June 2021).
[5] Natural England (2017) Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale map Strategic scale map Yorkshire and The Humber (ALC015). Natural England; York.
[6] Google (2021). Google Maps incorporating Google Streetview. (online) (Accessed 30 June 2021).
[7] Google (2022). Google Earth Pro. (online). (Accessed April 2022).
[8] Defra (2021). Multi-Agency Geographical Information for the Countryside (MAGIC). (online) Available at https://magic.defra.gov.uk/magicmap.aspx (Accessed 30 June 2021).

Organisation	Data Source	Data Provided
	erosion and water use in agriculture[9].	
Cranfield University	Climatological Data for Agricultural Land Classification[10]	Agroclimatic data to inform ALC.

Soils

1.2.2 The scale of the Soil Survey of England and Wales (1984) mapping is such that it is not accurate to the field level and does not pick up small-scale local variations in soil type. It does however provide a general indication of the soil types within the Site and the wider Borough. The Site lies in an area of Foggathorpe 2 (712i) association.

1.2.3 A summary of the characteristics of this soil association is provided in **Table 1.2**.

Table 1.2 – Summary of soil types and soil erodibility risk for the soil within the study area

Soil Association	Description	Erodability
Foggathorpe 2 (712i)	Slowly permeable seasonally waterlogged stoneless clayey and fine loamy over clayey soils. Some similar coarse loamy over clayey soils. Soils are slowly permeable and can be seasonally waterlogged (Wetness Class III and IV) even with drainage	Very Small Risk (Water).

Agricultural land classification

1.2.4 The Provisional 1:250,000 ALC mapping indicates that agricultural land within the Site is ALC Grade 3 (good to moderate). However, as with the soils data, the scale of the mapping is not accurate at the field level as it does not pick up variations in ALC grade for areas less than approximately 80 ha. However, it does provide an indication of the predominant ALC grading in the wider area.

1.2.5 The BMV Likelihood mapping indicates that agricultural land within the Site is of moderate likelihood of BMV land (20 – 60 % area of BMV).

[9] Cranfield University, Knox *et al*. (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report. pp147'. (online). (Accessed 30 June 2021).
[10]Cranfield University (2013). Climatological Data for Agricultural Land Classification (online). Available at: https://data.gov.uk/dataset/8a334958-ff65-4f5c-9674-5a85e61ee269/climatological-data-for-agricultural-land-classification (Accessed 30 June 2021).

Aerial imagery

1.2.6 Satellite imagery of the Site, shown in Plate 2, which shows some signs of soil variability in the central and southern field, and no obvious changes in the northern field.

Plate 2 - Satellite imagery of the Site (© Google Earth)

1.3 Site Survey

Methodology

1.3.1 A soil survey was undertaken from 11 May 2022 by experienced soil surveyors using augered soil cores and soil profile pits. A detailed soil survey was undertaken with 1 point per ha.

1.3.2 Auger cores were taken using a 70 mm diameter hand-held Edelman auger, capable of sampling to a maximum depth of 100 cm; the soil profile pit was excavated, using a spade to a maximum depth of 75 cm, sufficient to evaluate the *in situ* structure of the soil profile.

1.3.3 A total of 22 points, 19 cores and 3 pits were inspected. As shown on in **Figure 11.4, Volume 5, Document 5.4.11**, the survey points were distributed across the Site, giving a survey density of more than one point per hectare in the areas of agricultural land for detailed ALC survey, and a less densely distributed to verify the existing ALC survey. This includes all of the conditions present on Site, above the recommendations set out in standard survey and ALC guidance and methodology. The purpose of the survey was to provide details of soil profile characteristics and to inform the ALC assessment.

1.3.4 To confirm the soil texture across the Site, ten soil samples were sent for analysis of particle size distribution by NRM Laboratories, accredited by UKAS to the internationally recognised standard for competence; ISO/IEC 17025.

Site description

1.3.5 The northern and central field were under a cereal crop which appeared to be wheat. The southern field was under a cover crop or oil seed rape.

1.3.6 A large hedgerow separates the southern field form the northern two, with smaller hedgerows between the roads and surrounding fields.

Soils

1.3.7 Two soil series, both from the Foggathorpe 2 (712i) association, were identified during the site survey. The Portington Series and the Foggathorpe Series, a description and image of each is provided below.

Portington Series

1.3.8 Horizon 1, topsoil, depth averaged 37 cm, with a sandy clay loam texture, dark brown colour (2.5Y 2.5/1), with no mottling and a granular to subangular blocky structure. The soil was moderately developed with medium ped sizes and a very friable consistency. There were no stones observed.

1.3.9 Horizon 2, upper subsoil, depth averaged 75 cm, with a sandy loam texture, pale colour (10YR 6/1) with many ochreous mottles (100%, 10YR 5/8). Biopores were observed in this horizon, the structure was sub angular blocky with moderate development and a medium ped size, the consistence was very friable. Some profiles showed a thin grey band before the main subsoil, which was of the same colour but with very few mottles. There were no stones observed.

1.3.10 Horizon 3, lower subsoil, depth was 120 cm (the maximum observed for ALC surveys), with a silty clay texture, dark grey in colour (5Y 5/1), moderate ochreous mottling (40%, 10YR 5/8). No biopores were observed, the structure was prismatic, of moderate development, with a very coarse ped size and extremely firm consistence. There were no stones observed.

1.3.11 The soils in this series are predominantly of Wetness Class 2, with gleying occurring within 70cm, and a slowly permeable layer occurring within 80 cm. One observed point (169) was of Wetness Class 1, where there is no slowly permeable layer within 80 cm or gleying within 70 cm.

1.3.12 Example plates of this soil series are shown below.

Plate 3 - Point 169 – Portington Series – Wetness Class 1

Plate 4 - Point 172 – Portington Series – Wetness Class 2

Foggathorpe Series

1.3.13 Horizon 1, topsoil, depth averaged 35 cm, with a loamy sand to sandy clay loam texture, dark brown colour (2.5Y 2.5/1), with no mottling and a granular to subangular blocky structure. The soil was moderately developed with medium ped sizes and a very friable consistency. There were no stones observed.

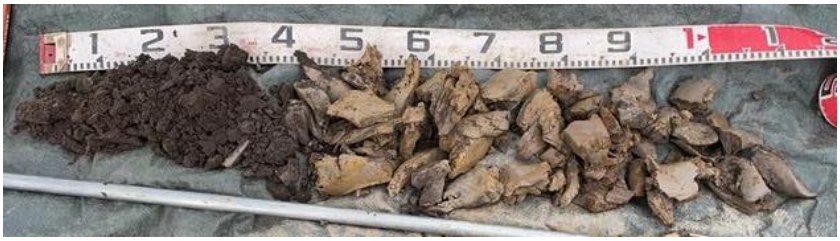
1.3.14 Horizon 2, upper subsoil, depth averaged 75 cm, with a heavy clay loam to silty clay texture, pale colour (10YR 6/1) with moderate to many ochreous mottles (40-100%, 10YR 5/8). Biopores were generally not observed in this horizon, the structure was prismatic with moderate development and a very coarse ped size, the consistence was very firm. There were no stones observed.

1.3.15 Horizon 3, lower subsoil, depth was 120 cm (the maximum observed for ALC surveys), with a silty clay texture, dark grey in colour (5Y 5/1), slight to moderate ochreous mottling (20 - 40%, 10YR 5/8). No biopores were observed, the structure was prismatic, of moderate development, with a very coarse ped size and extremely firm consistence. There were no stones observed.

