

Project Name: Longhedge Solar Farm Report Name: Response to Inspector's Flood Risk Questions Author: Lucy Ginn/Simon Jacques Checked/Approved by: Simon Jacques Date: 10/07//2024 Project number: P24-0105

Introduction

This Technical Note has been prepared to respond to flood risk questions from the Inspector on appeal APP/P3040/W/23/3330045. These questions were issued on the 17th June 2024 and are enclosed at the end of this document. Specifically, this technical note responds to questions 5 to 8 (inclusive). Each question from 5 to 8 is set out below in italics, with the respective responses following.

This document also provides an assessment of the potential impact of the proposed new Pylon on site from a flood risk and drainage perspective which was also raised by the Inspector.

Question 5

"A note to set out your respective views about the climate change allowance that would be appropriate here for flood risk assessment [CD1.24 p4.79 applies 100 year + 20%]"

Technical Appendix 4: Flood Risk and Drainage Impact Assessment (CD1.24) prepared by Neo Environmental and dated 30.11.2022 details that the 1 in 100 year plus 20% climate change flood model data from the Environment Agency was used to inform flood risk mitigation measures on site. Specifically, the 1 in 100 year plus 20% climate change allowance extent was used to inform which Inverter pairings on site require more than standard raising and the 1 in 100 year plus 20% climate change flood level was used to inform to what level any impacted Inverter pairings would need to be raised to. Neo Environmental's report details that just one Inverter pairing proposed on site is located within the modelled 1 in 100 year plus 20% climate change flood extent (see p4.79) and that when raised above the modelled 1 in 100 year plus 20% climate change flood level (17.60mAOD) with a 600mm freeboard allowance, that the inverter will be raised to 18.20mAOD.

The 20% climate change allowance used by Neo Environmental was in line with allowances included within the Humber River Basin Management Plan (RBMP) and the EA's own 2012 River Smite Flood Modelling Study hydraulic model. The RBMP was first published on 21st October 2022, just prior to the issue of Neo Environmental's report. There was a minor change to the RBMP on 22nd December 2022 to confirm the River Basin Management Plans are the current plans approved by the Secretary of State for the Environment, Food and Rural Affairs.

The Flood Risk and Drainage Impact Assessment (CD1.24) was submitted in support of the planning application (and the subsequent appeal) and the Lead Local Flood Authority (LLFA) were consulted in December 2022. The LLFA did not require a re-consultation (the RBMP was already published when they were consulted). No additional flood risk or drainage information was submitted by the appellant and in any event is outside the appellants control, and the LLFA confirmed in their consultee comments that they had 'no objection' and had 'no further comments to make'.

The Environment Agency (EA) were consulted at the same time and commented on 05 January 2023 raising no objection subject to the following condition:



"The development shall be carried out in accordance with the submitted Flood Risk Assessment (titled 'Technical Appendix 4: Flood Risk and Drainage Impact Assessment Longhedge Solar Farm', dated 30/11/22, compiled by Neo Environmental Ltd) and the following mitigation measures it details:

- Finished floor levels of the inverter pairings shall be set no lower than 18.20 metres above Ordnance Datum (AOD)
- Finished floor levels of all other vulnerable infrastructure shall be set no lower than 300mm above ground levels.

These mitigation measures shall be fully implemented prior to occupation and subsequently in accordance with the scheme's timing/phasing arrangements. The measures detailed above shall be retained and maintained thereafter throughout the lifetime of the development."

Current guidance suggests a climate change allowance of 23% should be used for the site. This is in accordance with the "flood risk assessments: climate change allowances" guidance on the gov.uk website provided by the EA. Whilst this guidance was published by the Environment Agency in March 2022, predating the preparation of the Flood Risk and Drainage Impact Assessment (CD1.24), in raising no objection to the subsequent application it is reasonable to assume that both the LLFA and Environment Agency were content with the 20% climate change allowance identified within the Flood Risk and Drainage Impact Assessment (CD1.24).

