

The Planning Inspectorate

By email:

morganandmorecambeowfta@planninginspectorate.gov.uk.

Our ref: XA/2025/100411/02

Your ref: EN020032

Date: 4 August 2025

Dear Sir

DEADLINE 4 – Comments regarding REP3-061 OUTLINE HYDROGEOLOGICAL RISK ASSESSMENT OF LYTHAM ST ANNES DUNES SSSI REV F01

We have reviewed the document REP3-061 Outline Hydrogeological Risk Assessment (oHyRA) of Lytham St Annes dunes SSSI REV F01, submitted at Deadline 3. The document in its current form provides an initial assessment of potential impacts to the groundwater environment, but further detail will be required to understand the potential impact that the Transmission Assets could have on the Lytham St Annes Dunes Site of Special Scientific Interest (SSSI), Lytham St Annes Local Nature Reserve (LNR) and St Annes Old Links Golf Course & Blackpool South Rail Line Biological Heritage Site (BHS).

The document states that following the granting of consent for the Transmission Assets, detailed HyRA(s) will be prepared as part of the detailed Code of Construction Practice(s), prior to commencement of the relevant stage of works and will follow the principles established in this oHyRA.

The final agreed Outline HyRA should demonstrate how the following comments will be taken into account and incorporated into the detailed site-specific risk assessments.

We note at para. 1.4.1.3 that a similar structure will be used for the HyRA to inform the trenchless installation below the River Ribble.

Please see a summary of our issues below. Detailed comments are provided in Appendix A.

- We do not feel there is sufficient data to support the assumptions made in this report and we request further ground investigation and monitoring be carried out to validate the groundwater conceptual model.

- We have concerns that the groundwater monitoring data provided in the Hydrogeological Risk Assessment is from a single borehole location, covers a brief monitoring period and may not be reliable.
- We do not agree with the assumptions regarding heat dissipation being 'unlikely' to impact the quality and temperature of groundwater.
- The Applicant should provide anticipated daily dewatering volumes.
- The risks to groundwater from contamination associated with Blackpool Airport (historically RAF Squires Gate) during dewatering activities require further assessment to determine that all impacts are considered and mitigated.
- We remain concerned with the risks presented to the golf course abstractions as the conclusions/outcomes have been understated.
- The Applicant should demonstrate that the zone of influence for the maximum excavation depths will not extend to the Dunes SSSI.

Please see out detailed comments within Appendix A – Detailed Comments.

Yours faithfully



Planning Specialist – National Infrastructure Team

Direct e-mail NITeam@environment-agency.gov.uk

Appendix A – Detailed Comments

1. Hydrogeological Conceptual Model

Geological Setting

We request clarification of the ground investigation data used to inform the conceptual model. We require the inclusion of exploratory borehole logs for 'CP+RC' and 'MORGAN_A2_CP01B', including the groundwater observations.

Furthermore, there are inconsistencies between the borehole observations, British Geological Survey (BGS) map information and the accompanying figures – particularly the presence and depth of the 'Middle Sands' deposits. The borehole logs, BGS geological mapping and accompanying figures should be reviewed to ensure consistency and clarity.

Detailed Comments

Section 2.3.1.1 establishes that geological conditions have been determined based on BGS mapping data and information gathered from two locally drilled boreholes, 'CP+RC' and 'MORGAN_A2_CP01B'.

The positions of these two boreholes are shown on Figure 2.5, and some related information is provided within the report. This forms part of an indicative cross section through the study area Figure 2.6. and some details of installation, groundwater observations and drill depths are given. However, engineering logs for the two boreholes have not been provided. These should be appended to the report, as a significant portion of the report is dependent on the findings from these two boreholes.

There is some inconsistency in the summary information provided in the report. It is unclear which information relates to CP+RC as opposed to MORGAN_A2_CP01B. The interface between the Blown Sand deposits and underlying Glacial Till at CP+RC is indicated to be different depths in subsections 2.3.3.4 and 2.3.3.12.

Furthermore, Figure 2.7, which demonstrates the geological and hydrogeological setting of the site, shows the presence of a thick horizon of 'middle sand' deposits immediately underlying blown sand, or peat and alluvium deposits, which are not discussed in the borehole summary.

Section 2.3.3.10 refers to a horizon of 'middle sand', according to BGS mapping recorded regionally in the centre of the generally cohesive Glacial Till deposits. The report does not clearly discuss whether or not this was encountered in the boreholes.