1.3.16 The soils in this series are predominantly of Wetness Class 2, with gleying occurring within 70cm, and a slowly permeable layer occurring within 80 cm. One observed point (169) was of Wetness Class 1, where there is no slowly permeable layer within 80 cm or gleying within 70 cm.

1.3.17 Example photographs of this soil series are shown below.

Plate 5 - Point 170 – Foggathorpe Series – Wetness Class 3



Agroclimatic data

1.3.18 Agroclimatic data was taken from the nearest meteorological stations and interpolated to obtain site-specific values, see **Table 1.3**.This was then used to establish whether the agricultural land quality of the Site is limited by climate and, in conjunction with soil profile characteristics, wetness and droughtiness.

1.3.19 It was found that the climate did not poses a limitation to the ALC on Site.

Table 1.3 – Interpolated agroclimatic data for the Site

Measure (units)	Value
Average annual rainfall (mm)	625
Accumulated Temperature (0C)	1381
Field Capacity Duration (FCD) (days)	141
Moisture Deficit Wheat (mm)	104.5

Measure (units)	Value
Moisture Deficit Potatoes (mm)	95.4

Direct limitations to ALC grade

1.3.20 This section summarises the direct limitations to ALC grade at the Site (for detailed assessment of each Survey Point refer to **Annex 11A.1**).

1.3.21 There was no limitation to ALC grade due to site limitations (climate, gradient, risk of flooding, microrelief) or soil limitations (texture and structure, depth, stoniness, chemical).

Interactive limitations to ALC grade

1.3.22 This section summarises the interactive limitations (soil wetness, droughtiness, erosion) to ALC grade at the Site (for detailed assessment of each Survey Point refer to **Annex 11A.1**).

1.3.23 The combination of 141 Field Capacity Days, varying soil textures, structure and consistence, with the Wetness Classes 1 to 4 there are interactive limitations to ALC grade at the Site.

1.3.24 Wetness poses a limitation to ALC grade of the Site for some points where heavier and more firm subsoils were encountered which impedes soil drainage. This was found in areas with pale coloured subsoils and ochreous mottling. Resulting in a limitation to ALC Grade 2 and Subgrade 3a at a single point within the Site.

1.3.25 Droughtiness poses a limitation to the ALC grade for some points where the upper subsoil has a higher clay content, these soils will suffer from droughtiness in this lower rainfall area. Calculations indicate that the droughtiness will be slight for potatoes and in some areas also wheat, resulting in a limitation to ALC Grade 2 at some points within the Site

1.4 Overall agricultural land classification

1.4.1 Grade boundaries were drawn based on field observations and ALC calculations from individual points, to create the final ALC mapping units. The ALC map comprises Grade 2, Subgrade 3a and Subgrade 3b agricultural land, with some areas of non-agricultural land. The main differentiation between gradings at the Site was the depths to the slowly permeable and gleyed soil horizons.

1.4.2 A description of each grade is provided below, a summary of the ALC gradings for the site is shown in **Table 1.4**, and geographically in **Figure 11.4, Volume 5, Document 5.4.11**.

Grade 2

1.4.3 Areas of land showing only slight limitations to agricultural production due to droughtiness and/or wetness.

Subgrade 3a

1.4.4 Areas of land with limitations to agricultural production due to subsoil wetness, where a slowly permeable layer occurs within 70cm, and gleying within 80cm depth.

Subgrade 3b

1.4.5 Areas of land with moderate limitations to agricultural production due to subsoil wetness, where gleying is present within 40cm depth.

Non-agricultural

1.4.6 Land not used for agricultural production. A portion of the agricultural land within the survey boundary had been lost to development of agricultural buildings in the north east side of the survey boundary. Separating the landholdings between the southern and middle field was a large tree and hedgerow, approximately 5m wide.

Table 1.4 – Summary of Agricultural Land Classification at the Site

ALC or other land category	Area (ha)	Percentage (%)
Grade 1 (excellent)	0.0	0.0
Grade 2 (very good)	**8.8**	**40.1**
Subgrade 3a (good)	**10.5**	**47.9**
Subgrade 3b (moderate)	**1.4**	**6.3**
Grade 4 (poor)	0.0	0.0
Grade 5 (very poor)	0.0	0.0
Non-agricultural	**1.3**	**5.8**
Total	**22.0**	**100**

1.5 Summary and conclusions

The agricultural land within the survey boundary is made up of Grade 2 (very good quality, 8.8 ha, 40.1 %), Subgrade 3a (good quality, 10.5, 47.9%) and Subgrade 3b (moderate quality, 1.4 ha, 6.3 %) agricultural land. The main differentiation between gradings at the Site was the depths to the slowly permeable and gleyed soil horizons. A small area of non-agricultural land (1.3 ha, 5.8 %) is present where a new agricultural building and hardstanding has been erected in the north east corner of the survey boundary, and in a wide tree belt between the southern and middle field.

The proposed location of the CSEC for the Project would be located on an area of Grade 2 and Subgrade 3a agricultural land.

The soils in the survey boundary range from a light textured sandy loams to heavy clays and are consistent with the Foggathorpe 2 (712i) soil association, specifically the Foggathorpe and Portington series.

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Annex 11A.1
Soil Survey Record and ALC Breakdown

Survey point number corresponds with the numbers on in **Figure 11.4, Volume 5, Document 5.4.11** and in the other Annexes.

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Soil Survey Record and ALC Calculations

Legend for non-self-explanatory terms:

Horizons - number of different horizons identified within the profile
Type - type of sample, auger core or soil profile pit dug using a spade
Depth - depth to the bottom of the (horizon number) horizon in cm
Texture - C - clay, ZC - silty clay, SC - sandy clay, CL - clay loam, SCL - sandy clay loam, ZCL - silty clay loam, SL - sandy loam, LS - loamy sand, S - sand;
CL and ZCL textures are subdivided into medium (M) and heavy (H) classes according to clay content, as follows: M medium (less than 27 % clay), H heavy (27-35 % clay); F, M and C refer to fine, medium and coarse, respectively, and are subdivisions of S, LS, SL, and SZL textures; O - organic, P - peat or peaty, HP - humified (highly decomposed peat), FP - fibrous peat, SFP - semi-fibrous peat; MZ - marine light silts
Matrix (main) colour - dominant colour of the soil; **Hue** - Munsell colour hue; **Value** - Munsell colour value; **Chroma** - Munsell colour chroma
Mottling - spots and blotches of different colour than the dominant matrix colour
Ped faces - surfaces of the primary soil fragments into which the soil naturally breaks up upon excavating
FeMn - ferri-manganifeours concertions
Biopores - 'yes' if >0.5 % biopores greater than 0.5 mm diameter present (by area)
Stones > 2 cm up to % - maximum percentage of 2 - 6 cm diameter stones
Stones > 6 cm up to % - maximum percentage of > 6 cm diameter stones
Type - H - All hard rocks or stones (those which cannot be scratched with a finger nail); SS - Soft, medium or coarse grained sandstones; SIM - Soft 'weathered' igneous or metamorphic rocks or stones; SL - Soft oolitic or dolomitic limestones; SFS - Soft fine-grained sandstones; SAZ - Soft, argillaceous or silty rocks or stones; CH - Chalk or chalk stones; GRH - Gravel[1] with non-porous (hard) stones; GRS - Gravel[1] with porous stones (mainly soft stone types listed);1 - Gravel with at least 70% rounded stones by volume
Structure type - SG - single grain; GR - granular; SAB - subangular blocky; AB - angular blocky; PR - prismatic; PL - platy; MAS - massive
Dev - Development, how well the structure is developed; W - weak; M - moderate; S - strong
Consistence - Soil consistence (strength); L - loose; VFR - very friable; FR - friable; FIR - firm; VFIR - very firm; EXFIR - extremely firm; EXHD - extremely hard
Gley - depth to gleying
SPL - depth to slowly permeable layer
Wetness Class - classification of the soil according to the depth and duration of waterlogging in the soil profile, the higher the class, the longer and at the shallower depth the soil is wet

