Frodsham Solar

Environmental Statement: Volume 2
Appendix 9-1: Flood Risk Assessment and Drainage Strategy
Part 1 of 5

July 2025

Cubico
SUSTAINABLE INVESTMENTS

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Revision P02

Frodsham Solar

Frodsham Marsh, Frodsham, Cheshire West and Chester

Flood Risk Assessment & Drainage Strategy

July 2025

Waterco

Assessment | Modelling | Design

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Revision	**Date**	**Comment**
01	23/05/2025	First issue
02	07/07/2025	Second issue – Updated with development flood map overlay and watercourse location plan

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Appendices

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1. Introduction

Waterco has been commissioned to undertake a Flood Risk Assessment and Drainage Strategy in relation to a proposed solar farm at land north of the M56, Frodsham, Cheshire, WA6 7BQ. This report has been prepared in support of a Development Consent Order (DCO) application for consent to undertake a Nationally Significant Infrastructure Project (NSIP).

The purpose of this report is to outline the potential flood risk to the Site, the impact of the Proposed Development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified risk. This report has been prepared in accordance with the guidance contained in the National Policy Statement EN-1, EN-3 and EN-5, the National Planning Policy Framework (NPPF), and the National Planning Practice Guidance (NPPG): Flood Risk and Coastal Change.

This report also includes a Drainage Strategy. The aim of the Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment. These measures are secured via Requirement 10 of the **draft DCO [EN010153/DR/3.1]**.

This FRA has been prepared with reference to the flood and coastal erosion risk data published by the Environment Agency in January and March 2025. This assessment considers flood risk over the lifetime of the development (40 years) taking account of UKCP18 climate change allowances.

2. Existing Conditions

The Solar Array Development Area (SADA) covers an area of approximately 246ha and is centred on National Grid Reference: 350921, 378604. The wider Site boundary, the Order Limits, covers an area of approximately 337.5ha. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed May 2025) together with a Site visit undertaken by Waterco, shows that the eastern half of the SADA (to the east of Brook Furlong) comprises agricultural land, and fallow agricultural land, known as Frodsham Marshes, which is intersected by a series of ditches / watercourses. The western half of the SADA (to the west of Brook Furlong) comprises part of the former Manchester Ship Canal Dredging Deposit Ground, and includes Cells 1, 2 and 5. The cells have been restored to agricultural land and are now grazed by sheep / cattle. Wind turbines are located in the western extent of the Site and are served by an existing access road.

The Site is bordered by the River Weaver and the Manchester Ship Canal to the north, the River Weaver to the east, the M56 to the south-east, and agricultural land to the south-west and west. Access to the Site will be from the west, via Pool Lane, Grinsome Road, Marsh Lane and the existing wind farm access tracks. Vehicular access is possible from Weaver Lane in the south-east and Brook Furlong to the south-west but these would not be used to access the Site, other than in the event of an emergency.

Local Topography

A topographical survey has been undertaken by PM Surveys UK Ltd in December 2022. The topographical survey shows the central and eastern extents of the SADA are generally low lying land and relatively flat with levels varying from 4.58 metres Above Ordnance Datum (m AOD) to 5.1m AOD. The western extent of the SADA is not covered by the topographical survey.

Topographic levels to m AOD have also been derived from a 1m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). The LiDAR data generally corroborates the topographical survey and shows that the western extent of the SADA is situated at an elevated level between 8.8m AOD and 12m AOD.

Topographical information is provided in Appendix B.

Ground Conditions

Published Ground Conditions

The British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the Site is underlain by Tidal Flat deposits comprising clay, silt and sand. The superficial deposits are identified as being underlain by the Helsby Sandstone Formation, the Wilmslow Sandstone Formation and the Chester Formation (sandstone).

The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a Site-specific basis.

Numerous BGS borehole records are located within the Site. Within the eastern half of the Site BGS borehole records generally indicate a layer of topsoil, underlain by a layer of clay, with thin layers of silt and sand at the bottom of excavated boreholes.

Historical BGS borehole reference SJ57NW318 is located at NGR: 351096, 378754. This record identifies slightly sandy clay topsoil from ground level to 0.3metres below ground level ('m.bgl'). Firm to stiff grey mottled orange sandy (find-medium) silty clay is identified between 0.3m.bgl to 3m.bgl. This is underlain by dark grey silty fine and medium sand to the base of the borehole (4.0m.bgl). Water was struck at 1.20m.bgl.

Historical BGS borehole reference SJ57NW316 is located at NGR: 351697, 378684 and identifies similar strata. Grass onto dark brown slightly sandy (fine to coarse) clay topsoil is encountered from ground level to 0.2m.bgl. Soft to firm orange brown mottled grey slightly sandy silty clay is identified between 0.2m.bgl to 2.30m.bgl. Soft black slightly sandy (fine-medium) clayey silt is identified below this to the base of the borehole (4.70m.bgl). Water was struck at 2.80m.bgl.

A borehole location plan together with the aforementioned borehole records are included in Appendix C.

Within the western half of the Site, comprising the Manchester Ship Canal Dredging Grounds, borehole records derived from the wind farm, show made ground comprising a mix of sandy slit and sandy silty clay to depths of between 5.45m.bgl and 9.0m.bgl. This was typically followed by medium dense gravelly silty sand with occasional bands of silty clay to the base of the boreholes to 35m.bgl. Organic silty clay transitioning

into clayey fibrous peat is recorded at depths of circa 12m.bgl to circa 17m.bgl.

Hydrogeology

According to the EA's Aquifer Designation data, obtained from MAGIC's online mapping [accessed May 2025], the tidal flat deposits are classified as a Secondary Undifferentiated Aquifer. Secondary Undifferentiated Aquifers are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

The underlying Wilmslow, Chester and Helsby Sandstone Formations are described as Principal Aquifers. Principal Aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

The EA's 'Source Protection Zones' data, obtained from MAGIC's online mapping [accessed May 2025], indicates that the Site is not located within a Groundwater Source Protection Zone. There is no EA registered, or private water abstractions located on the Site.

Site Investigations

A Stage 1 Geo-Environmental Assessment has been undertaken by Smith Grant LLP in October 2024 (ES Vol 2 Appendix 10-1: Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2). The reports key findings are as follows:

'MSC Deposit Ground Cells 1,2, 3 & 5

The western third of the SADA has been subject to a long history of tipping of material dredged from the nearby Manchester Ship Canal, with dredgings recorded to a maximum depth of 10.3m bgl. Below the dredgings, ground conditions within this area have been confirmed to comprise alluvial silts and organic peat deposits to depths of around 12m bgl, followed by glaciofluvial sands overlying glacial till encountered at around 20m bgl…Although the dredgings have generally been tipped above surrounding ground level, the groundwater is likely to be in hydraulic connectivity with the surrounding aquifer within the superficial deposits. This area has since been developed as part of the Frodsham Wind Farm.

The dredgings sampled and analysed as part of ground investigations for the Wind Farm have not revealed elevated contaminant concentrations exceeding either a commercial or POS Park end use other than a single sample of dredging fill…

… Hydrocarbon odours of varying strengths were recorded in the logs of approximately one third of exploratory holes within previous investigation in the MSCDG dredging cells extending into the natural underlying soils in specific areas…

…Asbestos fibres have been encountered in a small proportion of sampled dredging fill materials and associated topsoil, all of which, have returned containing <0.001% asbestos. A JIWG asbestos risk assessment has assessed the asbestos risk as being low which mainly relates to the construction phase where ground

disturbance will take place…

…Soil leachate has exceeded Environmental Quality Standards (EQS) for select heavy metals and PAHs, and groundwater has reflected similar. This shows that the contaminants within the dredgings are to a certain extent leachable and mobile and that a pollutant linkage already exists to groundwater. Given that the dredging materials have been present for between 60 and 80 years, over such a timescale, it is envisaged that significant leaching of contaminants between soils and groundwater/surface water will have already occurred.

Dissolved methane has been recorded within sampled ground and surface waters and ground gas monitoring within the MSCDG Cells has reported up to 60% v/v methane and up to 40% v/v carbon dioxide although maximum corresponding flows were reported only up to 2.6l/hr. Flows of ground gas could increase as a result of land draining and disturbance. The assessment has concluded that a medium/Low risk exists in conjunction with the build-up of both asphyxiant and flammable ground gases within enclosed spaces (including BESS and SADA control compound plus trenching during construction).

The main receptors within the proposed NBBMA are wading birds…Nearby surface watercourses are also a prominent receptor for leachable contaminants within the dredging infill. A qualitative contaminant risk assessment has previously been undertaken within this area…associated with the development of the Frodsham Wind Farm which exists in MSCDG cells 1 and 5 plus off Site on MSCDG Cell 4... Selected heavy metals and PAHs were identified within surface waters on the NBBMA (including three ponds which had been lined with clay). This shows that the contaminants within the dredgings are to a certain extent leachable and mobile and that a pollutant linkage already exists to nearby surface water. It is considered that creation of the NBBMA will present a relatively low and insignificant impact upon the wading birds…'

A Site investigation for the eastern extent of the SADA was undertaken in June 2024. No notable contamination was identified across this area.

Local Drainage

Public sewer records have been obtained from United Utilities (UU) and are included in Appendix D. The UU sewer records show that there are no public sewers crossing the Site.

The Site includes an area of Frodsham Marsh which has been drained to provide agricultural land. A series of ditches / watercourses are present in this area. The water level in the ditches is regulated by Environment Agency owned pumping stations. It is understood that 2no. 900 l/s pumping stations are in operation. One of the pumping stations, known as Frodsham Pumping Station, is located in the easternmost extent of the Site and discharges to the adjacent River Weaver.

3. Development Proposals

The proposed development is for in-field solar arrays with associated access tracks, substation and battery energy storage system (BESS). The Proposed Development also includes the associated infrastructure for connection to the local electricity distribution network, as well as a private wire electricity connection which

could facilitate a connection to nearby businesses that would utilise the renewable energy by the proposed development.

The Proposed Development includes an ecological mitigation area which is being designed to mitigate effects on non-breeding birds, for which the Mersey Estuary Special Protection Area (SPA) is designated for. This area is located to the west of the SADA and is referred to as the Non-Breeding Bird Mitigation Area (NBBMA). A Skylark Mitigation Area is proposed to the south of Moorditch Lane.

A proposed development plan is included in Appendix E.

The majority of the Site will remain permeable, with land beneath the solar panels retained as grassland. Access tracks will be formed from permeable surfacing, with the existing access tracks in the western extent of the Site (serving the wind turbines) retained. The proposed Frodsham Solar Substation and BESS will cover an area of approximately 2.5ha. The Proposed Development has an operational lifespan of up to 40 years.

Full details of the Proposed Development are described in the ES Vol 1 Chapter 2.0 [EN010153/DR/6.1].

4. Flood Zone Classification and Policy Context

The EA 'Flood Map for Planning' (latest version, published in March 2025), included in Appendix F, shows that the western extent of the SADA is located within Flood Zone 1 - an area outside of the extreme flood extent, considered to have a less than 0.1% annual probability of flooding. The eastern extent of the SADA is located within Flood Zone 3a – an area considered to be at flood risk with a 1% (1 in 100) or greater annual probability of flooding from rivers and / or a 0.5% (1 in 200) or greater annual probability of flooding from the sea. The Site is shown to be in an area which benefits from the protection offered by flood defences.

A 'Flood Map for Planning' with the proposed development overlaid is also provided as Appendix F. This maps identifies the location of key infrastructure with respect to the Flood Zones.

The risk of flooding from all sources including fluvial (from watercourses) tidal, surface water, sewer flooding, groundwater and artificial sources is provided in the following sections.

In accordance with Annex 3 of the NPPF, solar farm developments are classified as 'essential infrastructure'. Table 2 of the NPPG: Flood Risk and Coastal Change states that 'essential infrastructure' development is considered appropriate within Flood Zones 1 and 2. Where 'essential infrastructure' is located in Flood Zone 3, the NPPF Exception Test must be passed.

For the Exception Test to be passed it must be demonstrated that:

A. the development would provide wider sustainability benefits to the community that outweigh flood risk, and

B. the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

This report considers the risk of flooding from all sources and the mitigation measures which could be applied to ensure the development is safe for its lifetime.

Consideration of the Sequential Test has been set out in in the Alternative Site Assessment (ASA) (ES Volume 2 Appendix 3-1: Alternative Site Assessment [EN010153/DR/6.2])and should be read in conjunction with this Flood Risk Assessment and Drainage Strategy. The ASA concludes that the Sequential Test is passed for the Proposed Development.

National Policy

The Overarching National Policy Statement (NPS) for Energy (EN1), NPS for Renewable Energy (EN-3) and the NPS for Electricity Networks Infrastructure (EN-5) have been reviewed and inform this report.

Local Policy

Policy ENV1 - Flood Risk and Water Management, Policy DM 40 Development and Flood Risk and Policy DM 41 Sustainable Drainage Systems (SuDS) of The Cheshire West and Cheshire Council Local Plan (adopted January 2015) have been reviewed and inform this report.

Table 9-1 of ES Vol 1 Chapter 9: Flood Risk, Drainage and Surface Water [EN010153/DR/6.1] sets out how the above national and local policies have been considered in the DCO application.

Local guidance documents including the Cheshire West and Chester Council Strategic Flood Risk Assessment (SFRA) (March 2016), the Cheshire West and Chester Council Preliminary Flood Risk Assessment (PFRA) (2017-2023), the Cheshire West and Chester Council Local Flood Risk Management Strategy and the Cheshire West and Chester Borough Council Sustainable Drainage Systems (SuDS) Guidance – (volume 1) (v4) (June 2020) have been reviewed and inform this report.

