



Triton Knoll Offshore Wind Farm Limited Triton Knoll Electrical System

Appendix 19: Agricultural Land Clarification Note

Date: 01 February 2016

Appendix 19 of the Applicant's
Response to Deadline 5

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1. REINSTATEMENT OF DRAINAGE WITHIN THE ORDER LIMITS

Current position

- 1.1 This note has been produced to further clarify the Applicant's position in relation to the reinstatement of drainage. This topic has been discussed extensively in submitted documents, hearings and meetings with the LIG and landowners.
- 1.2 The Applicant has consistently maintained throughout the examination its position that that agricultural land drainage can be effectively reinstated using only land within the 60 metre Order limits to a condition at least as effective as that encountered pre-construction.
- 1.3 This position has been set out in the following key written submissions to the examination:
- Agricultural Land Drainage Clarification Note (Appendix 28 of the Applicant's Response to Deadline 2)
 - Written Summary of The Applicant's Oral Case put at Onshore Impacts (Appendix 3 of the Applicant's Response to Deadline 3)
 - Joint Statement with Land Interest Group (Appendix 38 of the Applicant's Response to Deadline 4)
 - Theoretical land drainage designs (Plots 001 - 004) (Appendix 46 of the Applicant's Response to Deadline 4)
 - Written Summary of The Applicant's Oral Case put at Local Impacts Hearing on 19 January (Appendix 1 of the Applicant's Response to Deadline 5)
- 1.4 It is also worth noting that Section 4 of the Outline Soil Management Plan (Revision B) (Appendix 25 of the Applicant's Response to Deadline 4) sets out considerable detail about how agricultural land drainage will be managed. This is secured through Requirement 14 of the draft DCO (Revision F) (Appendix 22 of the Applicant's Response to Deadline 5).
- 1.5 Alongside this consistent statement of position, the Applicant has sought to demonstrate that agricultural land drainage can be effectively reinstated using only land within the Order limits by providing theoretical drainage designs on four fields that were agreed with the Land Interest Group (LIG) on 3rd December. Theoretical designs were prepared for these agreed examples and these were subsequently discussed with the LIG on 22nd December 2015 and submitted as Appendix 46 of the Applicant's response to Deadline 4.
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- 1.6 The Applicant has also consistently stated that detailed drainage design can only be reliably carried out following site inspection and detailed survey within each individual field. In line with this position, and in addition to the theoretical drainage designs discussed above, the Applicant has consistently offered meetings with landowners to discuss drainage matters in more detail. In recent weeks these meetings have started to take place and the Applicant has been able to discuss specific drainage in detail with a number of landowners as set out below, in each case demonstrating how drainage reinstatement could be undertaken effectively within the Order Limits.
- 1.7 It is clearly impractical to provide a detailed design for each and every field at this early stage, because such designs can only be indicative until the full suite of pre-construction surveys are complete and the detailed cable design has been undertaken. However, the provision of theoretical field by field designs by the Applicant provides the ExA and interested parties with further certainty that drainage can be effectively reinstated within the Order Limits.
- 1.8 In addition to the four designs (Plot 001 to Plot 004) submitted at Appendix 46 to the Applicant's Response to Deadline 4 [REP4-079], the Applicant has produce a further set of four additional example theoretical designs (Example 5 to Example 8) where the cable corridor passes through the a wider range of existing drainage systems. These four additional designs cover the expected range of drainage systems that might be encountered by the proposed development.

Example 5

- 1.9 Example 5 illustrates a fairly typical 160 mm pre-installation drain collecting the upstream water and diverting it into an outfall ditch with enough depth to be able to junction in the existing drains. This will allow the upstream existing drains to function normally during construction and divert the water away from the working corridor, the post-installation drains can then be run parallel with the Order Limits.