Overall ALC - this part of the table combines results of the classification for each of the limitations

Soil profile descriptions																				
							Matrix (main) colour			Peat-specific properties					Mottling				
Survey point	Type	Grad-ient	Soil distur-bed or resto-red	Horizon	Depth	Texture	Hue	Value	Chroma	Von Post	Water content (B)	Fine fibre content (F)	Coarse fibre content (R)	Wood remains (W)	Abundan-ce up to %	Hue	Value	Chroma
154	**Core**	0	no	1	35	SCL	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	55	C	10YR	5	1	n/a	n/a	n/a	n/a	n/a	40	7.5YR	5	6
				3	100	MSL	7.5YR	7	1	n/a	n/a	n/a	n/a	n/a	20	10YR	7	6
				4	120	ZC	5PB	4	0	n/a	n/a	n/a	n/a	n/a	40	10YR	4	6
				5														
155	**Core**	0	no	1	30	MCL	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	55	HCL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				3	85	SCL	10YR	6	1	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				4	120	ZC	5Y	4	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				5														
156	**Core**	0	no	1	35	MCL	10YR	2	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	73	HCL	10YR	6	1	n/a	n/a	n/a	n/a	n/a	100	10YR	7	8
				3	120	C	5Y	4	1	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				4														
				5														
157	**Core**	0	no	1	25	MCL	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	50	HCL	10YR	6	2	n/a	n/a	n/a	n/a	n/a	40	10YR	7	8
				3	65	MSL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				4	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				5														
158	**Core**	0	no	1	40	MCL	10YR	3	1	n/a	n/a	n/a	n/a	n/a	2	10YR	5	8
				2	80	HCL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				3	120	C	5Y	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				4														
				5														
159	**Core**	0	no	1	32	MCL	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	60	HCL	10YR	6	1	n/a	n/a	n/a	n/a	n/a	100	10YR	7	8
				3	120	C	5Y	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				4														
				5														
160	**Core**	0	no	1	35	MCL	10YR	3	1	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	50	MSL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	2	10YR	5	8
				3	70	HCL	10YR	6	1	n/a	n/a	n/a	n/a	n/a	20	10YR	5	8
				4	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				5														
161	**Core**	0	no	1	38	MCL	10YR	3	1	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	70	HCL	10YR	6	1	n/a	n/a	n/a	n/a	n/a	40	10YR	6	8
				3	120	C	5Y	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				4														
				5														
162	**Core**	0	no	1	30	SCL	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	60	MCL	5PB	6	0	n/a	n/a	n/a	n/a	n/a	40	7.5YR	5	4
				3	110	C	5PB	5	0	n/a	n/a	n/a	n/a	n/a	100	10YR	4	4
				4														
				5														
163	**Core**	0	no	1	35	MSL	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	55	SCL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	6	8
				3	90	ZC	5PB	6	0	n/a	n/a	n/a	n/a	n/a	40	7.5YR	6	6
				4	115	SC	5PB	6	0	n/a	n/a	n/a	n/a	n/a	100	7.5YR	6	6
				5														
164	**Pit**	0	no	1	25	ZC	10YR	3	2	n/a	n/a	n/a	n/a	n/a	2	10YR	7	6
				2	75	HCL	N	6	0	n/a	n/a	n/a	n/a	n/a	100	10YR	5	6
				3	80	ZC	7.5YR	5	1	n/a	n/a	n/a	n/a	n/a	40	7.5YR	4	4
				4														
				5														
165	**Core**	0	no	1	40	MCL	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	74	MSL	10YR	6	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				3	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				4														
				5														
166	**Core**	0	no	1	42	MCL	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	42	MCL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				3	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				4														
				5														
167	**Core**	0	no	1	40	MCL	10YR	3	1	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	45	MSL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	20	10YR	5	8
				3	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				4														
				5														
169	**Core**	0	no	1	43	SCL	2.5Y	2.5	1	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	55	MSL	10YR	5	3	n/a	n/a	n/a	n/a	n/a	20	10YR	5	8
				3	80	MSL	10YR	6	1	n/a	n/a	n/a	n/a	n/a	100	10YR	6	8
				4	93	HCL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	6	8
				5	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	4	4
170	**Core**	0	no	1	40	LMS	2.5Y	2.5	1	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	80	HCL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	6	8
				3	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	20	10YR	4	4
				4														
				5														

Soil profile descriptions continued

Survey point	Ped faces				FeMn up to %	Biopo-res	Stones and rocks			Structure			Consis-tence	Calca-reous	Gley-ing	SPL	Notes
	Colour different to matrix	Hue	Value	Chroma			> 2 cm up to %	> 6 cm up to %	Type	Type	Deve-lop-ment	Ped size					
154	no	n/a	n/a	n/a	0	yes	0	0	n/a	GR	W	F	FR	no	NO	NO	
	no	n/a	n/a	n/a	2	no	0	0	n/a	PR	M	M	VFIR	no	YES	YES	
	no	n/a	n/a	n/a	0	no	5	0	SS	GR	M	F	VFR	no	NO	NO	-
	yes	10YR	7	4	0	no	0	0	n/a	PR	S	C	EXFIR	no	YES	NO	
155	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	VFIR	no	YES	YES	H3 was a heavy clay with
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	W	M	FR	no	YES	YES	a sand pocket,
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	NO	predominately SCL.
156	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	C	FR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	C	VFIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXHD	yes	YES	YES	-
157	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	VFIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	W	M	VFR	no	YES	NO	-
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	VFIR	no	YES	YES	
158	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	C	VFIR	no	YES	YES	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	NO	Moved point away from OHL.
159	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	SAB	M	C	EXFIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	YES	-
160	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FR	no	NO	NO	
	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	C	FIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	VFIR	no	YES	YES	-
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	YES	
161	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	C	VFIR	no	YES	YES	Small pocket of sand in
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	YES	H2. Noticeable algae on soil surface and indication of standing water.
162	no	n/a	n/a	n/a	0	yes	0	0	n/a	GR	W	F	FR	no	NO	NO	
	no	n/a	n/a	n/a	2	no	0	0	n/a	SAB	W	M	FIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	M	VFIR	no	NO	YES	-
163	no	n/a	n/a	n/a	0	yes	0	0	n/a	GR	W	F	FR	no	NO	NO	
	yes	10YR	8	6	40	no	0	0	n/a	SAB	W	F	FIR	no	YES	NO	
	no	n/a	n/a	n/a	2	no	0	0	n/a	PR	M	M	VFIR	no	YES	YES	Moved point away from
	no	n/a	n/a	n/a	0	no	0	0	n/a	SAB	W	F	FIR	no	YES	NO	OHL.
164	no	n/a	n/a	n/a	2	yes	0	0	n/a	SAB	M	M	FIR	no	NO	NO	
	yes	10YR	7	6	20	yes	0	0	n/a	SAB	M	M	FIR	no	YES	NO	
	yes	7.5YR	7	6	0	no	0	0	n/a	SAB	M	M	FIR	no	NO	NO	-
165	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FR	no	NO	NO	
	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	W	M	VFR	no	YES	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	YES	Signs of standing water in soil surface, algae.
166	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	C	VFIR	no	YES	YES	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	VFIR	no	YES	YES	-
167	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FIR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	SAB	M	F	VFR	no	YES	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	YES	-
169	no	n/a	n/a	n/a	0	yes	0	0	n/a	GR	M	M	VFR	no	NO	NO	
	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	VFR	no	YES	NO	
	no	n/a	n/a	n/a	0	yes	0	0	n/a	PR	M	M	VFR	no	YES	NO	-
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	M	FIR	no	YES	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	No	NO	NO	
170	no	n/a	n/a	n/a	0	yes	0	0	n/a	GR	M	M	VFR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	VFIR	no	YES	YES	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	NO	NO	-

