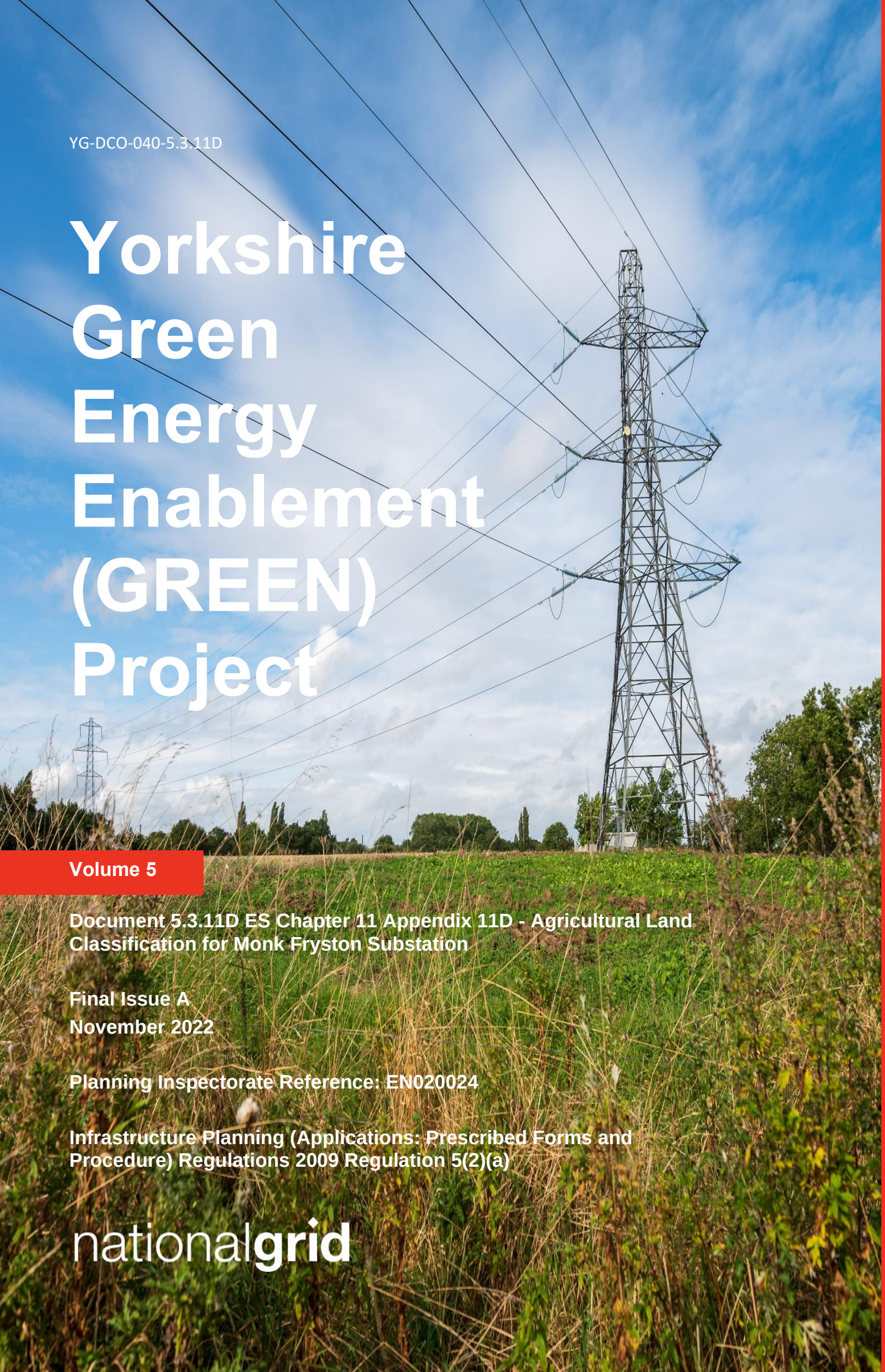
YG-DCO-040-5.3.11D

Yorkshire Green Energy Enablement (GREEN) Project



Volume 5

Document 5.3.11D ES Chapter 11 Appendix 11D - Agricultural Land Classification for Monk Fryston Substation

Final Issue A

November 2022

Planning Inspectorate Reference: EN020024

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

nationalgrid

Page intentionally blank

Contents

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

1. Agricultural Land Classification for Monk Fryston Substation 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 a new substation is proposed adjacent to the existing Monk Fryston Substation, the survey boundary (referred to in this document as 'the Site') can be seen on **Figure 11.7, Volume 5, Document 5.4.11**.

1.1.3 The Site is located within North Yorkshire County Council, approximately 19 km east of Leeds City Centre, approximate central grid reference SE486292.

1.1.4 The Site comprises four agricultural fields covering an area of approximately 35 ha. Surrounding land use includes further agricultural fields to the north, east and west of the Site. To its southwest the site borders the existing substation. Areas of non-agricultural land were noted during the survey, these included a small verges and drainage ditches at the edges of agricultural land parcels within the Site, and a road traversing the site from North to south.

1.1.5 The entire site is typically gently sloping, with the elevation ranging from 34 to 42 m ASL.

1.1.6 Plate 1 shows a view of the Site conditions on the day of the survey in May 2022. The weather was overcast with sunny intervals and intermittent short rain showers.

1.1.7 Plate 2 shows a view of the Site conditions on the day of the survey in September 2022. The weather was warm, overcast and dry.

Plate 1 - Site condition on the day of the survey in May 2022 (north eastern field, looking south)

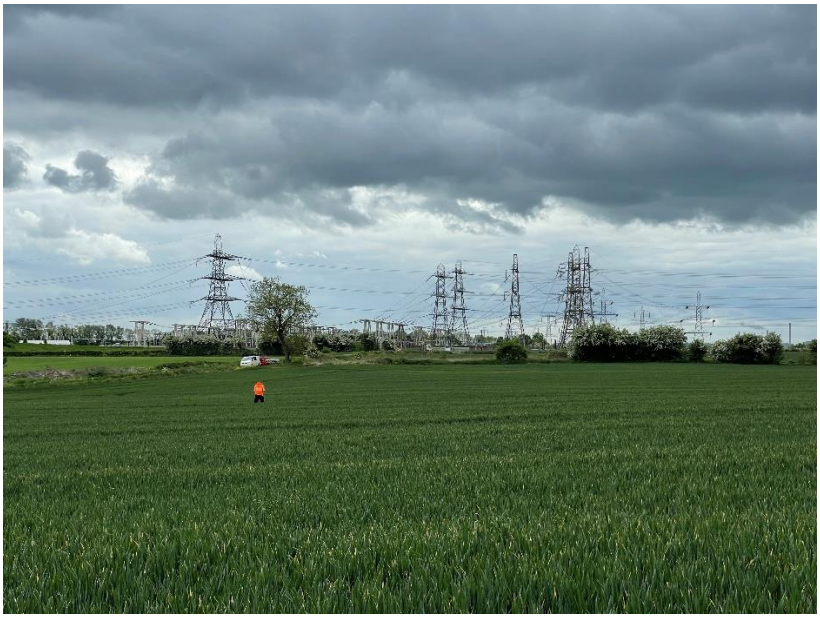
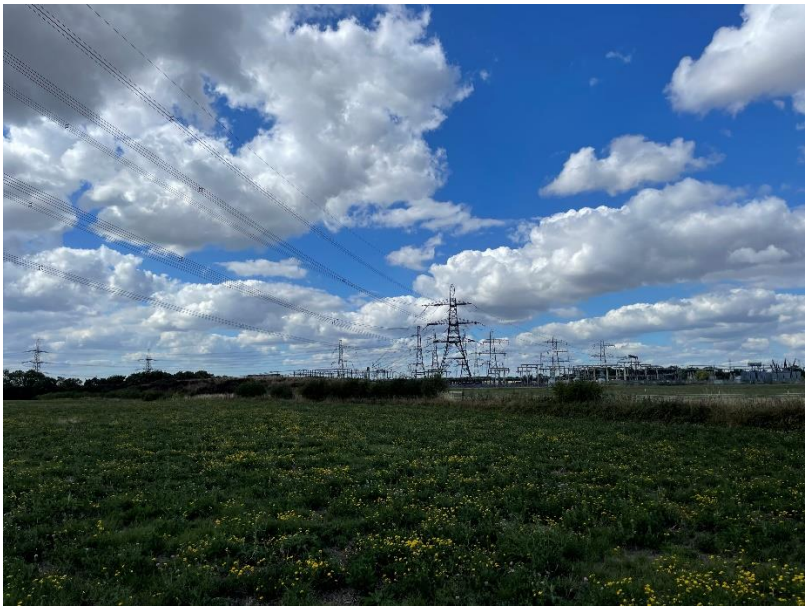


Plate 2 - Site condition on the day of the survey in September 2022 (southern field looking north west)



Definitions

1.1.8 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

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

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).

1.1.9 **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].

1.1.10 **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.

1.2 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	1:250,000 scale mapping predicting the likelihood of BMV agricultural land.

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

Organisation	Data Source	Data Provided
	Yorkshire and The Humber (ALC015)[5].	
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 erosion and water use in agriculture[9].	Soil erosion criteria to inform soil sensitivity classifications.
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 Aberford (511a) association.

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

[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)..
[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
[10]Cranfield University (2013). Climatological Data for Agricultural Land Classification (online). (Accessed 30 June 2021).

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

Soil Association	Description	Erodability
Aberford (511a)	Shallow, locally brashy well drained calcareous fine loamy soils over limestone. Some deeper calcareous soils in colluvium. Soils are permeable and well drained (Wetness Class I) although minor drainage is required where thin mudstones or clay shales outcrop.	Small Risk (Water).