2. Groundwater Monitoring

We do not agree it can be concluded there is a laterally impersistent potentially variable groundwater table, based on the available data. Further ground investigation and monitoring should be carried out to validate the groundwater conceptual model that will inform the detailed HyRA. Ideally, this should include monitoring of levels within the Blown Sands. It may be prudent to check the integrity of the installation in CP+RC and carry out further monitoring at that location. Please see our detailed comments below that explain our concerns regarding the ground water observations and data.

Detailed Comments

The groundwater monitoring data provided in the HyRA is from a single borehole location, covers a brief monitoring period and may not be reliable.

Section 2.4.3 describes groundwater observations from the above-mentioned borehole CP+RC. The report states that a groundwater strike was observed within Blown Sands deposits 1.0 metres below ground level (mbgl), rising to 0.73 (mbgl). The borehole was subsequently installed with a response zone targeting the underlying Glacial Till between 21.0 and 30.0 (mbgl). The installation was subsequently monitored over four weekly rounds, with water depths rising from 0.53 (mbgl) on the initial visit to ground level on the third and fourth visits.

The report provides two possible explanations for these results:

- The presence of sub-artesian piezometric pressure within the low permeability glacial till; or
- Flooding of the borehole by surface water due to high rainfall.

We agree with the report's conclusion the presence of sub-artesian groundwater within predominantly cohesive Glacial Till is unlikely. However, if installed correctly with a response zone as described there should not be direct connectivity between rainwater and the borehole's response zone. This may suggest the upper seal of the borehole may not be functioning adequately, and casts doubt on the reliability of the data. Another possibility is the 'middle sand' reported within the Glacial Till could be responsible for the presence of sub-artesian groundwater levels. There is no reference to such a horizon being encountered in the boreholes.

The report states that shallow groundwater conditions encountered at CP+RC were absent in 'a borehole to the west of the SSSI/LNR/BHS'. We require clarity from the Applicant:

- Which borehole this relates to.
- Whether the observations relate to monitoring or water strikes and provide further information.

- It is unclear if borehole to the west of the SSSI was dry or if groundwater was encountered at a comparatively greater depth.

The Applicant may wish to refer to BGS borehole record SD33SW183, centred at National Grid Reference 331620, 430400. This provides pumping test data dated 1999 from a borehole located at St. Anne's Old Links Golf Club. Although no associated borehole log is available, the pump test data show a starting groundwater level of 0.99 mbgl, and depths of approximately 3.6 to 3.8 mbgl during the pumping test. These suggest the presence of at least locally continuous shallow groundwater.

3. Heat Impacts on Groundwater

We do not agree with the report's assumptions made regarding heat dissipation being 'unlikely' to impact the quality and temperature of groundwater. The groundwater conceptual model requires further detail to establish an accurate baseline to assess the impacts from heat, we request the applicant:

- Provide further data to strengthen the conceptual groundwater model
 - Ground investigation data
 - Groundwater monitoring data
- Demonstrate there is a sufficient thickness of dry sand underlying the Dunes SSSI to act as mitigation against heat impacts.
- Consider the thermal transfer properties of the underlying geology of the Dunes SSSI.
- Submit detailed engineering information regarding anticipated thermal emissions from buried HV cables.

Detailed Comments

Sections 3.4.2.7 to 3.4.2.10 discuss thermal emissions from buried HV cables during the operational phase. The report states that levels of heat loss and dissipation of heat through the soil can only be determined once further details of cable voltage, soil structure including thermal properties, and final engineering design are available. We agree with the above statement.

The report then describes the measures taken to manage mutual heating effects from offshore cables, and states that as any heat dissipation in offshore cables is likely to be localised and confined to areas immediately surrounding the offshore cables a similar situation would be likely for groundwater impacts. We do not agree with this assumption and are of the opinion that there is significantly more potential for heat dissipation in the open offshore environment where surrounding water can circulate freely. Depending on groundwater flow rates and the thermal characteristics of the surrounding soil, the extent of thermal influence for onshore buried cables could be significantly higher.

Several design features that will mitigate potential impacts are provided. We do not agree that low thermal conductivity of dry sand can be considered to be an embedded mitigation item for impacts on groundwater temperature through operational cable heating as we do not consider there to be currently enough evidence that a significant thickness of *dry* sand will be present between the receptor (i.e. Dunes SSSI) and source (i.e. buried cables).

