



Legend

- Site Boundary
- Defences
 - Very Poor
 - Poor
 - Fair
 - Good
 - Very Good
 - Unchecked
 - No Data

-	FOR INFORMATION	AB	23.07.24
REV:	DESCRIPTION:	BY:	DATE:

STATUS: FOR INFORMATION

CLIENT:
RWE

SITE: Peartree Hill Solar Farm
TITLE: Inland Defences (2 of 2)



SCALE AT A3: 1:30,000	DATE: 23.07.24	DRAWN: AB	CHECKED: PG
PROJECT NO: 20-206	DRAWING NO: 60-304	REVISION: -	



Legend

- Site Boundary 
- Combined Breach Extents 
- Defence Section Removed 
- Depth (m)
- 0 - 0.1 
- 0.1 - 0.3 
- 0.3 - 0.5 
- 0.5 - 0.7 
- 0.7 - 0.9 
- 0.9 - 1.1 
- 1.2 - 1.5 
- 1.5 - 1.8 
- >1.8 

-	FIRST ISSUE	AB	25.07.24
REV:	DESCRIPTION:	BY:	DATE:

STATUS: INTERNAL USE ONLY

CLIENT:
RWE

SITE:
Peartree Hill Solar Farm

TITLE:
Monk Dike Bank Removal West (NB1)
100yr + 17% Maximum Depth



SCALE AT A3: 1:14,000	DATE: 25.07.2024	DRAWN: AB	CHECKED: PG
PROJECT NO: 20-206	DRAWING NO: 60-253	REVISION: -	

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Legend

- Site Boundary 
- Combined Breach Extents 
- Defence Section Removed 
- Depth (m)
- 0 - 0.1 
- 0.1 - 0.3 
- 0.3 - 0.5 
- 0.5 - 0.7 
- 0.7 - 0.9 
- 0.9 - 1.1 
- 1.2 - 1.5 
- 1.5 - 1.8 
- >1.8 

-	FIRST ISSUE	AB	25.07.24
REV:	DESCRIPTION:	BY:	DATE:

STATUS: INTERNAL USE ONLY

CLIENT:
RWE

SITE:
Peartree Hill Solar Farm

TITLE:
Monk Dike Bank Removal East (NB2)
100yr + 17% Maximum Depth



SCALE AT A3: 1:5,000	DATE: 25.07.2024	DRAWN: AB	CHECKED: PG
PROJECT NO: 20-206	DRAWING NO: 60-254	REVISION: -	

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Legend

- Order Limits
- Parcel Names
- Sensitive Infrastructure
- Flood Level Increase (m)
 - < -0.1
 - 0.1 to -0.05
 - 0.05 to -0.02
 - 0.02 to -0.005
 - 0.005 to 0.005
 - 0.005 to 0.02
 - 0.02 to 0.05
 - 0.05 to 0.1
 - > 0.1
- Was wet now dry
- Was dry now wet

Notes

Sensitive infrastructure areas encompass the coverage of solar panels, substations, inverters, battery storage etc. but do not include access or cable routes.

-	FIRST ISSUE	CF	12.08.2024
REV:	DESCRIPTION:	BY:	DATE:

STATUS:	INTERNAL USE ONLY
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CLIENT:	RWE
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SITE:	Peartree Hill Solar Farm
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TITLE:	Additional Bridges Sensitivity Sheet 1 of 2
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SCALE AT A3: 1:20,000	DATE: 12.08.24	DRAWN: CF	CHECKED: AB
PROJECT NO: 20-206	DRAWING NO: 60-255	REVISION: -	

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Legend

Order Limits

Parcel Names

Sensitive Infrastructure

Flood Level Increase (m)

< -0.1

-0.1 to -0.05

-0.05 to -0.02

-0.02 to -0.005

-0.005 to 0.005

0.005 to 0.02

0.02 to 0.05

0.05 to 0.1

> 0.1

Was wet now dry

Was dry now wet

Notes
Sensitive infrastructure areas encompass the coverage of solar panels, substations, inverters, battery storage etc. but do not include access or cable routes.

-	FIRST ISSUE	CF	12.08.24
REV:	DESCRIPTION:	BY:	DATE:

STATUS: INTERNAL USE ONLY

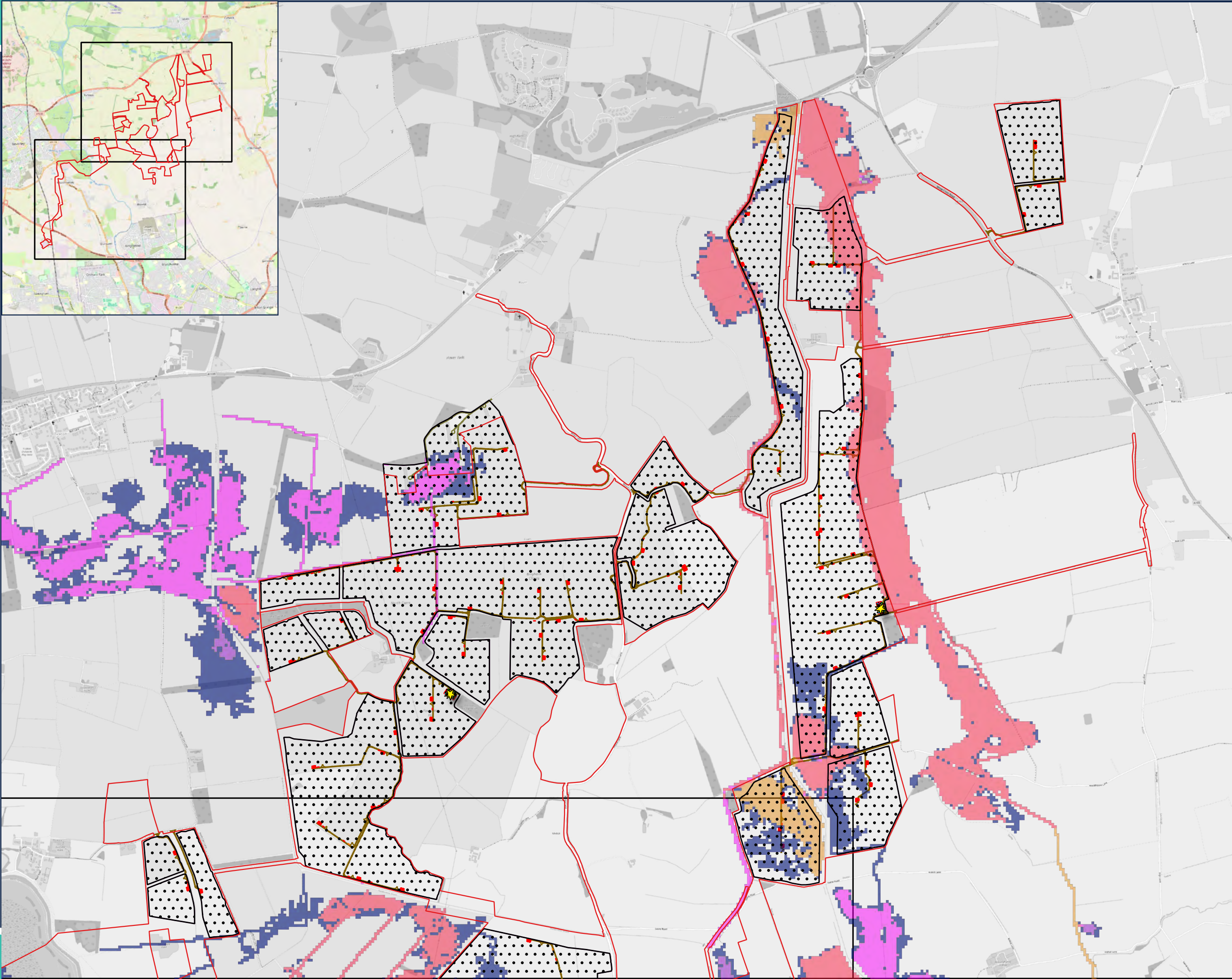
CLIENT:
RWE

SITE:
Peartree Hill Solar Farm

TITLE:
Additional Bridges Sensitivity
Sheet 2 of 2



SCALE AT A3: 1:20,000	DATE: 12.08.24	DRAWN: CF	CHECKED: AB
PROJECT NO: 20-206	DRAWING NO: 60-243	REVISION: -	



Legend

Order Limits

Sensitive Infrastructure

Substations

Level Increase (m)

< -0.25

-0.25 to -0.15

-0.15 to -0.1

-0.1 to -0.005

-0.005 to 0.005

0.005 to 0.1

0.1 to 0.15

0.15 to 0.25

> 0.25

Was wet now dry

Was dry now wet

Notes

Sensitive infrastructure areas encompass the coverage of solar panels, substations, inverters, battery storage etc. but do not include access or cable routes.