Agricultural land classification

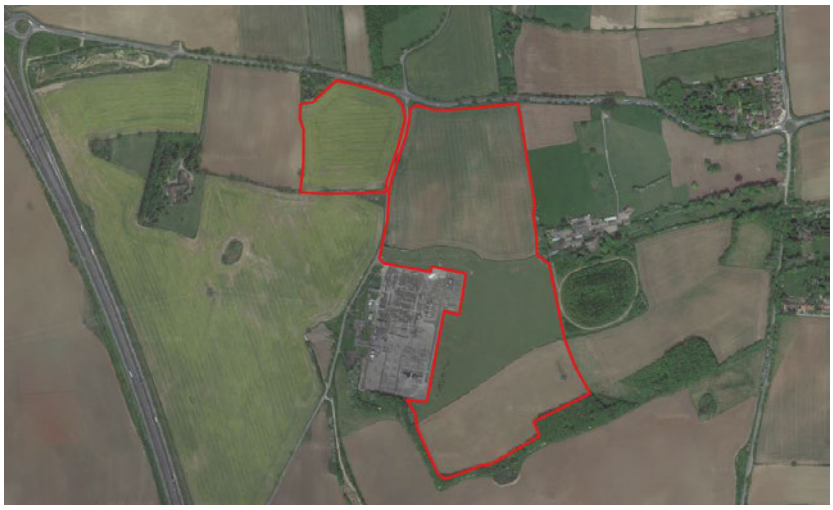
1.2.4 The Provisional 1:250,000 ALC mapping indicates that agricultural land within the Site is ALC Grade 3 (good to moderate). However, as with the soils data, the scale of the mapping is not accurate at the field level as it does not pick up variations in ALC grade for areas less than approximately 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 high likelihood of BMV land (>60 % area of BMV)

Aerial imagery

1.2.6 Satellite imagery of the Site, shown in Plate 1, which shows some signs of soil wetting variability in the central field, and no obvious changes in the northwest and southern fields.

Plate 3: Satellite imagery of the Site (© Google Earth)



1.3 Site Survey

Methodology

1.3.1 A soil survey was undertaken on the whole site split across several days due to land access, on 12 May, 1 and 12 September 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 120 cm; soil profile pits were 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 35 points, 32 cores and 3 pits were inspected. As shown on **Figure 11.7, 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. 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 During the survey on 12 May 2022, only the north-west field was surveyed, and was under a cereal crop which appeared to be wheat.

1.3.6 During the surveys in September 2022, the north-eastern field had been harvested with crop stubble indicating wheat or barley. The central field was under permanent pasture with sheep grazing. The southern field was fallow with some wildflowers and clover.

1.3.7 Within the central field adjacent to the Monk Fryston substation there is two large soil bunds being used as visual screens for the substation. These were c.4m in height and grass and shrub covered.

Soils

1.3.8 Soils onside confirmed the presence of the Aberford (511a) association, a description and image of the soil profile is provided below.

Aberford Series

1.3.9 Horizon 1, calcareous topsoil, depth averaged 30 cm, with a medium clay loam texture, dark brown colour (10YR 3/3), with no mottling and a granular to subangular blocky structure. The soil was weakly to moderately developed with medium ped sizes and a very friable consistency. Topsoil stone content varied ranging 5-100 %, predominantly chalk and limestone, for both diameters >2 cm and >6 cm.

1.3.10 Horizon 2, calcareous subsoil depth averaged 45 cm, with a medium to heavy clay loam texture, dark brown of colour (10YR 6/8), with no mottling. Biopores were observed in this horizon, the structure was sub angular blocky with weak to moderate development and a medium ped size, the consistence was very friable. Stone content varied 10 – 100 %, but with both diameters >2 cm and >6 cm equally present. Horizon 2 is sat on hard limestone bedrock.

1.3.11 The soils in this series are predominantly of Wetness Class 1, soils are free draining.

1.3.12 Example plates of this soil series are shown below.

Plate 4: Point 33 – Aberford – Wetness Class 1

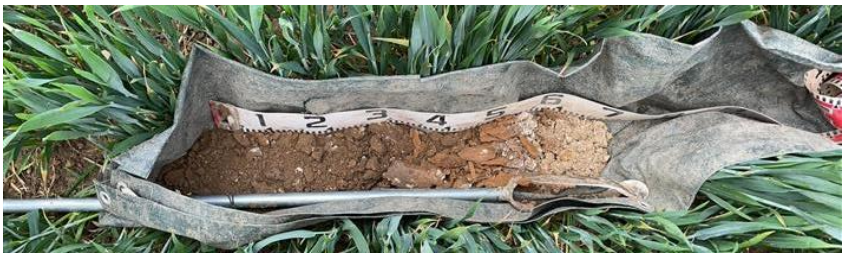


Plate 5: Point 177 – Aberford – Wetness Class 1

Agroclimatic data

1.3.13 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.

1.3.14 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)	629
Accumulated Temperature (0C)	1385
Field Capacity Duration (FCD) (days)	134
Moisture Deficit Wheat (mm)	104.1
Moisture Deficit Potatoes (mm)	95.4

Direct limitations

1.3.15 This section summarises the direct limitations present at the Site (for detailed assessment of each Survey Point refer to **Annex 11D.1**).

1.3.16 Across the Site stones were observed in both topsoil and subsoil. Stoniness poses a limitation to the agricultural land quality for some points where stones were observed in the top 25 cm. Stoniness may vary markedly over short distances, within the survey area resulting in a limitation was to ALC Subgrade 3a (point 36) with a 15% content of stones greater than 2cm.

1.3.17 Soil depth in some areas of the site caused a limitation to the ALC grade to Grade 2 with depths between 45 to 60cm, Subgrade 3a with soil depths between 30 and 45cm, and Subgrade 3b with soil depths between 20 and 30cm. Soil depth was not the most limiting factor to ALC grade at the site.

1.3.18 The loamy sand topsoil texture at point 31 limited the ALC grade at this point to Grade 2 as loamy sand textured soils do not provide sufficient water and nutrient retention to be Grade1, however this was not the most limiting factor.

1.3.19 Within the survey area there are two areas where soil has been formed into a visual screen for the existing substation. The gradient (>18 degrees) on the side of the slope will limit the use of machinery for agricultural production, and hence this area and the small unworkable area up to the substation is limited to Grade 5.

1.3.20 There is no further limitation to land quality due to flood risk (summer and winter).

Interactive limitations

1.3.21 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 11D.1**).

1.3.22 The combination of 134 Field Capacity Days, varying soil textures, structure and consistence, with the Wetness Class 1 and 2, there are interactive limitations at the Site.

1.3.23 Droughtiness poses a limitation to the agricultural land quality for some points where the soil depth is shallower and the stoned content is higher, reducing plant available water, 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. The resulting in limitation to Grade 2, Subgrade 3a and 3b at some points within the Site. Droughtiness was the most limiting factor to ALC grade at the Site.

1.3.24 Wetness poses a limitation to ALC grade at the site to Grade 2 and Subgrade 3a in some areas of the site, but this was not the most limiting factor to ALC grade at the site.

1.4 Overall agricultural land classification

1.4.1 Grade boundaries were drawn based on field observations and the calculations from the individual points to make mapping units representative of field conditions. The boundaries of the previous ALC survey were amended slightly to take into account the new surrounding ALC information. The ALC map comprises Grade 2 to 5 Agricultural Land, with some smaller areas of non-agricultural land where the road traverses the site.

1.4.2 A summary of the ALC gradings for the site is shown in **Table 1.4**, and geographically in **Figure 11.7, 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 wetness.

Subgrade 3a

1.4.4 Areas of land with limitations to agricultural production due to droughtiness and 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 droughtiness.

Grade 5

1.4.6 The two areas with a limitation based on gradient of >18 degrees where soil has been used as a visual screen for the existing substation.

Non-agricultural

1.4.7 Land not used for agricultural production. A portion of the agricultural land within the survey boundary is non-agricultural where a public road traverses the survey area between the north west field and northeast field.

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)	**1.94**	**5.95**
Subgrade 3a (good)	**22.47**	**68.91**
Subgrade 3b (moderate)	**7.18**	**22.02**
Grade 4 (poor)	0.0	0.0
Grade 5 (very poor)	0.78	2.39
Non-agricultural	**0.24**	**0.74**
Total	**32.61**	**100.0**

1.5 Summary and Conclusions

1.5.1 The agricultural land within the survey boundary is made up of Grade 2 (very good quality, 1.94 ha, 5.95 %), Subgrade 3a (good quality, 22.47 ha, 68.91%), Subgrade 3b (moderate quality, 7.18 ha, 22.02 %), and Grade 5 (0.78 ha, 2.39%) agricultural land. The main differentiation between gradings at the Site was the degree of droughtiness for wheat and potatoes due to soil depth. A small area of non-agricultural land (1.22 ha, 5.80 %) is present where conifer plantation is present within the eastern field, and woodland in an area along the southern boundary.

1.5.2 The proposed location of the substation extension for the Project would be located on an area of Subgrade 3a, Subgrade 3b, and Grade 5 agricultural land.

1.5.3 The soils in the survey boundary are of a medium to heavy texture clays and silty clays and are consistent in nature with the Aberford (511a) soil association. One point was a

sandy silt loam, however the clay content was 2 % off of a clay loam, so this is likely a natural variation in the sand content.

Annex 11D.1
Soil Survey Record and ALC Breakdown

Survey point number corresponds with the numbers on **Figure 11.7, Volume 5, Document 5.4.11** and in the other Annexes.