The final risk ranking is given as 'very low risk'. As mentioned previously, we require basic quantification of the issue that leads to this conclusion/status.

4. Groundwater Contamination and Dewatering Activities

Groundwater contamination

The Risk Assessment does not discuss the risks from existing groundwater contamination associated with the current and historic use of Blackpool Airport. This should be assessed and mitigation identified as required.

Blackpool airport and dewatering contamination

The Applicant should confirm any potential sources of contamination within the dewatering zone of influence and if necessary develop a strategy to monitor and manage any contaminants migrating into excavations during the dewatering activities. If relevant, the design of the trenchless crossing should also prevent the creation of a preferential migration pathway for any such contamination.

The TJB area identified for dewatering within the report is situated in the southern part of Blackpool Airport, within a largely undeveloped part of the airfield. Post-WWII aerial photography available at Historic England ([Aerial Photo Explorer – Over 400,000 aerial photos in Historic England's digitised collections | Historic England](#)) suggests that this area was initially developed with its current layout as part of RAF Squires Gate. Current Google aerial imagery shows the area to be bounded to the South and West by a perimeter road, to the East by open airfield, and to the North by an open air yard, which may be used as a Fire Training Area (FTA).

If an FTA or fuel/oil storage area is located nearby this could mean the localised presence of contaminants including petroleum hydrocarbons and Per- and polyfluoroalkyl substances (PFAS) within shallow soils and groundwater, which dewatering activities could draw toward the excavation. If the groundwater entering excavations is contaminated this would likely prevent discharge to surface water drainage systems or to groundwater.

Discharge of effluent during construction dewatering.

Further consideration is required regarding the discharge of effluent during construction dewatering. It is necessary to identify potential sources of contamination (the airport), then sample and test as appropriate. This should be considered in the scope of future works.

The discharge of such effluent to the same groundwater formation would require a permit under engineering type activities. Discharge to watercourse here does not seem an option.

Monitoring of Dewatering Activities

Periodic monitoring should be carried out during active dewatering to verify that groundwater levels at the key identified receptors, i.e. the SSSI and the licenced abstraction at Lytham St. Annes Golf Course, are not being adversely impacted and to enable corrective action if required.

The proposal should identify how dewatering is proposed to be managed, i.e. via abstraction licence or exemption. The available options for management will be dependent on the quantity of groundwater anticipated to be abstracted. The report should state the anticipated dewatering volumes per day. Section 3.1.1.2 identifies that any groundwater ingress into the Transition Joint Bay excavations would be pumped out and discharged to the local surface water drainage system. Liaison should take place with the drainage asset owners, United Utilities Ltd, to ensure that the required volumes can be discharged via this route and to determine any water quality testing requirements.

Note that Section 1.4.1.3 states that the structure of this HyRA will also be used for a similar study of the trenchless installation below the River Ribble (as captured in CoT41 of the Commitments Register). We presume that this will also be the case for other sensitive crossing sites requiring HDD, as outlined in CoT41.

Risk to Golf Course Abstractions

We do not agree with the Applicants assessment of the developments impacts to the golf course abstraction and risks derogating their license. There should be further consideration given to the proposals impacts on local water abstraction licenses and if necessary appropriate mitigation measures established.

There are multiple abstraction points on the golf course, and some are likely to be near the dewatering activity at Blackpool Airport for the TJBs. Some wells are described as being only six feet deep and could be adjacent to the boundary between the two areas. The probability of a pathway existing (from Table 3.1) should be regarded as '**Highly Likely**'. The initial ranking is not 'low risk' as stated in Table 3.2.

The water abstraction requirements for this development have not yet been identified, combined with presence of shallow groundwater, which means the severity of the impacts is not yet understood. Therefore, consideration should be given to appropriate mitigation measures and alternative supply (mains water) during construction activities.

We acknowledge the comments made in section 5.1.1.3 that further work is required regarding this topic.

Exit Pits

The exit pits are not clearly discussed in the HyRA. Table 3.13 of the Environmental Statement shows these would be located at least 100m from the western SSSI boundary. Each includes a maximum cofferdam area of 75m² and 3m depth, each actively worked on for a period of up to two weeks.