The containerised infrastructure appears as red blocks on this plan

-	FIRST ISSUE	CF	12.08.24
REV:	DESCRIPTION:	BY:	DATE:

STATUS:	INTERNAL USE ONLY
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CLIENT:	RWE
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SITE:	Peartree Hill Solar Farm
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TITLE:	Flow Sensitivity Sheet 1 of 2
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SCALE AT A3: 1:20,000	DATE: 12.08.2024	DRAWN: CF	CHECKED: AB
PROJECT NO: 20-206	DRAWING NO: 60-235	REVISION: 01	



Legend

- Order Limits
- Sensitive Infrastructure
- Substations
- Level Increase (m)
 - < -0.25
 - 0.25 to -0.15
 - 0.15 to -0.1
 - 0.1 to -0.005
 - 0.005 to 0.005
 - 0.005 to 0.1
 - 0.1 to 0.15
 - 0.15 to 0.25
 - > 0.25
- Was wet now dry
- Was dry now wet

Notes

Sensitive infrastructure areas encompass the coverage of solar panels, substations, inverters, battery storage etc. but do not include access or cable routes. The containerised infrastructure appears as red blocks on this plan

01	SECOND ISSUE	CF	12.08.2024
REV:	DESCRIPTION:	BY:	DATE:

STATUS: INTERNAL USE ONLY

CLIENT:
RWE

SITE:
Peartree Hill Solar Farm

TITLE:
Flow Sensitivity
Sheet 2 of 2



SCALE AT A3: 1:20,000	DATE: 12.08.2024	DRAWN: CF	CHECKED: AB
PROJECT NO: 20-206	DRAWING NO: 60-236	REVISION: 01	



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APPENDIX D

Consultation Record

Meeting date and time: 27th March 2:30
Meeting Address: Virtual

Project Title	Pear Tree Solar Farm
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Meeting Title	Hydraulic Modelling Discussion
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Attendees	Alex Bearne – Calibro Mike Greslow – RWE Anna Bloor – RSK Lizzie Griffiths – Environment Agency (EA) Sacha Lavers – EA Phil Sale – EA Ryan Smitheman- EA
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Item 1	Tidal Flood Risk PS questioned whether specific modelling of tidal flood risk had been carried out. AB advised that the area team had advised that tidal flood risk modelling was not required. AB noted that there have been extensive flood defence works carried out by Hull City Council and East Riding of Yorkshire Council which have a standard of protection of 1 in 200 year including an allowance for climate change to ~2040 [although not mentioned in the meeting it is understood that these defences have been designed to allow a managed adaptive response; the defences have been constructed so that increasing their level in the future is relatively straightforward). AB noted that the existing defended model outputs do not predict significant flooding of the site at that even the undefended 200 year outputs are not significantly worse than the H++ simulation outputs. AB also noted that the extent of FZ2 was more extreme than the undefended outputs for the Hull and Holderness study and surmised that it is likely to have been based on a simplistic tidal assessment. PS confirmed that specific tidal flood risk modelling is not necessary. SL requested that the rationale be clearly set out in relevant reporting.
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Item 2	Model Amendments
AB set out changes to existing model as set out in the briefing note issued before the meeting PS advised that the approach was reasonable and no concerns raised. EA Post meeting note: there was some acknowledgement in the meeting regarding the age of the design hydrology used in the Hull and Holderness modelling. Upon further review of the modelling from 2013, it is noted that uncertainties in the standard percentage runoff and permeable base flow values can have a significant effect on the areas being indicated as being at risk. Some evaluation of the design flow estimates used in the modelling in the context of more recent methods and historic flooding would be sensible. Some justification should be provided within the model reporting as to why the 2013 design flows are still considered appropriate for use.	

Item 3	Tidal Boundaries
AB gave an overview of the changes made to the Hull and Holderness Drain model supplied by the EA to reflect sea level rise using the highest astronomical tidal (HAT) level from the Coastal Flood Boundary dataset and the latest higher central estimates for sea level rise to 2066 and for the H++ scenario for 2100. PS agreed that the approach was reasonable but advised that an additional study (Humber 2100+ Extreme Water Levels) had been carried out to determine extreme water levels in Humber Estuary. PS requested that the outputs of these be considered. PS and AB agreed to consider the outputs by cross-referencing the predicted 1 in 2 year levels against the CFB and adjusting the HAT to allow a sensitivity test of the design event model if the levels are higher.	

Item 4	Breach Modelling
AB explained the approach and parameters used to carry out the breach assessments in accordance with the 'Breach of Defences Guidance - Modelling and Forecasting Technical Guidance Note'. AB noted that the outputs from the Hull Breaches were relatively insensitive to breach location. PS agreed that the breach parameter methodology in terms of opening size and trigger times used was acceptable. PS and AB agreed that further breach simulations for the Monks Dyke were prudent. PS requested relevant information to allow review of breach approach	

Item 5	Sensitivity Runs
PS requested sensitivity testing of inflows at +20%. AB agreed to carry out flow sensitivity testing for: design event; 2 Hull Breach runs; 2 Monks Dyke Breach runs PS suggested sensitivity testing of floodplain roughness in the design event model would provide an indication of whether development would increase flood risk elsewhere. No specific values were agreed at the meeting AB post meeting suggests +5% 2D roughness run for post development +20% as general sensitivity. EA post meeting note: We agree this would be useful. Ideally this would focus on adding a roughness patch to the model for the locations where solar panels are proposed and running that. We usually ask for some consideration of the solar panel upstands within hydraulic models (through roughness or flow constriction layers), although we appreciate that this is not always practical in some locations given model grid cell resolution and other limitations. Suggested roughness values for this patch would be something in the range of 0.07 to 0.1 depending on the configuration of the solar panel upstands (similar to forest for example). A general roughness test for the 2d domain of +20% is fine.	

Item 6	Model Submission
AB advised the intention to submit the model for review upon completion.	

Item 7	Site Mitigation
AB set out that a sequential approach had been taken to development but due to operational reason some supporting infrastructure (switch gear, inverters etc) would need to be located in areas at risk of flooding during a breach. AB set out the approach to site mitigation as follows: - Substations to be located outside of simulated flood events (including breach and H++). All sensitive infrastructure to be raised at least 0.3m above the worst case flood level. - Hybrid inverter containers to be located outside the design event flood and, where necessary, raised above the breach flood levels - Inverter containers and storage containers to be located outside the design event flood where possible or otherwise at least 0.3m above the design event flood level and above breach event flood levels. - Lowest panel edges to be raised at least 0.3m above the design event flood and above breach event flood levels	

- Access tracks to be provided on grade where practicable. If not compensatory storage to be provided.

PS and SL agreed with the approach. EA post meeting note: One important thing to also consider is that, where it is not possible to locate sensitive infrastructure outside of the design flood extent, the impacts of this raising on flood risk to third parties should be properly understood and if necessary floodplain compensation/mitigation should be provided to offset this risk.

Where less than 600mm freeboard is needed above the design level, SL queried what consideration had been taken of debris within flood waters to ensure that the scheme will remain safe during times of flood. AB noted that the catchment is almost wholly agricultural land and limited wood debris would be expected within flood waters. AB also explained that due to the flat nature of the land flood velocities are generally low (except adjacent to breaches) and that there would be limited entrained debris that would pose a risk to infrastructure where flood velocities are below 1.0m/s.

SL requested that the approach and justification for the suitability of any freeboard proposed, factoring in the possible impacts of debris within flood water, be clearly set out in relevant reporting.

Action items	Person responsible	Deadline
Item 1 – Calibro to provide further information on tidal flood risk in relevant reporting	AB	No set deadline
Item 1 – EA to confirm source of data used to define Flood Zones at the site	PS	1 month
Item 3 – EA to provide outputs of Humber 2100+ Extreme Water Levels study	PS	12.04.24
Item 3 – Calibro to review Humber 2100+ Extreme Water Levels Study and carry out sensitivity run if necessary.	AB	For model submission
Item 4 – Calibro to provide GIS vzsh breach files and layout information	AB	Completed
Item 4 – EA to review and provide comments	PS	12.04.24
Item 5 – Calibro to carry out flow and roughness sensitivity runs	AB	For model submission
Item 5 – EA to confirm suggested sensitivity tests meet requirements	PS	12.04.24

Item 6 – Calibro to submit model and report to EA (and provide updated timeframe by End of April)	AB	May 2024
Item 6 – EA to prepare cost-recovery agreement and upon receipt of intended submission date resources for review	LG	As required
Item 7 – Calibro to provide discussion of debris and potential impact on infrastructure in relevant reporting	AB	No set deadline

Meeting minutes

Item 3	Re: Financial Overview

Conclusions

Action items	Person responsible	Deadline

Alex Bearne

From: Sale, Philip [REDACTED]
Sent: 12 April 2024 15:10
To: Alex Bearne
Cc: Griffiths, Lizzie; Lavers, Sacha
Subject: Pear Tree Solar Farm - Modelling Consultation - breach locations

Hi Alex,

Thanks for sending through the modelled and proposed breach locations. I have had a look at these along with the breach parameters.

The adopted Z values and width of the variable z shapes all appear sensible. I can't comment on the breach trigger values without seeing the model but what you talked about during the meeting was reasonable in terms of setting trigger times. One thing I am unable to check is whether the variable z shapes correctly lower the 1d_2d cells as I don't have access to the model and corresponding check files. I have looked at the toe elevations of the breaches based on a comparison against 2 metre resolution composite Lidar data dated 2022. Breach *2d_vzsh_MD_HB_BR1_001_R* on the River Hull appears to have quite a low Z value compared to the toe of the embankment based on Lidar data, but the Z value within *2d_vzsh_HLB_BR1e_001_R* which is right next to it looks sensible.

I note that some of the breaches on the River Hull have a closure time of 30 hours which aligns with the guidance on breach parameters (LIT 56413) for tidal rivers but section 2.4.2 page 4 of the technical note mentions a closure time of 56 hours for the River Hull breaches. To be fair the River Hull is a tidal/fluvial watercourse and the risk is more fluvial driven given the presence of the Hull Barrier so you could also argue that 56 hours might be appropriate and more precautionary but appreciate the guidance isn't overly prescriptive in this regard and the values presented are only a guide.