ALC for areas represented by individual survey points													
Survey point	**Wetness class**	**Climate**	**Gradient**	**Summer flood risk**	**Winter flood risk**	**Topsoil texture**	**Soil Depth**	**Topsoil stoniness**	**Wetness**	**Droughti-ness**	**Other (see "Limited by" column)**	**ALC Grade**	**Limited by**
154	4	1	1	1	1	1	1	1	3b	1	1	**3b**	Wetness
155	4	1	1	1	1	1	1	1	3b	1	1	**3b**	Wetness
156	2	1	1	1	1	1	1	1	2	2	1	**2**	Wetness Droughti-ness
157	2	1	1	1	1	1	1	1	2	2	1	**2**	Wetness Droughti-ness
158	3	1	1	1	1	1	1	1	3a	2	1	**3a**	Wetness
159	2	1	1	1	1	1	1	1	2	1	1	**2**	Wetness
160	2	1	1	1	1	1	1	1	2	2	1	**2**	Wetness Droughti-ness
161	3	1	1	1	1	1	1	1	3a	2	1	**3a**	Wetness
162	2	1	1	1	1	1	1	1	2	2	1	**2**	Wetness Droughti-ness
163	3	1	1	1	1	1	1	1	2	1	1	**2**	Wetness
164	2	1	1	1	1	1	1	1	3b	1	1	**3b**	Wetness
165	2	1	1	1	1	1	1	1	2	1	1	**2**	Wetness
166	3	1	1	1	1	1	1	1	3a	2	1	**3a**	Wetness
167	3	1	1	1	1	1	1	1	3a	1	1	**3a**	Wetness
169	1	1	1	1	1	1	1	1	1	1	1	**1**	None
170	3	1	1	1	1	2	1	1	2	2	1	**2**	Topsoil texture Wetness Droughti-ness

Soil profile descriptions																			
							Matrix (main) colour			Peat-specific properties					Mottling			
Survey point	Type	Grad-ient	Soil distur-bed or resto-red	Horizon	Depth	Texture	Hue	Value	Chroma	Von Post	Water content (B)	Fine fibre content (F)	Coarse fibre content (R)	Wood remains (W)	Abundan-ce up to %	Hue	Value	Chroma
171	**Core**	0	no	1	35	SCL	2.5Y	2.5	1	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	58	MCL	10YR	7	1	n/a	n/a	n/a	n/a	n/a	20	10YR	6	8
				3	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				4														
				5														
172	**Core**	0	no	1	38	SCL	2.5Y	2.5	1	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	75	MSL	10YR	6	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				3	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				4														
				5														
173	**Core**	0	no	1	28	MCL	10YR	3	3	n/a	n/a	n/a	n/a	n/a	2	10YR	5	8
				2	65	HCL	10YR	6	1	n/a	n/a	n/a	n/a	n/a	20	10YR	7	8
				3	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	5	8
				4														
				5														
174	**Pit**	0	no	1	28	ZC	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	50	ZC	10YR	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	6	6
				3	65	ZC	5PB	6	0	n/a	n/a	n/a	n/a	n/a	100	7.5YR	5	6
				4														
				5														
175	**Core**	0	no	1	40	MCL	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	71	HCL	10YR	5	1	n/a	n/a	n/a	n/a	n/a	100	10YR	7	8
				3	120	ZC	5Y	5	1	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				4														
				5														
176	**Pit**	0	no	1	29	ZC	10YR	3	2	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	55	MSL	10YR	7	1	n/a	n/a	n/a	n/a	n/a	40	7.5YR	6	6
				3	75	ZC	5PB	4	0	n/a	n/a	n/a	n/a	n/a	40	10YR	4	4
				4														
				5														

Soil profile descriptions continued

Survey point	Ped faces				FeMn up to %	Biopo-res	Stones and rocks			Structure			Consis-tence	Calca-reous	Gley-ing	SPL	Notes
	Colour different to matrix	Hue	Value	Chroma			> 2 cm up to %	> 6 cm up to %	Type	Type	Deve-lop-ment	Ped size					
171	no	n/a	n/a	n/a	0	yes	0	0	n/a	GR	M	M	VFR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	SAB	M	C	VFIR	no	YES	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	YES	-
172	no	n/a	n/a	n/a	0	yes	0	0	n/a	GR	M	M	VFR	no	NO	NO	
	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	VFR	no	YES	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	YES	-
173	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	C	VFIR	no	NO	YES	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	YES	-
174	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FIR	no	NO	NO	
	yes	10YR	3	3	0	yes	0	0	n/a	SAB	M	F	FIR	no	YES	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	M	VFIR	no	YES	YES	-
175	no	n/a	n/a	n/a	0	yes	0	0	n/a	SAB	M	M	FR	no	NO	NO	
	no	n/a	n/a	n/a	2	no	0	0	n/a	PR	M	C	EXFIR	no	NO	YES	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	M	VC	EXFIR	no	YES	YES	-
176	no	n/a	n/a	n/a	0	yes	0	0	n/a	GR	W	F	FR	no	NO	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	GR	M	M	FIR	no	YES	NO	
	no	n/a	n/a	n/a	0	no	0	0	n/a	PR	S	C	VFIR	no	NO	YES	-

ALC for areas represented by individual survey points													
Survey point	**Wetness class**	**Climate**	**Gradient**	**Summer flood risk**	**Winter flood risk**	**Topsoil texture**	**Soil Depth**	**Topsoil stoniness**	**Wetness**	**Droughti-ness**	**Other (see "Limited by" column)**	**ALC Grade**	**Limited by**
171	3	1	1	1	1	1	1	1	3a	1	1	**3a**	Wetness
172	2	1	1	1	1	1	1	1	2	1	1	**2**	Wetness
173	3	1	1	1	1	1	1	1	3a	2	1	**3a**	Wetness
174	3	1	1	1	1	1	1	1	3b	3a	1	**3b**	Wetness
175	3	1	1	1	1	1	1	1	3a	2	1	**3a**	Wetness
176	3	1	1	1	1	1	1	1	3b	3a	1	**3b**	Wetness

Annex 11A.2
Droughtiness Calculations

Survey point number corresponds with the numbers on in **Figure 11.4, Volume 5, Document 5.4.11,** and in the other Annexes.

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Droughtiness Calculations

Abbreviations for non self-explanatory terms:

TAv – Total amount of soil water available to plants, considered to be the volumetric soil water content between 0.05 and 15 bar suction or, in case of sands and loamy sands, 0.10 and 15 bar suction. These suctions approximate to the conditions of field capacity and wilting point (when the plants can extract no more moisture from the soil).