Assuming these would also be subject to dewatering during the construction phase, this activity should also be considered within the HyRA for the SSSI. We anticipate due to the comparatively shallow maximum excavation depth at these locations, that the zone of influence would likely not extend into the SSSI but this should be clearly demonstrated by the Applicant.

5. Additional Comments

SSSI/Water Levels

The desktop assessment that has been undertaken provides an initial assessment of the risk, although it does have limitations that have previously been highlighted. It indicates that drawdown impacts are unlikely to extend as far as the SSSI. It is considered reasonable to regard the approach taken as a tier 1 type assessment, and this seems appropriate.

Shuttered Sheet Piling

The possible use of shuttered sheet piling to limit groundwater ingress is listed as a secondary mitigation option for impacts to the SSSI from temporary TJB dewatering. This is likely to significantly reduce the zone of influence during dewatering activities. The Applicant should confirm if and how the sheet piling would be decommissioned following construction as these structures could potentially affect shallow groundwater flow if retained in situ.

Subsidence

Consideration should be given to the potential for subsidence caused by dewatering activities.



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Dear Sir

DEADLINE 4 – COMMENTS ON SUBMISSIONS RECEIVED BY DEADLINE 3.

We have reviewed relevant submissions received by Deadline 3 and would like to make the following comments:

- [REP3-010] Draft Development Consent Order (Tracked) - Rev F05 – comments as per the Environment Agency position below.
- [REP3-014] Commitments Register Rev F04– no comments
- [REP3-019] Outline Code of Construction Practice (Tracked) - Rev F02 - comments as per the Environment Agency position below.
- [REP3-023] Outline Ecological Management Plan (Tracked) - Rev F03 – no comments
- [REP3-038] Errata (Tracked) Rev F03 – no comment
- [REP3-047] S_D1_6.6 Environment Agency Statement of Common Ground - Rev F02 – agreed
- [REP3-052] Applicants response to IP submissions received at Deadline 2 Rev 01 comments as per the Environment Agency position below.
- [REP3 – 061] Outline Hydrogeological Risk Assessment of Lytham St Annes Dunes SSSI - Rev F01 – detailed comments have been submitted and are appended here in Annex 1.
- [REP3-065] Outline wildlife hazard management plan - no comments

Environment Agency position

Our position at Deadline 4 regarding the points raised in our Relevant Representation [RR-0677] and Written Representation [REP1-076], and responding to the Applicant's response provided at Deadline 3 [REP3-052], is set out below.

Ref RR-0677	Topic	Position at Deadline 2	REP1-076	Position at Deadline 3	REP2-056	Position at Deadline 4
0677.2	Ecology <ul style="list-style-type: none"> mitigation measures for otters Habitat creation and improvement proposals at Lea Marsh Fields and Dow Brook. 	<ul style="list-style-type: none"> Mitigation for otters - On-going discussion. This will be covered under the Ecological Management Plan, Requirement 12, for which the EA requests to be added as consultee. Habitat creation for otter - On-going discussion. This will be detailed in the Biodiversity Benefit Statement for which the EA requests to be 	076.5	<i>This matter is on-going.</i> <ul style="list-style-type: none"> [REP2-005] draft DCO Mitigation and enhancement measures are covered in the Ecological Management Plan, Requirement 12. We are not satisfied with the proposed revised wording of Requirement 12.(1) (b) “...<i>the Environment Agency where works have the potential to impact wetland habitats</i>”. We maintain our request that the EA is	056.5	<i>These matters can be closed.</i> We have reviewed are position and are now satisfied with the revised wording in Requirement 12 (b).

		added as consultee.		<p>included as an unqualified consultee for the Ecological Management Plan</p> <ul style="list-style-type: none"> • Response noted. [REP2-021] Biodiversity Benefit Statement. In the event that implementation of the Biodiversity Benefit Statement is secured, the Environment Agency requests to be included as a consultee for the detailed enhancement measures for the Biodiversity Benefit Area at Lea Marsh Fields. 		<ul style="list-style-type: none"> • We concur with the Applicant's response regarding Biodiversity Benefit.
0677.3	Flood Risk EA requests early	This matter is on-going. To ensure there is adequate consultation	076.6	<i>This matter is on-going.</i> We share the Applicant's view that protective	056.6	<i>This matter is on-going.</i> Discussions are on-going. The EA have responded to the Applicant's updates to the