Page intentionally blank

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

Survey point	Type	Grad-ient	Soil distur-bed or resto-red	Horizon	Depth	Texture	Matrix (main) colour			Peat-specific properties					Mottling			
							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
28	Core	0	no	1 2 3 4 5	28 45	HZCL MCL	10YR 10YR	3 4	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0
29	Core	0	no	1 2 3 4 5	35 85	MCL MSZL	10YR 7.5YR	3 2	3 3	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0
30	Core	0	no	1 2 3 4 5	25 42	SCL SCL	10YR 7.5YR	4 6	3 8	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0
31	Pit	1	no	1 2 3 4 5	30	LFS	10YR	3	3	n/a	n/a	n/a	n/a	n/a	0	0	0	0
32	Core	0	no	1 2 3 4 5	32 54	HZCL HZCL	10YR 7.5YR	3 4	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0
33	Core	0	no	1 2 3 4 5	35 57	HCL HCL	10YR 10YR	3 4	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0
34	Core	0	no	1 2 3 4 5	34	HCL	10YR	3	4	n/a	n/a	n/a	n/a	n/a	0	0	0	0
35	Core	0	no	1 2 3 4 5	40	HCL	10YR	3	4	n/a	n/a	n/a	n/a	n/a	0	0	0	0
36	Core	1	no	1 2 3 4 5	25	HCL	10YR	3	3	n/a	n/a	n/a	n/a	n/a	0	0	0	0
37	Core	0	no	1 2 3 4 5	35 63	HCL HCL	10YR 10YR	3 3	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0
38	Core	0	no	1 2 3 4 5	38 63	HCL HCL	10YR 10YR	3 3	4 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0
39	Core	0	no	1 2 3 4 5	35 64	HCL MCL	10YR 10YR	3 4	4 6	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0
40	Pit	0	no	1 2 3 4 5	35 64	HCL HCL	10YR 10YR	3 6	3 8	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 2	0 10YR	0 5	0 8
41	Core	0	no	1 2 3 4 5	35	HCL	10YR	3	3	n/a	n/a	n/a	n/a	n/a	0	0	0	0
42	Core	0	no	1 2 3 4 5	32 64	HCL HCL	10YR 10YR	3 4	3 6	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0

Soil profile descriptions continued

Survey point	Ped faces				FeMn	Biopo-	Stones and rocks			Structure			Consis-	Calca-	Gley-	SPL	Notes
	Colour different to matrix	Hue	Value	Chroma	up to %	res	> 2 cm up to %	> 6 cm up to %	Type	Type	Deve- lop- ment	Ped size	tence	reous	ing		
28	no	n/a	n/a	n/a	0	yes	10	5	SL	SAB	M	M	VFR	yes	NO	NO	-
	no	n/a	n/a	n/a	0	yes	10	5	SL	SAB	M	M	FR	yes	NO	NO	
29	no	n/a	n/a	n/a	0	yes	5	5	SL	GR	W	M	VFR	yes	NO	NO	-
	no	n/a	n/a	n/a	0	yes	5	5	SL	SAB	W	M	VFR	yes	NO	NO	
30	no	n/a	n/a	n/a	2	yes	10	0	CH	GR	W	F	VFR	yes	NO	NO	Chalk bedrock at 45 cm.
	no	n/a	n/a	n/a	0	no	50	35	CH	GR	W	F	FR	yes	NO	NO	
31	no	n/a	n/a	n/a	20	yes	50	35	CH	GR	W	F	VFR	yes	NO	NO	Very stoney H1.
32	no	n/a	n/a	n/a	2	yes	5	5	SL	SAB	W	M	FR	yes	NO	NO	-
	no	n/a	n/a	n/a	2	yes	5	5	SL	SAB	W	M	VFR	yes	NO	NO	
33	no	n/a	n/a	n/a	0	yes	5	0	CH	SAB	M	M	VFR	yes	NO	NO	Shallow soil over chalk.
	no	n/a	n/a	n/a	0	no	0	0	n/a	SAB	M	C	FR	yes	NO	NO	
34	no	n/a	n/a	n/a	2	yes	5	0	CH	SAB	M	F	VFR	no	NO	NO	Refused on bedrock.
35	no	n/a	n/a	n/a	2	yes	5	0	CH	SAB	M	M	VFIR	no	NO	NO	Compacted soil, hard plough plan at 20 cm, limestone bedrock at base.
36	no	n/a	n/a	n/a	0	yes	15	0	SL	GR	M	F	FR	no	NO	NO	Stony in area and hard at base.
37	no	n/a	n/a	n/a	2	yes	5	0	CH	GR	M	F	FR	no	NO	NO	Refused on bedrock.
	no	n/a	n/a	n/a	2	yes	5	0	H	GR	W	F	VFR	no	NO	NO	
38	no	n/a	n/a	n/a	0	yes	5	0	CH	SAB	M	F	VFR	no	NO	NO	Bedrock at base.
	no	n/a	n/a	n/a	2	yes	5	0	H	GR	W	F	VFR	no	NO	NO	
39	no	n/a	n/a	n/a	2	yes	5	0	CH	SAB	M	F	FR	no	NO	NO	Sandier subsoil.
	no	n/a	n/a	n/a	2	yes	5	0	H	GR	W	F	VFR	no	NO	NO	
40	no	n/a	n/a	n/a	2	yes	5	5	CH	SAB	M	M	EXHD	no	NO	NO	Very hard soil, chalk at base.
	no	n/a	n/a	n/a	2	yes	5	0	H	SAB	W	M	EXHD	no	NO	NO	
41	no	n/a	n/a	n/a	2	yes	5	0	SL	SAB	M	F	EXFIR	no	NO	NO	Same as pit 40, refused on stone, very hard to get through.
42	no	n/a	n/a	n/a	0	yes	5	0	CH	SAB	M	M	FR	no	NO	NO	Refused on rock.
	no	n/a	n/a	n/a	0	yes	5	0	H	GR	M	F	VFR	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**
28	1	1	1	1	1	1	2	2	2	3b	1	**3b**	Droughti-ness
29	1	1	1	1	1	1	1	1	1	2	1	**3a**	Pattern
30	1	1	1	1	1	1	3a	2	1	3b	1	**3b**	Droughti-ness
31	1	1	1	1	1	2	3a	4	1	4	1	**3b**	Pattern
32	1	1	1	1	1	1	2	1	2	3a	1	**3a**	Droughti-ness
33	1	1	1	1	1	1	2	1	2	3a	1	**3a**	Droughti-ness
34	1	1	1	1	1	1	3a	1	2	3b	1	**3b**	Droughti-ness
35	1	1	1	1	1	1	3a	1	2	3b	1	**3b**	Droughti-ness
36	1	1	1	1	1	1	3b	3a	2	4	1	**3b**	Pattern
37	1	1	1	1	1	1	1	1	2	2	1	**2**	Wetness Droughti-ness
38	1	1	1	1	1	1	1	1	2	2	1	**2**	Wetness Droughti-ness
39	1	1	1	1	1	1	1	1	2	2	1	**2**	Wetness Droughti-ness
40	1	1	1	1	1	1	1	1	2	3a	1	**3a**	Droughti-ness
41	1	1	1	1	1	1	3a	1	2	3b	1	**3b**	Droughti-ness
42	1	1	1	1	1	1	1	1	2	2	1	**2**	Wetness Droughti-ness

Soil profile descriptions

Survey point	Type	Grad-ient	Soil distur-bed or resto-red	Horizon	Depth	Texture	Matrix (main) colour			Peat-specific properties					Mottling			
							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
43	**Core**	2	no	1 2 3 4 5	30 70	HCL C	10YR 2.5YR	4 4	4 3	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	2 0	10YR 0	5 0	6 0
44	**Core**	1	no	1 2 3 4 5	40 50	HCL C	10YR 10YR	3 4	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 40	0 10YR	0 6	0 6
45	**Core**	1	no	1 2 3 4 5	38 55	HCL C	10YR 2.5YR	3 5	8 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 0	0 0	0 0	0 0
46	**Core**	1	no	1 2 3 4 5	35 41	HCL HCL	10YR 10YR	3 4	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	20 20	10YR 10YR	6 6	6 6
47	**Core**	0	no	1 2 3 4 5	45 60	HCL ZC	10YR 2.5Y	5 7	2 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	2 2	10YR 2.5Y	5 6	6 1
48	**Core**	0	no	1 2 3 4 5	27 46	HCL HCL	10YR 10YR	3 4	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	2 2	10YR 10YR	6 6	6 6
50	**Core**	0	no	1 2 3 4 5	18 40 48	HCL HCL HCL	10YR 10YR 10YR	3 5 5	3 8 8	n/a n/a n/a	n/a n/a n/a	n/a n/a n/a	n/a n/a n/a	n/a n/a n/a	2 2 2	10YR 10YR 10YR	5 6 6	8 8 8
51	**Core**	0	no	1 2 3 4 5	32 50	HCL HCL	10YR 10YR	3 6	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	20 100	10YR 10YR	6 6	6 6
52	**Core**	0	no	1 2 3 4 5	35 70	HCL C	10YR 2.5YR	3 4	3 3	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	40 0	10YR 0	6 0	6 0
54	**Core**	0	no	1 2 3 4 5	40 70	HCL C	10YR 10YR	5 5	3 6	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	2 20	10YR 10YR	5 6	8 8
55	**Core**	0	no	1 2 3 4 5	40 70	HCL C	10YR 10YR	5 5	3 6	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	2 20	10YR 10YR	5 6	8 8
56	**Core**	0	no	1 2 3 4 5	33	HCL	10YR	3	3	n/a	n/a	n/a	n/a	n/a	20	10YR	6	6
57	**Core**	0	no	1 2 3 4 5	35 55	HCL ZC	10YR 10YR	3 5	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 20	0 10YR	0 5	0 6
58	**Core**	0	no	1 2 3 4 5	40 70	HCL HCL	10YR 10YR	5 5	3 6	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	2 20	10YR 10YR	5 6	8 8
59	**Core**	0	no	1 2 3 4 5	35 55	HCL HCL	10YR 10YR	3 5	3 4	n/a n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a	0 20	0 10YR	0 5	0 6