The proposed breaches along Monk Dyke look reasonable in terms of their placement.

What was the rationale for not undertaking a breach at east 506700 north 438725, east 508280 north 436920, and east 508565 north 436090 on the left and right bank of the River Hull (figure 1 below)? Is this because these are relatively low risk areas for cable routing?

In terms of the Flood Zone composition for the area, I am currently liaising with several colleagues on this. We will confirm this shortly.

Let me know if you need any further information.

Kind regards,

Phil

Figure 1: Locations on the River Hull which intersect the red line boundary for the site where breaches are not proposed.

From: [Patrick Goodey](#)
To: [Jon Church](#)
Cc: [Alex Bearn](#)
Subject: RE:[CAL: 20-206] Peartree Hill Solar - Drainage Strategy Meeting
Date: 06 June 2024 11:40:00
Attachments: [image003.png](#)

Hi all,

Good to meet earlier, just to pick up the salient points we raised/agreed-

- Acceptance of the plan to drain isolated containerised infrastructure via their gravel bases and to ground, mimicking the existing conditions
- Parts of the site, particularly around Holderness Drain, East Drain and Beswick experience prolonged flooding due to high water table
- Flooding of the site is acceptable, provided negligible impacts to third parties, infrastructure resilience and access issues
- Damage to existing land drainage acceptable presuming it has negligible impact on third parties
- PG to attempt to obtain landowner drainage records
- Critical infrastructure (BESS areas and substation compounds) as well as access to be cognisant of such flooding – PG to undertake more detailed analysis of ground levels around these and investigate if some raising of access tracks/critical infrastructure would assist. Need to consider impacts to third parties.
- Concern raised regarding use of gravel base beneath substation slab due to potential stability issues. PG to raise with client team and potentially revert to proximity filter trench
- Watercourses typically experience high levels – can be bankfull or higher for 2/3 months. Therefore, all agreed the currently proposed ‘sealed’ drainage unit with discharge to the watercourses is no better than simply allowing runoff to ground via gravel bases, acknowledging the likely prolonged saturated conditions.
- PG to send revised drainage designs by 21/6. If necessary and subject to analysis of third party impacts, revised designs to reflect mitigation designs to account for prolonged saturation – e.g. raised access roads

I hope that captures our main points, let me know if there is anything I’ve missed

Thanks
Patrick

Patrick Goodey MSc BSc
Head of Flood Risk & Hydrology



33 Colston Avenue | Bristol | BS1 4UA

M
T

Mr Mike Greslow
RWE Renewables
Windmill Hill Business Park,
Whitehill Way
Swindon
SN5 6PB

Our ref: XA/2024/100093/01-L01
Your ref: S.42 Peartree Hill
Date: 25 June 2024

Dear Mr Greslow

SECTION 42 OF THE PLANNING ACT 2008: CONSULTATION ON PROPOSED APPLICATION FOR DEVELOPMENT CONSENT.

PEARTREE HILL SOLAR FARM, EAST RIDING OF YORKSHIRE.

Thank you for working with the National Infrastructure Team on this project. We have provided this statutory planning advice under our chargeable service agreement: **ENVPAC/1/NIT/00028.**

We have undertaken a review of the documentation submitted for the statutory section 42 consultation that opened on the 15 May 2024.

Further information is required for the Environment Agency to provide a definitive response on relevant environmental impacts. This is important so we can provide the best possible advice to the Planning Inspectorate. It is strongly recommended that any further reports, statements or surveys that require our review and / or agreement are submitted as soon as possible to resolve any issues, before the Development Consent Order (DCO) is submitted.

We look forward to continuing to work with you as the detailed proposals continue to develop, and to reviewing and providing advice on relevant supporting documents as these are generated. If you have any questions about any of our comments, please contact us.

Our headline comments are listed below – more detailed advice is on key issues is listed in the various appendices to this letter.

- Impacts relating to fish have not been considered within the documentation submitted. More weight should be afforded to fish impacts to ensure the development identifies species likely impacted and adjusts mitigation measures as appropriate.
- There needs to be a water resources assessment which includes all potential consumptive uses of water at both the construction and operation phases of the development. This is to understand the water demand of the proposal and ensure that the surrounding area can meet this need without detrimental impacts on the environment.

Cont/d..

- There needs to be an assessment of geomorphology related issues to understand fluvial geomorphological risk. This is to inform design and ensure appropriate mitigation is put in place.
- The assessments of water quality issues are incomplete, requiring adjustments to methodology, risks and mitigation measures to reduce the project's impact to the water environment.

Any requests to disapply any permits or consents should be sent to us in writing as soon as possible to allow us sufficient time to consider them (minimum 6 months). Depending on the outcome this will have implications for the content of the DCO.

Sufficient time is required to ensure we can appropriately respond to discharge of requirements and protective provision consultations. Please ensure in your DCO a minimum of 21 days is stipulated as a response time for the discharge of requirements and a minimum of 61 days for protective provisions.

Please note this response does not represent our final view in relation to any future DCO, or any environmental permit applications made to us. Our final views will be based on all relevant information including applications and guidance available at the time of submission.

Yours sincerely

Miss Lizzie Griffiths
Planning Specialist – National Infrastructure Team

E-mail Nlteam@environment-agency.gov.uk

List of Appendices

Appendix A: Biodiversity

Appendix B: Fisheries

Appendix C: Water Resources

Appendix D: Water Quality

Appendix E: Flood Risk

Appendix F: Geomorphology

Appendix G: Groundwater and Contaminated Land

Appendix H: Informative

Appendix A: Biodiversity

Relevant Policies

Issue:

The Water Framework Directive (WFD), Eel Regulations (2009), and the Salmon and Freshwater Fisheries Act 1975 (SAFFA) have not been included when identifying relevant legislation. It is a legal requirement that the needs of all relevant biodiversity legislation have been incorporated into proposals.

Impact:

Not following legislation can result in inappropriate development and harm to the surrounding environment and protected species.

Solution:

Ensure the requirements of all relevant legislation has been incorporated into proposals and revise and include all relevant policies in the biodiversity chapter of the Environmental Statement (ES).

Additional Comment:

Parts of the SAFFA relevant to this type of development and that should be considered, are but are not limited to: Part 1, Sections 2 and 4. Parts of The Eels (England and Wales) Regulations 2009 relevant to this type of development and that should be considered, are but are not limited to: Part 4.

Biodiversity Enhancement

Paragraph 4.6.6 of National Policy Statement (NPS) EN-1 states that "NSIP proposals, whether onshore or offshore, should seek opportunities to contribute to and enhance the natural environment by providing net gains for biodiversity, and the wider environment where possible."

Issue:

Mink eradication has not been added on to the enhancement and mitigation opportunities.

Impact:

If any displacement works are required, the presence of mink will be a serious threat to water vole survival.

Solution:

Add mink eradication to the enhancement opportunities for the project.

Additional comment:

There is a large network of mink trapping going on in the River Hull valley, which is being co-ordinated by the Yorkshire Wildlife Trust, and it is hoped that this will allow water voles to recolonise their former range from the surviving populations in the Hull valley.

Biodiversity Mitigation and Enhancement

Para 4.6.12 of NPS EN-1 states that "When delivering biodiversity net gain off-site, developments should do this in a manner that best contributes to the achievement of relevant wider strategic outcomes, for example by increasing habitat connectivity, enhancing other ecosystem service outcomes, or considering use of green infrastructure strategies."

Issue:

Risk of fragmented mitigation and enhancement areas.

Impact:

The impacts related to poor mitigation and enhancement design can lead to:

- Limits species mobility, increase risk of harm/death, reduce genetic diversity, disease vulnerability

- Reduction in species richness
- Impacts condition and resilience of habitat
- Risk of Biodiversity Net Gain (BNG) not providing ecologically functioning habitats.
- Risk of watercourses not being consulted on or delivered

Solution:

Please submit:

- Details of opportunities for enhancement of the waterbodies (outlined in section 7.12.2), with reference to enhancement of in-stream habitat and flow diversity
- Plans to use cable corridor to connect habitats
- Plans to connect habitats to areas outside of Draft Order Limits
- Links to the Local Nature Recovery Schemes (LNRS)
- Habitat Management and Monitoring Plan
- Legal agreement for future proofing mitigation and enhancement areas

Early engagement and consultation on for BNG would support the DCO process as we can ensure that the baseline surveys are adequate in covering the lists of BNG options and ensuring the Biodiversity Gain Plan supports watercourses. We would actively encourage and support the use of BS 8683:2021 Process for designing and implementing BNG.

Appendix B: Fisheries

Preliminary Ecological Appraisal Report

According to paragraph 5.4.22 of NPS EN-1, "The design of Energy NSIP proposals will need to consider the movement of mobile / migratory species such as birds, fish and marine and terrestrial mammals and their potential to interact with infrastructure." In addition, paragraph 5.4.35 is clear that "applicants should demonstrate that mitigations required as a result of legal protection of habitats or species will be complied with."

Issue:

The impact on fish species across construction, operation and decommissioning phases has not been considered.

Impact:

Development could have a significant impact on fish species, in particular European eel, which is a European protected species.

Solution:

An assessment of the impacts on eels and other fish species from the construction activities (i.e. runoff, lighting, noise/vibration from piling and machinery), operation, and decommissioning of the development is required. Details of mitigation must be included where any impacts have been identified.