	involvement in detailed project design	through the use of Protective Provisions and the disapplication of FRAPS.		provisions will be agreed before the end of Examination. To ensure there is adequate consultation through the use of Protective Provisions and the disapplication of FRAPS.		EA's standard Protective Provisions. We fully expect that protective provisions will be agreed before the end of Examination. The EA have provided comment on the revised Flood Risk Assessment, and look forward to reviewing a final version for D5.
0677.4	Geology Hydrogeological Risk Assessment required.	This matter is on-going. <ul style="list-style-type: none"> Hydrogeological risk assessment (HyRA) for all HDD or any other trenchless utility installation methods is proposed to be secured through Requirement 8. We are satisfied with this approach, but for clarity, a hydrogeological risk assessment must be listed under sub-paragraph (2) of Requirement 8 	076.7	<i>This matter is on-going.</i> [REP2-005] draft DCO - We are satisfied that Hydrogeological risk assessment (HyRA) is now listed under Requirement 8 para (2) (o), The amendment currently specifies Lytham St Annes SSSI, but we request that it also specify the River Ribble crossing for consideration in the outline HyRA. We await the submission of the outline HyRA for review at Deadline 3.	056.7	<i>This matter is on-going.</i> We maintain our position that Requirement 8 para (20) (o) should also include specific mention of the River Ribble crossing. We have provided comments on the draft HyRA submitted at D3 and look forward to reviewing an amended version for D5.

		of the dDCO [APP-005]. An outline Hydrogeological risk assessment should be provided in support of the Outline CoCP [APP-193]				
	Foundation Works Risk Assessment required.	A Foundation Works Risk Assessment is proposed to be secured through Requirement 8. We are satisfied with this approach, but for clarity, a Foundation Works risk assessment must be listed under sub-paragraph (2) of Requirement 8 of the dDCO [APP-005].		We are satisfied that the need for a Foundation Works Risk Assessment, where suspected contamination is present and deep foundation works are proposed, is covered under Requirement 8, and we withdraw our request that it be listed under sub-para.(2). However, to provide assurance that this Requirement will cover all potential foundation works that may create a risk of pollution, we request the following amended wording to [APP-193] outline CoCP, Geology and	056.7	<p><i>This matter is on-going.</i></p> <p>Regarding the wording in [REP3-019] Outline Code of Construction Practice (Tracked) - Rev F02, the EA is seeking amended wording to ensure that references to deep piling will also include other deep foundation works.</p> <p>At Deadline 3 we proposed amended wording regarding ‘<i>deep foundation works</i>’ for inclusion at para 1.7.2.17 -18. We since acknowledge the Applicant’s position that this suggested amended wording may be difficult to define.</p> <p>We would therefore propose an alternative wording of : “Where suspected contamination is present and piling <u>or other deep foundation works where there is a likelihood of interaction with groundwater</u> is proposed, detailed piling risk assessments will be developed....”</p>

				<p>ground conditions para 1.7.2.17:</p> <p>“...Where suspected contamination is present and piling or deep foundation works are proposed, detailed foundation works risk assessment(s) will be developed...”</p>		
0677.6	<p>Amended timescales</p> <p>EA requires 21 days to review consultations on matters specified in requirements.</p>	<p>This matter is on-going. We are not satisfied with the suggested wording ‘or a longer period is agreed with both the undertaker and the discharging authority’.</p> <p>We maintain our position that the Environment Agency requires 21 days to review consultations on matters specified in requirements.</p>	076.9	<p><i>This matter is on-going</i></p> <p>[REP2-005] draft DCO Schedule 12 Approval of matters specified in requirements. 5. (1) Provision of information by Consultees</p> <ul style="list-style-type: none"> • We maintain our position that the Environment Agency requires 21 days to review consultations on matters specified in requirements. 	056.8	<p><i>This matter can be closed.</i></p> <p>We are satisfied with the amended wording in {REP3-010] Draft Development Consent Order (Tracked) - Rev F05</p>
0677.7	Protective Provisions	<p>This matter is on-going. We are in on-going discussion regarding the final form of the protective provisions.</p>	076.11	<p><i>This matter is on-going.</i></p> <p>We are in on-going discussion regarding the final form of the protective provisions.</p>	056.9	<p><i>This matter is on-going.</i></p> <p>The EA have now provided comment on the Applicant’s proposed edits to the EA standard PP wording. We are in on-going discussion and fully expect to agree</p>