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					
43	no no	n/a n/a	n/a n/a	n/a n/a	2 0	yes yes	5 0	0 0	SS n/a	SAB PR	M M	C C	FR EXFIR	no no	NO NO	NO NO	Subsoil prismatic red clay.
44	no no	n/a n/a	n/a n/a	n/a n/a	0 0	yes yes	5 5	0 5	SS CH	SAB PR	M M	C M	FIR VFIR	no no	NO NO	NO NO	H2, chalk and red clay mixture.
45	no no	n/a n/a	n/a n/a	n/a n/a	0 0	yes yes	5 0	5 0	SS n/a	SAB PR	M M	C C	FIR VFIR	no no	NO NO	NO NO	Red clay H2.
46	no no	n/a n/a	n/a n/a	n/a n/a	2 0	yes yes	5 5	0 0	SS SS	GR SAB	M M	M M	FR VFIR	no no	NO NO	NO NO	Chalky stones at base. Could not pass.
47	no no	n/a n/a	n/a n/a	n/a n/a	2 2	yes yes	0 10	0 10	n/a CH	SAB GR	S M	M C	FIR FR	no no	NO NO	NO NO	Brown over ochreous yellow chalk.
48	no no	n/a n/a	n/a n/a	n/a n/a	0 0	yes yes	0 5	0 0	n/a SS	GR SAB	M M	M F	FR FR	no no	NO NO	NO NO	Hit Rocky layer at base. Could not pass.
50	no no no	n/a n/a n/a	n/a n/a n/a	n/a n/a n/a	2 2 2	yes yes yes	5 5 5	0 0 0	SL SL SL	SAB SAB SAB	M W W	F F F	EXFIR EXFIR EXFIR	no no no	NO NO NO	NO NO NO	H3 likely parent material.
51	no no	n/a n/a	n/a n/a	n/a n/a	0 2	yes yes	5 5	5 5	CH CH	GR AB	M M	M M	FR VFIR	no no	NO YES	NO NO	Subsoil very dry, very hard. Could not pass stones at base.
52	no no	n/a n/a	n/a n/a	n/a n/a	0 0	yes yes	0 0	5 0	SS n/a	SAB MAS	M M	M M	FIR EXFIR	no no	NO NO	NO NO	-
54	no no	n/a n/a	n/a n/a	n/a n/a	2 2	yes yes	5 5	0 0	SL SL	SAB SAB	M W	M M	EXFIR EXFIR	no no	NO NO	NO NO	Very dry and hard, refused on stone.
55	no no	n/a n/a	n/a n/a	n/a n/a	2 2	yes yes	5 5	0 0	SL SL	SAB SAB	M W	M M	EXFIR EXFIR	no no	NO NO	NO NO	Same as 54.
56	no	n/a	n/a	n/a	0	yes	5	5	SS	SAB	M	M	FIR	no	NO	NO	Could not pass 35cm in this area, tried multiple points.
57	no yes	n/a 10YR	n/a 6	n/a 1	2 0	yes yes	5 5	0 0	SL SL	SAB SAB	M W	F M	EXFIR EXFIR	no no	NO YES	NO NO	Same as 59 to 32cm.
58	no no	n/a n/a	n/a n/a	n/a n/a	2 2	yes yes	5 5	0 0	SL SL	SAB SAB	M W	M M	EXFIR EXFIR	no no	NO NO	NO NO	Same as 55.
59	no yes	n/a 10YR	n/a 6	n/a 1	2 0	yes yes	5 5	0 0	SL SL	SAB SAB	M W	F M	EXFIR EXFIR	no no	NO YES	NO NO	Slightly greyed in subsoil.

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**
43	1	1	1	1	1	1	1	1	2	3a	1	**3a**	Droughti-ness
44	1	1	1	1	1	1	2	1	2	3b	1	**3b**	Droughti-ness
45	1	1	1	1	1	1	2	1	2	3b	1	**3b**	Droughti-ness
46	1	1	1	1	1	1	3a	1	2	3b	1	**3b**	Droughti-ness
47	1	1	1	1	1	1	1	1	2	3a	1	**3a**	Droughti-ness
48	1	1	1	1	1	1	2	1	2	3a	1	**3a**	Droughti-ness
50	1	1	1	1	1	1	2	1	2	3b	1	**3a**	Pattern
51	2	1	1	1	1	1	2	1	3a	3a	1	**3a**	Wetness Droughti-ness
52	1	1	1	1	1	1	1	1	2	3a	1	**3a**	Droughti-ness
54	1	1	1	1	1	1	1	1	2	3a	1	**3a**	Droughti-ness
55	1	1	1	1	1	1	1	1	2	3a	1	**3a**	Droughti-ness
56	1	1	1	1	1	1	3a	1	2	3b	1	**3b**	Droughti-ness
57	2	1	1	1	1	1	2	1	3a	3a	1	**3a**	Wetness Droughti-ness
58	1	1	1	1	1	1	1	1	2	3a	1	**3a**	Droughti-ness
59	2	1	1	1	1	1	2	1	3a	3a	1	**3a**	Wetness Droughti-ness

Soil profile descriptions

Survey point	Type	Grad-ient	Soil distur-bed or resto-red	Horizon	Depth	Texture	Matrix (main) colour			Peat-specific properties					Mottling			
							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
60	**Core**	2	no	1	28	HCL	10YR	3	3	n/a	n/a	n/a	n/a	n/a	20	10YR	6	6
				2	55	HCL	10YR	5	4	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				3														
				4														
				5														
61	**Core**	2	no	1	34	HCL	10YR	3	3	n/a	n/a	n/a	n/a	n/a	20	10YR	6	6
				2	55	C	10YR	5	4	n/a	n/a	n/a	n/a	n/a	40	10YR	5	8
				3														
				4														
				5														
62	**Pit**	0	no	1	28	HCL	10YR	4	3	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	43	ZC	10YR	6	6	n/a	n/a	n/a	n/a	n/a	20	10YR	3	1
				3	80	C	2.5YR	4	4	n/a	n/a	n/a	n/a	n/a	2	10YR	7	1
				4														
				5														
63	**Core**	2	no	1	34	HCL	10YR	3	3	n/a	n/a	n/a	n/a	n/a	2	10YR	6	4
				2	50	ZC	10YR	6	6	n/a	n/a	n/a	n/a	n/a	20	10YR	3	1
				3														
				4														
				5														
177	**Core**	0	no	1	40	HCL	10YR	5	3	n/a	n/a	n/a	n/a	n/a	0	0	0	0
				2	75	ZC	10YR	6	8	n/a	n/a	n/a	n/a	n/a	20	10YR	6	2
				3														
				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					
60	no no	n/a n/a	n/a n/a	n/a n/a	0 0	yes yes	5 5	0 0	SS SS	SAB PR	M M	M C	FIR EXFIR	no no	NO NO	NO NO	-
61	no no	n/a n/a	n/a n/a	n/a n/a	0 0	yes yes	5 5	0 0	SS SS	SAB PR	M M	M C	FIR EXFIR	no no	NO NO	NO NO	Same as 60. Hit bedrock at 50cm.
62	no no no	n/a n/a n/a	n/a n/a n/a	n/a n/a n/a	0 2 2	yes yes yes	5 5 0	0 5 0	CH CH n/a	SAB AB PR	M W W	M C VC	FIR EXFIR EXHD	no no no	NO NO NO	NO NO NO	Grey brown (no mottle) yellow ish brown (grey mottled) over red (grey mottling).
63	no no	n/a n/a	n/a n/a	n/a n/a	2 2	yes yes	5 5	0 5	SS CH	SAB AB	M W	M C	FIR EXFIR	no no	NO NO	NO NO	Subsoil red heavy clay. Hit chalk bedrock.
177	no no	n/a n/a	n/a n/a	n/a n/a	2 2	yes yes	5 5	0 0	CH CH	SAB AB	M W	M C	FIR VFIR	no no	NO NO	NO NO	Mcl over zc chalk.

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**
60	1	1	1	1	1	1	2	1	2	3b	1	**3b**	Droughti-ness
61	1	1	1	1	1	1	2	1	2	3b	1	**3b**	Droughti-ness
62	1	1	1	1	1	1	1	1	2	3a	1	**3a**	Droughti-ness
63	1	1	1	1	1	1	2	1	2	3b	1	**3b**	Droughti-ness
177	1	1	1	1	1	1	1	1	2	3a	1	**3a**	Droughti-ness

Annex 11D.2
Droughtiness Calculations

Survey point number corresponds with the numbers on **Figure 11.7, Volume 5, Document 5.4.11,** and in the other Annexes.