Additional Comment:

There are number of ditches/drains that fall within the proposed site boundary, which are likely to be hydrologically connected to more significant watercourses running adjacent and through the site (River Hull, Holderness Drain, Monk Dike, Meaux and Routh East Drain, Beverley and Barnston Drain). It is our opinion that this ditch/drain network will support habitat suitable for European eel and other fish species.

There are approximately 60 wet ditches of various sizes and lengths that are hydrologically connected and joined to the River Hull and Holderness Drain, both of which flow into the tidal Humber Estuary Special Area of Conservation (SAC). The ditches have been scoped out as providing suitable habitat for fish, but it is known that the European eel inhabits such ditch networks. European eel are listed as critically endangered on the IUCN Red List of Threatened Species, they are also listed as a species of principal importance under Section 41 of the Natural Environment and Rural communities (NERC) Act 2006. They are also protected under The Eels (England and Wales) Regulations 2009. It is recommended that fish surveys are conducted on ditches/drains across the site and the results should then form part of the baseline data for the ES.

Culverting

NPS EN-3, paragraphs 2.10.87 and 2.10.88, state that "Culverting existing watercourses / drainage ditches should be avoided" and "Where culverting for access is unavoidable, applicants should demonstrate that no reasonable alternatives exist and where necessary it will only be in place temporarily for the construction period."

Issue:

The Preliminary Environmental Information Report (PEIR) indicates that the preparatory works will involve the temporary and permanent installation of culverts under watercourses and ditches onsite.

Impact:

Any culverting of a watercourse or waterbody that contains fish can impact on lifecycle migration, both locally and more long distant. Culverting also impacts on fish habitat and spawning habitat by decreasing the quality of substrate.

Solution:

Culverting watercourses should be avoided at first and where possible replaced by a full span crossing that maintains the natural substrate and allows free fish passage. The ES and Construction Environment Management Plan (CEMP) need to include details of where any watercourse crossing will take place and how they will be designed to ensure impacts on fish is negligible. This should include an assessment of the impacts of any temporary or permanent culverting on fluvial processes and geomorphology.

Additional Comment:

We are opposed to the culverting of any watercourse because of the adverse ecological, flood risk, geomorphological, human safety and aesthetic impacts. Watercourses are important linear features of the landscape and should be maintained as continuous corridors to maximise their benefits to society. We will, where we deem appropriate, take possible cumulative impacts into account when making decisions. We will actively pursue the restoration of culverted watercourses to open channels.

There are approximately 60 wet ditches of various sizes lengths that are hydrologically connected and joined to the River Hull and Holderness Drain, both of which flow into the tidal Humber Estuary Special Area of Conservation SAC. The ditches have been scoped out as providing suitable habitat for fish. It is known the European eel (*Anguilla anguilla*) inhabitant such ditch networks.

Our records show that the River Hull has a population of European smelt (*Osmerus eperlanus*) and brown/sea trout (*Salmo trutta*) both migratory species listed as a priority species under S41 of the NERC Act. There are also records of bullhead (*Cottus gobio*) which is an Annex II species under the Habitat Directive. The Humber Estuary SAC is designated for river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*), allis shad (*Alosa alosa*) and twaite shad (*Alosa fallax*), all of which are migratory species which may populate the River Hull.

Noise and Vibration

NPS EN-1 states in paragraph 5.12.4 that "Noise resulting from a proposed development can also have adverse impacts on wildlife and biodiversity. Noise effects of the proposed development on ecological receptors should be assessed by the Secretary of State in accordance with the Biodiversity and Geological Conservation section of this NPS at Section 5.4. This should consider underwater noise and vibration..."

Issue:

Fish have not been included in the assessment of the route corridor options to the Creyke Beck Substation, which cross the River Hull.

Impact:

There is the potential for noise and vibrations from the drilling to impact on fish species in the River Hull. Impacts from noise and vibration are more likely given the relatively shallow depth of trench and wide area of corridor.

Solution:

An assessment on fish species from the impacts of any noise or vibrations during the cable laying must be detailed in the ES and CEMP and submitted as part of the DCO. Where necessary mitigation measures should be included to make any impacts negligible. This may involve a timing restriction to avoid any key spawning or migratory periods.

Additional Comment:

Our records show that the River Hull has a population of European smelt (*Osmerus eperlanus*) and brown/sea trout (*Salmo trutta*) both migratory species listed as a priority species under S41 of the NERC Act. There are also records of bullhead (*Cottus gobio*) which is Annex II species

under the Habitat Directive. The Humber Estuary SAC is designated for river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*), allis shad (*Alosa alosa*) and twaite shad (*Alosa fallax*), all of which are migratory species which may populate the River Hull.

Underwater noise or vibration may affect natural migratory fish behaviour and in extremities, kill fish. If it is assumed that noise and vibration from Horizontal Directional Drilling (HDD) is negligible to fish, then this needs to be backed up with evidence. As the River Hull is functionally linked to the Humber Estuary SAC, any impact from the river cable crossing on fish associated with the SAC designation, should be screened at Stage 1 of an Habitat Regulations Assessment and submitted as part of the DCO. There are records of juvenile river lamprey in the River Hull.

Appendix C: Water Resources

Construction consumptive use of water

NPS EN-1 states that the ES should describe “existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Abstraction Licensing Strategies) and also demonstrate how proposals minimise the use of water resources and water consumption in the first instance”

Issue:

The PEIR report has not identified any water resource demands anticipated during the construction phase of the project.

Impact:

Unsustainable water use can result in detrimental impacts in the environment.

Solution:

Provide details of a sustainable water supply strategy. If the consumptive use of water is required during construction, we recommend that the impacts of taking water out of the local environment are considered by the planning process as early on as possible as this assessment can identify potential obstacles and help to expedite the permitting process later.

Additional Comment:

Consumptive uses of water during construction can include on-site concrete or other materials production, dust suppression and wheel washing. In addition, whilst de-watering can in some circumstances be considered non-consumptive, it is also within water resources regulation.

More information about water availability can be found in the Abstraction Licensing Strategy¹ for the catchment or through further consultation.

Operation phase use of water

Issue:

The water demands during operation are identified as being brought to the proposed development by bowser, provided from an existing private irrigation network, or using mains water supplies.

Impact:

If the use of irrigation mains is to be explored, the impact of increased uptake from existing licences should be considered. A change in purpose on an existing licence provides the opportunity to review sustainability and a variation or new licence may not be guaranteed or may include restrictive conditions.

Solution:

Provide details of a sustainable water supply strategy. We recommend early engagement with the water company to agree what can be supplied from mains water supply and we would encourage consideration for water efficiency where possible in the design of operational facilities.

¹ Abstraction License Strategy, see [Abstraction licensing strategies \(CAMS process\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/614442/Abstraction_Licensing_Strategy_-_CAMS_process_-_GOV.UK.pdf)

Appendix D: Water Quality

Watercourse Sensitivity Methodology

Issue:

Table 15.2 uses the WFD status of a watercourse as the example for how the sensitivity of watercourses to water quality changes has been determined.

Impact:

The current approach risks potentially significant effects being underestimated, and inappropriate mitigation being proposed, which increases the risk to the environment and protected species from pollution.

Solution:

A more holistic approach to determining the sensitivity of receptors to water quality changes should be used. It should be done using professional judgement, considering the factors above, so the ability of a watercourse to tolerate changes can accurately be described. Specific justification for determining specific watercourse sensitivity should be provided in the ES and expand beyond just WFD designation.

Additional Comment:

Relying just on the WFD status of a waterbody to determine its sensitivity, risks inaccuracies in the assessment. The sensitivity of a watercourse to water quality impacts is more significantly impacted by the ecology within the watercourse, its size, flow characteristics and amenity use of the watercourse. Additionally, relying on the chemical status of a watercourse is not a reliable method for determining sensitivity as all waterbodies in England are categorised as failing.

Water Quality Risks

Issue:

The current approach to assessing the magnitude of effects (stating that magnitude of effect will be determined by the likelihood of a change to WFD status) is inadequate.

Impact:

The risks to the environment are not understood, which undermines mitigation strategies and increases the risk to the environment and protected species from pollution.

Solution:

The activities should be reassessed to ensure they reflect the appropriate level of risk to the environment. Changes to water quality that do not impact WFD status should still be considered as having the potential to cause medium or high adverse effects, depending on the extent, severity and duration of that change.

Additional Comment:

Significant pollutions or deterioration in water quality can occur without resulting in a change in WFD status because the effect is short term, it occurs in a non-designated water body, or it takes place in a location that is not actively monitored. The proposed method risks the underestimation of water quality impacts as a result. For example, further deterioration of a waterbody graded as 'poor' should still be regarded as a negative change of that waterbody and avoided where possible.

Rainwater Run-Off

Issue:

Before vegetation is established, the ground will not be protected by the solar PV modules from intense rainfall.

Impact:

This may cause sediment pollution or breach the conditions of any water discharge permits that may be granted for the works. Rainwater will need to drain off the solar modules and this could

result in intense rainfall hitting the ground across a reduced surface area, increasing soil compaction and the forming ruts and gullies during the temporary period between installation and vegetation establishment.

Solution:

The Outline Construction Environmental Management Plan (oCEMP) should ensure that mitigation measures are in place for worst-case scenarios and ensure the risks of pollution related to bare soil is appropriately managed.

Outline Constuction Environmental Management Plan (oCEMP)

Issue:

The oCEMP has not been submitted at this stage.