EAv – Easily available water, held in the soil between 0.05 and 2.0 bar suction, used for calculating cereal available water below 50 cm depth where root systems are less well developed, and the plant's ability to extract water is diminished.

Values of TAv and EAv are estimated for each horizon based on soil texture and structural condition according to the ALC guidelines (MAFF, 1988).

AP – crop adjusted available water capacity, a measure of the quantity of water held in the soil profile which can be taken up by a specific crop.

MD – the moisture deficit term used in the ALC droughtiness assessment is a crop-related meteorological variable which represents the balance between rainfall and potential evapotranspiration calculated over a critical portion of the growing season.

MB – moisture balance: MB=AP-MD, MB for wheat and potatoes determines limitation by droughtiness

Data inputs										Droughtiness calculations																											
						Av. water (soil)		Av. water (stones)		AP wheat													AP potatoes															Limited to ALC grade
Survey Point	Horizon	Horizon thickness	Texture	Stones %	Structural condition	TAv %	EAv %	TAv %	EAv %	TAv/EAv	Start depth	End depth	Horiz. thickn.	TAv/EAv soil	% non stone	TAv/EAv stones	Stones %	AP wheat		AP(wheat) -MD(wheat)	Start depth	End depth	Horiz. thickn.	TAv top/sub soil	non-stone %	TAv stones	Stone %	AP potatoes		AP(potato) -MD(potato)	
154	1	35	SCL	0	GOOD	17				TAv	0	35	35	17	100	0	0	595			0	35	35	17	100	0	0	595			
										EAv	0	35	0	0	100	0	0	0													
	2	20	C	0	POOR	13	7			TAv	35	55	15	13	100	0	0	195			35	55	20	13	100	0	0	260			
										EAv	35	55	5	7	100	0	0	35													
	3	45	MSL	5	GOOD	17	13	3.0	2.0	TAv	55	100	0	17	95	3	5	0	153	48	55	100	15	17	95	3	5	245	110	15	1
										EAv	55	100	45	13	95	2	5	560													
	4	20	ZC	0	POOR	12	7			TAv	100	120	0	12	100	0	0	0			100	120	0	12	100	0	0	0			
										EAv	100	120	20	7	100	0	0	140													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
155	1	30	MCL	0	GOOD	18				TAv	0	30	30	18	100	0	0	540			0	30	30	18	100	0	0	540			
										EAv	0	30	0	0	100	0	0	0													
	2	25	HCL	0	POOR	12	7			TAv	30	55	20	12	100	0	0	240			30	55	25	12	100	0	0	300			
										EAv	30	55	5	7	100	0	0	35													
	3	30	SCL	0	MODERATE	15	10			TAv	55	85	0	15	100	0	0	0	136	31	55	85	15	15	100	0	0	225	107	11	1
										EAv	55	85	30	10	100	0	0	300													
	4	35	ZC	0	POOR	12	7			TAv	85	120	0	12	100	0	0	0			85	120	0	12	100	0	0	0			
										EAv	85	120	35	7	100	0	0	245													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
156	1	35	MCL	0	GOOD	18				TAv	0	35	35	18	100	0	0	630			0	35	35	18	100	0	0	630			
										EAv	0	35	0	0	100	0	0	0													
	2	38	HCL	0	POOR	12	7			TAv	35	73	15	12	100	0	0	180			35	73	35	12	100	0	0	420			
										EAv	35	73	23	7	100	0	0	161													
	3	47	C	0	POOR	13	7			TAv	73	120	0	13	100	0	0	0	130	25	73	120	0	13	100	0	0	0	105	10	2
										EAv	73	120	47	7	100	0	0	329													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
157	1	25	MCL	0	GOOD	18				TAv	0	25	25	18	100	0	0	450			0	25	25	18	100	0	0	450			
										EAv	0	25	0	0	100	0	0	0													
	2	25	HCL	0	POOR	12	7			TAv	25	50	25	12	100	0	0	300			25	50	25	12	100	0	0	300			
										EAv	25	50	0	7	100	0	0	0													
	3	15	MSL	0	GOOD	17	13			TAv	50	65	0	17	100	0	0	0	133	28	50	65	15	17	100	0	0	255	107	11	2
										EAv	50	65	15	13	100	0	0	195													
	4	55	ZC	0	POOR	12	7			TAv	65	120	0	12	100	0	0	0			65	120	5	12	100	0	0	60			
										EAv	65	120	55	7	100	0	0	385													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
158	1	40	MCL	0	GOOD	18				TAv	0	40	40	18	100	0	0	720			0	40	40	18	100	0	0	720			
										EAv	0	40	0	0	100	0	0	0													
	2	40	HCL	0	POOR	12	7			TAv	40	80	10	12	100	0	0	120			40	80	30	12	100	0	0	360			
										EAv	40	80	30	7	100	0	0	210													
	3	40	C	0	POOR	13	7			TAv	80	120	0	13	100	0	0	0	133	28	80	120	0	13	100	0	0	0	108	13	2
										EAv	80	120	40	7	100	0	0	280													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
159	1	32	MCL	0	GOOD	18				TAv	0	32	32	18	100	0	0	576			0	32	32	18	100	0	0	576			
										EAv	0	32	0	0	100	0	0	0													
	2	28	HCL	0	MODERATE	16	10			TAv	32	60	18	16	100	0	0	288			32	60	28	16	100	0	0	448			
										EAv	32	60	10	10	100	0	0	100													
	3	60	C	0	POOR	13	7			TAv	60	120	0	13	100	0	0	0	138	34	60	120	10	13	100	0	0	130	115	20	1
										EAv	60	120	60	7	100	0	0	420													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
160	1	35	MCL	0	GOOD	18				TAv	0	35	35	18	100	0	0	630			0	35	35	18	100	0	0	630			
										EAv	0	35	0	0	100	0	0	0													
	2	15	MSL	0	MODERATE	15	11			TAv	35	50	15	15	100	0	0	225			35	50	15	15	100	0	0	225			
										EAv	35	50	0	11	100	0	0	0													
	3	20	HCL	0	POOR	12	7			TAv	50	70	0	12	100	0	0	0	135	30	50	70	20	12	100	0	0	240	110	14	2
										EAv	50	70	20	7	100	0	0	140													
	4	50	ZC	0	POOR	12	7			TAv	70	120	0	12	100	0	0	0			70	120	0	12	100	0	0	0			
										EAv	70	120	50	7	100	0	0	350													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													