						protective provisions before the end of examination.
0677.14	Onshore Biodiversity Benefit Statement Section 1.5.2.8 & 1.5.3.13: The EA support any plans to improve the condition of Dow Brook and the habitat creation at Lea Marsh Fields, particularly the creation of ditches. We request that we are consulted on any such proposals and Landscape Management Plan as they are developed through consultation under amended Requirement 6.	<p>This matter is on-going. Section 1.5.1.3 of the Biodiversity Benefit Statement [APP-216] states that the habitat creation and enhancement proposals remain indicative at this stage in the DCO application process, and will be based on detailed landscaping designs for the onshore substations and biodiversity benefit area at Lea Marsh Fields.</p> <p>We wish to secure consultation on these landscaping designs, specifically where they are relevant to watercourse enhancement and creation as detailed in paras 1.5.2.8 (Dow Brook) and 1.5.3.13 (Lea Marsh Fields) of</p>	076.17	<i>This matter can be closed.</i> We are satisfied with the response	056.10	<i>This matter is closed.</i>

		the Biodiversity Benefit Statement [APP-216].				
0677.17	Outline Dust Management Plan 1.4.5.1 Dust suppression:	This matter is ongoing. We maintain our position that para 1.4.5.1 of the outline Dust Management Plan [APP-195] should highlight that if water is obtained by local extraction, then this may require an abstraction licence. This potential need for a licence will then be identified in the detailed Dust Management Plan(s). Failure to recognise the need for an abstraction licence could result in subsequent unnecessary delays to site construction activities.		<i>This matter can be closed.</i> We are satisfied with the response	056.11	<i>This matter is closed.</i>
0677.19	Hydrology and flood risk Page 48 Row 3 column 4: minimum vertical clearances	Page 48 Row 3 column 4: We recognise that CoT10 is a commitment to maintaining a minimum 2m vertical	076.22	<i>This matter can be closed</i> We are satisfied with the Errata [REP1-064] submitted at Deadline 1.	056.12	<i>This matter is closed.</i>

	2.6.10.11 Page 77: flood risk impacts from temporary works	<p>clearance below all main rivers, secured in Requirement 8, and through Protective Provisions Schedule 10 Part 9.</p> <p>We are currently in discussion with the applicant to ensure that the Protective Provisions are applicable to all potential works areas where the Environment Agency would need to be consulted at the detailed design stage.</p> <p>2.6.10.11 Page 77: We await confirmation that there will be no flood risk effects from temporary construction works in the maximum design scenario.</p>	<p>We are satisfied that Requirement 5 (2) provides for consultation with the Environment Agency regarding trenchless installation works as appropriate.</p> <p>We are currently in discussion with the applicant to ensure that the Protective Provisions are applicable to all potential works areas where the Environment Agency would need to be consulted at the detailed design stage.</p> <p>We are satisfied that this will be considered at detailed design stage.</p>			
0677.22	Soil Management Plan	<p>Further discussion required.</p> <p>The EA's concern is specifically regarding the potential for temporary soil storage</p>		<p><i>This matter can be closed</i></p> <p>[APP-200] We are satisfied that this is covered in the embedded best practice</p>	056.13	<i>This matter is closed.</i>

		to divert or obstruct the movement of flood waters. This concern does not appear to be addressed in the Outline Soil Management Plan [APP-200] and associated best practice guidance.		guidance Defra 2009 and Institute of Quarrying (IQ) Good Practice Guide for Handling Soils in Mineral Workings (IQ, 2021)		
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Yours faithfully

[Redacted]

Planning Specialist – National Infrastructure Team

[Redacted] [@environment-agency.gov.uk](mailto:[Redacted]@environment-agency.gov.uk)

Annex 1 Environment Agency response to REP3-061

Annex 1 – Environment Agency response to REP3-061



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Detailed Comments

The groundwater monitoring data provided in the HyRA is from a single borehole location, covers a brief monitoring period and may not be reliable.

Section 2.4.3 describes groundwater observations from the above-mentioned borehole CP+RC. The report states that a groundwater strike was observed within Blown Sands deposits 1.0 metres below ground level (mbgl), rising to 0.73 (mbgl). The borehole was subsequently installed with a response zone targeting the underlying Glacial Till between 21.0 and 30.0 (mbgl). The installation was subsequently monitored over four weekly rounds, with water depths rising from 0.53 (mbgl) on the initial visit to ground level on the third and fourth visits.