Page intentionally blank

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)	
28	1	28	HZCL	15	GOOD	19		4.0	3.0	TAv	0	28	28	19	85	4	15	469			0	28	28	19	85	4	15	469			
										EAv	0	28	0	0	85	3	15	0													
	2	17	MCL	15	GOOD	21	14	4.0	3.0	TAv	28	45	17	21	85	4	15	314			28	45	17	21	85	4	15	314			
										EAv	28	45	0	14	85	3	15	0													
	3									TAv	45	45	0	0	100	0	0	0			45	45	0	0	100	0	0	0			
										EAv	45	45	0	0	100	0	0	0	78	-24								78	-15	3b
	4									TAv	45	45	0	0	100	0	0	0			45	45	25	0	100	0	0	0			
										EAv	45	45	0	0	100	0	0	0													
	5									TAv	45	45	0	0	100	0	0	0			45	45	0	0	100	0	0	0			
										EAv	45	45	0	0	100	0	0	0													
29	1	35	MCL	10	GOOD	18		4.0	3.0	TAv	0	35	35	18	90	4	10	581			0	35	35	18	90	4	10	581			
										EAv	0	35	0	0	90	3	10	0													
	2	50	MSZL	10	GOOD	19	13	4.0	3.0	TAv	35	85	15	19	90	4	10	263			35	85	35	19	90	4	10	613			
										EAv	35	85	35	13	90	3	10	420													
	3									TAv	85	85	0	0	100	0	0	0			85	85	0	0	100	0	0	0			
										EAv	85	85	0	0	100	0	0	0	126	24								119	26	2
	4									TAv	85	85	0	0	100	0	0	0			85	85	0	0	100	0	0	0			
										EAv	85	85	0	0	100	0	0	0													
	5									TAv	85	85	0	0	100	0	0	0			85	85	0	0	100	0	0	0			
										EAv	85	85	0	0	100	0	0	0													
30	1	25	SCL	10	GOOD	17		10.0	7.0	TAv	0	25	25	17	90	10	10	408			0	25	25	17	90	10	10	408			
										EAv	0	25	0	0	90	7	10	0													
	2	17	SCL	85	GOOD	19	14	10.0	7.0	TAv	25	42	17	19	15	10	85	193			25	42	17	19	15	10	85	193			
										EAv	25	42	0	14	15	7	85	0													
	3									TAv	42	42	0	0	100	0	0	0			42	42	0	0	100	0	0	0			
										EAv	42	42	0	0	100	0	0	0	60	-43								60	-33	3b
	4									TAv	42	42	0	0	100	0	0	0			42	42	28	0	100	0	0	0			
										EAv	42	42	0	0	100	0	0	0													
	5									TAv	42	42	0	0	100	0	0	0			42	42	0	0	100	0	0	0			
										EAv	42	42	0	0	100	0	0	0													
31	1	30	LFS	85	GOOD	18		10.0	7.0	TAv	0	30	30	18	15	10	85	336			0	30	30	18	15	10	85	336			
										EAv	0	30	0	0	15	7	85	0													
	2									TAv	30	30	0	0	100	0	0	0			30	30	0	0	100	0	0	0			
										EAv	30	30	0	0	100	0	0	0													
	3									TAv	30	30	0	0	100	0	0	0			30	30	0	0	100	0	0	0			
										EAv	30	30	0	0	100	0	0	0	34	-69								34	-60	4
	4									TAv	30	30	0	0	100	0	0	0			30	30	40	0	100	0	0	0			
										EAv	30	30	0	0	100	0	0	0													
	5									TAv	30	30	0	0	100	0	0	0			30	30	0	0	100	0	0	0			
										EAv	30	30	0	0	100	0	0	0													
32	1	32	HZCL	10	GOOD	19		4.0	3.0	TAv	0	32	32	19	90	4	10	560			0	32	32	19	90	4	10	560			
										EAv	0	32	0	0	90	3	10	0													
	2	22	HZCL	10	GOOD	21	12	4.0	3.0	TAv	32	54	18	21	90	4	10	347			32	54	22	21	90	4	10	425			
										EAv	32	54	4	12	90	3	10	44													
	3									TAv	54	54	0	0	100	0	0	0			54	54	0	0	100	0	0	0			
										EAv	54	54	0	0	100	0	0	0	95	-7								98	5	3a
	4									TAv	54	54	0	0	100	0	0	0			54	54	16	0	100	0	0	0			
										EAv	54	54	0	0	100	0	0	0													
	5									TAv	54	54	0	0	100	0	0	0			54	54	0	0	100	0	0	0			
										EAv	54	54	0	0	100	0	0	0													
33	1	35	HCL	5	GOOD	18		10.0	7.0	TAv	0	35	35	18	95	10	5	616			0	35	35	18	95	10	5	616			
										EAv	0	35	0	0	95	7	5	0													
	2	22	HCL	0	MODERATE	16	10			TAv	35	57	15	16	100	0	0	240			35	57	22	16	100	0	0	352			
										EAv	35	57	7	10	100	0	0	70													
	3									TAv	57	57	0	0	100	0	0	0			57	57	0	0	100	0	0	0			
										EAv	57	57	0	0	100	0	0	0	93	-10								97	4	3a
	4									TAv	57	57	0	0	100	0	0	0			57	57	13	0	100	0	0	0			
										EAv	57	57	0	0	100	0	0	0													
	5									TAv	57	57	0	0	100	0	0	0			57	57	0	0	100	0	0	0			
										EAv	57	57	0	0	100	0	0	0													
34	1	34	HCL	5	GOOD	18		10.0	7.0	TAv	0	34	34	18	95	10	5	598			0	34	34	18	95	10	5	598			
										EAv	0	34	0	0	95	7	5	0													
	2									TAv	34	34	0	0	100	0	0	0			34	34	0	0	100	0	0	0			
										EAv	34	34	0	0	100	0	0	0													
	3									TAv	34	34	0	0	100	0	0	0			34	34	0	0	100	0	0	0			
										EAv	34	34	0	0	100	0	0	0	60	-43								60	-33	3b
	4									TAv	34	34	0	0	100	0	0	0			34	34	36	0	100	0	0	0			
										EAv	34	34	0	0	100	0	0	0													
	5									TAv	34	34	0	0	100	0	0	0			34	34	0	0	100	0	0	0			
										EAv	34	34	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)	
35	1	40	HCL	5	GOOD	18		10.0	7.0	TAv	0	40	40	18	95	10	5	704			0	40	40	18	95	10	5	704											
										EAv	0	40	0	0	95	7	5	0																				
	2									TAv	40	40	0	0	100	0	0	0			40	40	0	0	100	0	0	0											
										EAv	40	40	0	0	100	0	0	0																				
	3									TAv	40	40	0	0	100	0	0	0	70	-32	40	40	0	0	100	0	0	0	70	-23	3b								
										EAv	40	40	0	0	100	0	0	0																				
	4									TAv	40	40	0	0	100	0	0	0			40	40	30	0	100	0	0	0											
										EAv	40	40	0	0	100	0	0	0																				
	5									TAv	40	40	0	0	100	0	0	0			40	40	0	0	100	0	0	0											
										EAv	40	40	0	0	100	0	0	0																				
36	1	25	HCL	15	GOOD	18		4.0	3.0	TAv	0	25	25	18	85	4	15	398			0	25	25	18	85	4	15	398											
										EAv	0	25	0	0	85	3	15	0																				
	2									TAv	25	25	0	0	100	0	0	0			25	25	0	0	100	0	0	0											
										EAv	25	25	0	0	100	0	0	0																				
	3									TAv	25	25	0	0	100	0	0	0			25	25	0	0	100	0	0	0											
										EAv	25	25	0	0	100	0	0	0	40	-63									40	-54	4								
	4									TAv	25	25	0	0	100	0	0	0			25	25	45	0	100	0	0	0											
										EAv	25	25	0	0	100	0	0	0																				
	5									TAv	25	25	0	0	100	0	0	0			25	25	0	0	100	0	0	0											
										EAv	25	25	0	0	100	0	0	0																				
37	1	35	HCL	5	GOOD	18		10.0	7.0	TAv	0	35	35	18	95	10	5	616			0	35	35	18	95	10	5	616											
										EAv	0	35	0	0	95	7	5	0																				
	2	28	HCL	5	GOOD	21	14	1.0	0.5	TAv	35	63	15	21	95	1	5	300			35	63	28	21	95	1	5	560											
										EAv	35	63	13	14	95	1	5	173																				
	3									TAv	63	63	0	0	100	0	0	0			63	63	0	0	100	0	0	0											
										EAv	63	63	0	0	100	0	0	0	109	6									118	24	2								
	4									TAv	63	63	0	0	100	0	0	0			63	63	7	0	100	0	0	0											
										EAv	63	63	0	0	100	0	0	0																				
	5									TAv	63	63	0	0	100	0	0	0			63	63	0	0	100	0	0	0											
										EAv	63	63	0	0	100	0	0	0																				
38	1	38	HCL	5	GOOD	18		10.0	7.0	TAv	0	38	38	18	95	10	5	669			0	38	38	18	95	10	5	669											
										EAv	0	38	0	0	95	7	5	0																				
	2	25	HCL	5	GOOD	21	14	1.0	0.5	TAv	38	63	12	21	95	1	5	240			38	63	25	21	95	1	5	500											
										EAv	38	63	13	14	95	1	5	173																				
	3									TAv	63	63	0	0	100	0	0	0			63	63	0	0	100	0	0	0											
										EAv	63	63	0	0	100	0	0	0	108	6									117	24	2								
	4									TAv	63	63	0	0	100	0	0	0			63	63	7	0	100	0	0	0											
										EAv	63	63	0	0	100	0	0	0																				
	5									TAv	63	63	0	0	100	0	0	0			63	63	0	0	100	0	0	0											
										EAv	63	63	0	0	100	0	0	0																				
39	1	35	HCL	5	GOOD	18		10.0	7.0	TAv	0	35	35	18	95	10	5	616			0	35	35	18	95	10	5	616											
										EAv	0	35	0	0	95	7	5	0																				
	2	29	MCL	5	GOOD	21	14	1.0	0.5	TAv	35	64	15	21	95	1	5	300			35	64	29	21	95	1	5	580											
										EAv	35	64	14	14	95	1	5	187																				
	3									TAv	64	64	0	0	100	0	0	0			64	64	0	0	100	0	0	0											
										EAv	64	64	0	0	100	0	0	0	110	8									120	26	2								
	4									TAv	64	64	0	0	100	0	0	0			64	64	6	0	100	0	0	0											
										EAv	64	64	0	0	100	0	0	0																				
	5									TAv	64	64	0	0	100	0	0	0			64	64	0	0	100	0	0	0											
										EAv	64	64	0	0	100	0	0	0																				
40	1	35	HCL	10	GOOD	18		10.0	7.0	TAv	0	35	35	18	90	10	10	602			0	35	35	18	90	10	10	602											
										EAv	0	35	0	0	90	7	10	0																				
	2	29	HCL	5	MODERATE	16	10	1.0	0.5	TAv	35	64	15	16	95	1	5	229			35	64	29	16	95	1	5	442											
										EAv	35	64	14	10	95	1	5	133																				
	3									TAv	64	64	0	0	100	0	0	0			64	64	0	0	100	0	0	0											
										EAv	64	64	0	0	100	0	0	0	96	-6									104	11	3a								
	4									TAv	64	64	0	0	100	0	0	0			64	64	6	0	100	0	0	0											
										EAv	64	64	0	0	100	0	0	0																				
	5									TAv	64	64	0	0	100	0	0	0			64	64	0	0	100	0	0	0											
										EAv	64	64	0	0	100	0	0	0																				
41	1	35	HCL	5	GOOD	18		4.0	3.0	TAv	0	35	35	18	95	4	5	606			0	35	35	18	95	4	5	606											
										EAv	0	35	0	0	95	3	5	0																				
	2									TAv	35	35	0	0	100	0	0	0			35	35	0	0	100	0	0	0											
										EAv	35	35	0	0	100	0	0	0																				
	3									TAv	35	35	0	0	100	0	0	0			35	35	0	0	100	0	0	0											
										EAv	35	35	0	0	100	0	0	0	61	-42									61	-33	3b								
	4									TAv	35	35	0	0	100	0	0	0			35	35	35	0	100	0	0	0											
										EAv	35	35	0	0	100	0	0	0																				
	5									TAv	35	35	0	0	100	0	0	0			35	35	0	0	100	0	0	0											
										EAv	35	35	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)	
42	1	32	HCL	5	GOOD	18		10.0	7.0	TAv	0	32	32	18	95	10	5	563	111	8	0	32	32	18	95	10	5	563	120	27	2						
										EAv	0	32	0	0	95	7	5	0																		
	2	32	HCL	5	GOOD	21	14	1.0	0.5	TAv	32	64	18	21	95	1	5	360			32	64	32	21	95	1	5	640									
										EAv	32	64	14	14	95	1	5	187																		
	3									TAv	64	64	0	0	100	0	0	0			64	64	0	0	100	0	0	0									
										EAv	64	64	0	0	100	0	0	0																		
	4									TAv	64	64	0	0	100	0	0	0			64	64	6	0	100	0	0	0									
										EAv	64	64	0	0	100	0	0	0																		
	5									TAv	64	64	0	0	100	0	0	0			64	64	0	0	100	0	0	0									
										EAv	64	64	0	0	100	0	0	0																		
43	1	30	HCL	5	GOOD	18		3.0	2.0	TAv	0	30	30	18	95	3	5	518	92	-11	0	30	30	18	95	3	5	518	104	10	3a						
										EAv	0	30	0	0	95	2	5	0																		
	2	40	C	0	POOR	13	7			TAv	30	70	20	13	100	0	0	260			30	70	40	13	100	0	0	520									
										EAv	30	70	20	7	100	0	0	140																		
	3									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0									
										EAv	70	70	0	0	100	0	0	0																		
	4									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0									
										EAv	70	70	0	0	100	0	0	0																		
	5									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0									
										EAv	70	70	0	0	100	0	0	0																		
44	1	40	HCL	5	GOOD	18		3.0	2.0	TAv	0	40	40	18	95	3	5	690	82	-21	0	40	40	18	95	3	5	690	82	-12	3b						
										EAv	0	40	0	0	95	2	5	0																		
	2	10	C	10	POOR	13	7	10.0	7.0	TAv	40	50	10	13	90	10	10	127			40	50	10	13	90	10	10	127									
										EAv	40	50	0	7	90	7	10	0																		
	3									TAv	50	50	0	0	100	0	0	0			50	50	0	0	100	0	0	0									
										EAv	50	50	0	0	100	0	0	0																		
	4									TAv	50	50	0	0	100	0	0	0			50	50	20	0	100	0	0	0									
										EAv	50	50	0	0	100	0	0	0																		
	5									TAv	50	50	0	0	100	0	0	0			50	50	0	0	100	0	0	0									
										EAv	50	50	0	0	100	0	0	0																		
45	1	38	HCL	10	GOOD	18		3.0	2.0	TAv	0	38	38	18	90	3	10	627	82	-21	0	38	38	18	90	3	10	627	85	-8	3b						
										EAv	0	38	0	0	90	2	10	0																		