Data inputs										Droughtiness calculations																										
						Av. water (soil)		Av. water (stones)		AP wheat													AP potatoes														Limited to ALC grade
Survey Point	Horizon	Horizon thickness	Texture	Stones %	Structural condition	TAv %	EAv %	TAv %	EAv %	TAv/EAv	Start depth	End depth	Horiz. thickn.	TAv/EAv soil	% non stone	TAv/EAv stones	Stones %	AP wheat		AP(wheat) -MD(wheat)	Start depth	End depth	Horiz. thickn.	TAv top/sub soil	non-stone %	TAv stones	Stone %	AP potatoes		AP(potato) -MD(potato)	
161	1	38	MCL	0	GOOD	18				TAv	0	38	38	18	100	0	0	684	132	27	0	38	38	18	100	0	0	684	107	11	2
										EAv	0	38	0	0	100	0	0	0													
	2	32	HCL	0	POOR	12	7			TAv	38	70	12	12	100	0	0	144			38	70	32	12	100	0	0	384			
										EAv	38	70	20	7	100	0	0	140													
	3	50	C	0	POOR	13	7			TAv	70	120	0	13	100	0	0	0			70	120	0	13	100	0	0	0			
										EAv	70	120	50	7	100	0	0	350													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
162	1	30	SCL	0	GOOD	17				TAv	0	30	30	17	100	0	0	510	128	23	0	30	30	17	100	0	0	510	112	17	2
										EAv	0	30	0	0	100	0	0	0													
	2	30	MCL	0	MODERATE	16	10			TAv	30	60	20	16	100	0	0	320			30	60	30	16	100	0	0	480			
										EAv	30	60	10	10	100	0	0	100													
	3	50	C	0	POOR	13	7			TAv	60	110	0	13	100	0	0	0			60	110	10	13	100	0	0	130			
										EAv	60	110	50	7	100	0	0	350													
	4									TAv	110	110	0	0	100	0	0	0			110	110	0	0	100	0	0	0			
										EAv	110	110	0	0	100	0	0	0													
	5									TAv	110	110	0	0	100	0	0	0			110	110	0	0	100	0	0	0			
										EAv	110	110	0	0	100	0	0	0													
163	1	35	MSL	0	GOOD	17				TAv	0	35	35	17	100	0	0	595	137	32	0	35	35	17	100	0	0	595	108	12	1
										EAv	0	35	0	0	100	0	0	0													
	2	20	SCL	0	MODERATE	15	10			TAv	35	55	15	15	100	0	0	225			35	55	20	15	100	0	0	300			
										EAv	35	55	5	10	100	0	0	50													
	3	35	ZC	0	POOR	12	7			TAv	55	90	0	12	100	0	0	0			55	90	15	12	100	0	0	180			
										EAv	55	90	35	7	100	0	0	245													
	4	25	SC	0	MODERATE	15	10			TAv	90	115	0	15	100	0	0	0			90	115	0	15	100	0	0	0			
										EAv	90	115	25	10	100	0	0	250													
	5									TAv	115	115	0	0	100	0	0	0			115	115	0	0	100	0	0	0			
										EAv	115	115	0	0	100	0	0	0													
164	1	25	ZC	0	GOOD	17				TAv	0	25	25	17	100	0	0	425	138	33	0	25	25	17	100	0	0	425	137	42	1
										EAv	0	25	0	0	100	0	0	0													
	2	50	HCL	0	GOOD	21	14			TAv	25	75	25	21	100	0	0	525			25	75	45	21	100	0	0	945			
										EAv	25	75	25	14	100	0	0	350													
	3	5	ZC	0	GOOD	21	15			TAv	75	80	0	21	100	0	0	0			75	80	0	21	100	0	0	0			
										EAv	75	80	5	15	100	0	0	75													
	4									TAv	80	80	0	0	100	0	0	0			80	80	0	0	100	0	0	0			
										EAv	80	80	0	0	100	0	0	0													
	5									TAv	80	80	0	0	100	0	0	0			80	80	0	0	100	0	0	0			
										EAv	80	80	0	0	100	0	0	0													
165	1	40	MCL	0	GOOD	18				TAv	0	40	40	18	100	0	0	720	152	48	0	40	40	18	100	0	0	720	123	28	1
										EAv	0	40	0	0	100	0	0	0													
	2	34	MSL	0	GOOD	17	13			TAv	40	74	10	17	100	0	0	170			40	74	30	17	100	0	0	510			
										EAv	40	74	24	13	100	0	0	312													
	3	46	ZC	0	POOR	12	7			TAv	74	120	0	12	100	0	0	0			74	120	0	12	100	0	0	0			
										EAv	74	120	46	7	100	0	0	322													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
166	1	42	MCL	0	GOOD	18				TAv	0	42	42	18	100	0	0	756	134	30	0	42	42	18	100	0	0	756	109	14	2
										EAv	0	42	0	0	100	0	0	0													
	2	0	MCL	0	POOR	12	7			TAv	42	42	0	12	100	0	0	0			42	42	0	12	100	0	0	0			
										EAv	42	42	0	7	100	0	0	0													
	3	78	ZC	0	POOR	12	7			TAv	42	120	8	12	100	0	0	96			42	120	28	12	100	0	0	336			
										EAv	42	120	70	7	100	0	0	490													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
167	1	40	MCL	0	GOOD	18				TAv	0	40	40	18	100	0	0	720	136	31	0	40	40	18	100	0	0	720	111	15	1
										EAv	0	40	0	0	100	0	0	0													
	2	5	MSL	0	GOOD	17	13			TAv	40	45	5	17	100	0	0	85			40	45	5	17	100	0	0	85			
										EAv	40	45	0	13	100	0	0	0													
	3	75	ZC	0	POOR	12	7			TAv	45	120	5	12	100	0	0	60			45	120	25	12	100	0	0	300			
										EAv	45	120	70	7	100	0	0	490													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													