The current guidance states that for essential infrastructure located in Flood Zone 2 or 3a, such as the site, the higher central climate change allowance should be used. The site is located in the Lower Trent and Erewash Management Catchment, for which the higher central peak river flow allowance to the 2050s (assumed 40 year design life) is 23%. Figure 1 below shows relevant extracts from the climate change allowance guidance and Lower Trent and Erewash Management Catchment Catchment.

Using a value of 20%, rather than a value of 23% is appropriate when the following points are taken into consideration:

- It is the basis established by the Humber River Basin Management Plan (RBMP) and the EA's own 2012 River Smite Flood Modelling Study hydraulic model.
- A climate change allowance difference of 3% is not expected to make a material difference to the 1 in 100 year plus 20% climate change allowance flood level that has been used to define the required raising within the associated flood extent. The expected flood level difference this extra 3% may incur is considered highly likely to be within the 600mm freeboard allowance that has been applied to the Inverter pairing raising to reach a Finished Floor Level of 18.20mAOD. The initial approach was notably conservative in its freeboard allocation, and this is considered to suitably account for a 3% climate change allowance uplift.
- The Environment Agency have not objected to the proposals, or the use on a 20% climate change allowance.
- Only one Inverter pairing on site is affected in any event and only approximately 50% of the Inverter pairing which is being raised to 18.20mAOD is within the 1 in 100 year plus 20% climate change flood extent. The other half is not predicted to be impacted by this event.



Figure 1 - Current Climate Change Guidance

| Using peak river flow allowances for flood risk assessments Use the <u>flood risk vulnerability classification</u> to classify the vulnerability of your development. Assess both the central and higher central allowances for strategic flood risk assessments. | Lower Trent and Erewash Management Catchment peak river flow allowances | | \otimes | |
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| essential infrastructure – use the higher central allowance. highly vulnerable – use central allowance (development should not be permitted in flood zone 3a) more vulnerable – use the central allowance less vulnerable – use the central allowance water compatible – use the central allowance | 2020s 2050s 2080s | Central 13% 17% 29% | Higher 18% 23% 39% | Upper 29% 38% 62% |

Question 6

"Suggested planning Condition 9 would set a FFL of 18.2 m AOD for inverter pairings. For all inverter pairings to which this provision would apply what would be the difference between the existing ground level and the FFL for each of those inverter pairings?"

The FFL of 18.2mAOD would apply to one Inverter pairing. This is the only Inverter pairing located within the EA's 1 in 100 year plus 20% climate change allowance flood extent. The level of 18.2mAOD is based on a 1 in 100 year plus 20% climate change allowance flood level of 17.60mAOD with an additional 600mm freeboard allowance.

The topographic survey of the site shows that ground levels where the single Inverter pairing will have an FFL of 18.2mAOD, are situated between 17.41mAOD and 17.58mAOD. A drawing highlighting the FFL of the Inverter pairing and the existing ground level is enclosed at the end of this document.

The construction method used to achieve an FFL of 18.2mAOD will be confirmed during details design. Assuming a "worst-case" of raising, based on the lowest recorded ground level at the Inverter pairing location of 17.41mAOD, up to 0.79m of raising is required.

Lost flood volume within the flood zone would equate to the volume occupied by the foundations of the Inverter between existing ground level of between 17.58mAOD and 17.41mAOD and the expected flood level of 17.6mAOD allowing for climate change, i.e. a flood depth of between 20mm and 190mm over the area of the Inverter. The area of the Inverter equates to less than 0.1% of the current flood zone extent. Combined with minimal depths of lost flood volume within the flood zone, the effects of the floor raising in terms of flood risk including consequential risk beyond the site limits are therefore negligible.

Question 7

"Would all other inverter pairings be subject to the 300mm FFL requirement, and if so would that mean their above ground height would be 3.3 m based on 'typical inverter substation' [CD1.15] ?"

Yes. As detailed in Technical Appendix 4: Flood Risk and Drainage Impact Assessment (CD1.24 p4.79) prepared by Neo Environmental and dated 30.11.2022, all Inverter pairings located outside the 1 in 100 year plus 20% climate change flood extent will be raised 300mm above the ground.