	2	17	C	0	POOR	13	7			TAv	38	55	12	13	100	0	0	156			38	55	17	13	100	0	0	221									
										EAv	38	55	5	7	100	0	0	35																		
	3									TAv	55	55	0	0	100	0	0	0			55	55	0	0	100	0	0	0									
										EAv	55	55	0	0	100	0	0	0																		
	4									TAv	55	55	0	0	100	0	0	0			55	55	15	0	100	0	0	0									
										EAv	55	55	0	0	100	0	0	0																		
	5									TAv	55	55	0	0	100	0	0	0			55	55	0	0	100	0	0	0									
										EAv	55	55	0	0	100	0	0	0																		
46	1	35	HCL	5	GOOD	18		3.0	2.0	TAv	0	35	35	18	95	3	5	604	72	-30	0	35	35	18	95	3	5	604	72	-21	3b						
										EAv	0	35	0	0	95	2	5	0																		
	2	6	HCL	5	GOOD	21	14	3.0	2.0	TAv	35	41	6	21	95	3	5	121			35	41	6	21	95	3	5	121									
										EAv	35	41	0	14	95	2	5	0																		
	3									TAv	41	41	0	0	100	0	0	0			41	41	0	0	100	0	0	0									
										EAv	41	41	0	0	100	0	0	0																		
	4									TAv	41	41	0	0	100	0	0	0			41	41	29	0	100	0	0	0									
										EAv	41	41	0	0	100	0	0	0																		
	5									TAv	41	41	0	0	100	0	0	0			41	41	0	0	100	0	0	0									
										EAv	41	41	0	0	100	0	0	0																		
47	1	45	HCL	0	GOOD	18				TAv	0	45	45	18	100	0	0	810	104	1	0	45	45	18	100	0	0	810	109	16	3a						
										EAv	0	45	0	0	100	0	0	0																		
	2	15	ZC	20	GOOD	21	15	10.0	7.0	TAv	45	60	5	21	80	10	20	94			45	60	15	21	80	10	20	282									
										EAv	45	60	10	15	80	7	20	134																		
	3									TAv	60	60	0	0	100	0	0	0			60	60	0	0	100	0	0	0									
										EAv	60	60	0	0	100	0	0	0																		
	4									TAv	60	60	0	0	100	0	0	0			60	60	10	0	100	0	0	0									
										EAv	60	60	0	0	100	0	0	0																		
	5									TAv	60	60	0	0	100	0	0	0			60	60	0	0	100	0	0	0									
										EAv	60	60	0	0	100	0	0	0																		
48	1	27	HCL	0	GOOD	18				TAv	0	27	27	18	100	0	0	486	87	-16	0	27	27	18	100	0	0	486	87	-6	3a						
										EAv	0	27	0	0	100	0	0	0																		
	2	19	HCL	5	GOOD	21	14	3.0	2.0	TAv	27	46	19	21	95	3	5	382			27	46	19	21	95	3	5	382									
										EAv	27	46	0	14	95	2	5	0																		
	3									TAv	46	46	0	0	100	0	0	0			46	46	0	0	100	0	0	0									
										EAv	46	46	0	0	100	0	0	0																		
	4									TAv	46	46	0	0	100	0	0	0			46	46	24	0	100	0	0	0									
										EAv	46	46	0	0	100	0	0	0																		
	5									TAv	46	46	0	0	100	0	0	0			46	46	0	0	100	0	0	0									
										EAv	46	46	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)	
50	1	18	HCL	5	GOOD	18		4.0	3.0	TAv	0	18	18	18	95	4	5	311			0	18	18	18	95	4	5	311										
										EAv	0	18	0	0	95	3	5	0																			
	2	22	HCL	5	MODERATE	16	10	4.0	3.0	TAv	18	40	22	16	95	4	5	339			18	40	22	16	95	4	5	339										
										EAv	18	40	0	10	95	3	5	0																			
	3	8	HCL	5	MODERATE	16	10	4.0	3.0	TAv	40	48	8	16	95	4	5	123			40	48	8	16	95	4	5	123										
										EAv	40	48	0	10	95	3	5	0	77	-25								77	-16	3b						
	4									TAv	48	48	0	0	100	0	0	0			48	48	22	0	100	0	0	0										
										EAv	48	48	0	0	100	0	0	0																			
	5									TAv	48	48	0	0	100	0	0	0			48	48	0	0	100	0	0	0										
										EAv	48	48	0	0	100	0	0	0																			
51	1	32	HCL	10	GOOD	18		10.0	7.0	TAv	0	32	32	18	90	10	10	550			0	32	32	18	90	10	10	550										
										EAv	0	32	0	0	90	7	10	0																			
	2	18	HCL	10	MODERATE	16	10	10.0	7.0	TAv	32	50	18	16	90	10	10	277			32	50	18	16	90	10	10	277										
										EAv	32	50	0	10	90	7	10	0																			
	3									TAv	50	50	0	0	100	0	0	0			50	50	0	0	100	0	0	0										
										EAv	50	50	0	0	100	0	0	0	83	-20								83	-11	3a						
	4									TAv	50	50	0	0	100	0	0	0			50	50	20	0	100	0	0	0										
										EAv	50	50	0	0	100	0	0	0																			
	5									TAv	50	50	0	0	100	0	0	0			50	50	0	0	100	0	0	0										
										EAv	50	50	0	0	100	0	0	0																			
52	1	35	HCL	5	GOOD	18		3.0	2.0	TAv	0	35	35	18	95	3	5	604			0	35	35	18	95	3	5	604										
										EAv	0	35	0	0	95	2	5	0																			
	2	35	C	0	POOR	13	7			TAv	35	70	15	13	100	0	0	195			35	70	35	13	100	0	0	455										
										EAv	35	70	20	7	100	0	0	140																			
	3									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0										
										EAv	70	70	0	0	100	0	0	0	94	-9								106	13	3a						
	4									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0										
										EAv	70	70	0	0	100	0	0	0																			
	5									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0										
										EAv	70	70	0	0	100	0	0	0																			
54	1	40	HCL	5	GOOD	18		4.0	3.0	TAv	0	40	40	18	95	4	5	692			0	40	40	18	95	4	5	692										
										EAv	0	40	0	0	95	3	5	0																			
	2	30	C	5	MODERATE	16	8	4.0	3.0	TAv	40	70	10	16	95	4	5	154			40	70	30	16	95	4	5	462										
										EAv	40	70	20	8	95	3	5	155																			
	3									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0										
										EAv	70	70	0	0	100	0	0	0	100	-2								115	22	3a						
	4									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0										
										EAv	70	70	0	0	100	0	0	0																			
	5									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0										
										EAv	70	70	0	0	100	0	0	0																			
55	1	40	HCL	5	GOOD	18		4.0	3.0	TAv	0	40	40	18	95	4	5	692			0	40	40	18	95	4	5	692										
										EAv	0	40	0	0	95	3	5	0																			
	2	30	C	5	MODERATE	16	8	4.0	3.0	TAv	40	70	10	16	95	4	5	154			40	70	30	16	95	4	5	462										
										EAv	40	70	20	8	95	3	5	155																			
	3									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0										
										EAv	70	70	0	0	100	0	0	0	100	-2								115	22	3a						
	4									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0										
										EAv	70	70	0	0	100	0	0	0																			
	5									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0										
										EAv	70	70	0	0	100	0	0	0																			
56	1	33	HCL	10	GOOD	18		3.0	2.0	TAv	0	33	33	18	90	3	10	545			0	33	33	18	90	3	10	545										
										EAv	0	33	0	0	90	2	10	0																			
	2									TAv	33	33	0	0	100	0	0	0			33	33	0	0	100	0	0	0										
										EAv	33	33	0	0	100	0	0	0																			
	3									TAv	33	33	0	0	100	0	0	0			33	33	0	0	100	0	0	0										
										EAv	33	33	0	0	100	0	0	0	54	-48								54	-39	3b						
	4									TAv	33	33	0	0	100	0	0	0			33	33	37	0	100	0	0	0										
										EAv	33	33	0	0	100	0	0	0																			
	5									TAv	33	33	0	0	100	0	0	0			33	33	0	0	100	0	0	0										
										EAv	33	33	0	0	100	0	0	0																			
57	1	35	HCL	5	GOOD	18		4.0	3.0	TAv	0	35	35	18	95	4	5	606			0	35	35	18	95	4	5	606										
										EAv	0	35	0	0	95	3	5	0																			
	2	20	ZC	5	MODERATE	15	8	4.0	3.0	TAv	35	55	15	15	95	4	5	217			35	55	20	15	95	4	5	289										
										EAv	35	55	5	8	95	3	5	39																			
	3									TAv	55	55	0	0	100	0	0	0			55	55	0	0	100	0	0	0										
										EAv	55	55	0	0	100	0	0	0	86	-16								89	-4	3a						
	4									TAv	55	55	0	0	100	0	0	0			55	55	15	0	100	0	0	0										
										EAv	55	55	0	0	100	0	0	0																			
	5									TAv	55	55	0	0	100	0	0	0			55	55	0	0	100	0	0	0										
										EAv	55	55	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)	
58	1	40	HCL	5	GOOD	18		4.0	3.0	TAv	0	40	40	18	95	4	5	692			0	40	40	18	95	4	5	692			
										EAv	0	40	0	0	95	3	5	0													
	2	30	HCL	5	MODERATE	16	10	4.0	3.0	TAv	40	70	10	16	95	4	5	154			40	70	30	16	95	4	5	462			
										EAv	40	70	20	10	95	3	5	193													
	3									TAv	70	70	0	0	100	0	0	0	104	1	70	70	0	0	100	0	0	0	115	22	3a
										EAv	70	70	0	0	100	0	0	0													
	4									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0			
										EAv	70	70	0	0	100	0	0	0													
	5									TAv	70	70	0	0	100	0	0	0			70	70	0	0	100	0	0	0			
										EAv	70	70	0	0	100	0	0	0													
59	1	35	HCL	5	GOOD	18		4.0	3.0	TAv	0	35	35	18	95	4	5	606			0	35	35	18	95	4	5	606			
										EAv	0	35	0	0	95	3	5	0													
	2	20	HCL	5	MODERATE	16	10	4.0	3.0	TAv	35	55	15	16	95	4	5	231			35	55	20	16	95	4	5	308			
										EAv	35	55	5	10	95	3	5	48													
	3									TAv	55	55	0	0	100	0	0	0	88	-14	55	55	0	0	100	0	0	0	91	-2	3a
										EAv	55	55	0	0	100	0	0	0													
	4									TAv	55	55	0	0	100	0	0	0			55	55	15	0	100	0	0	0			
										EAv	55	55	0	0	100	0	0	0													
	5									TAv	55	55	0	0	100	0	0	0			55	55	0	0	100	0	0	0			
										EAv	55	55	0	0	100	0	0	0													
60	1	28	HCL	5	GOOD	18		3.0	2.0	TAv	0	28	28	18	95	3	5	483			0	28	28	18	95	3	5	483			
										EAv	0	28	0	0	95	2	5	0													
	2	27	HCL	5	POOR	12	7	3.0	2.0	TAv	28	55	22	12	95	3	5	254			28	55	27	12	95	3	5	312			
										EAv	28	55	5	7	95	2	5	34													
	3									TAv	55	55	0	0	100	0	0	0	77	-25	55	55	0	0	100	0	0	0	79	-14	3b
										EAv	55	55	0	0	100	0	0	0													
	4									TAv	55	55	0	0	100	0	0	0			55	55	15	0	100	0	0	0			
										EAv	55	55	0	0	100	0	0	0													
	5									TAv	55	55	0	0	100	0	0	0			55	55	0	0	100	0	0	0			
										EAv	55	55	0	0	100	0	0	0													
61	1	34	HCL	5	GOOD	18		3.0	2.0	TAv	0	34	34	18	95	3	5	587			0	34	34	18	95	3	5	587			
										EAv	0	34	0	0	95	2	5	0													
	2	21	C	5	POOR	13	7	3.0	2.0	TAv	34	55	16	13	95	3	5	200			34	55	21	13	95	3	5	263			
										EAv	34	55	5	7	95	2	5	34													
	3									TAv	55	55	0	0	100	0	0	0	82	-21	55	55	0	0	100	0	0	0	85	-8	3b
										EAv	55	55	0	0	100	0	0	0													
	4									TAv	55	55	0	0	100	0	0	0			55	55	15	0	100	0	0	0			
										EAv	55	55	0	0	100	0	0	0													
	5									TAv	55	55	0	0	100	0	0	0			55	55	0	0	100	0	0	0			
										EAv	55	55	0	0	100	0	0	0													
62	1	28	HCL	5	GOOD	18		10.0	7.0	TAv	0	28	28	18	95	10	5	493			0	28	28	18	95	10	5	493			
										EAv	0	28	0	0	95	7	5	0													
	2	15	ZC	10	POOR	12	7	10.0	7.0	TAv	28	43	15	12	90	10	10	177			28	43	15	12	90	10	10	177			
										EAv	28	43	0	7	90	7	10	0													
	3	37	C	0	POOR	13	7			TAv	43	80	7	13	100	0	0	91	97	-5	43	80	27	13	100	0	0	351	102	9	3a
										EAv	43	80	30	7	100	0	0	210													
	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													
63	1	34	HCL	5	GOOD	18		3.0	2.0	TAv	0	34	34	18	95	3	5	587			0	34	34	18	95	3	5	587			
										EAv	0	34	0	0	95	2	5	0													
	2	16	ZC	10	POOR	12	7	10.0	7.0	TAv	34	50	16	12	90	10	10	189			34	50	16	12	90	10	10	189			
										EAv	34	50	0	7	90	7	10	0													
	3									TAv	50	50	0	0	100	0	0	0	78	-25	50	50	0	0	100	0	0	0	78	-16	3b
										EAv	50	50	0	0	100	0	0	0													
	4									TAv	50	50	0	0	100	0	0	0			50	50	20	0	100	0	0	0			
										EAv	50	50	0	0	100	0	0	0													
	5									TAv	50	50	0	0	100	0	0	0			50	50	0	0	100	0	0	0			
										EAv	50	50	0	0	100	0	0	0													
177	1	40	HCL	5	GOOD	18		10.0	7.0	TAv	0	40	40	18	95	10	5	704			0	40	40	18	95	10	5	704			
										EAv	0	40	0	0	95	7	5	0													
	2	35	ZC	5	POOR	12	7	10.0	7.0	TAv	40	75	10	12	95	10	5	119			40	75	30	12	95	10	5	357			
										EAv	40	75	25	7	95	7	5	175													
	3									TAv	75	75	0	0	100	0	0	0	100	-3	75	75	0	0	100	0	0	0	106	13	3a
										EAv	75	75	0	0	100	0	0	0													
	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 3
Laboratory Results