The report provides two possible explanations for these results:

- The presence of sub-artesian piezometric pressure within the low permeability glacial till; or
- Flooding of the borehole by surface water due to high rainfall.

We agree with the report's conclusion the presence of sub-artesian groundwater within predominantly cohesive Glacial Till is unlikely. However, if installed correctly with a response zone as described there should not be direct connectivity between rainwater and the borehole's response zone. This may suggest the upper seal of the borehole may not be functioning adequately, and casts doubt on the reliability of the data. Another possibility is the 'middle sand' reported within the Glacial Till could be responsible for the presence of sub-artesian groundwater levels. There is no reference to such a horizon being encountered in the boreholes.

The report states that shallow groundwater conditions encountered at CP+RC were absent in 'a borehole to the west of the SSSI/LNR/BHS'. We require clarity from the Applicant:

- Which borehole this relates to.
- Whether the observations relate to monitoring or water strikes and provide further information.

- It is unclear if borehole to the west of the SSSI was dry or if groundwater was encountered at a comparatively greater depth.

The Applicant may wish to refer to BGS borehole record SD33SW183, centred at National Grid Reference 331620, 430400. This provides pumping test data dated 1999 from a borehole located at St. Anne's Old Links Golf Club. Although no associated borehole log is available, the pump test data show a starting groundwater level of 0.99 mbgl, and depths of approximately 3.6 to 3.8 mbgl during the pumping test. These suggest the presence of at least locally continuous shallow groundwater.

3. Heat Impacts on Groundwater

We do not agree with the report's assumptions made regarding heat dissipation being 'unlikely' to impact the quality and temperature of groundwater. The groundwater conceptual model requires further detail to establish an accurate baseline to assess the impacts from heat, we request the applicant:

- Provide further data to strengthen the conceptual groundwater model
 - Ground investigation data
 - Groundwater monitoring data
- Demonstrate there is a sufficient thickness of dry sand underlying the Dunes SSSI to act as mitigation against heat impacts.
- Consider the thermal transfer properties of the underlying geology of the Dunes SSSI.
- Submit detailed engineering information regarding anticipated thermal emissions from buried HV cables.

Detailed Comments

Sections 3.4.2.7 to 3.4.2.10 discuss thermal emissions from buried HV cables during the operational phase. The report states that levels of heat loss and dissipation of heat through the soil can only be determined once further details of cable voltage, soil structure including thermal properties, and final engineering design are available. We agree with the above statement.

The report then describes the measures taken to manage mutual heating effects from offshore cables, and states that as any heat dissipation in offshore cables is likely to be localised and confined to areas immediately surrounding the offshore cables a similar situation would be likely for groundwater impacts. We do not agree with this assumption and are of the opinion that there is significantly more potential for heat dissipation in the open offshore environment where surrounding water can circulate freely. Depending on groundwater flow rates and the thermal characteristics of the surrounding soil, the extent of thermal influence for onshore buried cables could be significantly higher.

Several design features that will mitigate potential impacts are provided. We do not agree that low thermal conductivity of dry sand can be considered to be an embedded mitigation item for impacts on groundwater temperature through operational cable heating as we do not consider there to be currently enough evidence that a significant thickness of *dry* sand will be present between the receptor (i.e. Dunes SSSI) and source (i.e. buried cables).

The final risk ranking is given as 'very low risk'. As mentioned previously, we require basic quantification of the issue that leads to this conclusion/status.

4. Groundwater Contamination and Dewatering Activities

Groundwater contamination

The Risk Assessment does not discuss the risks from existing groundwater contamination associated with the current and historic use of Blackpool Airport. This should be assessed and mitigation identified as required.

Blackpool airport and dewatering contamination

The Applicant should confirm any potential sources of contamination within the dewatering zone of influence and if necessary develop a strategy to monitor and manage any contaminants migrating into excavations during the dewatering activities. If relevant, the design of the trenchless crossing should also prevent the creation of a preferential migration pathway for any such contamination.

