Review Item	Pass/Concern/Fail	Explanation and Comments	Comments of James Fulton
Background	**P = Pass** **C = Concern** **F = Fail**		
Is the company/author a specialist in ALC?	C	The author is a ”chartered surveyor, agricultural valuer and agricultural consultant” and, although he has experience of producing ALC reports, there is no indication that he is an ALC specialist or a member of the Institute of Soil Science.	Additional Information provided at Appendix A
Have published soil maps been mentioned?	P	Paragraph 3.2 - the correct soil associations are identified, but no reference for the source is given.	
Is the site description correct?	C	No locational context is given. The main report (paragraph 2.7) describes the site as extending to 161.3ha of arable land over 22 fields: the report text has not been updated following the amendment to the red line boundary.	Additional information has been provided - now paragraph 2.9
Has the correct geology been identified?	P	Paragraph 3.1 - broadly, yes, however multiple named limestone beds within the Foston Member (of the Scunthorpe Mudstone Formation) have been omitted: Dry Doddington Nodule Bed, Lodge Farm Limestones Bed, Fenton Limestone Bed, Littlegate Limestones Bed, Mill Lane Limestones Bed, Highfield Farm Limestones Bed, Glebe Farm Bed, and the Charmouth Mudstone Formation on the southwestern edge.	
Has the correct Provisional ALC grading been identified, and, where applicable, has existing data been referred to?	P	Paragraph 3.3 - the site has been correctly identified as Grade 3. No existing detailed data available.	
Climate data			
Is interpolated climate data included for the site (esp. Field Capacity Days (FCD), Moisture Deficits (MD) and Maximum grade on climate)?	C	Section 4 - Mostly. The climate data has been recalculated using the grid reference and site altitude given. Most of the criteria are the same, with the exception of the moisture deficit for potatoes, which the report has as 99.92mm, but calculation shows to be 107mm. The level of accuracy of the climatic parameters given in the report (to two decimal places) is not necessary.	An error has been identified in the spreadsheet used and the data at section 4 and appendix 2 has been updated and now matches what was found by the reviewer

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Site and standalone limitations			
Have gradients, micro-relief and flooding been considered?	P	Yes, in Sections 4, 5 and 6.	
Soils and interactive limitations			
Have the correct ALC guidelines been referenced and used?	P	Paragraph 2.9 - the report makes reference to the MAFF 1988 ALC guidelines, and follows the methodology within the guidelines.	
Have topsoils and subsoils been field surveyed? References to soil pits, auger samples & lab samples should be included.	P	In total, 161 profiles and three pits were observed over 161ha of agricultural land. Two topsoil samples were subject to laboratory analysis.	
Are the soil types clearly described, including reference to gleying, slowly permeable layers (SPL) soil wetness class (SWC) and drought?	P	Section 7 - descriptions are brief but satisfactory.	
Have the reasons for ALC grading been clearly described?	P	Yes, in Section 8, albeit briefly.	
Have soil structure and porosity been described?	P	Given in the appended pit descriptions, although “coarse” structure is referred to as “course”.	
Have soils been described using Soil Survey Field Handbook (Hodgson 1997)?	P	Standard terminology is used.	
Have soils been described using Munsell soil colour notations?	P	Munsell colour notations are provided in profile logs given in Appendix 3.	
Conclusions and references			

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Is there a table clearly showing areas of ALC grades?	P	The report includes three tables of ALC grades of the surveyed area and final site area – both areas in the Executive Summary and the surveyed area only in Section 10.	
Is there a list of references (normally including Soil Survey of England and Wales mapping, the ALC guidelines, Munsell soil colour charts and the Soil Survey Field Handbook)?	P	All references are given as footnotes.	
Have the limitations been justified when concluding the ALC grade(s) on the site?	P	Sections 8 and 9.	
Does the soil described correspond with the mapped data?	P	The soils identified on site are generally consistent with the mapped soil data. No soils were identified as being calcareous (which will influence grading with clay topsoils). Soil belonging to a third association mapped outside of the site boundary was also identified.	
Schedule of auger borings and soil pits			
Has a map of auger boring & soil pit locations been included?	P	Appendix 1 Map Sample Points. The mapping has not been updated following an amendment (reduction) to the site boundary which would have been of assistance.	

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Have laboratory analyses been included to confirm topsoil particle size distribution?	P	The analysis results for two samples are given between Appendix 3b and Appendix 4.	
Has a schedule of auger boring information been provided?	P	Pages 12 to 14. All 161 profiles are given – many are not required as they are no longer in the site boundary.	
Do the auger borings show horizon depths, colours and textures?	P	Horizon depths, colours and textures are noted. There are small errors in the depths of some horizons, e.g. Profile 124 has horizons of 0-30cm, 3065cm and 60-120cm lower subsoil, and the pit at point 85 has 0-30cm, 30-60cm, 60-75cm and 90120cm.	
Do the auger boring records clearly show soil wetness class?	P	Shown in Appendix 4. Would be preferable to combine with profile data in Appendix 3.	
Do the auger boring records clearly show topsoil stone content?	P	The stone content column is left blank in all cases, however paragraph 5.1 notes that there were “no notable stones found on site”.	
Do the auger boring records clearly show depth to gleying and depth to slowly permeable layer (SPL)?	C	Appendix 4 notes the depth to SPL as 35cm and the depth to gleying as <40cm for all but seven profiles. The grade of these seven profiles is determined by droughtiness rather than wetness. Less than 40cm is not a clear statement of the depth to a gleyed horizon. The depth to a SPL of 35cm does not coincide with the depth to a separate soil horizon (it is part way through the upper subsoil which is otherwise described as one consistent horizon). Two of the three soil pits (15 and 85) both indicate in Appendix 3b that gleying and SPL start at a depth of 30cm, yet the schedule in Appendix 4 describes both as 35cm to SPL and <40cm to gleyed horizon.	In determining wetness it is assumed that a slowly permeable layer shallower than 35cm can be removed by cultivations and so where the layer has been identified shallower than 35cm it has been recorded as 35cm. As far as the depth of the gleyed horizon is concerned when determining wetness the assessment is onthe basis of a gleyed horizon shallower than 40cm or between 40 and 70cm. For the sake of clarity Appendix 4 has been updated