5. Consultation

Environment Agency (EA)

A pre-planning opinion request was submitted to the EA in October 2022. The EA response is included in Appendix F. The EA were also consulted regarding the future operation of Frodsham Marsh Pumps in November 2022. In their response (Appendix F), the EA have stated:

'We do operate and maintain Frodsham and Ince Pumping stations and have no plans to stop pumping or maintaining the pumps. We will require 24hr vehicle access to Frodsham Pumping Station including during construction.'

A charged pre-planning opinion request was submitted to the EA in January 2023 and a draft review (non-statutory) of an earlier version of this Flood Risk Assessment and Drainage Strategy was undertaken by the EA in July 2024. In their review (Appendix F) the EA raised the following points:

- The developer should use the 2080s higher central allowance for the climate change projections

pertaining to peak river flow. The credible maximum scenario is the upper end allowance.

- The developer should use the higher central and upper end allowances for sea level rise. The credible maximum scenario is the H++ scenario and is based on sea level rise of 1.9 metres plus an allowance for surge.

- The developer will need to consider flood storage compensation for all structures within the design flood plus climate change flood extent. This includes the mounting structures / post for solar panels, the inverter stations, and changes in level from the roads.

Waterco provided a letter response to the EA's draft review which is included in Appendix F (14740-EA FRA Letter-01). In reply to Waterco's response, the EA have confirmed: the design flood events; modelled breach locations; requirements for flood risk activity permits; and, offsets from flood defences.

In response to the EA's reply, Waterco submitted a second letter (14740-EA FRA Letter 02) along with a Flood Compensatory Storage Technical Note (14740 – Flood Compensatory Storage Technical Note 02), both of which are included in Appendix F together with the EA response. It was agreed with the EA that the impact of the development on flood risk elsewhere should be considered through detailed hydraulic modelling. The hydraulic modelling has been undertaken with the findings discussed in the following sections.

Further correspondence from the EA provided in response to the Preliminary Environmental Information Report (PEIR) is detailed in ES Vol 2 Appendix 9-5: Consultation Responses [EN010153/DR/6.2].

Lead Local Flood Authority (LLFA)

A consultation request was submitted to the LLFA in October 2022. In their response (Appendix G), the LLFA have stated that:

'With regards to the drainage strategy, we would have no objections to the continued use of infiltration and informal connections to the ordinary watercourses on Site. Please note that any alterations to these existing ditch lines would require formal consent from the LLFA via a Land Drainage Consent Application, under Land Drainage Act 1991.

The FRA / Drainage Strategy will need to demonstrate that the proposed development will not increase surface water runoff into the receiving ordinary watercourses. LLFA approval would be subject to all surface water flows being managed and retained on Site, to ensure no exacerbation of any localised flood risk. Additionally, any changes in land levels will need to be agreed directly with both the LLFA and Local Planning Authority.'

Additional LLFA comments were provided in July 2024, in relation to a review of a previous version of this report. The LLFA response is included in Appendix G.

Other Consultees

The Planning Inspectorate (PINS) has provided a scoping opinion (including Cheshire West and Chester Council (CWaCC) comments) on the proposed development, which is provided in the ES Vol 2 Appendix 1-2

Planning Inspectorate Scoping Opinion (July 2023) [EN010153/DR/6.2]. The relevant extract of the scoping opinion is included in Appendix I and is responded to in ES Vol 2 Appendix 9-5: Consultation Responses [EN010153/DR/6.2].

All correspondence relating to flood risk and drainage provided in response to the Preliminary Environmental Information Report (PEIR) is detailed in ES Vol 2 Appendix 9-5: Consultation Responses [EN010153/DR/6.2].

6. Sources of Flooding and Probability

Fluvial & Tidal

The Site is intersected by several ditches (ordinary watercourses) and designated EA 'Main Rivers' (fluvial), namely Red Wall Ditch, The Lum, Marsh Green and Ship Street Course. The watercourses within the SADA form part of Frodsham Marshes. Mapping showing the location of all watercourses on Site is included as Appendix J. The ditches in the eastern extent of the SADA drain to EA main rivers. The EA main rivers within the eastern extent of the SADA culminate in the easternmost extent of the Site where flows are then pumped into the River Weaver via an EA pumping station (Frodsham Pumping Station).

The River Weaver is located along the eastern and part of the northern Site Order limits. The River Weaver flows north-west in this location and joins the Manchester Ship Canal. The Manchester Ship Canal is located immediately north-west of the Site and flows south-west. The Manchester Ship Canal joins the River Mersey approximately 12.7km north-west of the Site. The River Mersey is located approximately 250m north-west of the Site at its nearest point and flows north-west. The River Mersey is tidally influenced in this location.

The Weaver Navigation (canal) is located approximately 250m north-east of the Site and beyond the River Weaver.

Several waterbodies (ponds and ditches) are identified within the proposed NBBMA. Ditches in this area drain west and discharge to the Manchester Ship Canal.

Land west of the Site comprises Ince Marsh which is served by a number of ditches and EA main rivers. Flows from Ince Marsh are discharged to the Manchester Ship Canal via an EA pumping station (Ince Pumping Station) located approximately 3.37km south-west of the Site.

The Site is located in an area which benefits from the following flood defences:

Fluvial Flood Defences

Fluvial flood defences designated as 'natural high ground' are present along the designated EA Main Rivers which intersect the eastern extent of the SADA. Cross sections through the flood defences along the ditches within the Site, obtained using LiDAR data, show that the flood defences (natural high ground) are approximately 300mm higher than adjacent ground levels. These low-level flood defences would have no bearing on tidal flooding from the Mersey or fluvial flooding from the River Weaver. Details of the flood defences on Site, including the cross sections, are included in the Waterco document '14740-EA FRA Letter -

02' (dated 29/08/2024) in Appendix F.

Using the EA 'Asset Information and Maintenance Programme' data (data.gov.uk), the main rivers on Site are designated as being 'fluvial'. The defence crest levels for the 2no, main rivers which flow south through the eastern extent of the SADA (Redwall Ditch and the Lum), as identified by the EA 'Spatial Flood Defences' dataset, vary from 4.59m AOD to 5.23m AOD.

Natural high ground is also present adjacent to the EA Main River along the southern boundary of the Site (Ship Street Course). The minimum defence crest level of the high ground varies from 4.07m AOD to 5.32m AOD. The defence condition is classified as 'fair', which indicates the presence of defects that could reduce performance of the asset. An 8m buffer from the flood defences within the Site (with exception of the River Weaver flood defences which require a 16m buffer) has been agreed with the EA.

Combined Fluvial & Tidal Flood Defences

Flood defences adjoining the River Weaver and the River Mersey offer protection to the Site from both fluvial and tidal flooding. The flood defences include:

- An earth embankment adjacent to the River Weaver on the eastern boundary of the Site. The minimum defence crest level of the embankment varies from 6.9m AOD to 7.6m AOD (taken from a combination of topographical survey and LiDAR data). The defence condition is classified as 'fair'.

- Engineered high ground along the northern boundary of the Site adjacent to the River Weaver. Defence crest levels are in the region of 6.7m AOD. The defence condition is classified as 'fair'.

- An earth embankment located approximately 400m north-west of the Site between the Manchester Ship Canal and the River Mersey. This flood defence protects the Site from the River Mersey and has a defence crest level of 6.6m AOD. No information is available on the condition of the flood defence.

- Engineered high ground in the western extent of the Site and immediately north-east of the Site provides an informal flood defence. The high ground in the western extent of the Site comprises the Manchester Ship Canal deposits ground (now forming part of Frodsham Wind Farm). The high ground north-east of the Site comprises a former landfill, known as the INEOS Inovyn Deposit Ground which received dredgings from the River Weaver. Although no longer operational it is still subject to an Environmental Permit.

The locations of flood defences are shown on the EA 'Flood Map for Planning' in Appendix F.

Visual flood defence asset inspection reports have been undertaken for the flood defences adjoining the River Weaver and are included in Appendix H. The surveys found the River Weaver flood defences to be in 'fair condition' without any major defects. Future maintenance of the defences will be required to monitor and manage vegetation growth, and monitor and manage erosion to the defence crest. Assuming maintenance actions are undertaken, the defence will be able to offer protection to the development over the 40 year design life.

Fluvial flooding could occur if the River Weaver or Manchester Ship Canal overtop their defences during or following an extreme rainfall event. Coastal / tidal flooding could occur from overtopping of the River Weaver and River Mersey defences during an extreme tidal event. Flooding could also occur from a breach of the flood defences.

The EA 'Historic Flood Risk' map (Appendix F) indicates that there are no records of fluvial or tidal flooding at or near to the Site.

EA Modelled Data

Model outputs (EA products 5 & 6) for fluvial flood events have been obtained from the EA in October 2022. The modelled data has been taken from the Ince and Frodsham (2011) and Lower Weaver (2020) models. Model outputs for the Mersey Estuary have been obtained from the EA in October 2023. Estimated flood levels for the Manchester Ship Canal have been obtained from the EA in October 2023. The flood levels are taken from the Manchester Ship Canal 2018 model.

As per the EA's request (Appendix F), Waterco have updated the Lower Weaver and Mersey Estuary hydraulic models to consider alternative climate change allowances, breach scenarios and the interaction between the tidal and fluvial flood risk. The current EA Mersey Estuary and EA Lower Weaver FMP/TUFLOW hydraulic models have been used as a base for Waterco's modelling work. Full details of the hydraulic modelling are included in the Waterco Hydraulic Modelling Report (report reference: 14740-HMR-01), provided in ES Vol 2 Appendix 9-3 [EN010153/DR/6.2].

The EA Ince and Frodsham (2011) model has also been reviewed by Waterco and the hydrology within the model has been updated by Waterco to provide an up to date assessment of climate change allowances. Full details of the hydrology updates to the EA Ince and Frodsham model are provided in ES Vol 2 Appendix 9-4: Waterco Ince and Frodsham Technical Note [EN010153/DR/6.2].

The modelled outputs (EA & Waterco outputs) include flood depth and water level mapping for a range of events and are included as Appendix K.

Ince and Frodsham

The Ince and Frodsham model considers flood risk from Ince and Frodsham Marshes and the Manchester Ship Canal Company deposits grounds.

The EA model considers a 'Do Nothing' scenario and a 'Do Minimum' scenario. The 'Do Nothing' scenario represents the flood risk to the Site should a failure of the Environment Agency (EA) pumping stations, which serve Frodsham Marshes and Ince Marsh, occur. The 'Do Minimum' scenario considers the maintenance and pump rates/levels assumed to be same as now.

Do Nothing

As shown in Figure 1, during the 'do nothing' (pump failure scenario), isolated areas across the centre of the Site are estimated to flood during the 50% Annual Exceedance Probability (AEP) flood event with a maximum water level of 4.44m AOD. The areas of flooding are restricted to existing topographical low points including exsiting ponds.

Figure 1 - 50% AEP Fluvial Event - Maximum Water Levels – Do Nothing

During the 20% AEP and 10% AEP 'do nothing' flood events, the flood extent and levels are similar to that of the 50% AEP event. There is a marginal increase in the maximum water level during the 10% AEP event, with a water level of 4.47m AOD recorded in the south-western extent of the Site, however no development is proposed in this location which is a wetland area referred to as 'the Lum'. Water levels across the remainder of the Site reach a maximum of 4.46m AOD.

As shown in Figure 2, during the 4% AEP 'do nothing' event, the areas of flooding are comparable to the 50% AEP flood event. A maximum water level of 4.49m AOD is estimated. The majority of the Site is flood free.

Figure 2 - 4% AEP Fluvial Event - Maximum Water Levels – Do Nothing

As shown in Figure 3, during the 1.33% AEP 'do nothing' event, there is a minimal increase in flood extent and the water level reaches a maximum of 4.54m AOD. During the 1% AEP 'do nothing' event, the flood extent remains similar to that of the 1.33% AEP and a maximum water level of 4.55m AOD is estimated in the

developable area of the Site.

Figure 3 – 1.33% AEP Fluvial Event - Maximum Water Levels – Do Nothing

The risk of flooding from the watercourses on Site during the 'do nothing' event is very low across the majority of the Site during all considered events, with flooding generally constrained to isolated topographical low points including existing ponds.

Do Minimum

As shown in Figure 4, all operational areas of the Site are flood free during all considered events up to and including the 1% AEP flood event when the EA pump is in operation.