Impact:

Without a draft of this plan, we are unable to provide comment on whether we believe it provides sufficient mitigation to reduce the risks to the water environment.

Solution:

To ensure that an appropriate oCEMP is developed, it is advised to utilise all available guidance. We would like to refer you to our advice provided in response to the Scoping Report, as well as to IEMA Practitioner Vol 12: Environmental Management Plans (2008). We would welcome continued engagement through our pre-application advice service to further improve the development of an effective oCEMP.

Additional Comment:

For groundwater protection we want assurances that the chosen construction methods will be risk assessed. It is not clear whether certain activities that could pose a risk to controlled waters will be included in the Environmental Management Plans. Of particular concern are risks associated with horizontal directional drilling and foundation works. This is of particular concern in areas of Principal aquifer and within Source Protection Zones.

WFD assessment

Paragraph 5.16.7 of NPS EN-1 is clear that “The ES should in particular describe: ... any impacts of the proposed project on water bodies or protected areas (including shellfish protected areas) under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.”

Issue:

Section 15.14.3 confirms that a WFD assessment will be provided to support the DCO submission. No draft assessment has been provided at this stage. The proposed WFD assessment appears to concentrate on impacts to ‘designated’ waterbodies, but WFD applies to all surface waterbodies, not just those designated for monitoring purposes.

Impact:

Without a draft version, we are unable to provide comment on the WFD assessment. This increases the risk of encountering issues after the DCO has been submitted. Insufficient consideration of the impacts of the construction, operation and decommissioning of the structures to waterbodies, including their geomorphological characteristics, across the site may lead to a breach in WFD regulations.

Solution:

You should follow all available guidance in the production of the WFD assessment. We encourage continued engagement with ourselves, through our pre-application service, to ensure an accurate WFD assessment is produced. We recommend that you aim to improve water quality throughout the development area and consider opportunities to deliver WFD objectives as part of your design. This could form part of the BNG watercourse uplift.

Additional Comment:

In particular, we refer you to the guidance on WFD for Nationally Significant Infrastructure Projects². WFD mandates at a minimum that condition must not deteriorate and should preferably be left in a better state than that encountered before the activity. For example, the watercourse Foredyke Stream Lower to Holderness Dr [GB104026066910] has the mitigation measure to investigate feasibility of improving floodplain connectivity and to construct a two-stage channel with meanders. You should consider how this project factors in the need to deliver mitigation measures for WFD waterbodies and how it has considered the long-term impacts of the development on watercourses.

You must also ensure you avoid preventing delivery of WFD objectives, for example, avoid bringing cables to surface level in floodplains earmarked for future river restoration.

WFD Waterbody Areas**Issue:**

In Appendix 15.2, Water Framework Directive Water Body Areas, the catchments highlighted within Figure 15.2 do not include Catchwater Drain or Lambwath Stream from Source to Foredyke Stream. This is despite the study area (and parts of the development) falling within these catchments.

Impact:

If these catchments are not included within the WFD assessment, there is a risk that the assessment does not describe the full potential effects on these waterbodies.

Solution:

These catchments should be included within the WFD assessment to be submitted as part of the DCO submission.

Battery Energy and Storage System (BESS)**Issue:**

No reference is made to the potential impacts on water quality due to routine run-off or firewater from the onsite substation or BESS.

Impact:

There is a risk that appropriate mitigation will not be developed if these risks are not properly considered.

Solution:

The impact of surface water discharges from this area should be included within the ES. Mitigation to protect against these impacts should be developed and appropriately secured, for example through a drainage strategy or through the Outline Operation Environmental Management Plan.

Additional Comment:

The BESS is likely to include large areas of hardstanding with associated drainage infrastructure. Routine run-off can be contaminated with particulates or hazardous substances because of routine activities or spills. These areas also pose above average risk of fires. In the event of a fire, it is likely that high volumes of polluting firewater will also be produced which requires careful management.

BESSs have the potential to pollute the environment, so we welcome the proposal to produce a Battery Safety Management Plan. You should consider the impact to all environmental receptors during each phase of development. Particular attention should be applied in advance to the impacts on groundwater and surface water from the escape of firewater/foam and any contaminants that it may contain. Suitable environmental protection measures should be

² See [Advice Note Eighteen: the Water Framework Directive](#)
Cont/d..

provided including systems for containing and managing water run-off. You should ensure that there are multiple 'layers of protection' to prevent the source-pathway-receptor pollution route occurring.

Further Government guidance on considering potential risks of BESS in planning applications is available online³.

³ See [Renewable and low carbon energy - GOV.UK](#)

Appendix E: Flood Risk

Consideration of Climate Change

NPS EN-1 states that "where new energy infrastructure is, exceptionally, necessary in flood risk areas (for example where there are no reasonably available sites in areas at lower risk), policy aims to make it safe for its lifetime without increasing flood risk elsewhere and, where possible, by reducing flood risk overall."

Issue:

Climate change has not been adequately assessed.

Impact:

Failure to adequately assess the flood risk to and from the proposed development for its entire lifespan could lead to a misrepresentation of the possible risk, insufficient flood risk mitigation, and a potential to increase flood risk elsewhere.

Solution:

The FRA should therefore assess climate change for a 75 year lifetime, as recommended by the Planning Practice Guidance, using appropriate allowances and assessing a credible maximum scenario.

Additional Comment:

It is reasonable to assume the development, or aspects of it, will still be in use beyond the 40 year lifespan, so climate change should be assessed for 75 years. In line with the Gov.uk guidance⁴, Nationally Significant Infrastructure Projects should assess the flood risk from a credible maximum climate change scenario, which means using the 'upper end' allowance for peak river flow, with a minimum of the 'higher central' allowance being designed to. Using the 75-year life expectancy, the allowances for the 2080s epoch should be used, which relates to a 'higher central' allowance of 33% and an 'upper end' allowance of 66% for the Hull and East Riding management catchment.

The PEIR Report states that the emerging FRA will include an assessment of the H++ climate change scenario. Provided that the H++ allowance is being taken as at least 66%, then we accept this approach, but will expect this to be clearly assessed within the emerging FRA. The applicant can request information on recent observed flood data from the Area Customers & Engagement Team⁵ which can be used to inform and validate the hydraulic modelling being undertaken.

Easement Distances

Issue:

Chapter 15, Section 15.7.4 states that an 8-metre easement from the top of main riverbanks or the 'landward' toe of flood defences will be provided, which is a requirement for fluvial main rivers and associated assets only.

Impact:

Risk that the proposed development would restrict essential maintenance and emergency access to the watercourses and defences and may adversely affect the construction and stability of the flood defences, which would compromise their function. The permanent retention of a continuous unobstructed area is an essential requirement for future maintenance and/or improvement works.

Solution:

In addition to an 8 metre easement from any fluvial main rivers and assets, a 16 metre easement should be maintained between any elements of the proposed development and any

⁴ See [Flood Risk Assessments: climate change allowances'](#)

⁵ Please email neyorkshire@environment-agency.gov.uk

tidally influenced main rivers or tidal flood defences. A flood risk activity permit will be required for any works within these distances under the Environmental Permitting Regulations 2016.

Flood Defences

Issue:

Chapter 15, Section 13.2, states that the condition of flood defences is not going to be taken into consideration.

Impact:

Failure to assess the condition of the flood defences may result in a misrepresentation of the current and future residual flood risks associated with the proposed development, which may lead to insufficient flood risk mitigation and a subsequent increase in flood risk both to, and as a result of, the proposed development.

Solution:

Although breach modelling is being undertaken by the applicant, any assessment of residual flood risk, both now and in the future, will be insufficient without further consideration of the condition of the flood defences. Through understanding the condition of existing defences and how defence conditions may change over the lifetime of the development, you must give appropriate consideration to how residual flood risk can be managed and mitigated.

Additional Comment:

Given that the proposed scheme benefits from the presence of flood defences, understanding the condition of these defences is important in assessing the changes in future flood risk to and from the proposed development. Several flood defence assets in the catchment require significant investment to bring them up to, and maintain them to, a good standard of service, both now and in the future. You should consider the flood defences that benefit the proposed development, specifically how these defences will remain fit for purpose for the lifetime of the development, part of which will require a better understanding of the condition of these defences. The emerging FRA should incorporate a condition survey of the flood defences to demonstrate that they are in sufficient condition to remain fit for purpose through the lifetime of the proposed development. If the flood defences are found to have a life-expectancy less than that of the proposed development, then you will need to consider how the life of these defences could be extended to continue protecting the proposed development for its lifetime.

Appendix G: Geomorphology

Lack of Consideration of Geomorphology

Issue:

There is no consideration of geomorphology within the PEIR.

Impact:

Possible effects on geomorphology of fluvial environments are not properly understood and appropriate mitigation has therefore not been provided. Poorly designed cable crossings could have a negative impact on the riparian habitat.

Solution:

Provide evidence that you have considered risks to watercourses when undergoing the site selection process and that crossing main rivers and significant waterbodies have been avoided where possible. Watercourse crossing designs should be informed by the assessment of fluvial processes and geomorphology and the depth of HDD should consider the likelihood of future erosion and or/channel movement. Impacts to geomorphology need to be clearly outlined and details of appropriate and relevant mitigation given.