Example 6

- 1.10 Example 6 illustrates a more complex existing design with many generations of existing drain, again collecting the upstream water with a 160 mm header drain and diverting it away from the Order Limits during construction. The post-installation drainage will run with the Order Limits but there would be a need to increase the diameter of the post-installation drainage due to the length of the drains and the fall on the land. This would prevent the drains surcharging in heavy rainfall situations.

Example 7

- 1.11 Example 7 illustrates existing drains running a different angles with the drains to the east breaking on a hill so a pre-installation cut off drain would be required on both sides to pick up the existing drains. The drains to the west has a 6" main drainage pipe which would be intercepted and diverted within the Order Limits. There would need to be four
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farm track crossings (designed to specification). This example also shows a service crossing which will also be completed to a design specification.

Example 8

- 1.12 Example 8 shows cross connections within the Order Limits to allow jetting of the existing drains after construction. A sacrificial header drain would be installed at pre-installation stage to divert water away from the Order Limits during construction. Drains would be reconnected within the order limits (to design specification) at the post-installation stage. This would allow the drainage system to work as it did before and allow the facility to jet if required.
- 1.13 The Applicant considers that these examples adequately represent all systems that might be encountered by the proposed development and provided further certainty that drainage can be reinstated within the Order Limits.
- 1.14 Detailed plans of these additional theoretical designs are attached as Example 5 to Example 8 in Appendix 1 to this clarification note.
- 1.15 It should be noted that all drainage designs produced to date are theoretical in that they demonstrate an appropriate method of drainage reinstatement within the Order Limits. They do not seek to infer that this will be the final design selected and they are not informed by the full suite of information collected during the pre-construction surveys or the final design of the TKES electrical system works. As set out in previous submissions, particularly the Agricultural Land Drainage Clarification Note (Appendix 28 of the Applicant's Response to Deadline 2), the final design of drainage reinstatement cannot be completed until the final design of the whole electrical system is completed and in some cases the design may need to be revised to accommodate conditions encountered on site during construction.

Anecdotal evidence provided by landowners at hearings

- 1.16 During the Local Impacts Issue Specific hearing on 19th January 2016 the ExA referred to evidence provided by interested parties, specifically farmers, that drainage cannot be reinstated within the Order limits. The Applicant does not agree with this assertion. The Applicant acknowledges that there have been anecdotal submissions, often verbal, in relation to agricultural drainage, but as far as the Applicant is aware no actual evidence has been submitted to the ExA which demonstrates that drainage could not be reinstated within the 60 m-wide Order limits.
- 1.17 The Applicant's position is clear in that these representations are not evidence, as they are not backed up by the information required to substantiate the assertion.
- 1.18 The Applicant acknowledges that "as-built" drainage designs were submitted as part of the DMJ Drainage report (submitted at Appendix 2 for Deadline 1 submission from
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Wilkin Chapman LLP). These drainage situations have been responded to in Appendix 46 of Deadline 4, demonstrating how drainage can be reinstated within the 60 m-wide Order limits and identifying one example of where a reasonable request by the landowner to carry out works outside of the Order limits would be handled by the Applicant.

- 1.19 As such where drainage information has been provided in relation to specific fields within the Order Limits, the Applicant has carried out a theoretical drainage design and has been able to demonstrate that reinstatement can take place within the Order limits.

Cross connection drainage reinstatement

- 1.20 The Applicant acknowledges that the use of cross connection techniques to reinstate drainage has been questioned by interested parties in anecdotal evidence, again often submitted verbally.
- 1.21 It is the Applicant's position that cross connections, when appropriately designed and carried out to the proper specification, are a robust and reliable method of reinstating drainage and create no addition risk of future damage to drainage systems.
- 1.22 This position is supported by Land Drainage Services, who have 46 years of knowledge and experience of the function, design and reinstatement of drainage systems, notably within the local area. Drainage engineering has changed significantly over recent decades and many of the concerns raised are based on experience of older and earlier drainage systems and methods for drainage reinstatement. It is notable that over the last 30 years, Land Drainage Services have stated that they have no evidence that a cross connection has failed.
- 1.23 Further, the Applicant has experience from the Gwynt y Mor onshore cable route, where 4 cables were installed within a 40 m-wide cable corridor, which passes through a coastal flood plain. Every field crossed used the cross connection approach to reconnect drains. There have been no reported connection failures to date and none of the affected landowners have raised any issues with respect to drainage reinstatement problems.
- 1.24 It therefore remains the Applicant's clear position that agricultural land drainage systems can be reinstated effectively and safely within the Order limits.