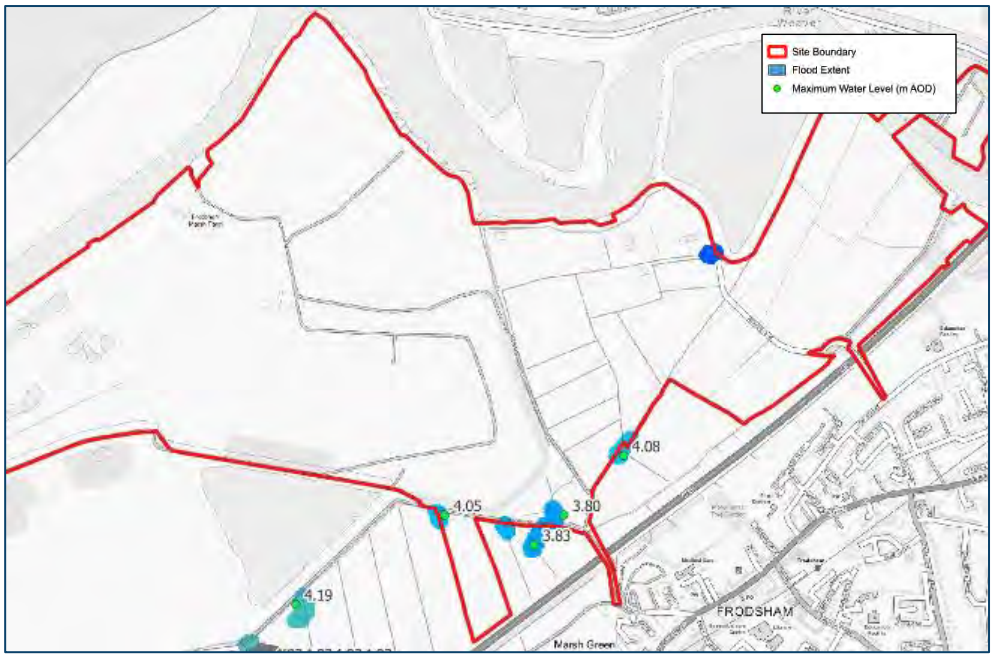


Figure 4 - 1% AEP Fluvial Event - Maximum Water Levels - Do Minimum

Table 1 shows the in-channel water levels and adjacent flood defence heights for a range of node points within the Site for the 1% AEP 'Do Minimum' scenario. The node locations are shown in Figure 5. The in-channel water levels are a minimum of 0.853m below the flood defence crest levels.

Table 1: Ince and Frodsham Model – In-channel Flood Levels

Node Location	Q100 Maximum Water Level (m AOD)	Defence Crest Height (m AOD)
MARG_0793	4.227	5.08
MARG_0048	4.062	5.23
TLUM_0396	3.389	5.15

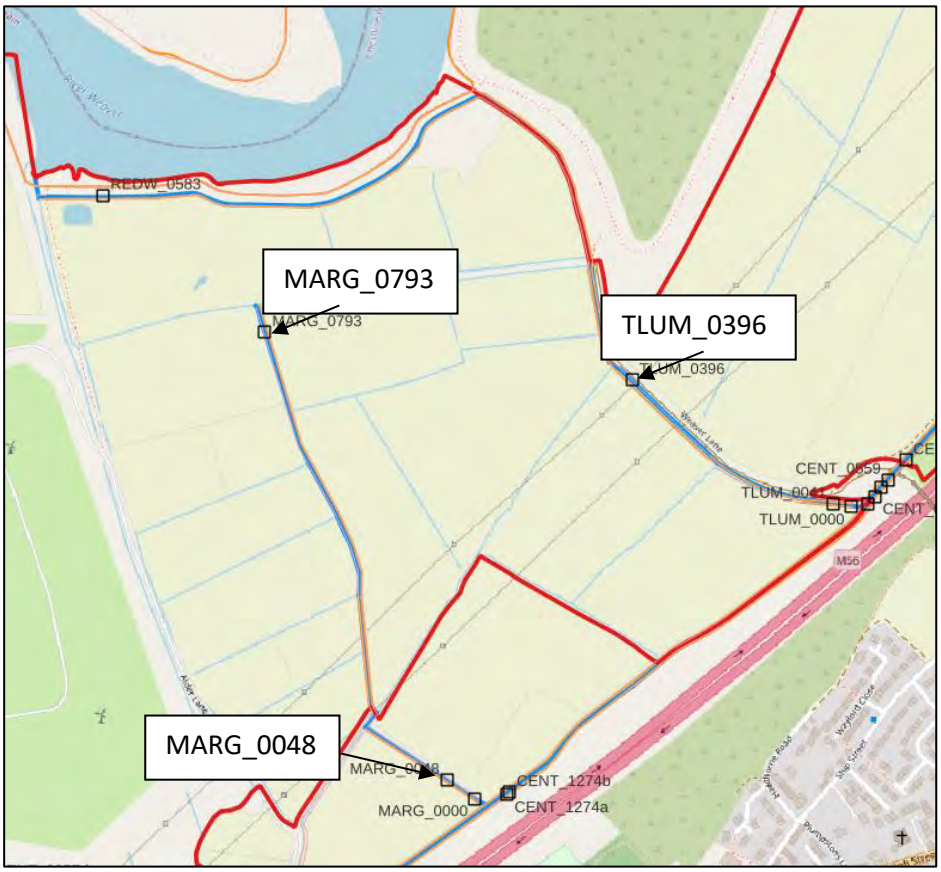


Figure 5 - Ince and Frodsham Model Node Locations

Climate Change Allowances

The EA Ince and Frodsham model does not include an assessment of climate change. Therefore, a hydrology assessment been undertaken by Waterco to consider the impact of future climate change (CC) during the 1% AEP event by increasing flows by 67% and 106%. Full details of the hydrology assessment are included within the Ince and Frodsham Technical Note provided as ES Vol 2 Appendix 9-4: Waterco Ince and Frodsham

Technical Note [EN010153/DR/6.2]).

Climate change allowances of 67% and 106% have been applied to the 1% AEP peak flows at model cross-sections MARG_0793 and TLUM_0396 detailed within Figure 5. Water levels for the 1% AEP plus 67% CC and 1% AEP plus 106% CC are included in Table 2.

Table 2 - Peak Water Levels - Climate Change Scenarios

Node	1% AEP + 67% CC		1% AEP + 106% CC	
	Peak Flow (m^3/s)	Peak Water Level (m AOD)	Peak Flow (m^3/s)	Peak Water Level (m AOD)
MARG_0793	0.39	4.74	0.48	4.84
TLUM_0396	0.06	4.76	0.08	4.89

The estimated in-channel water levels are 0.24m below the defence (natural high ground) level at node point MARG_0793 during the 1% AEP plus 106% CC event. The estimated in-channel water levels are 0.26m below the defence (natural high ground) level at node point TLUM_0396 during the 1% AEP plus 106% CC event. No out of channel flooding is estimated during the 1% AEP plus 67% CC and 1% AEP plus 106% CC climate change events. The risk of flooding to the Site from the watercourses which intersect the Site is therefore considered to be very low.

Lower Weaver

The EA Lower Weaver model considers flood risk from the River Weaver, between its confluence with Wincham Brook (between Northwich and Winnington) and the Manchester Ship Canal. The River Weaver model also considers flood risk from the Weaver Navigation.

As per the EA correspondence '*The developer should use the 2080s higher central allowance for the climate change projections pertaining to peak river flow. The credible maximum scenario is the upper end allowance Using the 2080s epoch would include an uplift of +67% on fluvial flows. The Upper scenario should be run as a sensitivity test.'* The EA have also requested a breach scenario, which represents the failure of a section of flood defences.

A range of fluvial design events have been modelled for the existing Site scenario in the Lower Weaver model. Key flood events considered are detailed in Table 3.

Table 3: Lower Weaver Model Simulations

Watercourse / Source	Scenario	Event (% AEP)
Lower Weaver Fluvial	Defended	1% AEP present day
		0.1% AEP present day
		1% AEP plus 67% CC event (2080's epoch)
		1% AEP plus 106% CC event (2080's epoch)
		Joint probability 1% AEP plus 67% CC fluvial event with 0.5% AEP Upper End CC (year 2075) tidal event.
	Breach (2no. breach scenarios on the River Weaver defences, discussed below)	1% AEP plus 67% CC event
		1% AEP plus 106% CC event
		Joint probability 1% AEP plus 67% CC fluvial event with 0.5% AEP Upper End CC (year 2075) tidal event.

Defended Scenario

The EA modelled outputs show that the Site is flood free during all considered present day (year 2020) fluvial events, up to and including the 1.33% AEP defended fluvial event. As such, only more extreme flood events, as detailed in Table 3, have been considered in this assessment.

As shown in Figure 6 below and in the model outputs (Appendix K), the eastern extent of the Site is estimated to flood during the 1% AEP present day event. During this event, floodwater is shown to overtop a low spot in the River Weaver flood defences along the eastern boundary of the Site. Floodwater flows in a south westerly direction across the eastern extent of the Site. Flood levels vary from 4.86m AOD to 5.19m AOD. Flood depths are generally less than 300mm.

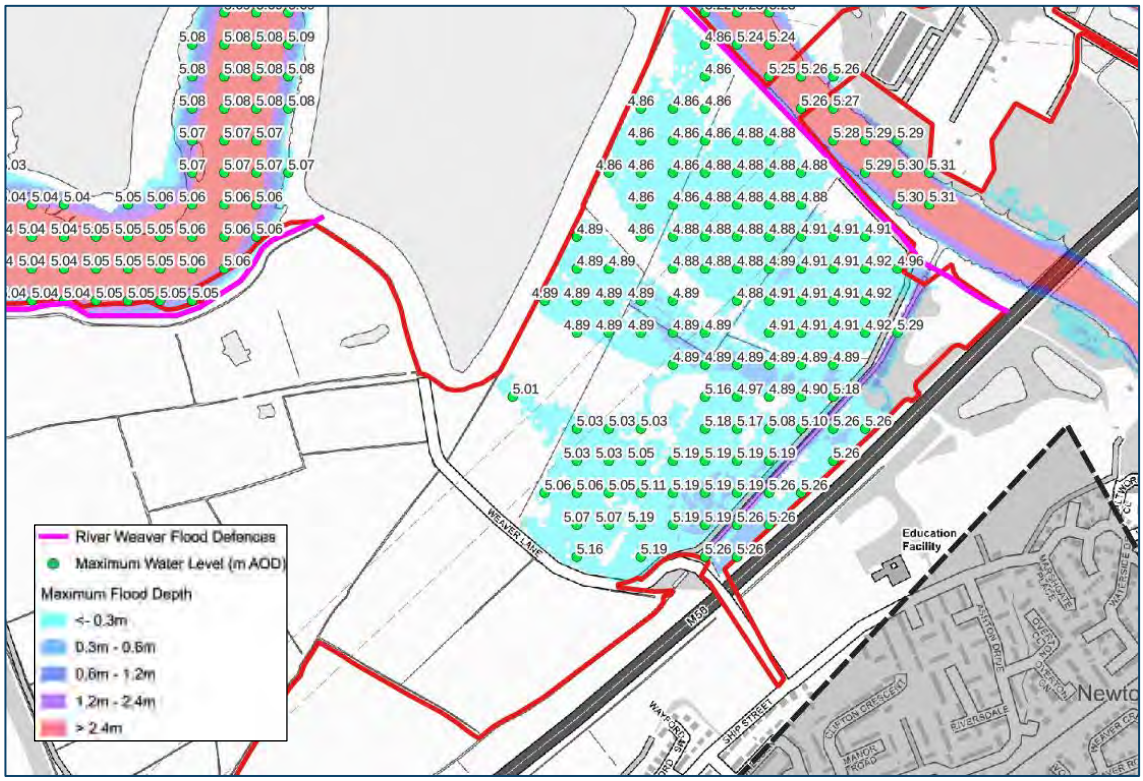


Figure 6 - 1% AEP Fluvial Event - Maximum Water Levels – Defended

As shown in Figure 7, when accounting for 67% climate change on the 1% AEP fluvial event, the eastern extent of the SADA is estimated to flood. A maximum water level of 5.73m AOD is estimated with flood depths generally varying from 740mm to 1.14m.

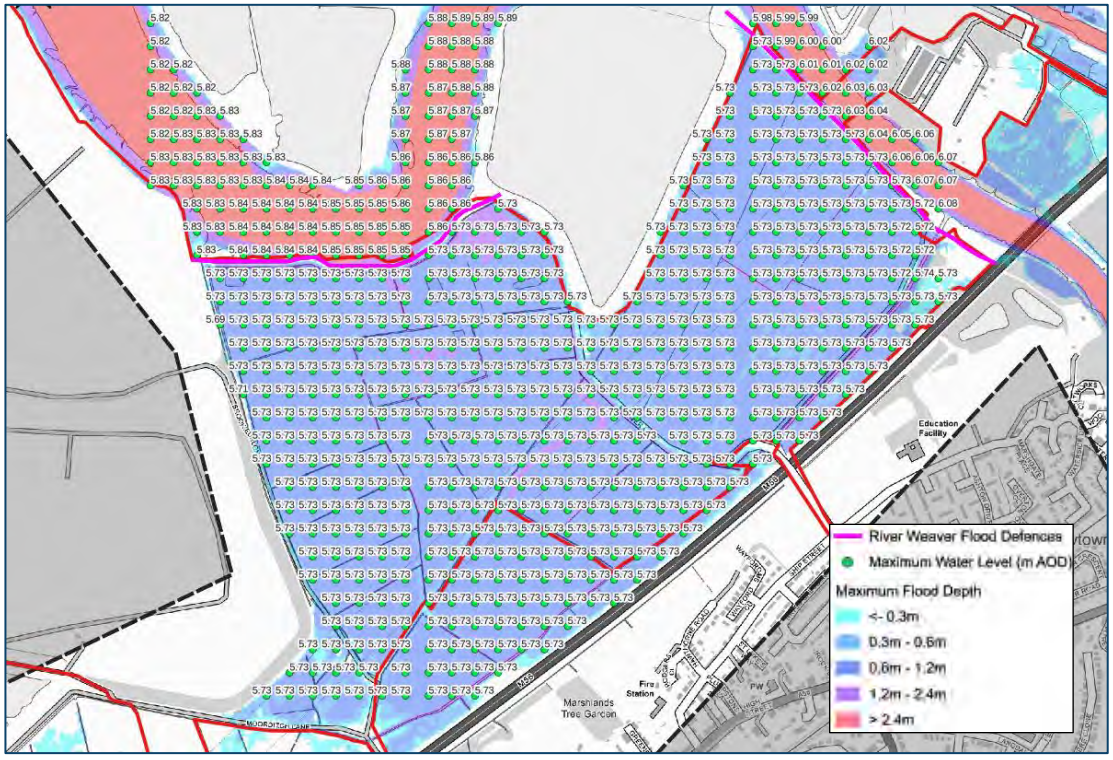


Figure 7 – 1% AEP Fluvial Event + 67% CC- Maximum Water Levels – Defended

Running a credible maximum scenario is required by the EA, so that the resilience of the Site to more severe climate change can be understood. The credible maximum scenario is represented by a 106% CC allowance. As shown in Figure 8, during the 1% AEP plus 106% CC event, the maximum water level is estimated at 6.07m AOD. Flood depths during this event vary from 1.07m to 1.47m.