Data inputs										Droughtiness calculations																										
						Av. water (soil)		Av. water (stones)		AP wheat													AP potatoes														Limited to ALC grade
Survey Point	Horizon	Horizon thickness	Texture	Stones %	Structural condition	TAv %	EAv %	TAv %	EAv %	TAv/EAv	Start depth	End depth	Horiz. thickn.	TAv/EAv soil	% non stone	TAv/EAv stones	Stones %	AP wheat		AP(wheat) -MD(wheat)	Start depth	End depth	Horiz. thickn.	TAv top/sub soil	non-stone %	TAv stones	Stone %	AP potatoes		AP(potato) -MD(potato)	
169	1	43	SCL	0	GOOD	17				TAv	0	43	43	17	100	0	0	731			0	43	43	17	100	0	0	731			
										EAv	0	43	0	0	100	0	0	0													
	2	12	MSL	0	GOOD	17	13			TAv	43	55	7	17	100	0	0	119			43	55	12	17	100	0	0	204			
										EAv	43	55	5	13	100	0	0	65													
	3	25	MSL	0	MODERATE	15	11			TAv	55	80	0	15	100	0	0	0	151	46	55	80	15	15	100	0	0	225	116	21	1
										EAv	55	80	25	11	100	0	0	275													
	4	13	HCL	0	MODERATE	16	10			TAv	80	93	0	16	100	0	0	0			80	93	0	16	100	0	0	0			
										EAv	80	93	13	10	100	0	0	130													
	5	27	ZC	0	POOR	12	7			TAv	93	120	0	12	100	0	0	0			93	120	0	12	100	0	0	0			
										EAv	93	120	27	7	100	0	0	189													
170	1	40	LMS	0	GOOD	13				TAv	0	40	40	13	100	0	0	520			0	40	40	13	100	0	0	520			
										EAv	0	40	0	0	100	0	0	0													
	2	40	HCL	0	POOR	12	7			TAv	40	80	10	12	100	0	0	120			40	80	30	12	100	0	0	360			
										EAv	40	80	30	7	100	0	0	210													
	3	40	ZC	0	POOR	12	7			TAv	80	120	0	12	100	0	0	0	113	8	80	120	0	12	100	0	0	0	88	-7	2
										EAv	80	120	40	7	100	0	0	280													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
171	1	35	SCL	0	GOOD	17				TAv	0	35	35	17	100	0	0	595			0	35	35	17	100	0	0	595			
										EAv	0	35	0	0	100	0	0	0													
	2	23	MCL	0	MODERATE	16	10			TAv	35	58	15	16	100	0	0	240			35	58	23	16	100	0	0	368			
										EAv	35	58	8	10	100	0	0	80													
	3	62	ZC	0	POOR	12	7			TAv	58	120	0	12	100	0	0	0	135	30	58	120	12	12	100	0	0	144	111	15	1
										EAv	58	120	62	7	100	0	0	434													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
172	1	38	SCL	0	GOOD	17				TAv	0	38	38	17	100	0	0	646			0	38	38	17	100	0	0	646			
										EAv	0	38	0	0	100	0	0	0													
	2	37	MSL	0	GOOD	17	13			TAv	38	75	12	17	100	0	0	204			38	75	32	17	100	0	0	544			
										EAv	38	75	25	13	100	0	0	325													
	3	45	ZC	0	POOR	12	7			TAv	75	120	0	12	100	0	0	0	149	44	75	120	0	12	100	0	0	0	119	24	1
										EAv	75	120	45	7	100	0	0	315													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
173	1	28	MCL	0	GOOD	18				TAv	0	28	28	18	100	0	0	504			0	28	28	18	100	0	0	504			
										EAv	0	28	0	0	100	0	0	0													
	2	37	HCL	0	POOR	12	7			TAv	28	65	22	12	100	0	0	264			28	65	37	12	100	0	0	444			
										EAv	28	65	15	7	100	0	0	105													
	3	55	ZC	0	POOR	12	7			TAv	65	120	0	12	100	0	0	0	126	21	65	120	5	12	100	0	0	60	101	5	2
										EAv	65	120	55	7	100	0	0	385													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
174	1	28	ZC	0	GOOD	17				TAv	0	28	28	17	100	0	0	476			0	28	28	17	100	0	0	476			
										EAv	0	28	0	0	100	0	0	0													
	2	22	ZC	0	GOOD	21	15			TAv	28	50	22	21	100	0	0	462			28	50	22	21	100	0	0	462			
										EAv	28	50	0	15	100	0	0	0													
	3	15	ZC	0	POOR	12	7			TAv	50	65	0	12	100	0	0	0	104	0	50	65	15	12	100	0	0	180	112	16	3a
										EAv	50	65	15	7	100	0	0	105													
	4									TAv	65	65	0	0	100	0	0	0			65	65	5	0	100	0	0	0			
										EAv	65	65	0	0	100	0	0	0													
	5									TAv	65	65	0	0	100	0	0	0			65	65	0	0	100	0	0	0			
										EAv	65	65	0	0	100	0	0	0													
175	1	40	MCL	0	GOOD	18				TAv	0	40	40	18	100	0	0	720			0	40	40	18	100	0	0	720			
										EAv	0	40	0	0	100	0	0	0													
	2	31	HCL	0	POOR	12	7			TAv	40	71	10	12	100	0	0	120			40	71	30	12	100	0	0	360			
										EAv	40	71	21	7	100	0	0	147													
	3	49	ZC	0	POOR	12	7			TAv	71	120	0	12	100	0	0	0	133	28	71	120	0	12	100	0	0	0	108	13	2
										EAv	71	120	49	7	100	0	0	343													
	4									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													
	5									TAv	120	120	0	0	100	0	0	0			120	120	0	0	100	0	0	0			
										EAv	120	120	0	0	100	0	0	0													

Data inputs										Droughtiness calculations																						
						Av. water (soil)		Av. water (stones)		AP wheat												AP potatoes											Limited to ALC grade
Survey Point	Horizon	Horizon thickness	Texture	Stones %	Structural condition	TAv %	EAv %	TAv %	EAv %	TAv/EAv	Start depth	End depth	Horiz. thickn.	TAv/EAv soil	% non stone	TAv/EAv stones	Stones %	AP wheat		AP(wheat) -MD(wheat)	Start depth	End depth	Horiz. thickn.	TAv top/sub soil	non-stone %	TAv stones	Stone %	AP potatoes		AP(potato) -MD(potato)	
176	1	29	ZC	0	GOOD	17				TAv	0	29	29	17	100	0	0	493	106	1	0	29	29	17	100	0	0	493	112	16	3a
										EAv	0	29	0	0	100	0	0	0													
	2	26	MSL	0	GOOD	17	13			TAv	29	55	21	17	100	0	0	357			29	55	26	17	100	0	0	442			
										EAv	29	55	5	13	100	0	0	65													
	3	20	ZC	0	POOR	12	7			TAv	55	75	0	12	100	0	0	0			55	75	15	12	100	0	0	180			
										EAv	55	75	20	7	100	0	0	140													
	4									TAv	75	75	0	0	100	0	0	0			75	75	0	0	100	0	0	0			
										EAv	75	75	0	0	100	0	0	0													
	5									TAv	75	75	0	0	100	0	0	0			75	75	0	0	100	0	0	0			
										EAv	75	75	0	0	100	0	0	0													

Annex 11A.3
Laboratory Results

Sample nomenclature:

NG-YG-SNS “survey point no” “Horizon number”

Survey point number corresponds with the numbers on in **Figure 11.4, Volume 5, Document 5.4.11,** and in the other Annexes.

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ANALYSIS REPORT

Contact : WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP
Tel. : 0191 232 0943

H448

Please quote the above code for all enquiries

Client : GM11455GMGE

Distributor : NT54881

Local Rep : KIRSTY ELLIOTT

Telephone :

Sample Matrix : Agricultural Soil

Laboratory Reference
Card Number 69149/22

Date Received 17-May-22
Date Reported 26-May-22

SOIL ANALYSIS REPORT

Laboratory Sample Reference	Field Details			Index			mg/l (Available)		
	No.	Name or O.S. Reference with Cropping Details	Soil pH	P	K	Mg	P	K	Mg
370217/22	1	**NG-YG-SNS 174 H1** *No cropping details given*	**7.3**	**5**	**3**	**5**	**83.6**	**359**	**279**
370218/22	2	**NG-YG-SNS 174 H2** *No cropping details given*	**7.7**	**2**	**2+**	**6**	**23.8**	**206**	**414**
370219/22	3	**NG-YG-SNS 174 H3** *No cropping details given*	**7.8**	**0**	**1**	**7**	**5.4**	**77**	**809**
370220/22	4	**NG-YG-SNS 164 H1** *No cropping details given*	**7.2**	**3**	**3**	**5**	**30.8**	**256**	**329**
370221/22	5	**NG-YG-SNS 164 H2** *No cropping details given*	**7.7**	**0**	**1**	**5**	**8.8**	**111**	**315**
370222/22	6	**NG-YG-SNS 164 H3** *No cropping details given*	**8.0**	**0**	**1**	**6**	**2.6**	**64**	**585**

If general fertiliser and lime recommendations have been requested, these are given on the following sheets.
The analytical methods used are as described in DEFRA Reference Book 427
The index values are determined from the AHDB Fertiliser Recommendations RB209 9th Edition.

Released by Sandy Cameron On behalf of NRM Date 26/05/22

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SOIL ANALYSIS REPORT

Laboratory Sample Reference	Field Details			Index			mg/l (Available)		
	No.	Name or O.S. Reference with Cropping Details	Soil pH	P	K	Mg	P	K	Mg
370223/22	7	**NG-YG-SNS 176 H1** *No cropping details given*	**7.8**	**0**	**1**	**6**	**<2.5**	**76**	**508**
370224/22	8	**NG-YG-SNS 176 H2** *No cropping details given*	**6.9**	**3**	**1**	**3**	**30.4**	**80**	**107**
370225/22	9	**NG-YG-SNS 176 H3** *No cropping details given*	**7.8**	**0**	**1**	**7**	**5.0**	**71**	**626**
370226/22	10	**NG-YG-SNS 172 H1** *No cropping details given*	**7.2**	**3**	**1**	**3**	**28.4**	**87**	**123**

If general fertiliser and lime recommendations have been requested, these are given on the following sheets.
The analytical methods used are as described in DEFRA Reference Book 427
The index values are determined from the AHDB Fertiliser Recommendations RB209 9th Edition.