Landowner engagement

- 1.25 Further to demonstrating that example fields can be reinstated within the Order Limits, the Applicant has sought on-site meetings with landowners and tenants to discuss drainage reinstatement in detail.

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- 1.26 These meetings accord with the Applicant's consistently stated position that detailed drainage designs need to be informed by on-site information.
- 1.27 To date meetings to discuss drainage matters in detail have taken place with the following landowners:
- Mr Mowbray on the 27th January 2016
 - E A Dring on the 13th January 2016
 - Mr Grant (Bishops Farm Partners) on the 13th January 2016
 - Clayton Bros on the 13th January 2016
 - G Bush on the 13th January 2016
 - M Fixter on the 13th January 2016
- 1.28 Theoretical drainage has been discussed at each of these meetings. It is the Applicant's position that reinstatement designs within the Order limits are possible on each of these examples.
- 1.29 Theoretical drainage design plans dealing with older clay bottomed flat drains have been drawn up for Mr Mowbray and are attached at Plot 009 in Appendix 1. These designs have been agreed in principle with Mr Mowbray.
- 1.30 The Applicant continues to seek further meetings and currently has arrangements for meetings in place with the following landowners:
- Beeswax Farming on the 9th February 2016
 - M Caudwell on the 9th February 2016

Existing commitments

- 1.31 The Applicant refers the ExA to the existing commitments in the Outline SMP (Revision B) (Appendix 25 of the Applicant's Response to Deadline 4), principally found at paragraphs 4.3, 4.11 and 4.12 as below:

"4.3 Drainage systems will be reinstated to the Landowner's reasonable satisfaction (and to the reasonable satisfaction of the Occupier, if applicable, and where this does not conflict with the Landowner's reasonable satisfaction), ensuring that the drainage system is put back in a condition that is at least as effective as the previous condition, and that the restoration follows best practice for field drainage installations, and takes into account site specific conditions."

"4.11 All drainage works can be carried out within the Order Limits, however where it is reasonable for the reinstatement of drainage to take place outside of the order limits it will be done subject to the agreement of the landowner."

“4.12 Where reinstatement of drainage outside of the Order Limits offers a more economic method of achieving requirements set out in 4.3, it will be done subject to the agreement of the landowner.”

Summary

- 1.32 The Applicant considers that it has demonstrated, and continues to demonstrate, that agricultural land drainage can be effectively reinstated within the 60m Order limits. In addition the Applicant has already committed to carry out works outside of the Order Limits if a reasonable request to do so is received or a more economic method is identified, subject to the agreement of the landowner.