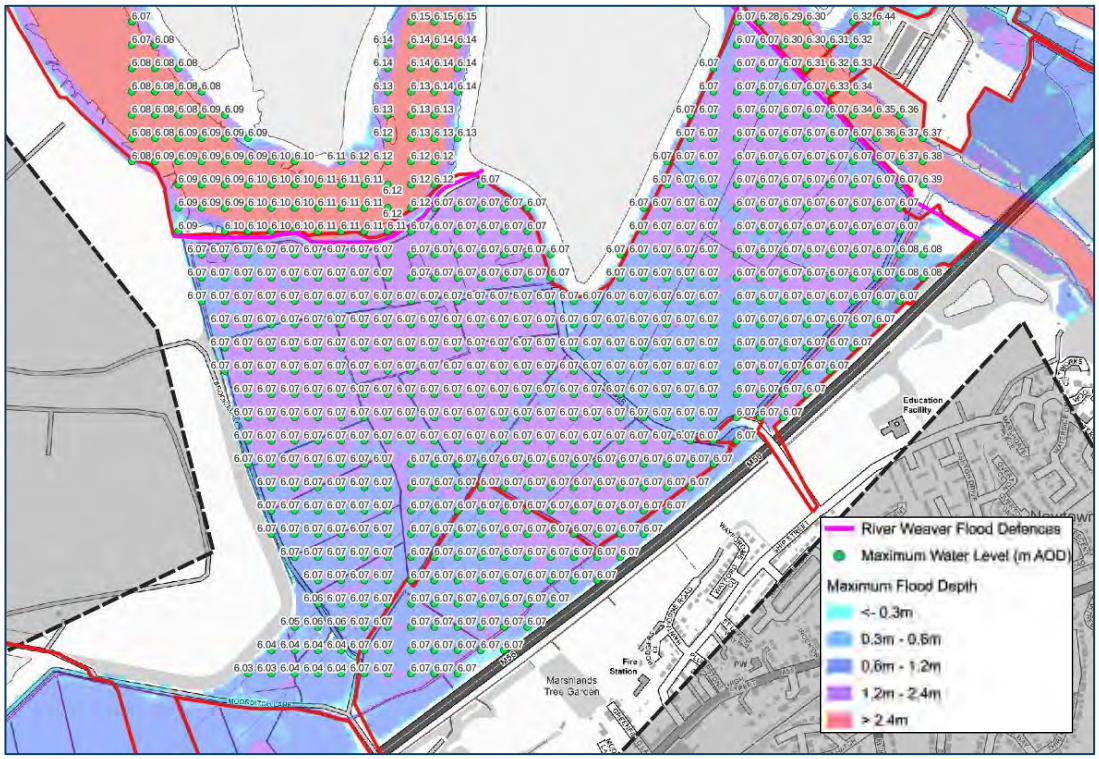


Figure 8 – 1% AEP Fluvial Event + 106% CC- Maximum Water Levels – Defended

A joint probability scenario, combining the 1% (1 in 100) plus 67% CC fluvial scenario with the 0.5% AEP plus upper end sea level rise (year 2075), has also been assessed. As shown in Figure 9, a maximum water level of 6.32m AOD is estimated during this event in the northern extent of the Site. Water levels are generally 6.28m AOD across the eastern extent of the Site.

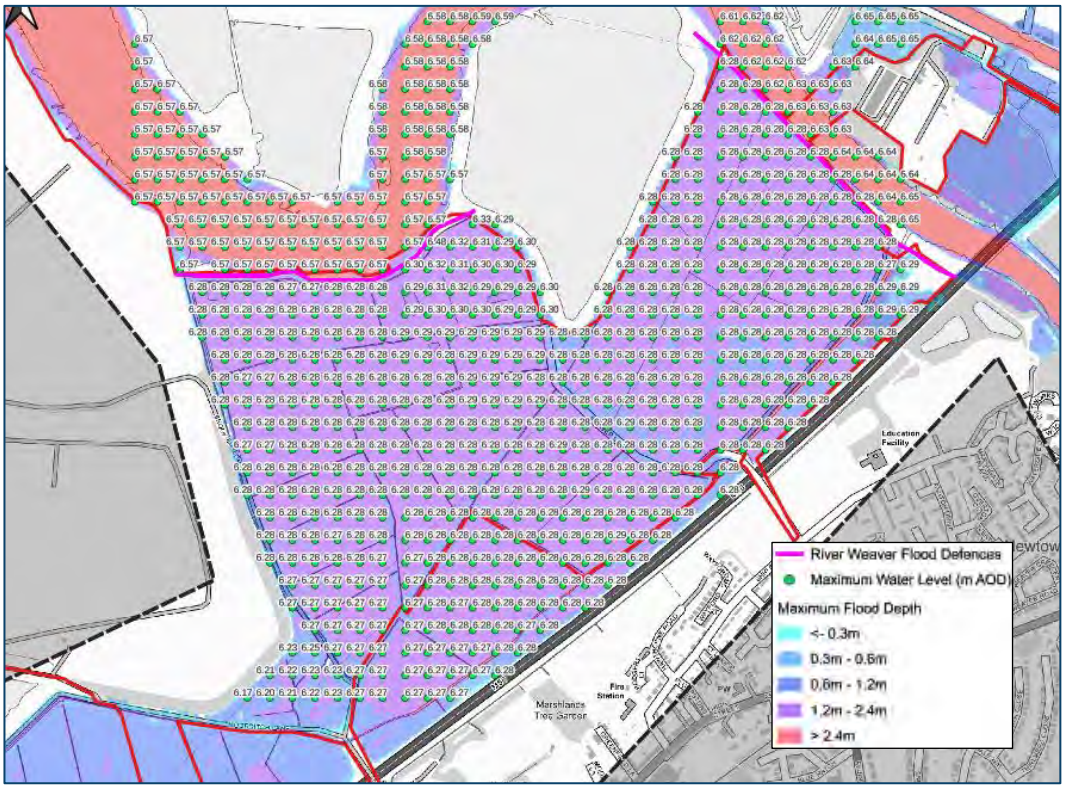


Figure 9 – Joint Probability 1% AEP plus 67% CC Fluvial Event with 0.5% AEP Upper End CC (year 2075) Tidal Event – Maximum Water Levels – Defended

Breach Scenario

As agreed with the EA, 2no. breach locations have been assessed for the Lower Weaver. Breach location 1 has been set up by lowering a 50m section of flood defence in the River Weaver flood defences along the northern boundary of the Site. The breached flood defence levels have been set to between 5.28m AOD and 5m AOD based on LiDAR levels adjacent to the breach location.

Breach location 2 has been set up by lowering a 50m section of flood defence in the River Weaver flood defences along the eastern boundary of the Site. The breached flood defence levels have been set to between 4.9m AOD and 5m AOD based on LiDAR levels adjacent to the breach location.

Breach 1

As shown in Figure 10, during the 1% AEP plus 67% CC breach event, maximum water levels reach up to 5.8m AOD in the eastern extent of the SADA. Flood depths generally vary from 0.79m to 1.19m.

Figure 10 – 1% AEP plus 67% CC Fluvial Event– Maximum Water Levels – Breach 1

As shown in Figure 11, during the 1% AEP plus 106% CC breach event, a maximum water level of 6.08m AOD is estimated in the eastern extent of the SADA. Flood depths generally vary from 1.08m to 1.48m.

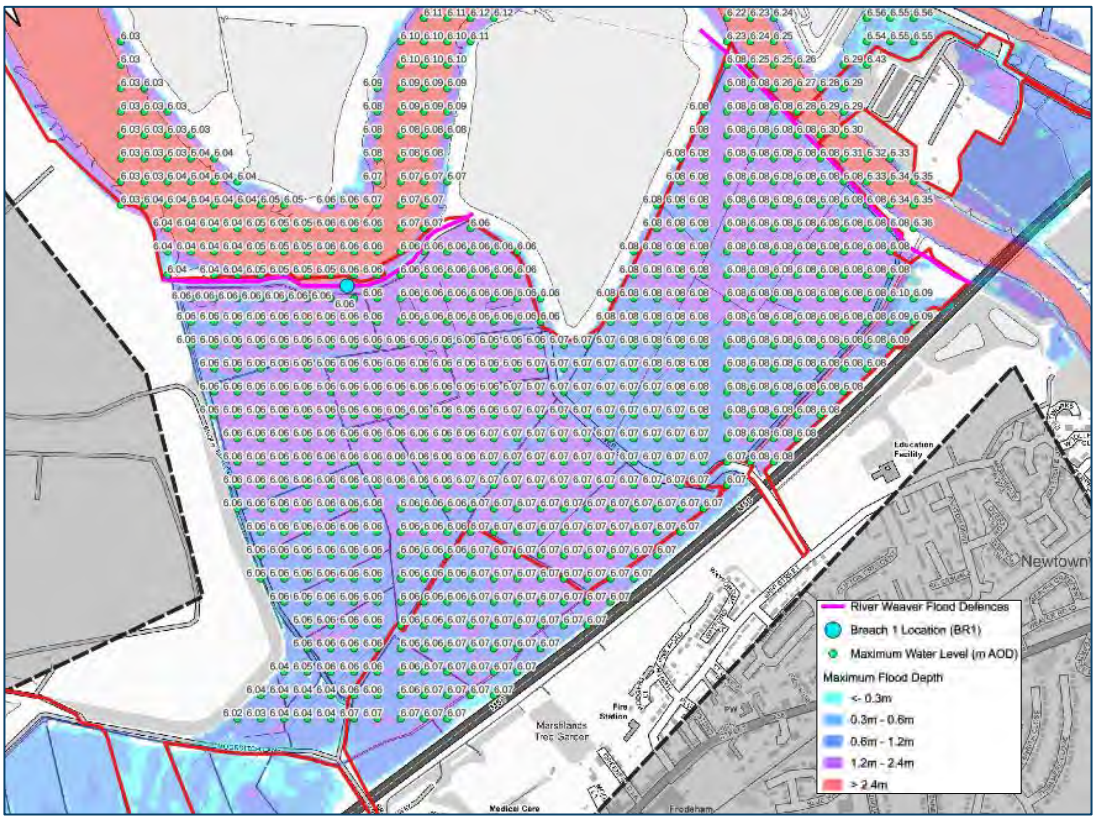


Figure 11 – 1% AEP plus 106% CC Fluvial Event– Maximum Water Levels – Breach 1

As shown in Figure 12, during the joint probability 1% AEP plus 67% CC fluvial event coinciding with the 0.5% AEP plus upper end sea level rise (year 2075) tidal event a maximum water level of 6.49m AOD is estimated.

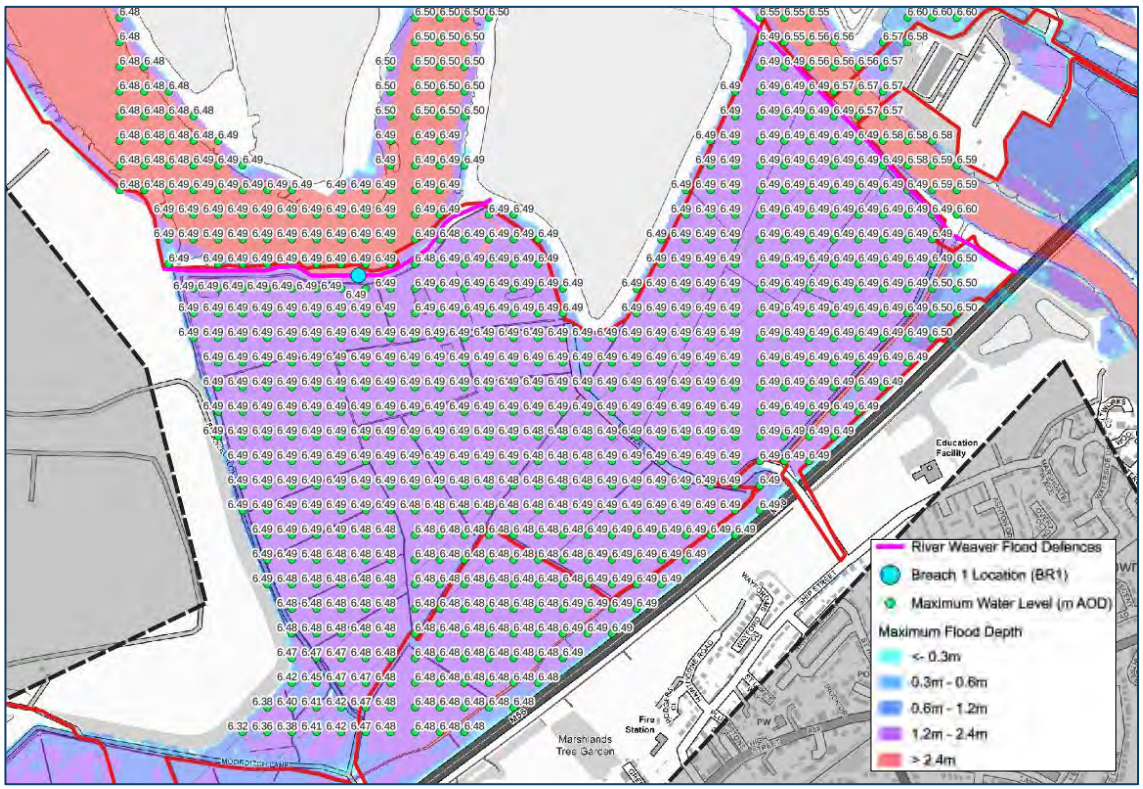


Figure 12 – Joint Probability 1% AEP plus 67% CC Fluvial Event with 0.5% AEP Upper End CC (year 2075) Tidal Event – Maximum Water Levels – Breach 1

Breach 2

As shown in Figure 13, during the 1% AEP plus 67% CC breach event, maximum water levels reach 5.95m AOD. Flood depths vary from 0.96m to 1.36m.