Additional Comment:

We would encourage the use of trenchless techniques to minimise the likelihood of cables entering the water environment. Drilling pits should be located a sufficient distance from the watercourse to prevent damage to the banks of the river and the riparian zone. Avoid designs which present legacy risks to natural processes and geomorphology beyond the project lifespan. For example, infrastructure such as access tunnels which are left in-situ after decommissioning could be exposed by future river movement, becoming an impediment to natural processes.

Biodiversity Net Gain for Watercourses

Issue:

BNG for watercourses has not been mentioned and the environmental enhancements proposed seem to be limited to riparian tree planting.

Impact:

Penalty for project with regards to fluvial / transitional and coastal environments.

Solution:

Conduct morphological surveys / River Condition Assessments for each watercourse affected by the project to characterise morphology and calculate BNG units that would be affected. Provide and secure mitigation for watercourse crossings and aim for an uplift of at least 10%.

Appendix H: Groundwater and Contaminated Land

Consideration of impacts on the SPZ1

Paragraph 5.16.7 of NPS EN-1 states that "The ES should in particular describe: ... any impacts of the proposed project on water bodies or protected areas [...] and source protection zones (SPZs) around potable groundwater abstractions."

Issue:

The cable route has not been confirmed and its location will be designed to avoid, as far as possible, sensitive receptors. However, very little emphasis is given within the report to the importance of protecting groundwater from contamination within the SPZ1.

Impact:

The construction of cable route could impact the sensitive groundwater within the large areas of SPZ that underlie all three cable route options.

Solution:

Follow the Environment Agency's approach to groundwater protection⁶ to ensure sufficient mitigation to pollution is incorporated into the design. This useful document provides an overview of the activities acceptable in SPZs.

Receptor Classification

Issue:

In Chapter 10, Section 10.11.2, the sensitivity assigned to the areas of SPZ1 is not deemed adequate.

Impact:

It is possible that insufficient mitigation to pollution will be proposed.

Solution:

Reassess the sensitivity and vulnerability of the aquifers and groundwater beneath the site to ensure sufficient mitigation to pollution is incorporated into the design.

Additional Comment:

Paragraph 10.11.2 states that, "*With respect to groundwater, the aquifers (particularly in the areas of the SPZ) are deemed to have a high sensitivity. The magnitude of impact of construction activity on groundwater quality would be negligible and therefore the significance of effect is considered to be negligible and not significant.*" Parts of the site lie within a SPZ1. In such areas the aquifers are of a very high sensitivity, and this should be given further consideration in the ES.

Recommendations for further work for land contamination

Issue:

Potential contaminant linkages are identified within the Appendix 10.1 Preliminary Risk Assessment and the report goes on to state that these linkages should be assessed further through site investigation. However, they are not included in the PEIR.

Impact:

Potential impacts to groundwater will not be adequately assessed and risks to groundwater from contamination may not be managed.

Solution:

In areas of historic landfill/suspected contamination we would expect to see the site investigation work completed.

⁶ <https://www.gov.uk/government/collections/groundwater-protection> and [The Environment Agency's approach to groundwater protection \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/publications/the-environment-agency-s-approach-to-groundwater-protection)

Private Water Supplies

Issue:

The PEIR does not mention private water supplies.

Impact:

Private water supplies may exist within the study area that can be vulnerable to contamination. If they are not included as a receptor, they are vulnerable to being overlooked.

Solution:

Contact the Local Authority for an up-to-date list of their private water supplies and include them in future assessments.

Appendix H: Informative

Waste - Recycling of Solar panels and batteries

Waste photovoltaic panels (solar panels) should be classified as a Business to Consumer (B2C) Waste Electrical and Electronic Equipment (WEEE) when being disposed of. The operator should follow the WEEE regulations and national protocol guidance when disposing of this waste.

The battery/ photovoltaic panels producer is responsible for minimising harmful effect of waste batteries upon the environment. The producer needs to ensure that the waste batteries and solar panels are entering an approved authorised treatment facility. The producer also needs to ensure that they keep a record of all WEEE waste produced, the weight and the facility it has been disposed at.

Further guidance for Waster electrical and electronic equipment can be found on Gov.uk⁷ as well as further guidance on Waste batteries⁸.

The Environmental Protection (Duty of Care) Regulations 1991 for dealing with waste materials are applicable to any off-site movements of wastes.

The code of practice applies to you if you produce, carry, keep, dispose of, treat, import, or have control of waste in England or Wales.

The law requires anyone dealing with waste to keep it safe and make sure it's dealt with responsibly and only given to businesses authorised to take it. The code of practice can be found online⁹.

⁷ <https://www.gov.uk/government/publications/weee-evidence-and-national-protocols-guidance/waste-electrical-and-electronic-equipment-weee-evidence-and-national-protocols-guidance#batteries-in-weee>

⁸ <https://www.gov.uk/guidance/waste-batteries-producer-responsibility>

⁹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1073585/Waste_duty_of_care_code_of_practice.pdf

Alex Bearne
[REDACTED]@calibro-consultants.com]

Our ref: XA/2024/100110/01-L01

Your ref: 20-206-60 Rev 01

Date: 01 July 2024

Dear Alex

REVIEW OF HYDRAULIC MODELLING. PEARTREE HILL SOLAR FARM, EAST RIDING OF YORKSHIRE.

Many thanks for your modelling submission, received on 17 June 2024. We have reviewed the Modelling Report, referenced 20-206-60 Revision No 01 and dated 17 June 2024, and the associated model files. Please find enclosed our completed review spreadsheet and a summary of our comments / questions below:

Key Comments

1. There are some areas of additional flooding in the baseflow/SPR sensitivity test within the development area. Is sensitive infrastructure located outside of these areas?
2. Minor point but the breaches on Monk Dyke appear to have been undertaken at breach locations 1 and 6, not at breach location 4 as referenced in table 3.3 of the model report.
3. Within the vicinity of the red line boundary for the development some structures are missing from the Flood Modeller model network, for example the A1035 bridge over Monk Dyke (FM cross section Cat00000) and Holderness Drain (FM cross section HN43), Swine Road Bridge over Monk Dyke (closest FM cross section MK4055), and Meaux Road Bridge over Holderness Drain (FM cross section HN21). Please consider these bridges, are they likely to surcharge and influence water levels within the development area?
4. A sense check against yearly maximum water levels at gauge sites such as Beverly Shipyard and Dunswell Ennerdale Bridge would be useful and would add some confidence that the model is still replicating physical processes well. Similarly, it would be useful to compare the model results against recorded historic outlines and provide some commentary on this with the final model report.

General Observations

Environment Agency
Lateral 8 City Walk, LEEDS, LS11 9AT.
Customer services line: 03708 506 506
www.gov.uk/environment-agency

Cont/d..

1. Section 3.1.3 of the model report describes the fluvial and baseflow dominated scenarios and mentions that the fluvial runoff scenario produces significantly more flooding than the baseflow scenario. This is true for catchments in the east but further west the baseflow scenario results in more significant flooding than the fluvial scenario. A review of the proposed development layout suggests the baseflow scenarios are more significant in the cable routing areas. Has this been considered?
2. Section 1.1.4 of the modelling report mentions that if in exceptional circumstances supporting infrastructure is located in flood risk areas it will be raised at least 0.3 metres above the flood level. Please note, where this is the case it would be prudent to test the impact within the hydraulic model, for example using a z shape to raise ground levels accordingly. Mitigation would also be required in the case of level for level or volume for volume compensation.
3. Section 2.1.4 of the modelling report describes temporary development during the construction phase including highways access, construction compounds and associated parking etc. If construction materials are located in flood risk areas, it would be prudent to assess the impact from these and provide the necessary floodplain compensation if applicable

With regards to the question... *"We have carried out a sensitivity test on flows combining both of the original test (baseflow increase of 30% and SPR increase of 20%) which shows limited change to flood levels in the design event and 4 simulated breach events. I note that the other local solar schemes didn't do any testing so I presume this will be sufficient to close out this item?"*

This is reasonable. The reason we asked for a sensitivity test on flows is because the design hydrology is over ten years old and uses the FEH rainfall-runoff approach, which has now largely been superseded by ReFH2. It is always important to check that any modelling used for site-specific flood risk assessments is fit for purpose and uses the best available information and methods in line with guidance regarding using modelling for flood risk assessments: [Using modelling for flood risk assessments - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/444444/Using_modelling_for_flood_risk_assessments_-_GOV.UK.pdf)

We trust this advice is useful.