Sample nomenclature:

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

Survey point number corresponds with the numbers on **Figure 11.7, Volume 5, Document 5.4.11** and in the other Annexes.

Page intentionally blank

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 69150/22

Date Received 17-May-22
Date Reported 27-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
370227/22	1	**NG-YG-MFS 32 H1** *No cropping details given*	**7.7**	**2**	**2-**	**6**	**22.6**	**135**	**455**
370228/22	2	**NG-YG-MFS 32 H2** *No cropping details given*	**7.9**	**0**	**1**	**6**	**5.0**	**67**	**476**
370229/22	3	**NG-YG-MFS 29 H1** *No cropping details given*	**8.0**	**1**	**1**	**5**	**13.6**	**74**	**346**
370230/22	4	**NG-YG-MFS 29 H2** *No cropping details given*	**7.9**	**0**	**0**	**5**	**4.8**	**54**	**344**
370231/22	5	**NG-YG-MFS 28 H1** *No cropping details given*	**8.1**	**2**	**1**	**5**	**16.0**	**103**	**339**

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 27/05/22

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 69150/22

Date Received 17-May-22
Date Reported 27-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
[redacted]									

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 27/05/22

MICRO NUTRIENT REPORT

DATE **27th May 2022**

SAMPLES FROM **GM11455GMGE**

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

Tel: [redacted]

Reference: **69150/370227/22**	Field Name: **NG-YG-MFS 32 H1**	**Result**	(*)	Deficient	Marginal	Target	Marginal	Excessive
Organic matter (LOI) %		4.9	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		17						
Silt (0.063 - 0.002mm) %		51						
Clay (< 0.002mm) %		32						
Textural Classification		Silty Clay Loam	2					

Reference: **69150/370228/22**	Field Name: **NG-YG-MFS 32 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) %		13						
Silt (0.063 - 0.002mm) %		55						
Clay (< 0.002mm) %		32						
Textural Classification		Silty Clay Loam	2					

Reference: **69150/370229/22**	Field Name: **NG-YG-MFS 29 H1**	**Result**	(*)	Deficient	Marginal	Target	Marginal	Excessive
Organic matter (LOI) %		3.8	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		22						
Silt (0.063 - 0.002mm) %		53						
Clay (< 0.002mm) %		25						
Textural Classification		Clay Loam	2					

Reference: **69150/370230/22**	Field Name: **NG-YG-MFS 29 H2**	**Result**	(*)	Deficient	Marginal	Target	Marginal	Excessive
Organic matter (LOI) %		2.2	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		50						
Silt (0.063 - 0.002mm) %		32						
Clay (< 0.002mm) %		18						
Textural Classification		Sandy Silt Loam	2					

Reference: **69150/370231/22**	Field Name: **NG-YG-MFS 28 H1**	**Result**	(*)	Deficient	Marginal	Target	Marginal	Excessive
Organic matter (LOI) %		4.0	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %		13						
Silt (0.063 - 0.002mm) %		59						
Clay (< 0.002mm) %		28						
Textural Classification		Silty Clay Loam	2					

[redacted]

Report continued.....