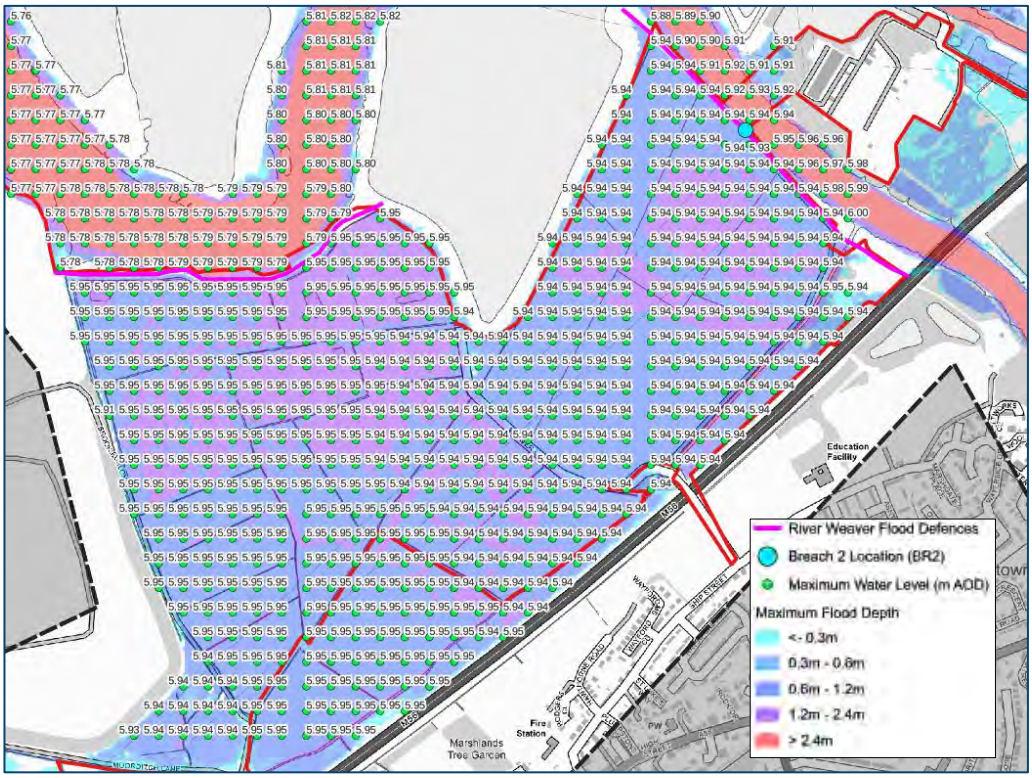


Figure 13 – 1% AEP plus 67% CC Fluvial Event – Maximum Water Levels – Breach 2

As shown in Figure 14, when accounting for 106% CC on the 1% AEP fluvial breach event, a maximum water level of 6.23m AOD is estimated. Flood depths generally vary from 1.22m to 1.62m.

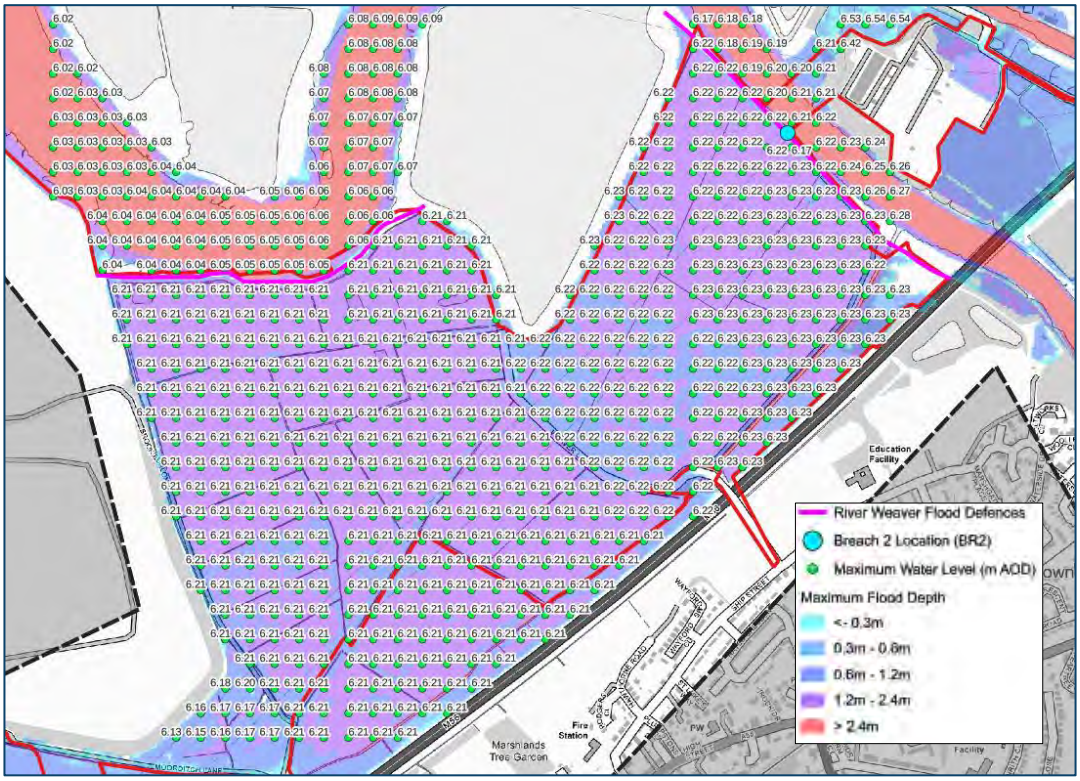


Figure 14 –1% AEP plus 106% CC Fluvial Event– Maximum Water Levels – Breach 2

As shown in Figure 15, during the 1% AEP plus 67% CC fluvial event coinciding with a 0.5% AEP tidal event with CC up to the year 2075, a maximum water level of 6.58m AOD is estimated.

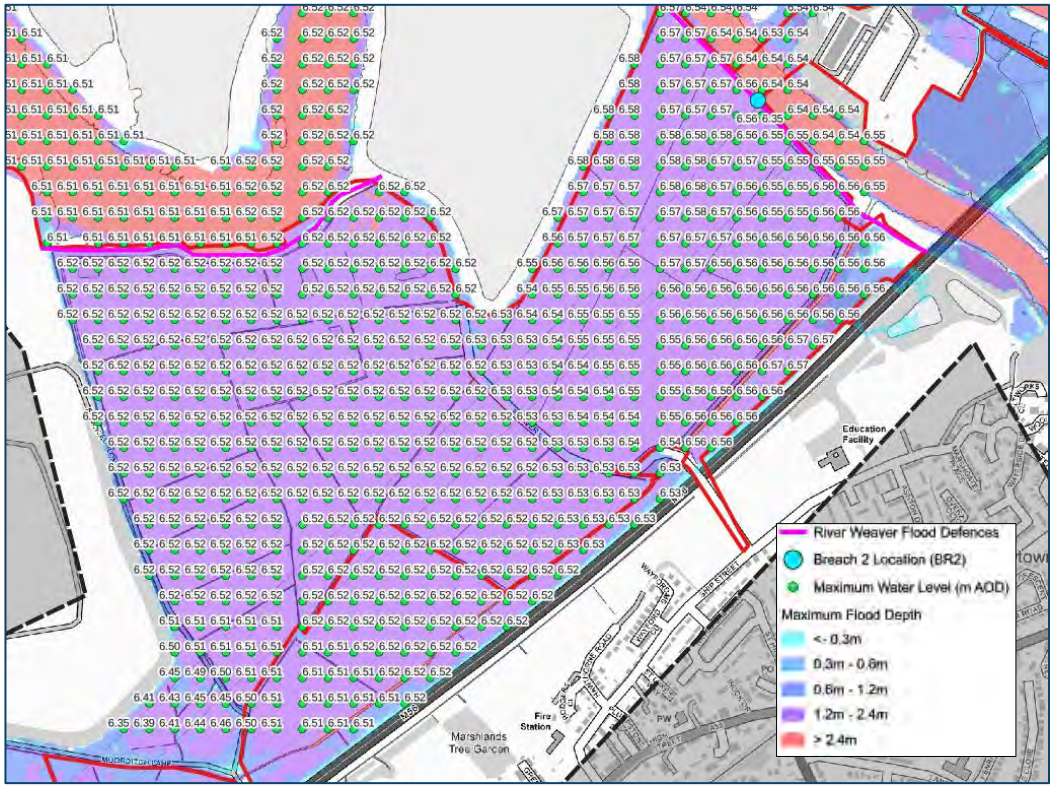


Figure 15 – Joint probability 1% AEP plus 67% CC fluvial event with 0.5% AEP Upper End CC (year 2075) tidal event – Maximum Water Levels – Breach 2 Scenario

It can therefore be concluded that the eastern extent of the SADA is at risk of flooding from the River Weaver during a defended scenario and in the event should the flood defences breach. The western extent of the SADA (including the BESS compound and substation), which is situated at a higher elevation (greater than 8.8m AOD), is flood free during all considered flood events of the River Weaver. The Site access route, up to Pool Lane to the west of the Site, is flood free during all considered fluvial flood events (including both defended and breach scenarios). Flood mapping showing the access route west of the Site is provided in Appendix K.

Manchester Ship Canal

A summary of the maximum in-channel water levels for Manchester Ship Canal for a range of fluvial flood events are provided in Table 4. Modelled nodes 3, 4 & 5 are closest to the Site. The node locations are shown on the EA 'Detailed Flood Map' in Appendix K.

Table 4 – Manchester Ship Canal In-channel Water Levels

		Normal Operation			
Node reference	Grid reference	1% AEP*	1% AEP + CC**	0.5% AEP	0.1% AEP
3	348076, 378116	5.88	6.07	6.04	6.03
4	350491, 379582	5.88	6.07	6.04	6.03
5	349758,380543	5.88	6.08	6.05	6.05

*Annual Exceedance Probability

** Climate Change (30%)

The minimum defence crest level along the northern Site boundary, adjacent to Node 3, is 6.8m AOD. A comparison of flood levels in Table 4 with the minimum defence crest level shows that the Site is flood free during all considered events. No flood defences are present in the north-western extent of Site, however, by comparing the minimum Site level in this location (10m AOD) with the flood levels, the Site is shown to be flood free.

The EA have also provided flood levels for a 'Gate Closed' scenario. These scenarios represent the gates at Latchford being partially or fully closed. The water levels at the node locations adjacent to the Site remain unchanged during the gate closed scenario.

It can therefore be concluded that the risk of flooding from the Manchester Ship Canal is very low. The EA have confirmed that no further assessment for the Manchester Ship Canal is necessary as the flood levels are significantly below the defence crest levels.

Mersey Estuary

As per EA correspondence (Appendix F), the flood events (including climate change uplifts) detailed in Table 5 have been agreed with the EA to assess tidal flood risk from the Mersey Estuary. On the basis that the operational lifetime of the development is 40 years, which is controlled via Requirement 19 of the draft DCO, a climate change uplift to the year 2075 is proposed. As set out in the ES, the development is anticipated to be operational by 2030, this would mean the Site was decommissioned in 2070. An additional five years, to 2075, has been considered to account for potential delays in commencing construction, thereby providing a conservative assessment of the development design life.

Table 5 – Mersey Estuary Model Simulations

Watercourse / Source	Scenario	Event (% AEP)
Mersey Tidal	Defended	0.5% AEP (year 2024)
		0.1% AEP (year 2024)
		0.5% AEP Higher Central CC to the year 2075
		0.5% AEP Upper End CC to the year 2075
		0.5% AEP H++ Scenario (+1.9m of sea level rise)
	Breach (of the Mersey defences only)	0.5% AEP (year 2024)
		0.1% AEP (year 2024)
		0.5% AEP Higher Central CC to the year 2075
		0.5% AEP Upper End CC to the year 2075
		0.5% AEP H++ Scenario (+1.9m of sea level rise)

Defended Scenario

During the 0.5% AEP (year 2024) tidal event (and in more extreme scenarios), floodwaters are shown to overtop the flood defences of the Mersey and subsequently the River Weaver defences along the northern boundary of the Site.

As shown in Figure 16, during the present day 0.5% AEP event, the centre of the SADA is estimated to flood. Flood depths during this event range from 50mm-350mm. The access route is flood free.