Yours sincerely

Miss Lizzie Griffiths
Planning Specialist - National Infrastructure Team

Direct dial [REDACTED]
Direct e-mail [REDACTED]@environment-agency.gov.uk

Cc Mathew McNulty, RSK
Mike Greslow, RWE

End

Meeting Note

Project: Peartree Hill Solar Farm

Date: 01 July 2024

Meeting Title: 'Peartree Hill Solar Farm - flood risk'

Attendees:

Alex Bearne	- Flood Risk & Hydrology Lead (Calibro)
Ben Twiss	- EIA Coordinator (RSK)
Matt McNulty	- EIA Support (RSK)
Charlotte King	- EIA Support (RSK)
Mike Greslow	- Project Manager (RWE)
Angus Duncan	- Junior Project Manager (RWE)
Lizzie Griffiths	- Planning Specialist – National Infrastructure Team (Environment Agency)
Philip Sale	- Hydraulic Modeller (Environment Agency)
Sian Holland	- Incoming Flood Risk Advisor (Environment Agency)
Sacha Lavers	- Outgoing Flood Risk Advisor (Environment Agency)
Ryan Smitheman	- Planning Advisor (Environment Agency)

No.	Description	Action
	Introductions	
1	Alex thanked the EA for the prompt review of the Hydraulic Modelling report.	
	Response to the Preliminary Environmental Information Report (PEIR): Consideration of Climate Change - The FRA should assess climate change for a 75-year lifetime	
2	Alex queried this comment as it had previously been agreed with the EA that sea level rise up to 2066 would be assessed (based on the proposed project lifetime of 40 years). The substations would be there longer but Alex explained that the	

No.	Description	Action
	H++ covers beyond 2100 and the substations would be placed above this level.	
3	Sacha explained that it was more in line with the planning practice guidance approach, where a life expectancy of 75 years is the starting point for non-residential developments. This is ideally what the EA would want to be assessed but there is scope for a shorter life expectancy. She confirmed that it would be sufficient to impose a time-limited requirement, whereby if the development does extend beyond the 40-year lifetime then further assessments of future flood risk would be needed at that stage. Sacha acknowledged that the proposed assessment covers a maximum credible scenario.	Calibro / RWE
	Response to the PEIR: Easement distances – An 8m easement distance is required for fluvial watercourses, but a 16m easement is required for tidal watercourses	
4	Alex asked for a steer on which watercourses are considered fluvial and which are considered tidal. He has been working on the premise that only the River Hull is considered tidal.	
5	Philip said he will check ‘asset classification’ for the other watercourses to confirm which are fluvial/tidal.	EA
	Response to the PEIR: Flood defences – The condition of flood defences should be considered in any assessment of residual flood risk, both now and in the future	
6	Alex asked if the EA has an up-to-date register on the condition of flood defences.	
7	Sacha said she will check and send over any info she can find on the condition of flood defences.	EA (post meeting note, requested via Customers & Engagement team at neyorkshire@environment-agency.gov.uk)
8	Alex questioned what the modelling team were expected to then do with this information. The modelling to date has covered a future breach in a 1 in 100 event which seems a reasonable worst-case scenario unless maintenance of all flood defences is withdrawn.	
9	Sacha explained that future investment is needed for these defences and that unless there is investment, the defences might not be in place for the project lifetime.	

No.	Description	Action
10	Alex said that Calibro can look into further modelling but need to have a defined scope that meets EA requirements, as there is no policy , guidance or standards in this regard. Once the EA provide information on condition of flood defences, Calibro can run a couple of additional simulations (e.g. if a certain defence doesn't get maintained, what could happen). This can then be shared with the EA again (potentially with a follow-up meeting) so that all parties can reach an agreement on the scope.	Calibro / EA
	Response to Hydraulic Modelling report: Some structures (the A1035 bridge over Monk Dyke (FM cross section Cat00000) and Holderness Drain (FM cross section HN43), Swine Road Bridge over Monk Dyke (closest FM cross section MK4055), and Meaux Road Bridge over Holderness Drain (FM cross section HN21)) are missing from the Flood Modeller model network – Request for these bridges to be considered	
11	Alex said that in the first instance, Calibro could do a qualitative assessment and asked if the EA could provide survey information for the named structures.	Calibro
12	Philip said he has sent some photos but can look for more information. He feels like impacts would be localised, but one crossing did look close to solar infrastructure.	EA
	Response to Hydraulic Modelling report: A sense check against yearly maximum water levels at gauge sites such as Beverly Shipyard and Dunswell Ennerdale Bridge would be useful, as would comparing the model results against recorded historic outlines and providing some commentary on this.	
13	Alex asked if the EA could provide data on maximum water levels at the gauge sites.	
14	Philip pointed out that the information was included in the review workbook (see ‘gauge check’ tab) that the EA had provided with their response. He clarified that a few lines should be added to the report to explain that the assessment has been validated against historic records.	Calibro
	Response to Hydraulic Modelling report: Section 3.1.3 of the model report describes the fluvial and baseflow dominated scenarios and mentions that the fluvial runoff scenario	

No.	Description	Action
	produces significantly more flooding than the baseflow scenario. This is true for catchments in the east but further west the baseflow scenario results in more significant flooding than the fluvial scenario. A review if the proposed development layout suggests the baseflow scenarios are more significant in the cable routing areas. Has this been considered?	
15	Alex explained that modelling to date hasn't explicitly considered the cable routes as the focus has been on the solar areas (the 'Land Areas') to determine their layout. Also, the cables will be buried underground and are not water sensitive. The CEMP will need to consider potential flooding in these areas. The model report will be corrected to reflect that the solar generation areas are sensitive to the fluvial runoff scenario rather than the entire site.	Calibro
	Response to Hydraulic Modelling report: Where supporting infrastructure is located in flood risk areas, it will be raised at least 0.3 metres above the flood level. In these cases it would be prudent to test the impact within the hydraulic model, for example using a z-shape to raise ground levels accordingly. Mitigation would also be required in the case of level for level or volume for volume compensation.	
16	Alex and Mike clarified that containerised infrastructure would sit on plinth pads, raised roughly 0.5m above the ground anyway. The pads would be approximately a 0.3m by 0.3m, which is relatively insignificant in the context of the total flooded area and the model grid (15m). There are no plans for wholesale raising of ground levels beneath infrastructure. Also, it is hoped that such infrastructure will be removed from flood risk areas at the next stage of modelling/design.	
17	Philip agreed that specific modelling of the plinths would not be required.	
	Response to Hydraulic Modelling report: If construction materials are located in flood risk areas, it would be prudent to assess the impact from these and provide the necessary floodplain compensation if applicable	

No.	Description	Action
18	Alex noted that there is a temporary compound proposed near Monk Dike and asked for details on the rollout of the scheme and if there would be dedicated storage areas.	
19	Mike said that material would be stored in construction compounds (shown in Figure 3.1 in Volume 2 of the PEIR). The proposed compounds have largely been driven by construction efficiencies, but RWE can review their locations. Note that the site will be constructed sequentially. RWE are currently developing the construction schedule and can share this and compound locations with Calibro and the EA.	RWE
20	Alex noted that the substation in Land Area C is on a higher spot, so moving any temporary compound closer to that may help. It may be best to have one or two main construction compounds for storage and then smaller satellite compounds when developing certain sections of the site. Mike confirmed that main construction compounds would likely be near substations.	RWE
	Next Steps	
21	Mike shared that RWE are aiming for design freeze end of July/start of August.	
22	It was agreed that next steps should initially occur via email, with a follow-up meeting to be arranged only if deemed necessary. Each team should work through their own actions but include all meeting attendees in emails.	All

Mr Mike Greslow
RWE Renewables
Windmill Hill Business Park, Whitehill
Way
Swindon
SN5 6PB

Our ref: XA/2024/100110/02-L01
Your ref: 20-206
Date: 29 August 2024

Dear Mr Greslow

**REVIEW OF HYDRAULIC MODELLING REPORT ADDENDUM. PEARTREE HILL
SOLAR FARM, EAST RIDING OF YORKSHIRE.**

We have reviewed the Addendum to the Flood Modelling Report, provided to us on 14 August 2024. We confirm that we are happy with the information within the report and confirm that we consider the modelling to be fit for purpose.

We trust this is useful.

Yours sincerely

Miss Lizzie Griffiths
Planning Specialist - National Infrastructure Team

Direct dial [REDACTED]
Direct e-mail [REDACTED]@environment-agency.gov.uk

Alex Bearne

From: [REDACTED]
Sent: 12 July 2024 10:06
To: Mathew McNulty
Cc: Alex Bearne; Greslow, Michael; Ben Twiss; David Hoare; Holland, Sian; Sale, Philip
Subject: RE: Peartree Hill Solar Farm - flood risk meeting notes
Attachments: 2024.07.01 Meeting Minutes (with EA edits).docx

Follow Up Flag: Follow up
Flag Status: Completed

Hi Matt,

Thanks for these. We have reviewed the meeting notes and consider them to be a satisfactory record of the meeting. I have made a couple of very minor additions in the attached version.

In regard to the EA actions from this meeting:

- 1) Asset Classification - According to our Asset Information Management System, the assets on the River Hull are classed as tidal/fluvial. The assets on the Holderness Drain and Monk Dyke are classed as fluvial.
- 2) Condition of flood defences – as reflected in the meeting minute changes, this has now been actioned via the local Customers & Engagement team to comply with the Environmental Information Regulations.
- 3) Missing structures – Phil has been in touch with the local data and evidence team, who have confirmed they do not have any survey information available for these bridges. In the absence of survey information, perhaps the easiest solution in this instance would be to do some sensitivity testing in the model to see what the impact is. This would perhaps involve adding the bridge units and making some assumptions on dimensions based on a site visit or the photography which is included within the model review spreadsheet.

Kind regards

Lizzie

Lizzie Griffiths

Planning Specialist – National Infrastructure Team

Environment Agency | Lateral, 8 City Walk, Leeds, LS11 9AT



From 1 April 2024 the Environment Agency will be implementing new legislative powers to recover its costs for all stages of the Nationally Significant Infrastructure Project (NSIP) consenting regime. Please contact us for details for what this means for your existing or proposed NSIP.

From: Mathew McNulty [REDACTED]
Sent: Tuesday, July 2, 2024 2:21 PM
To: Griffiths, Lizzie [REDACTED]
[REDACTED]

Subject: Peartree Hill Solar Farm - flood risk meeting notes

Some people who received this message don't often get email from [REDACTED]@rsk.co.uk. [Learn why this is important](#)

Good afternoon Lizzie and team,

Thanks again for the flood risk meeting in relation to Peartree Hill Solar Farm yesterday. Please find attached the meeting notes.