The TJB area identified for dewatering within the report is situated in the southern part of Blackpool Airport, within a largely undeveloped part of the airfield. Post-WWII aerial photography available at Historic England ([Aerial Photo Explorer – Over 400,000 aerial photos in Historic England's digitised collections | Historic England](#)) suggests that this area was initially developed with its current layout as part of RAF Squires Gate. Current Google aerial imagery shows the area to be bounded to the South and West by a perimeter road, to the East by open airfield, and to the North by an open air yard, which may be used as a Fire Training Area (FTA).

If an FTA or fuel/oil storage area is located nearby this could mean the localised presence of contaminants including petroleum hydrocarbons and Per- and polyfluoroalkyl substances (PFAS) within shallow soils and groundwater, which dewatering activities could draw toward the excavation. If the groundwater entering excavations is contaminated this would likely prevent discharge to surface water drainage systems or to groundwater.

Discharge of effluent during construction dewatering.

Further consideration is required regarding the discharge of effluent during construction dewatering. It is necessary to identify potential sources of contamination (the airport), then sample and test as appropriate. This should be considered in the scope of future works.

The discharge of such effluent to the same groundwater formation would require a permit under engineering type activities. Discharge to watercourse here does not seem an option.

Monitoring of Dewatering Activities

Periodic monitoring should be carried out during active dewatering to verify that groundwater levels at the key identified receptors, i.e. the SSSI and the licenced abstraction at Lytham St. Annes Golf Course, are not being adversely impacted and to enable corrective action if required.

The proposal should identify how dewatering is proposed to be managed, i.e. via abstraction licence or exemption. The available options for management will be dependent on the quantity of groundwater anticipated to be abstracted. The report should state the anticipated dewatering volumes per day. Section 3.1.1.2 identifies that any groundwater ingress into the Transition Joint Bay excavations would be pumped out and discharged to the local surface water drainage system. Liaison should take place with the drainage asset owners, United Utilities Ltd, to ensure that the required volumes can be discharged via this route and to determine any water quality testing requirements.

Note that Section 1.4.1.3 states that the structure of this HyRA will also be used for a similar study of the trenchless installation below the River Ribble (as captured in CoT41 of the Commitments Register). We presume that this will also be the case for other sensitive crossing sites requiring HDD, as outlined in CoT41.

Risk to Golf Course Abstractions

We do not agree with the Applicants assessment of the developments impacts to the golf course abstraction and risks derogating their license. There should be further consideration given to the proposals impacts on local water abstraction licenses and if necessary appropriate mitigation measures established.

There are multiple abstraction points on the golf course, and some are likely to be near the dewatering activity at Blackpool Airport for the TJBs. Some wells are described as being only six feet deep and could be adjacent to the boundary between the two areas. The probability of a pathway existing (from Table 3.1) should be regarded as '**Highly Likely**'. The initial ranking is not 'low risk' as stated in Table 3.2.

The water abstraction requirements for this development have not yet been identified, combined with presence of shallow groundwater, which means the severity of the impacts is not yet understood. Therefore, consideration should be given to appropriate mitigation measures and alternative supply (mains water) during construction activities.

We acknowledge the comments made in section 5.1.1.3 that further work is required regarding this topic.

Exit Pits

The exit pits are not clearly discussed in the HyRA. Table 3.13 of the Environmental Statement shows these would be located at least 100m from the western SSSI boundary. Each includes a maximum cofferdam area of 75m² and 3m depth, each actively worked on for a period of up to two weeks.

Assuming these would also be subject to dewatering during the construction phase, this activity should also be considered within the HyRA for the SSSI. We anticipate due to the comparatively shallow maximum excavation depth at these locations, that the zone of influence would likely not extend into the SSSI but this should be clearly demonstrated by the Applicant.

5. Additional Comments

SSSI/Water Levels

The desktop assessment that has been undertaken provides an initial assessment of the risk, although it does have limitations that have previously been highlighted. It indicates that drawdown impacts are unlikely to extend as far as the SSSI. It is considered reasonable to regard the approach taken as a tier 1 type assessment, and this seems appropriate.

Shuttered Sheet Piling

The possible use of shuttered sheet piling to limit groundwater ingress is listed as a secondary mitigation option for impacts to the SSSI from temporary TJB dewatering. This is likely to significantly reduce the zone of influence during dewatering activities. The Applicant should confirm if and how the sheet piling would be decommissioned following construction as these structures could potentially affect shallow groundwater flow if retained in situ.

Subsidence

Consideration should be given to the potential for subsidence caused by dewatering activities.