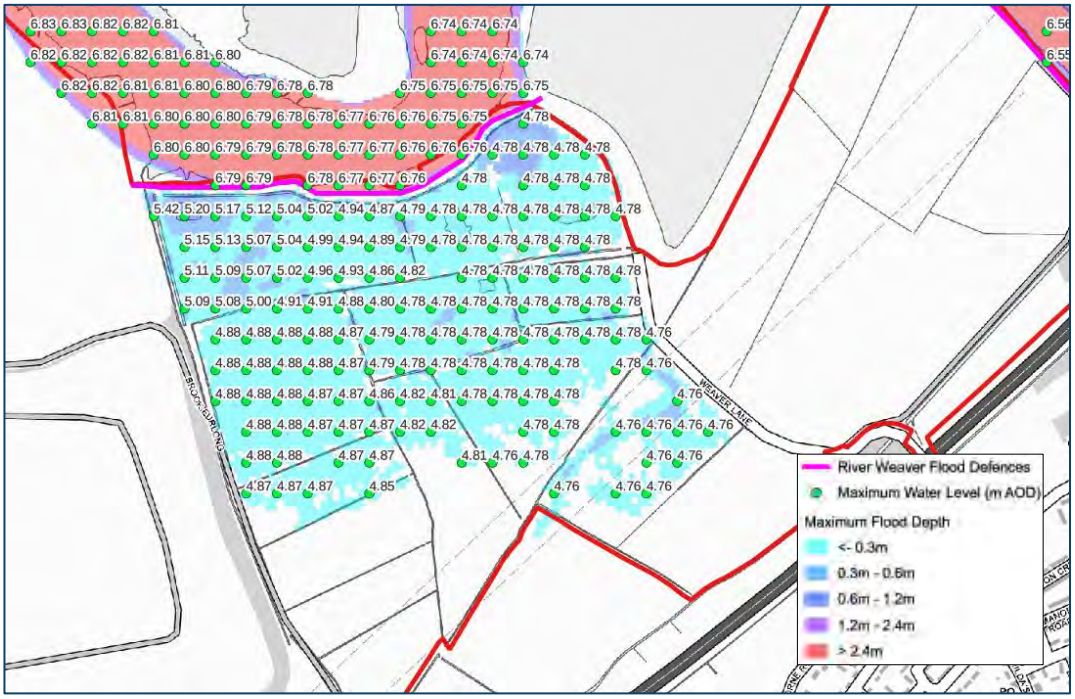


Figure 16 – 0.5% AEP Tidal Event - Maximum Water Levels – Defended

As shown in Figure 17, during the 0.1% AEP present day event, the flood extent increases to cover the eastern extent of the SADA. Flood depths are in the region of 300-800mm. A maximum water level of 5.54m AOD is

estimated.

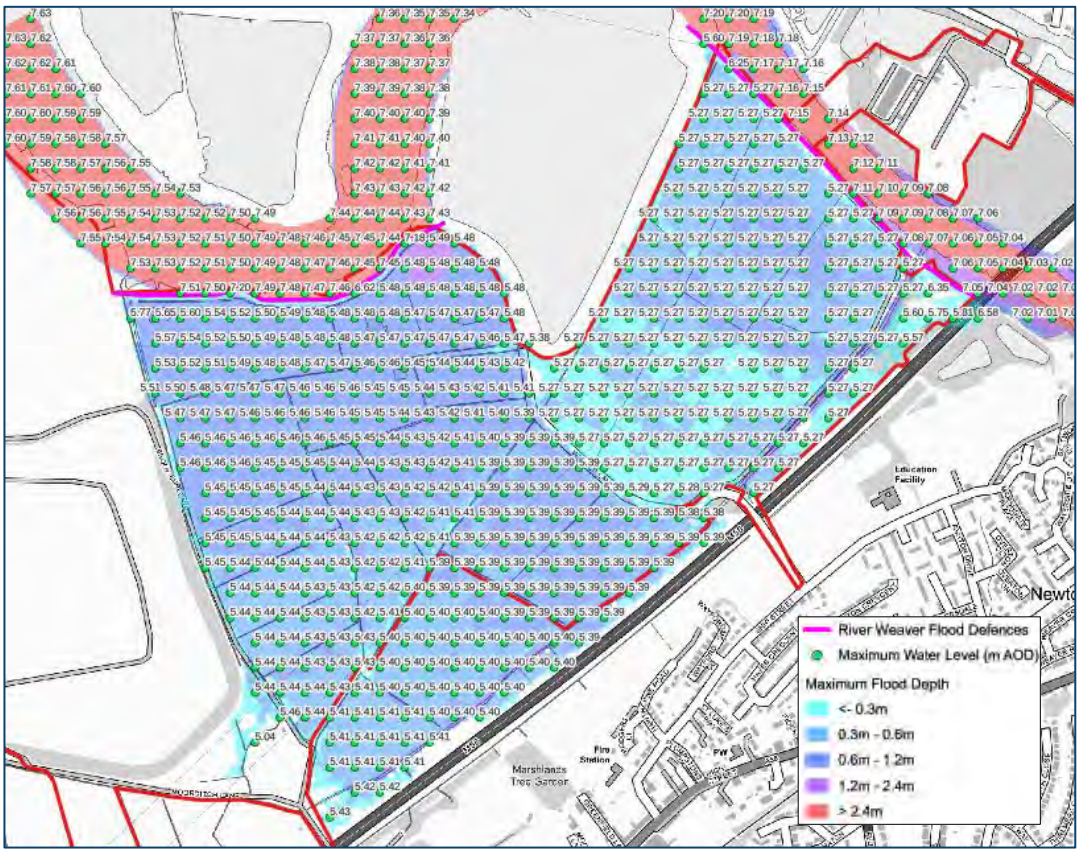


Figure 17 – 0.1% AEP Tidal Event - Maximum Water Levels – Defended

During the 0.5% AEP event with higher central CC up to the year 2075, the Site is estimated to flood with water levels generally in the region of 5.43m AOD to 5.57m AOD. Water levels increase to a maximum of 5.73m AOD in the northernmost extent of the Site, directly adjacent to the River Weaver defences.

As shown in Figure 18, during the 0.5% AEP event with upper end CC up to the year 2075, the Site is estimated to flood with water levels generally in the region of 5.88m AOD to 5.89m AOD. Water levels increase to a maximum of 5.96m AOD in the northernmost extent of the Site, directly adjacent to the River Weaver defences. The maximum water level in the location of proposed infrastructure (panels) is 5.89m AOD.

Figure 18 – 0.5% AEP Year 2075 Upper End defended Event – Tidal Mersey

A H++ climate change scenario (+1.9m sea level rise allowance) has also been considered to provide sensitivity scenario modelling. During this event, a maximum water level of 8.57m AOD is estimated, and flood depths across the Site reach up to 3.96m. As agreed with the EA, this scenario is necessary to understand the resilience of the Site to more severe climate change and does not inform design requirements.

Breach Scenario

A breach of the River Mersey defences in a tidal event has been considered. A breach has been applied on the River Mersey defences with the River Weaver defences remaining in place (not breached). The probability of a breach of the River Mersey and River Weaver defences occurring simultaneously is very low. This approach has been agreed with the EA. Figure 19 shows the breach location.

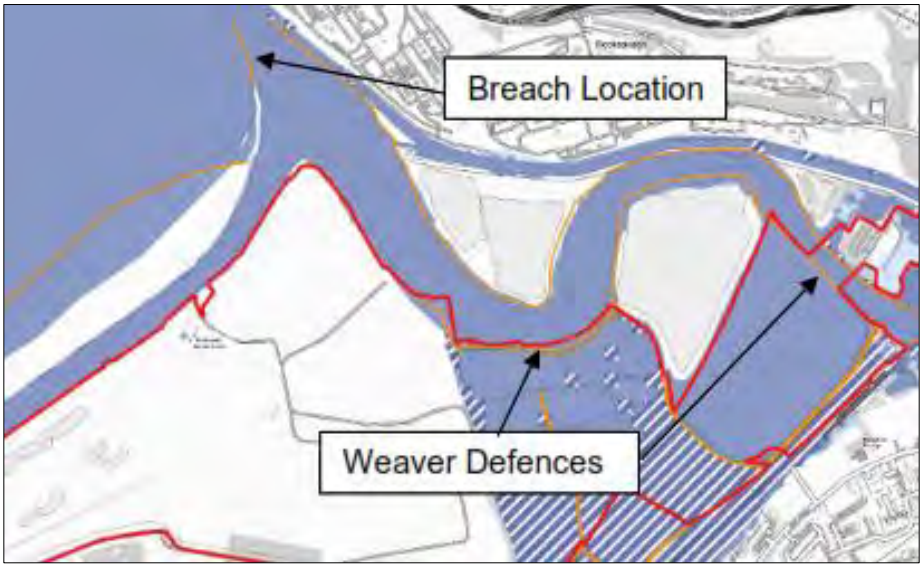


Figure 19 – Mersey Breach Location

As shown in Figure 20, the central section of the SADA is estimated to flood during the 0.5% AEP present day breach event. Flood depths during this event range from 50mm-370mm.

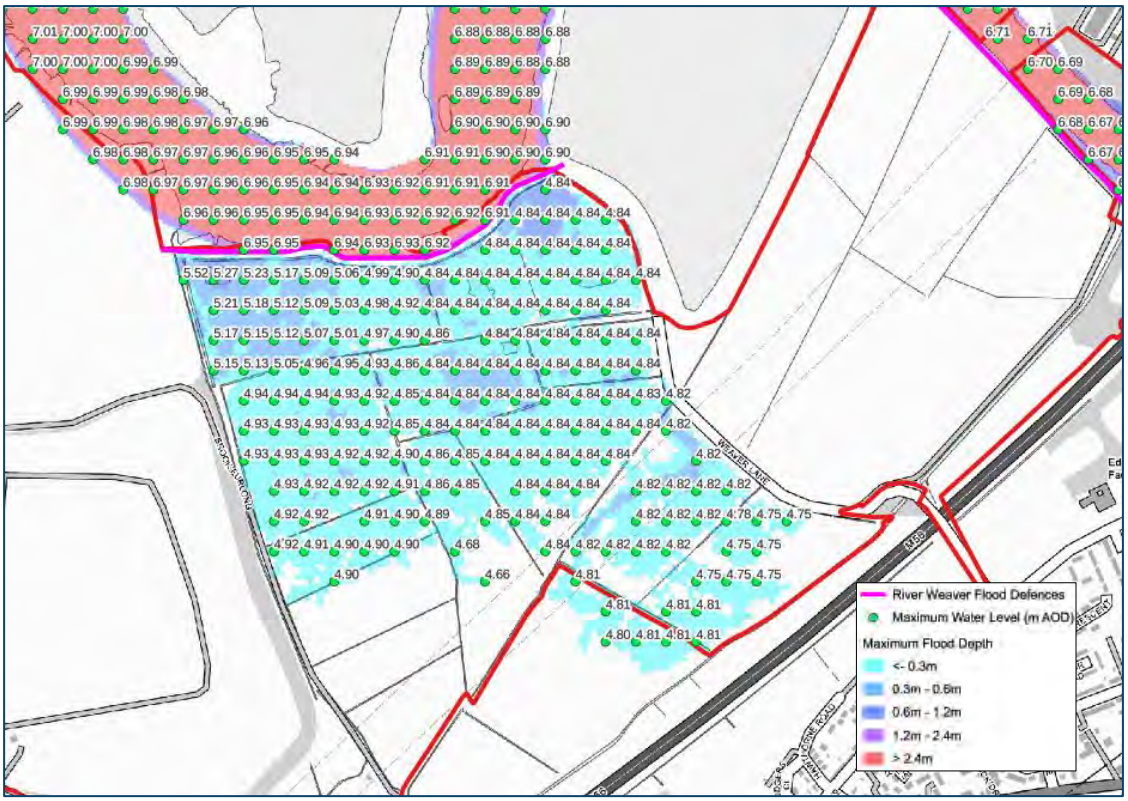


Figure 20 – 0.5% AEP Tidal Event - Maximum Water Levels – Breach

During the 0.5% AEP breach event with higher central CC up to the year 2075, the Site is estimated to flood with water levels up to 5.65m AOD. When accounting for upper end CC to the year 2100, flood levels increase to a maximum of 5.96m AOD. A H++ scenario (+1.9m sea level rise allowance) has also been considered for the breach event. During this event, flood levels and depths remain similar to that of the defended scenario.

This is due to the significant amount of overtopping already occurring.

Figure 21 shows the maximum water levels across the Site during the 0.5% AEP (year 2075) upper end tidal breach event.