I trust that these notes summarise the key discussion points and actions, but please let me know if you think any amendments are required.

Many thanks,
Matt

Matt McNulty
Environmental Consultant



RSK Environment Ltd
The Old School, Stillhouse Lane, Bedminster, Bristol BS3 4EB, UK

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Mr Mike Greslow
RWE Renewables
Windmill Hill Business Park, Whitehill
Way
Swindon
SN5 6PB

Our ref: XA/2024/100118/03-L01
Your ref: Email dated 22/01/2025
Date: 22 January 2025

Dear Mr Greslow

**PRE-APPLICATION – SOLAR FARM. RESPONSE TO EMAIL DATED 22ND
JANUARY 2025. PEARTREE HILL SOLAR FARM, EAST RIDING OF YORKSHIRE.**

Following our meeting on 20th January 2025 to discuss our recent advice on your draft Flood Risk Assessment (FRA), our ref XA/2024/100218/01, and Water Framework Directive Assessment (WFDa) our ref XA/2024/100118/02-L01, and your draft Potential Main Issues for Examination (PMIE) document, we write to confirm our position on your request to scope out the Water chapter from your Environmental Statement (ES) and provide feedback relating to the PMIE.

Water Chapter

We confirm that we are satisfied that the Water chapter can be scoped out of further assessment within the ES. This is on the basis that the FRA and WFDa are submitted with your Development Consent Order (DCO) application and on the understanding that the remaining issues highlighted in the above referenced letters are addressed through the Examination. This is also on the basis that our main concerns are focused around impacts on groundwater, and we understand that this will continue to be scoped in via the Land and Soils chapter.

Potential Main Issues for Examination

We refer to the draft PMIE document provided to us on 8 January 2025 and will address each identified issue in turn.

EA1 – Fish

We agree with the inclusion of this issue and consider the RAG status of 'amber' to appropriate, given that we have yet to see the results of the survey work undertaken. We note the intent to minimise culverting works, maintain an operational 10m buffer from watercourses free from development, and to use Horizontal Directional Drilling under the River Hull to avoid direct impacts.

EA2 – Water Discharge Permits / Abstraction Licensing

As discussed in the meeting, some thought still needs to be given to your dewatering strategy, so we agree with the inclusion of this matter within the PMIE and the RAG status assigned to it. Your comments in relation to this point are focused around water use being facilitated by bowers and your anticipation that water use will be relatively low. This suggests that our comments have been misunderstood.

Inlaying your cables, you may find that you need to dewater. How much dewatering is required, and the type of water to be removed, will depend on how deep you are likely to be laying the cable trenches and the groundwater levels in that area. This will determine whether you are able to operate under the exemption or if an abstraction licence is required for dewatering. Should you require a permit, there may be restrictions around when or how you abstract. For example, ensuring any water removed is returned into the system in the same place, or seasonal restrictions. We recommend you obtain pre-permitting advice from our National Permitting Centre as soon as possible to ensure that any potential restrictions are understood and can be managed. You should bear in mind the timescales given in our Scoping Opinion response, should a permit be required.

Please note that we cannot pre-determine a permit, but it is a business risk if you do not consider this issue early and you encounter problems with obtaining a permit following the grant of any planning consent.

EA3 – Water Quality

As noted at the beginning of this letter, we are content that water quality can be scoped out of further assessment, on the understanding that the remaining risks are predominantly to groundwater. In addition to providing an updated WFDa within the DCO application, we note your intention to include a bentonite breakout plan, as requested, and we appreciate the intention for any mitigation measures to be provided via the Construction Environment Management Plan and Battery Safety Plan.

Below, we have outlined our concerns in regard to the possible impact on groundwater.

With regard to WFD-9, [Hydrofluoric acid | Health and Safety Department](#), referenced within the WFDa, this is a guidance document for working with chemicals at the University of Edinburgh. It does not explain how hydrofluoric acid should be managed in the environment, so we do not consider it to be relevant to this situation. We agree that there is a risk of entry of contaminants to surface and groundwaters, but limited additional information has been presented and there is no assessment of the potential contaminants that may be present in the fire water other than hydrogen fluoride.

Under normal operation, BESS developments do not present significant risks to groundwater or surface water. However, there is potential for pollution of the water environment due to abnormal and emergency situations at BESS developments, in particular fires. Generally, the risks to groundwater and surface water from BESS development would be from pollution of surface water drainage from the site due to:

- A battery container fire at a BESS site
- Accidents or spillages from battery containers at a BESS site

We note that the battery storage areas are to be dispersed across the site. While we

recognize that this may reduce the risk of fire, there is still a risk that highly polluting chemicals in batteries could enter groundwater or surface water in firewater or rainfall, should a fire occur. We expect applicants to consider this risk and ensure that mitigation is in place to contain this water. To appropriately manage the risks from pollution of groundwater and surface water, you will need to produce a conceptual site model and assess the likelihood of pollutants within the site coming into contact with nearby waterbodies, directly or indirectly, and the degree of risk posed by the particular pollutants in question.

We expect suitable provisions to contain water in the event of a fire to be designed into the site. The capacity for such systems should be determined by the applicant in liaison with the fire service.

It may also be important to consider the risk of failure of mitigation measures to manage identified risks. For example, the risk that a containment system to contain surface water in the event of a fire may fail because of the fire. The extent of the measures taken to assess and manage this risk may depend on the sensitivity of the groundwater or surface water bodies affected.

The WFDa report goes on to state that,

“3.5.22 The runoff pollutant load is expected to be very low and consequently the gravel bases sufficient to cleanse water before discharge to the ground, thus having a negligible impact on groundwater receptor. This is evidenced by comparing the likely pollutant hazard indices from Table 26.2 of the SuDS Manual [Ref WFD10] with the SuDS mitigation indices for discharges to the ground in Table 26.4 of the SuDS Manual.

3.5.33 As recommended by the Site surface water drainage strategy (summarised above and described in more detail in ES Volume 4, Appendix 15.2: Flood Risk Assessment [EN010157/APP/6.4]), the hybrid inverter/battery units would be sited on gravel bases. This would be lined by a permeable geotextile to encourage percolation to the ground where possible.

3.5.34 The gravel base would be specified to be limestone-based, given the calcium carbonate content of limestone is understood to be effective at diluting hydrofluoric acid, as mentioned above.

3.5.35 Geotextiles are normally applied to drainage systems serving highways so are understood to be effective at filtering contaminants, particularly hydrocarbons and heavy metals.

3.5.36 A sand layer will be included with the geotextile, either above or below the geotextile at the base of the gravel, depending on manufacturer recommendations. This would provide additional absorption of contaminants, limiting their mobilisation potential.

3.5.39 Furthermore, the gravel base, membrane and sand layer would remove the pathway for release of pollutants and therefore provide sufficient mitigation to minimise potential impacts on the groundwater and surface water body receptors.”

This description of the proposed drainage at the site suggests that significant reliance will be placed on geotextile and gravel bases to attenuate the migration of potential contaminants. However, a conceptual site model, identifying the possible pollutants, pathways and receptors has not been presented. Current best practice is that firewater from BESS sites located on principal aquifers should be contained and the

applicant should therefore provide a suitable mechanism for containing surface water run-off in the event of a fire. We expect this to be included as a mitigation measure.

Please note that our groundwater protection guidance, 'Environment Agency's approach to groundwater protection', is being revised and will include a position for BESS development when updated.

In regard to the volumes of water required to be stored, the Fire Chief's guidance does refer to the provision of adequate water supply and it suggests that any water storage requirements are discussed and designed following liaison with the local fire and rescue service.

In light of the concerns highlighted, we consider it reasonable for this matter to remain within the PMIE with the RAG status of 'amber'.

EA4 – Water Resources

In reviewing this section since our meeting, we have noticed a discrepancy within the information provided that affects the inclusion of this issue within the PMIE and/or the RAG status assigned to it.

The issue relates to consumptive uses of water on site, eg for site facilities, wheel-washing etc. The draft PMIE (in response to EA2) states that bowsers will be filled from 'mains' water, but also (in response to EA4) that they will be filled using 'an existing nearby licenced water abstraction source'. The important distinction is whether you are using a public mains water supply, or a licensed abstraction.

If you are using a public water supply from Yorkshire Water, then it's up to you to seek confirmation from YW that water will be available to you. In this scenario, this would not require inclusion within the PMIE.

However, if you are intending to use a non-public water supply, from a source that has an existing abstraction licence, we would suggest discussing this further with ourselves and leaving it in the PMIE as an 'amber' issue. In this case, you would need to ensure the volume of water you need is available, but there are also potential licensing implications, for example, if you are changing the purpose of the abstraction to a use that is different from that for which it has been granted.

EA5 – Water Framework Directive

We consider this matter to be resolved and that it no longer warrants inclusion within the PMIE.

Disapplication

As mentioned in the meeting, our updated Protective Provisions have been finalised. I have enclosed a copy for your inclusion in your draft DCO, should you still wish to pursue disapplication of the Environmental Permitting Regulations for Flood Risk Activity Permits. Please note that we are unlikely to agree to changes.

If you are still seeking disapplication in regard to section 25 of the Water Resources Act, these may need to be amended. Clarification on this matter would be welcomed.

We trust this advice is useful.

Yours sincerely

Miss Lizzie Griffiths MRTPI
Planning Specialist - National Infrastructure Team

Direct dial
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