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Do the auger boring records clearly show moisture balance (MB) values for drought (Wheat & Potatoes)?	C	None included in the schedule of auger borings in Appendix 3. Only nine droughtiness calculations are included in Appendix 4, for locations 15, 85, 124127, 131, 132 and 140 (as above, seven of these profiles are limited by droughtiness; two remain limited by wetness).	Having calculated moisture balance for the trial pit locations it is clear that droughtiness is not the limiting factor for the majority of the site and so it has only been calculated where it si considered possibe that it will be the most limiting factor as explained at 9.3
Has detailed soil pit information been provided in the report and do the pit descriptions show horizon depths, colours and textures?	P	The locations of three pits are shown in Appendix 1 and descriptions are given in Appendix 3b. There is a typo in the depths of the soil horizons in the description of the pit at profile 85 (no data between 75cm and 90cm). Three photographs relating to one of the pits are provided. There is no overview picture of any pits to show the depths in-situ.	
Do the soil pits clearly show soil wetness class (WC)?	P	Noted.	
Do the soil pits clearly show moisture balance (MB) values for drought?	P	Noted.	
Do the soil pit clearly show soil structure and porosity in the subsoil?	P	Described for all pits but shown only for one pit.	
Technical and conclusions			
		The soil profile data appears too consistent for such a large area. Of the main soil type identified: • the colour in all but one topsoil (profile 122) is identical (2.5Y3/2) and all but six topsoils are exactly 30cm deep; • subsoil horizons are similarly identical (2.5Y5/2), other than the colour in profiles 4 and 8 (10YR4/6, which is not a gley colour). All but three reach exactly 60cm depth; • in seven profiles, the subsoil structure is given as “CAB” (coarse angular blocky) but in all others is given as “poor”. Of the seven, two were also pit locations. There is no reason given for the CAB structure having been allocated to the other five in particular.	Following issue of this review we went back to site on the 5th January 2022 to re sample a number of locations. As the reviewer says it is unusual to find a site that is so consistent but on re-inspection of various sample points the same results were found as in previous assessments. Additional photographs of the auger samples have

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Do the soil profile logs look credible?	C	The extract below shows the subtle variations in value and chroma within the hue of 2.5Y, and the low likelihood that virtually all of the main topsoil type is 2.5Y3(value)/2(chroma) or the main subsoil 2.5Y5/2, with no variation. Appendix 4 also notes that every single profile bar seven has a slowly permeable layer starting at 35cm which is not consistent with the pit data or with the upper subsoil starting at a consistent depth of 30cm. With 119 FCD, profiles gleyed within 40cm could have a slowly permeable starting as deep as 59cm and still be WC III (and Subgrade 3b). There is therefore plenty of latitude in the depth to the slowly permeable layer found on site for the classification of Subgrade 3b to be correct.	been added at appendix 3 to verify these findings. As the reviewer points out the difference between different colours is minimal but this also means that two people can look at the same sample and argue that it is a slightly different colour. In all cases the colours found are Pale or Grey indicating a gleyed horizon so any minor variation would not impact land grade. Appendix 4 has been updated as set out above.
Has the correct Wetness Class (WC) been identified?	P	Profiles in which there is a slowly permeable layer within 59cm of the surface are correctly identified as WC III.	
Has the correct grade been allocated?	P	The correct grades are allocated for the profiles as noted – WC III profiles with 119 FCD and noncalcareous clay topsoils are Subgrade 3b.	
Have photographs been included in the report?	C	Three photographs are provided in Appendix 3b, all relating to one of the three pits. Photographs of all pits should be provided and should include a pit overview as well as material from each horizon.	Additional photographs have been added at appendix 3.
Is there any reason to doubt the robustness of the survey and/or report conclusions?	C	The consistency between soil profile logs, particularly in colour and depth, appears unrealistic over a site of this size (161ha). Paragraph 2.4 notes that site visits were undertaken on 3rd January 2020, 17th July 2020 and 3rd October 2022. The map of sample points in Appendix 1 indicates that 123 auger points and two pits were observed on 3rd January 2020 and 38 auger points and one pit on 17th July 2020. The map does not show any points that were observed on 3rd October 2022. The observation of 123 profiles by one person by auger in one day is not remotely feasible; 38 could be achievable (with longer daylight hours) but not easily. This and the identical nature of most of the profile logs suggest that a majority of areas have been classified according to data extrapolated from a much smaller number of points.	Explained above Additional information supplied at 2.4, during site visits there was more than one surveyor on site during which an average of around 30 samples per surveyor per day was recorded.