2. PEAT WASTAGE

- 2.1 During the Local Impacts Issue Specific hearing on 19th January 2016, members of the LIG and Mr Ward raised concerns about the potential for peat wastage along the cable corridor.
- 2.2 The Applicant confirmed that the exact nature of the soils would be surveyed and recorded in the pre-entry record of condition on a field by field basis and that this information would be taken into account during the detailed design stage (as set out in the Outline Soil Management Plan (SMP) at Appendix 14 of the Applicant's Response to Deadline 5).
- 2.3 The soil survey will identify the soil types crossed by the Order Limits. Soils will be described according to the methods and terminology contained in the Soil Survey Field Handbook (Hodgson J M (1976). Soil Survey Field Handbook, Soil Survey Technical Monograph No. 5). Topsoil samples will also be taken for laboratory analysis of pH, organic matter content and major nutrients.
- 2.4 As a simplification, for a soil to be mapped as a peat the peat must be at least 40 cm thick and not be buried by more than 30 cm of mineral layers with low organic carbon.
- 2.5 The Applicant notes that the use of peatlands for improved pasture, for arable or for horticultural production requires drainage. Drainage leads to subsidence of the ground surface and the eventual destruction of the fragile peat. There are several components to peat wastage, the general term used to account for the loss of peat:
- Shrinkage – the removal of large amounts of water from the peat produces rapid initial shrinkage, with rates of 18 cm/a in Holme Fen, Cambridgeshire, between 1850 and 1860 (Hutchinson, 1980);

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- Compression – drainage also reduces the buoyancy effect of water which causes compression of peat under its own weight and increased bulk density. Passage of machinery increases the compaction;
 - Oxidation – under the ensuing aerobic conditions, decomposition (biochemical oxidation) becomes the dominant processes, mainly affecting the peat above the watertable
 - Other lesser components of wastage, including:
 - Wind erosion – where spring-sown crops offer a bare, loose soil surface to strong winds
 - Removal of soil on root crops
 - Accidental burning of dry peat
- 2.6 Rates of peat wastage have been assessed in the report commissioned by Cranfield University for the RSPB titled “An estimate of peat reserves and loss in the East Anglian Fens¹ (Holman, 2009).
- 2.7 This report (at Figure 3, Holman, 2009) identifies that the TKES cable corridor passes in proximity to an area of peat remnant. These are areas which were likely to have originally been peat soils but which have wasted to humose or mineral soils, termed skirtland. Very localised areas of thin peat may be present within these areas.
- 2.8 Wastage rates are anticipated to be 0.7-2.1 cm/yr for areas of peat (not Remnant Peat) under intensive cultivation. The potential for wastage of Remnant Peat is very much reduced because wastage has already occurred resulting in its current condition. However, the Applicant considers that this is a reasonable worst case rate of wastage that can inform the detailed design stage to ensure cables are installed at a sufficient depth to accommodate any future peat wastage appropriately.

Gas pipelines

- 2.9 Reference was made to a gas pipeline becoming exposed by the LIG at the Local Impacts Issue Specific hearing on 19th January 2016. The Applicant has requested, but has not yet received information about this. The Applicant has undertaken its own investigations and believes this is likely to be when a farmworker operating a tractor and subsoiler struck and fractured a gas pipeline on a farm near Fillingham, as reported in the Farmers Weekly² publication.

¹ https://www.rspb.org.uk/Images/Fenlandpeatassessment_tcm9-236041.pdf

² <http://www.fwi.co.uk/news/farm-fined-22k-after-worker-ruptures-gas-pipe.htm#.VqC30aHSh5U.mailto>

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- 2.10 The Applicant is unable to comment on this specific case without the detail. However, in general terms, underground gas pipelines and electricity cables have different properties when installed in areas of high water tables such as areas of the cable corridor.
- 2.11 The Applicant has consulted its drainage and agricultural advisors and can confirm that no examples of electricity cables rising to the surface or being exposed close to the surface are known to them.

3. CABLE DEPTH

- 3.1 The Applicant has now committed in the Outline Construction Method Statement (Revision C) (Appendix 21 [REP4-048] of the Applicant's Response to Deadline 4) to a minimum depth to top of the cable ducts of 1200 mm. Where cables are buried to 1200 mm (to the top of the ducts), the target excavation depth of the cable trench is indicatively 1500 mm, reflecting the minimum depth to top of the cable ducts plus 300 mm diameter for the ducts. The actual burial depth will adhere to these minima and will be determined during pre-construction at the detailed design stage.

Appendix 1 – Theoretical Drainage Designs (Example 5 to Example 8)