"Figure 6 – Inverter Station" is enclosed at the end of this document. This Figure shows the inverters have a typical total height of 3m. When accounting for the 300mm of raising, this will take the top of the inverter stations to 3.3m.

Question 8

"In suggested planning Condition 9 what would be included as 'other vulnerable infrastructure'?"

'Vulnerable Infrastructure' in this context refers to the inverters, spares containers and the proposed substation compound proposed to be located in Flood Zone 1, but excludes solar panels.

New Pylon

The Inspector has also requested further information about the potential impact of the new Pylon proposed on site.

The proposed Pylon will be located at the eastern end of the proposed substation compound. There are currently two options being considered for the proposed Pylon, known as Option 1 and Option 2. A plan of both options is enclosed at the end of this document.

The proposed Pylon will be located entirely within Flood Zone 1 and is not predicted to be at risk of flooding during a 1 in 1,000 year fluvial or tidal flood event (see Figure 2).

As detailed in Technical Appendix 4: Flood Risk and Drainage Impact Assessment (CD1.24 p4.125) prepared by Neo Environmental and dated 30.11.2022, sustainable drainage systems (SuDS) will be implemented on site to manage surface water runoff from the proposed grid substation where the proposed new Pylon will be located. The SuDS are proposed to comprise a swale conveying water to a detention pond which will outfall into the existing field drainage network on site.

As detailed in Table 4–5 of Technical Appendix 4: Flood Risk and Drainage Impact Assessment prepared by Neo Environmental and dated 30.11.2022, the proposed SuDS for the grid substation account of an impermeable area of 0.465ha. This impermeable area, based on the latest site layout named "P24–0105_EN_02E Landscape Masterplan-APPEAL", more than accounts for the full grid substation area, including the proposed Pylon, which totals 0.461ha. Figure 2 shows the impermeable area to be managed and where the Pylon will be situated.

The existing drainage strategy has therefore accounted for the proposed new Pylon and no further updates are required. As a conservative approach was taken by Neo Environmental to assume that the entire substation compound would be impermeable, the current proposed SuDS would be suitable for either Option 1 or Option 2 of the Pylon design.

Overall, the proposed Pylon is not considered to be at risk of flooding and with the proposed SuDS in place, will not increase surface water runoff rates or associated flood risk elsewhere.







Enclosures

971 Inspector's Inquiry Note – 17th June 2024

Drawing P24-0105-PEG-XX-XX-DR-C-0100-Proposed Inverter Raising

Figure 11 – Inverter Station

Proposed Pylon – Option 1

Proposed Pylon – Option 2

Inspector's Inquiry Note – 17 June 2024

Following the site visit on 17 June the Inspector requests that the parties submit a written note by 12 July to provide the following.

- 1. The height above the ground level of the 132kV pylons on the appeal site.
- 2. Visualisations from VP1 and VP2 for the appeal scheme showing Options 1 and 2 as depicted on CD1.16 and CD1.17.
- 3. Cross sections (bare earth) through the appeal site from the highest section of Bridleway BW6 towards (a) St Helena spire and (b) Pylon 3 as shown in blue on the attached plan.
- 4. Confirm ownership of the hedgerows along the site boundaries highlighted in yellow on the attached plan.
- 5. A note to set out your respective views about the climate change allowance that would be appropriate here for flood risk assessment [CD1.24 p4.79 applies 100 year + 20%]
- 6. Suggested planning Condition 9 would set a FFL of 18.2 m AOD for inverter pairings. For all inverter pairings to which this provision would apply what would be the difference between the existing ground level and the FFL for each of those inverter pairings?
- 7. Would all other inverter pairings be subject to the 300mm FFL requirement, and if so would that mean their above ground height would be 3.3 m based on 'typical inverter substation' [CD1.15] ?
- 8. In suggested planning Condition 9 what would be included as 'other vulnerable infrastructure' ?

| John Woolcock | | | |
|---------------|--|--|--|
| Inspector | | | |
| 17 June 2024 | | | |





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