Released by Sandy Cameron On behalf of NRM Date 26/05/22

MICRO NUTRIENT REPORT

DATE **26th May 2022**

SAMPLES FROM **GM11455GMGE**

WARDELL ARMSTRONG LLP
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NEWCASTLE UPON TYNE
NE1 4DP

Tel: 0191 232 0943

Reference: **69149/370217/22**	Field Name: **NG-YG-SNS 174 H1**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %		7.5	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		6						
Silt (0.063 - 0.002mm) %		50						
Clay (< 0.002mm) %		44						
Textural Classification		Silty Clay	2					

Reference: **69149/370218/22**	Field Name: **NG-YG-SNS 174 H2**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %		5.2	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		3						
Silt (0.063 - 0.002mm) %		54						
Clay (< 0.002mm) %		43						
Textural Classification		Silty Clay	2					

Reference: **69149/370219/22**	Field Name: **NG-YG-SNS 174 H3**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %		3.6	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		1						
Silt (0.063 - 0.002mm) %		53						
Clay (< 0.002mm) %		46						
Textural Classification		Silty Clay	2					

Reference: **69149/370220/22**	Field Name: **NG-YG-SNS 164 H1**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %		4.8	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		8						
Silt (0.063 - 0.002mm) %		46						
Clay (< 0.002mm) %		46						
Textural Classification		Silty Clay	2					

Reference: **69149/370221/22**	Field Name: **NG-YG-SNS 164 H2**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %		2.7	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		28						
Silt (0.063 - 0.002mm) %		41						
Clay (< 0.002mm) %		31						
Textural Classification		Clay Loam	2					

Reference: **69149/370222/22**	Field Name: **NG-YG-SNS 164 H3**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %		2.6	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		4						
Silt (0.063 - 0.002mm) %		60						
Clay (< 0.002mm) %		36						
Textural Classification		Silty Clay	2					

Reference: **69149/370223/22**	Field Name: **NG-YG-SNS 176 H1**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**

Report continued.....

MICRO NUTRIENT REPORT

DATE **26th May 2022**

SAMPLES FROM **GM11455GMGE**

WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP

Tel: [redacted]

Reference: **69149/370223/22** Field Name: **NG-YG-SNS 176 H1**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %	3.5	**1**	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	1						
Silt (0.063 - 0.002mm) %	50						
Clay (< 0.002mm) %	49						
Textural Classification	Silty Clay	**2**					

Reference: **69149/370224/22** Field Name: **NG-YG-SNS 176 H2**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %	3.5	**1**	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	68						
Silt (0.063 - 0.002mm) %	16						
Clay (< 0.002mm) %	16						
Textural Classification	Sandy Loam	**2**					

Reference: **69149/370225/22** Field Name: **NG-YG-SNS 176 H3**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %	3.4	**1**	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	0						
Silt (0.063 - 0.002mm) %	48						
Clay (< 0.002mm) %	52						

Reference: **69149/370226/22** Field Name: **NG-YG-SNS 172 H1**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %	3.6	**1**	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	57						
Silt (0.063 - 0.002mm) %	21						
Clay (< 0.002mm) %	22						
Textural Classification	Sandy Clay Loam	**2**					

Notes (*)

(1) NRM considers Organic soils to contain between 10-20% organic material with Peaty soils containing over 20% . The optimum ranges for Organic Matter which have been set are dependent on the soil type and the cropping but these must be viewed as guidance values only.

(2) In calcareous soils the sand, silt and clay sized fractions are likely to contain particles of carbonate which may result in the incorrect classification of soil type.

ANALYSIS REPORT

DATE 26th May 2022
SAMPLES FROM GM11455GMGE

SAMPLED BY KIRSTY ELLIOTT
NT54881

Report reference 69149/22

WARDELL ARMSTRONG LLP
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11 WATERLOO SQUARE
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NE1 4DP

Tel: [redacted]

Fertiliser Recommendations

The phosphate and potash recommendations shown below, are those required to replace the offtake and maintain target soil indices. The larger recommended applications for soils below target index will allow the soil to build up to this target index over a number of years. Not applying fertiliser to soils which are above target index will allow the soil to run down over a number of years to the target index.
The recommendation should be increased or decreased where yields are substantially more or less than that specified. The amount to apply can be calculated using the expected yield and values for the offtake of phosphate and potash per tonne of yield given in the RB209 9th edition.
All recommendations are given for the mid-point of each Index.
Where a soil analysis value (as given by the laboratory) is close to the range of an adjacent Index, the recommendation may be reduced or increased slightly taking account of the recommendation given for the adjacent Index. Small adjustments of less than 10 kg/ha are generally not justified.
Efficient use of P and K is most likely to be achieved on soils that are well structured and enable good rooting.
For visual evaluation of soil structure (VESS), a score on 1 or 2 would be considered adequate.
Don't forget to deduct nutrients applied as organic manures.
For Nitrogen recommendations please refer to the RB209 9th edition or seek advice from an FACTS qualified adviser.
Target Indices:
Arable, Forage, Grassland and Potato Crops: P Index 2, K Index 2-
(In rotations where most crops are Autumn-sown, soils are in good condition and P is applied annually, high index 1 can be an adequate target.)
Vegetables and Bulbs: P Index 3, K Index 2+
(If vegetables are only grown occasionally as part of an arable rotation, it would be most economic to target index 2 for arable and forage crops.)
Fruit Vines and Hops: P Index 2, K Index 2, Mg Index 2
(Note: Cider apples respond to K Index 3, Mg Index 3)
A lime recommendation is usually for a 20cm depth of cultivated soil or a 15cm depth of grassland soil. Where soil is acid below 20 cm and soils are ploughed for arable crops, a proportionately larger quantity of lime should be applied. However, if more than 10 t/ha is needed, half should be deeply cultivated into the soil and ploughed down, with the remainder applied to the surface and worked in.
For established grassland or other situations where there is no, or only minimal soil cultivation, no more than 7.5 t/ha of lime should be applied in one application.
In these situations, applications of lime change the pH below the surface very slowly. Consequently, the underlying soil should not be allowed to become too acidic because this will affect the root growth and thus limit nutrient and water uptake, which will adversely affect yield.

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
NG-YG-SNS 174 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370217 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
NG-YG-SNS 174 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370218 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
NG-YG-SNS 174 H3	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370219 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
NG-YG-SNS 164 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370220 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
NG-YG-SNS 164 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370221 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**

Fertiliser recommendations are based on **AHDB RB209 (Ninth Edition).** If a nutrient is deficient and no recommendation is given, either no recommendation is given in RB209 or we have insufficient data to give a recommendation. Apply Lime to the nearest half Ton / Tonne.
NRM is a UKAS accredited laboratory to ISO/IEC 17025

Report continued.....

ANALYSIS REPORT

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SAMPLES FROM GM11455GMGE

SAMPLED BY KIRSTY ELLIOTT
NT54881

Report reference 69149/22

WARDELL ARMSTRONG LLP
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Fertiliser Recommendations

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-SNS 164 H3	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370222 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-SNS 176 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370223 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-SNS 176 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370224 / Medium		*Kg/Ha*				*Te/Ha* **0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-SNS 176 H3	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370225 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-SNS 172 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370226 / Medium		*Kg/Ha*				*Te/Ha* **0**	**0**

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