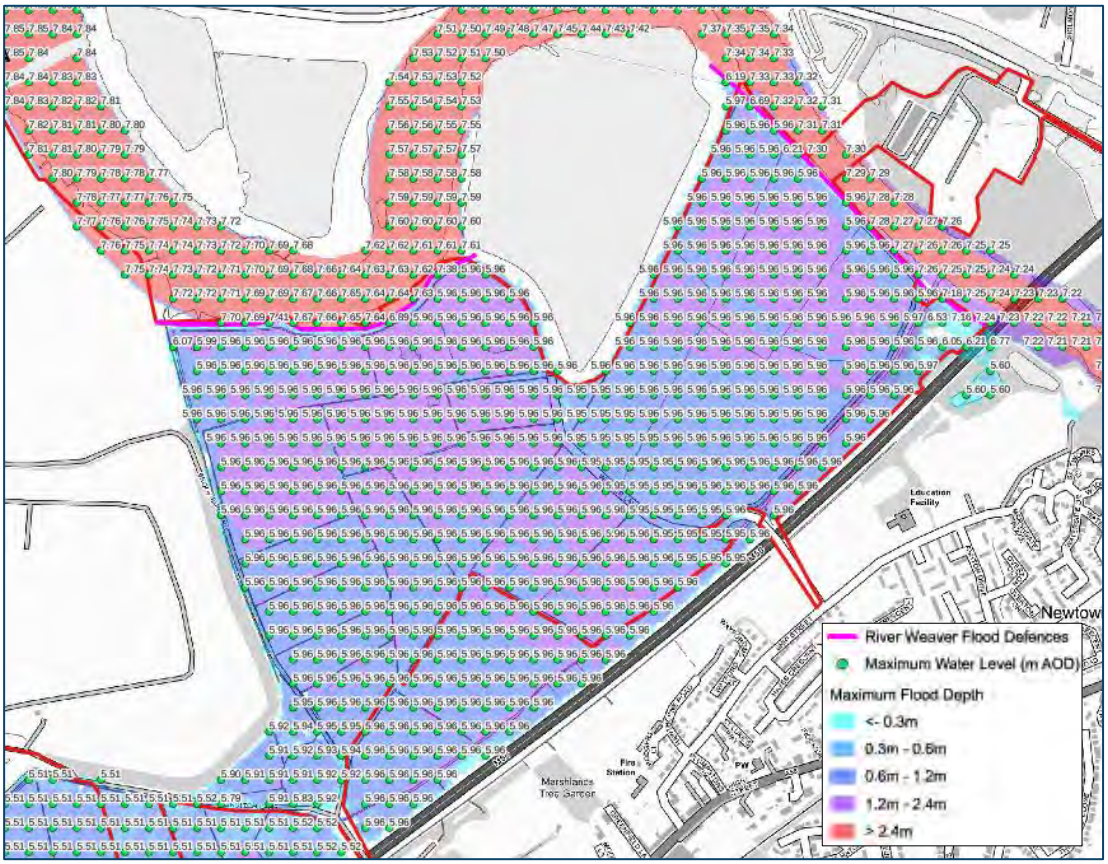


Figure 21 – 0.5% AEP Year 2075 Upper End Breach Event – Tidal Mersey

Summary

It can be concluded that the eastern extent of the SADA is at flood risk of flooding from the River Weaver (fluvial flooding) and River Mersey (tidal flooding). The flooding is exacerbated should the flood defences fail. The western extent of the Site, including the Frodsham Solar Substation and BESS, which is situated at a higher elevation is flood free during all considered flood events.

During the present-day scenario, flood depths during the 1% AEP fluvial and 0.5% AEP tidal events are less than 370mm across the eastern extent of the Site. With climate change applied, flood depths increase and are in the region of 1m (increasing up to 1.5m within topographical low points) during the 0.5% AEP upper end climate change defended tidal event.

The location of the grid connection points to the north of the River Weaver are shown to be flood free during all considered events.

The existing access in the western extent of the Site (Marsh Lane) is flood free during all considered fluvial flood events of the River Weaver. The existing access in the western extent of the Site is at risk of flooding during the tidal Mersey defended and breach flood events with climate change applied to the year 2075. Flood depths during the 0.5% AEP (year 2075) upper end tidal breach event are generally in the region of 150mm and a maximum of 240mm. Flood depths along Marsh Lane in the western extent of the Site during the 0.5% AEP year 2075 upper end tidal breach event are shown in Figure 22. The flood depths along Marsh Lane are shallow (generally less than 200mm) and would be considered passible to vehicles in the event of flooding.

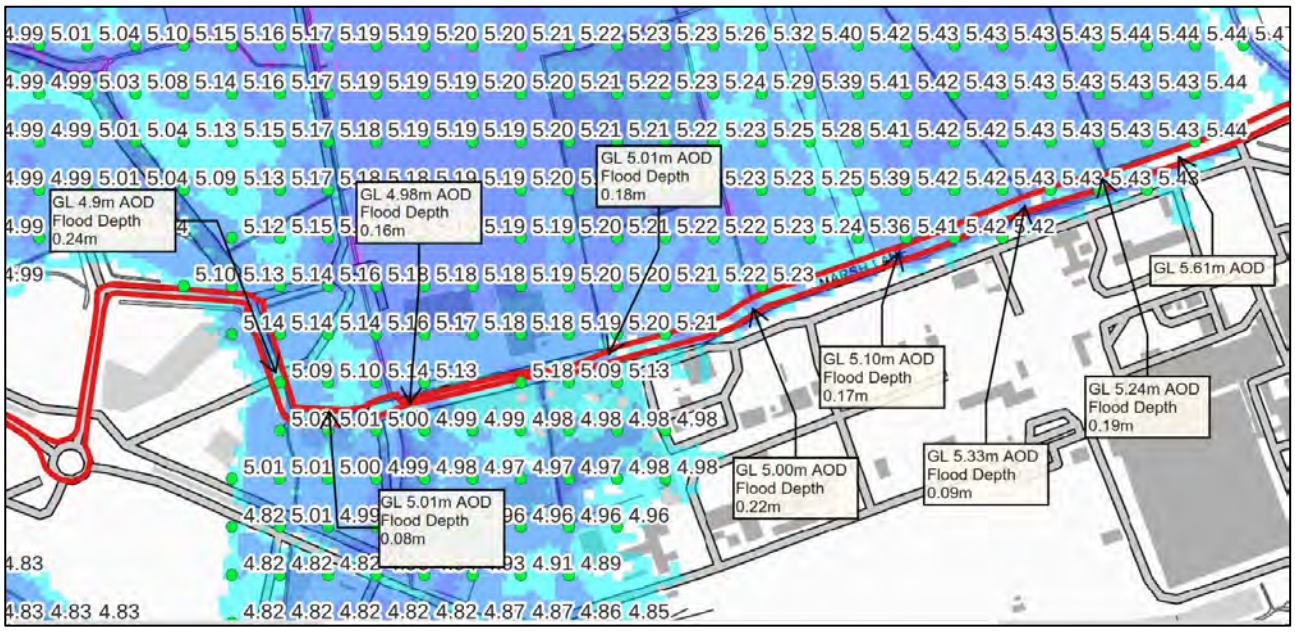


Figure 22 – 0.5% AEP Year 2075 Upper End Breach Event – Tidal Mersey – Marsh Lane Depths

Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The EA 'Flood Risk from Surface Water' map (Appendix F) indicates that the majority of the Site is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding. There are isolated pockets of land across the Site shown to be at high, medium and low risk of surface water flooding. High risk is identified as having greater than 3.3% annual probability of flooding. Medium risk is identified as having between a 3.3% and 1% annual probability of flooding. Low risk of surface water flooding is identified as having between a 1% and 0.1% annual probability of flooding.

The flood risk identified by EA mapping is limited in extent and is associated with surface water ponding within topographical low points on Site. The proposed solar arrays will be elevated above ground levels on supporting structures, with no inverters or equipment susceptible to flood damage located within the surface

water flood extent.

The SFRA 'Historic Surface Water Flooding Incidents' map (Appendix L) indicates that there are no records of surface water flooding at or near the Site. There are no distinct flow routes in this area which would direct any potential surface water flooding towards the Site.

The proposed BESS and Frodsham Solar Substation sites (Options 1 and 2) are outside of the 'high' and 'medium' risk surface water flood extents. The Option 2 Bess and Frodsham Solar Substation is also outside of the 'low' risk surface water flood extent meaning is has a less than 0.1% annual probability of surface water flooding. The easternmost extent of the Option 1 Bess and Frodsham Solar Substation encroaches into the 'low' risk surface water flood extent during the present day and climate change scenarios. EA surface water flood depth mapping (accessed online) shows that during the 'low' risk climate change event, flood depths do not reach up to 200mm.

It can therefore be concluded that the risk of surface water flooding across the majority of the Site is very low. Surface water ponding is identified on Site and is associated with topographical low points.

Sewer

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity. Flooding is mostly applicable to combined and surface water sewers.

There are no public sewers in the immediate vicinity of the Site. There are no records of sewer flooding affecting the Site. The risk of sewer flooding is therefore considered to be very low.

Groundwater

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

There are no records of groundwater flooding at or near to the Site. BGS borehole records indicate that the Site is underlain by firm to stiff clay. The impervious nature of the underlying deposits will limit the vertical migration of groundwater.

The Local Flood Risk Management Strategy states that *'there are no records of historic groundwater flooding that are considered as having significant harmful consequences'.*

It can therefore be concluded that the risk of groundwater flooding is low.

Artificial Sources

The Manchester Ship Canal is located immediately north-west of the Site. The flood risk associated with the Manchester Ship Canal has been considered in the fluvial section above.

The EA 'Flood Risk from Reservoirs' map (Appendix F) shows that when river levels are normal, there is no risk of flooding from reservoirs. The EA mapping shows that when there is also flooding from rivers, the Site

is at risk of flooding from a failure of the Bosley Reservoir (NGR: SJ9220065900), located approximately 42km east of the Site.

The EA state that reservoir flooding is extremely unlikely to happen. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the EA ensure that reservoirs are inspected regularly and essential safety work is carried out.

Summary of Potential Flooding

It can be concluded that fluvial and tidal flooding are the main potential source of flood risk to the Site. The associated risk has been used to inform mitigation design.

7. Mitigation

The eastern extent of the SADA is identified at fluvial flood risk from the River Weaver and tidal flood risk from the River Mersey during both the present day and climate change scenarios.

As agreed with the EA, the design flood event is the 0.5% AEP upper end climate change (year 2075) defended River Mersey tidal flood event. A 600mm freeboard is required above the design flood level.

A flood level of up to 5.89m AOD is estimated in the eastern extent of the SADA during the 0.5% AEP plus Upper End CC (2075) defended tidal flood event.

All panels and other electrical infrastructure susceptible to flooding, including inverters and PCU's, within the eastern half of the SADA will therefore be set at a minimum height of 6.52m AOD. A design level of 6.52m AOD provides 630mm freeboard above the 0.5% AEP plus upper end CC (2075) defended tidal flood level. A design level of 6.52m AOD provides the following freeboard values above a range of considered flood events:

- 790mm above the River Weaver 1% AEP plus 67% CC defended flood level (flood level of 5.73m AOD).
- 450mm above the River Weaver 1% AEP plus 106% CC defended flood level (flood level of 6.07m AOD).
- 200mm above the joint probability 1% AEP plus 67% CC fluvial and 0.5% AEP plus upper end CC (year 2075) tidal defended level (flood level of 6.32m AOD).
- 720mm above the River Weaver 1% AEP plus 67% CC breach 1 flood level (flood level of 5.8m AOD).
- 440mm above the River Weaver 1% AEP plus 106% CC breach 1 flood level (flood level of 6.08m AOD).
- 30mm above the joint probability 1% AEP plus 67% CC fluvial and 0.5% AEP plus upper end CC (year 2075) tidal breach 1 flood level (flood level of 6.49m AOD)

- 570mm above the River Weaver 1% AEP plus 67% CC breach 2 flood level (flood level of 5.95m AOD).
- 290mm above the River Weaver 1% AEP plus 106% CC breach 2 flood level (flood level of 6.23m AOD).
- 870mm above the River Mersey 0.5% AEP higher central CC (year 2075) breach flood level (flood level of 5.65m AOD).
- 560mm above the River Mersey 0.5% AEP upper end CC (year 2075) breach flood level (flood level of 5.96m AOD).

The western extent of the SADA is generally elevated above 10m AOD and is flood free during all considered events and no flood risk mitigation measures are required for development in this part of the Site. The proposed Frodsham Solar Substation and BESS are sequentially located in the higher western extent of the Site and are flood free in all considered fluvial and tidal events.

The easternmost extent of the Option 1 BESS and Frodsham Solar Substation encroaches into the 'low' risk surface water flood extent during the present day and climate change scenarios. EA surface water flood depth mapping (accessed online) shows that during the 'low' risk climate change event, flood depths do not reach up to 200mm. Should the Option 1 Bess and Frodsham Solar Substation be pursued, all equipment susceptible to water damage should be raised a minimum of 300mm above ground levels to provide mitigation against the identified shallow depth surface water flooding.

As detailed in the following sections, the BESS and Frodsham Solar Substation will be served by a drainage system which will accommodate rainfall during all events up to and including the 1 in 100 year plus 45% CC event. As such, the drainage system will prevent flooding within the BESS and Frodsham Solar Substation from rainfall / surface water sources during all events up to and including the 1% AEP plus 45% CC event.

The proposed mitigation measures will ensure that all areas of the Site can remain operational following the design flood event.

8. Impact Elsewhere

The potential impact of the proposed development on flood risk elsewhere has been quantified by comparing the existing and proposed development scenario model simulations.

During a meeting with the EA on 8th November 2024, the EA requested modelling to assess the off-Site impact of the proposed development on flood risk. The EA were in acceptance of the methodology proposed to model the development (DEV) scenario which included a flow constriction approach, blocking out a percentage of model cells based on the estimated flood water volume displacement, and increasing roughness at the location of the solar panels and security fencing. Full details of the proposed development scenario modelling are included within the Waterco Hydraulic Modelling Report (ES Vol 2 Appendix 9-3: Waterco Hydraulic Modelling Report [EN010153/DR/6.2]).

It is noted that minimal ground raising, generally constrained to approaches to watercourse bridge crossings, is proposed as part of the Proposed Development, and will therefore have de minimis effects on the Proposed Development scenario model. Any flood water volume displacement as considered by the hydraulic modelling is as a result of the cumulative footprint of all solar module supporting columns, fence posts, CCTV posts and any other posts / stilts used to raise infrastructure above flood levels. The cumulative footprint of structures within the flood extent is shown in Table 6.