MICRO NUTRIENT REPORT

DATE **27th May 2022**

SAMPLES FROM **GM11455GMGE**

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

Tel: [redacted]

[redacted]

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	27th May 2022
SAMPLES FROM	GM11455GMGE
SAMPLED BY	KIRSTY ELLIOTT
	NT54881
Report reference	69150/22

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

Tel: [redacted]
Fax:

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-MFS 32 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370227 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
NG-YG-MFS 32 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370228 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
NG-YG-MFS 29 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370229 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
NG-YG-MFS 29 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370230 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
NG-YG-MFS 28 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
370231 / 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

DATE 27th May 2022
SAMPLES FROM GM11455GMGE

SAMPLED BY KIRSTY ELLIOTT
NT54881

Report reference 69150/22

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

Tel: [redacted]

Fertiliser Recommendations

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-NOS 80 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370232 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-NOS 80 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370233 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-NOS 80 H3	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370234 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-NOS 107 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370235 / Medium		*Kg/Ha*				*Te/Ha* **0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
NG-YG-NOS 107 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
370236 / 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

ANALYSIS REPORT

Contact : WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP
Tel. : [redacted]

H448

Please quote the above code for all enquiries

Client : YORKSHIRE GREEN

Distributor : CA10496

Local Rep : B THOMAS

Telephone : [redacted]

Sample Matrix : Agricultural Soil

Laboratory Reference
Card Number 71907/22

Date Received 06-Sep-22
Date Reported 16-Sep-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
381758/22	1	**P57 H1 MONK FRYS** *No cropping details given*	**8.1**	**0**	**1**	**6**	**6.8**	**117**	**549**
[redacted]									

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 16/09/22

ANALYSIS REPORT

MICRO NUTRIENT REPORT

DATE **16th September 2022**

SAMPLES FROM **YORKSHIRE GREEN**

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

Tel: [redacted]

Reference: **71907/381758/22** Field Name: **P57 H1 MONK FRYS**	**Result**	(*)
Organic matter (LOI) %	4.7	1
Sand (2.00 - 0.063mm) %	31	
Silt (0.063 - 0.002mm) %	38	
Clay (< 0.002mm) %	31	
Textural Classification	Clay Loam	2

Deficient	**Marginal**	**Target**	**Marginal**	**Excessive**
OM level data not available for this crop				

[redacted]

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 16th September 2022
SAMPLES FROM YORKSHIRE GREEN

SAMPLED BY B THOMAS
CA10496

Report reference 71907/22

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

Tel: [redacted]
Fax:

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)*
P57 H1 MONK FRYS	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
381758 / Medium		*Kg/Ha*				*Te/Ha* **0**	**0**

[redacted]

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

ANALYSIS REPORT

Contact : WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP
Tel. : [redacted]

H448

Please quote the above code for all enquiries

Client : YORKSHIRE GREEN

Distributor : CA10796

Local Rep : B THOMAS

Telephone : [redacted]

Sample Matrix : Agricultural Soil

Laboratory Reference
Card Number 71923/22

Date Received 06-Sep-22
Date Reported 16-Sep-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
381842/22	1	**57 H2 MONK FRYS** *No cropping details given*	**7.6**	**0**	**1**	**7**	**3.6**	**95**	**631**
381843/22	2	**39 H2 MONK FRYS** *No cropping details given*	**7.7**	**0**	**1**	**4**	**4.8**	**104**	**238**
381844/22	3	**41 H1 MONK FRYS** *No cropping details given*	**7.9**	**1**	**2-**	**4**	**11.8**	**172**	**196**
381845/22	4	**39 H1 MONK FRYS** *No cropping details given*	**7.5**	**2**	**2+**	**5**	**16.0**	**197**	**294**
[redacted]									

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 16/09/22

ANALYSIS REPORT

Contact : WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP
Tel. : [redacted]

H448

Please quote the above code for all enquiries

Client : YORKSHIRE GREEN

Distributor : CA10796

Local Rep : B THOMAS

Telephone : [redacted]

Sample Matrix : Agricultural Soil

Laboratory Reference
Card Number 71923/22

Date Received 06-Sep-22
Date Reported 16-Sep-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
[redacted]									

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 16/09/22

ANALYSIS REPORT

MICRO NUTRIENT REPORT

DATE **16th September 2022**

SAMPLES FROM **YORKSHIRE GREEN**

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

Tel: [redacted]

Reference: **71923/381842/22** Field Name: **57 H2 MONK FRYS**	**Result**	(*)	Deficient	Marginal	Target	Marginal	Excessive
Organic matter (LOI) %	3.3	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	15						
Silt (0.063 - 0.002mm) %	46						
Clay (< 0.002mm) %	39						
Textural Classification	Silty Clay	2					

Reference: **71923/381843/22** Field Name: **39 H2 MONK FRYS**	**Result**	(*)	Deficient	Marginal	Target	Marginal	Excessive
Organic matter (LOI) %	2.4	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	30						
Silt (0.063 - 0.002mm) %	45						
Clay (< 0.002mm) %	25						
Textural Classification	Clay Loam	2					

Reference: **71923/381844/22** Field Name: **41 H1 MONK FRYS**	**Result**	(*)	Deficient	Marginal	Target	Marginal	Excessive
Organic matter (LOI) %	3.8	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	21						
Silt (0.063 - 0.002mm) %	49						
Clay (< 0.002mm) %	30						
Textural Classification	Clay Loam	2					

Reference: **71923/381845/22** Field Name: **39 H1 MONK FRYS**	**Result**	(*)	Deficient	Marginal	Target	Marginal	Excessive
Organic matter (LOI) %	3.9	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	28						
Silt (0.063 - 0.002mm) %	44						
Clay (< 0.002mm) %	28						
Textural Classification	Clay Loam	2					

[redacted]

Report continued.....

MICRO NUTRIENT REPORT

DATE **16th September 2022**

SAMPLES FROM **YORKSHIRE GREEN**

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

Tel: [redacted]

[redacted]

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 16th September 2022
SAMPLES FROM YORKSHIRE GREEN

SAMPLED BY B THOMAS
CA10796

Report reference 71923/22

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

Tel: [redacted]
Fax:

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)*
57 H2 MONK FRYS	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
381842 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
39 H2 MONK FRYS	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
381843 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
41 H1 MONK FRYS	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
381844 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
39 H1 MONK FRYS	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
381845 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**

[redacted]

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

DATE 16th September 2022
SAMPLES FROM YORKSHIRE GREEN

SAMPLED BY B THOMAS
CA10796

Report reference 71923/22

WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP
Tel: [redacted]
Fax:

Fertiliser Recommendations

[redacted]

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

ANALYSIS REPORT

Contact : WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE
Te [redacted]

H448

Please quote the above code for all enquiries

Client : GM11455

Distributor : CA10809

Sample Matrix : Agricultural Soil

Laboratory Reference
Card Number 72349/22

Date Received 15-Sep-22
Date Reported 26-Sep-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
383797/22	1	**NG YG MF 52 H2** *No cropping details given*	**8.1**	**0**	**1**	**7**	**4.8**	**118**	**871**
383798/22	2	**NG YG MF 62 H1** *No cropping details given*	**8.0**	**0**	**1**	**6**	**7.6**	**98**	**543**
383799/22	3	**NG YG MF 62 H2** *No cropping details given*	**8.4**	**0**	**1**	**7**	**<2.5**	**72**	**608**
383800/22	4	**NG YG MF 62 H3** *No cropping details given*	**8.2**	**0**	**1**	**7**	**<2.5**	**93**	**877**

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 26/09/22

MICRO NUTRIENT REPORT

DATE **26th September 2022**

SAMPLES FROM **GM11455**

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

[redacted]

Reference: **72349/383797/22** Field Name: **NG YG MF 52 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) %	9						
Silt (0.063 - 0.002mm) %	44						
Clay (< 0.002mm) %	47						
Textural Classification	Clay	2					

Reference: **72349/383798/22** Field Name: **NG YG MF 62 H1**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %	4.4	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	26						
Silt (0.063 - 0.002mm) %	41						
Clay (< 0.002mm) %	33						
Textural Classification	Clay Loam	2					

Reference: **72349/383799/22** Field Name: **NG YG MF 62 H2**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %	2.2	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	16						
Silt (0.063 - 0.002mm) %	48						
Clay (< 0.002mm) %	36						
Textural Classification	Silty Clay	2					

Reference: **72349/383800/22** Field Name: **NG YG MF 62 H3**	**Result**	**(*)**	**Deficient**	**Marginal**	**Target**	**Marginal**	**Excessive**
Organic matter (LOI) %	2.2	1	*OM level data not available for this crop*				
Sand (2.00 - 0.063mm) %	5						
Silt (0.063 - 0.002mm) %	44						
Clay (< 0.002mm) %	51						
Textural Classification	Clay	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 September 2022
SAMPLES FROM GM11455

SAMPLED BY CA10809

Report reference 72349/22

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

[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 MF 52 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
383797 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*		*Lime (Arable)*	*(Grass)*
NG YG MF 62 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
383798 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*		*Lime (Arable)*	*(Grass)*
NG YG MF 62 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
383799 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*		*Lime (Arable)*	*(Grass)*
NG YG MF 62 H3	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
383800 / Heavy		*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

Page intentionally blank

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

Registered in England and Wales
No. 4031152