Table 6 – Footprint of Structures Within the Flood Extent

Equipment	Dimensions	Number Within Flood Zone	Footprint Within Flood Extent (m^2)
PCU stilt	0.5x0.5m (0.25m^2)	160	40
Fence posts	0.1x0.1m (0.01m^2)	1715	17.15
CCTV post	0.1x0.1m (0.01m^2)	180	1.8
Module pile (c shape)	1.5x0.6x0.03m (0.027m^2)	48330	1304.91
Overhead line pylon	0.08m^2	18	1.44
			Total: 1,365.3m^2

Mersey Estuary

Model results (Appendix K) show that during the River Mersey defended and breach tidal events, there is negligible change in flood risk off Site when the proposed development scenario is compared with the existing scenario.

River Weaver

During both the defended and breach scenarios, there is no increase in flood risk elsewhere as a result of the proposed development scenario.

As the Proposed Development will not increase flood risk elsewhere, flood compensatory storage is not required.

Access roads will be formed by removing topsoil, organic soils, and filling with engineer fill. The access roads stone surface will be marginally higher than the surrounding ground. The access roads will therefore have negligible impact on flood risk elsewhere.

The access to the EA's pumping station in the eastern extent of the Site (adjacent the River Weaver) will remain unchanged. As such, the development will not impact upon the operation of the EA pumping station.

9. Flood Warnings and Evacuation

Flood alerts and warnings cover this area and given the flood risk at the Site it would be necessary to instigate a formal flood warning and evacuation procedure. Site management would register to receive flood warnings and alerts and this will form part of the operational Site procedures set out in the Outline Construction

Environmental Management Plan [EN010153/DR/7.5] and the Outline Operational Environmental Management Plan [EN010153/DR/7.6]. Flood warnings and flood alerts are a free service that provides prior warning of a flood event.

A Flood Warning & Evacuation Plan has been prepared by Waterco and is included as Appendix M and would be developed for local planning authority approval pursuant to DCO Requirement 12 and 13. The Flood Warning & Evacuation Plan includes full details on how to prepare for and respond to a flood event, and also details information on the time of inundation of flood water for a range of events.

It is expected that there would be 10 full time equivalent (FTE) roles during the Operational Phase covering Site maintenance, management and administrative roles, and land management including landscape maintenance and agriculture. However, the Proposed Development will not be permanently staffed, but would be temporarily occupied during periods when landscape maintenance, equipment servicing and repairs and replacement are being undertaken. There would also be occasional visits by control and administration staff. The Site will also be occupied during construction.

When a flood warning is in place, any construction works would not take place. During the operational phase, maintenance visits would not be undertaken when a flood warning is in force. If Site operatives are on Site upon receipt of flood warning, they will leave the Site immediately ensuring it is secured on leaving. The Site can be operated remotely, and routine maintenance works can be temporarily suspended. Once off-Site, travel routes and public transport schedules should be checked (for any road closures, cancelations etc.) to ensure safe travel to a place of residence.

Where flooding occurs without warning when the Site is staffed, evacuation from the lower eastern extent of the Site would be undertaken via either Brook Furlong or Weaver Lane. The applicable evacuation route depends on the operative's position on Site at the time of flooding.

All inverter / transformer substations which are distributed across the Site have been designed with a floor level above the design flood level. Each inverter / transformer substation therefore provides an area of safe refuge should flooding occur without warning and evacuation is not possible. The elevated western extent of the Site (Frodsham wind farm) also provides a place of refuge.

During the present day fluvial and tidal scenarios, Brook Furlong and Weaver Lane are flood free, as is the Site access off Marsh Lane to the west. As such, it is considered that a flood free safe access / egress route would be available during the construction phase.

10. Sequential and Exception Test

Sequential Test

NPS EN-1 requires that the Sequential Test is applied in respect of new development. The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas at the lowest probability of flooding. The Sequential Test is based on the Environment Agency Flood Zones and information

contained within the SFRA.

The Proposed Development is required to be located in close proximity to the local district network operator's substation, which is located east of the solar array area, on the north bank of the River Weaver and so the consideration of any 'reasonably available' Sites need to be seen in that context. Full consideration of the Sequential Test is set out in the Alternative Site Assessment ES Volume 2 Appendix 3-1: Alternative Site Assessment [EN010153/DR/6.2] and should be read in conjunction with this report.

A sequential approach has been taken within the design of the Site layout with the BESS and substation located within Flood Zone 1.

Exception Test

For the Exception Test to be passed it must be demonstrated that:

A. the development would provide wider sustainability benefits to the community that outweigh flood risk, and

B. the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

With reference to point (a) above, the Proposed Development of a solar farm will provide wider sustainability benefits to the community by generating renewable energy usage, helping the achievement of the UK's net zero targets. EN-1 is clear that NSIP solar developments are a Critical National Priority in order to meet the UK's energy security and net zero ambitions. The proposed solar farm development will also contribute to the Council's Sustainability Statement of Intent by using natural resources sustainably to reduce energy demand. Further information on the need for the Proposed Development, and discussion of this in the context of the Exception Test, is provided in ES Volume 2 ES Volume 2 Appendix 3-1: Alternative Site Assessment [EN010153/DR/6.2] and Section 7.0 of the Planning Statement [EN010153/DR/5.6].

With reference to point (b) above, this Flood Risk Assessment demonstrates that through mitigation design (ensuring all electrical infrastructure is raised 600mm above the design flood level), the Proposed Development will be safe and operational for its lifetime. Detailed hydraulic modelling has shown that the development will not increase flood risk elsewhere.

11.Surface and Foul Water Management Drainage Strategy

All drainage systems will be designed in accordance with the principles of CIRIA C753 publication 'The SuDS Manual' (2015).

The Site currently comprises a mixture of agricultural and drained marsh land, approximately half of which comprises former Manchester Ship Canal Dredging Deposit Grounds. Surface water runoff currently infiltrates into the ground or informally flows into existing watercourses on Site (rainwater runoff). The watercourses in the eastern extent of the Site discharge to the River Weaver via an EA operated pump. The

watercourses in the elevated western extent of the Site discharge to the Manchester Ship Canal.

The proposed solar arrays will not create any significant change to the current surface water drainage regime and the majority of the Site will remain permeable. As vegetation becomes established under the PV Arrays there is likely to be a decrease in surface water runoff rates compared to the baseline scenario, as wildflower grassland provides better infiltration and water retention compared to the previous arable land use.

Surface Water Management from Solar Panels

The proposed ground-mounted solar arrays will be elevated above the ground on steel frames, ensuring the ground beneath each panel remains permeable. The solar arrays will be laid in rows with 'rainwater' gaps between the rows of panels which will allow water to drain to the permeable ground beneath.

Runoff from the panels will result in negligible erosion at the base of each panel due to proposed land use comprising wildflower grassland as well as the flat nature of the Site. The flat nature of the Site would prevent any overland flows from forming.

It is therefore considered that the solar arrays will not result in an increase in the surface water runoff rates and volumes and will not alter the existing greenfield drainage regime. This in accordance with paragraph 2.10.84 of NPS for Renewable Energy (EN-3).

Surface Water Management from Supporting Infrastructure

The proposed PCU platforms will cover a minimal footprint and runoff from these will drain to a stone surround (filter trench or similar). The access tracks and any parking or turning areas will comprise porous stone material. If considered necessary at detailed design stage, filter drains would be provided adjacent to the roads to control any surface water runoff.

The proposed BESS compound and Frodsham Solar Substation compound will be formally drained. Given the impermeability of the underlying strata, it is proposed to discharge surface water from these compounds to an adjacent ordinary watercourse, as shown in Appendix P. Discharge will be made at a limited greenfield runoff rate.

Greenfield runoff rates have been estimated using the ICP SUDS method within MicroDrainage. A summary of the greenfield runoff rates is provided as Appendix N. The 1 in 1 year greenfield rate for the 2.49ha BESS compound area and substation is 10.6 l/s. A discharge rate of 10.6 l/s is therefore proposed.

In order to achieve a discharge rate of 10.6 l/s, attenuation storage will be required. Attenuation will be provided within the sub-grade of the compound's lined stone surfacing. An attenuation storage estimate has been provided using MicroDrainage software and is included as Appendix O.

An estimated storage volume of 2,201m³ will be required to accommodate the 1 in 100 year plus 45% CC event. The storage estimate is based on a discharge rate of 10.6 l/s, storage within a sub-grade structure, an impermeable drainage area of 2.49ha and hydro-brake flow control.

Based on a compound area of 24,910m^2 and a void ratio of 30% (applicable to stone aggregate), a sub-grade

depth of 295mm will be sufficient to provide the 2,201m^3 of storage required to accommodate the 1 in 100 year plus 45% CC event.

Perforated pipes will be laid within the stone sub-grade as to direct water towards the flow control device.

A concept drainage sketch detailing the proposed surface water discharge location for the Frodsham Solar Substation compound drainage system is included in Appendix P. Requirement 10 of the draft DCO sets out that full details of the surface water drainage strategy (which must be substantially in accordance with this section of the Flood Risk Assessment and Drainage Strategy) must be approved by CWACC in consultation with the Lead Local Flood Authority.

Exceedance Flows

The proposed drainage system of the BESS and Frodsham Solar Substation compound will be designed to accommodate the 1 in 100 year plus 45% CC event. Storm events in excess of the 1 in 100 year plus 45% CC event will be permitted to produce shallow depth flooding within the BESS and substation compound. Any above ground flooding resulting from a drainage system exceedance event will be contained within the BESS and substation compound through consideration of the boundary treatment i.e. a raised kerb or earth bunding.

Overland Flows

As shown on the Location Plan (Appendix A), watercourses or raised flood defences form the boundaries of the SADA. The Site is flat which would prevent any significant overland flows from forming. In the unlikely event of overland flows occurring during extreme rainfall events, overland flow would be intercepted by the watercourses on the boundaries of the SADA, or contained on Site by raised ground (flood defences) and would not be directed off-Site. The existing runoff / overland flow regime will therefore not change.

Surface Water Treatment

In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), other roofs (applicable to the containers accommodating the battery units, PCUs and buildings within the Frodsham Solar Substation compound) have a 'low' pollution hazard level, with low traffic roads (applicable to the access roads and permeable surfacing within the proposed BESS compound and substation) also classified as having a 'low' pollution hazard level. Table 7 shows the pollution hazard indices for each land use.

Table 7 – Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Other Roofs	Low	0.3	0.2	0.05
Low Traffic Roads	Low	0.5	0.4	0.4

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2

* Indices values range from 0-1.

The access roads, BESS compound and substation will be formed from permeable stone surfacing. Table 8 demonstrates that permeable surfacing will provide sufficient treatment.

Table 8 – SuDS Mitigation Indices

	Mitigation Indices		
Type of SuDS	**Total Suspended Solids (TSS)**	**Metals**	**Hydrocarbons**
Permeable Surfaces	0.7	0.6	0.7

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.3

Fire Water Management

The implementation of the BESS introduces the potential risk of contaminated fire water runoff. To mitigate this risk, the following measures will be implemented:

- An internal fire suppression system (sprinklers) will be built into the interior of each battery container unit.
- A designated drain (gully) on the concrete slab beneath each battery container unit will direct the fire water into a designated piped drain. The piped drain will discharge to a lined fire water lagoon within the BESS compound.
- A shut off valve will be placed on the fire water lagoon outfall and will be automated (set in the off position when fire water sprinklers are activated). This will prevent discharge of fire water to the wider water environment. An outfall from the fire water lagoon to the Sites drainage system is required to ensure the lagoon does not fill up with rainwater (ensuring the lagoon is empty and ready to accommodate fire water).
- Following a fire, contaminated flows will be collected from the fire water lagoon and transported by tanker to an appropriate treatment facility or would be or treated on Site and reused as firewater provision. The lagoon and drainage system would be cleaned before the valve from the firewater lagoon is reopened.
- The base of the permeable stone surfacing in the BESS will be lined with an impermeable geotextile as a precautionary measure to prevent firewater polluting shallow / perched groundwater.

The proposed fire water management system will ensure fire water is dealt with by a designated system and separated from the Sites surface water drainage system.

Foul Water Drainage

Domestic foul water generated during the construction and operational phases will be tankered off Site to an appropriate wastewater treatment plant. No connection to the local sewer network is proposed.

12.Maintenance

Maintenance of drainage features such as permeable surfacing will be the responsibility of the Applicant. A maintenance schedule for permeable surfacing is included in Appendix Q. The area beneath the solar panels will be grassland once operational which will reduce erosion. Substantial grass covering throughout the year will be maintained, with a maintenance plan put in place to include semi-frequent inspections of grassed areas. Re-seeding will take place where appropriate to maintain grass cover.

13.Other Considerations

Maintenance Access

Maintenance access to the Main Rivers, Ordinary Watercourses and flood defences on Site will be retained. Maintenance access will be secured by providing the following buffer strips:

- 8m from ordinary watercourses and main rivers within the Site (as agreed with the EA, see correspondence dated 4th October 2024 in Appendix F).
- 16m from the River Weaver and its associated flood defences.

Access Crossings

New or replacement access road crossings over watercourses will be required. Plans identifying the watercourse crossing locations are provided in Appendix R. 3no. Main River crossings are proposed (plan reference CP17, CP14 and CP22). Multiple other crossing points are proposed over ordinary watercourses. Crossings CP14 and CP22 over EA Main Rivers are existing culverted crossings which will be replaced by open span bridge structures.

The new crossings will be in the form of an open span bridge structure which will not impact on the channel capacity.

The proposed bridge soffit levels over EA Main Rivers will be set 600mm above the 1% AEP plus 67% CC in-channel water level. The proposed access bridge soffit levels for crossings over EA Main Rivers are included in Table 9.

Table 9 -Proposed Access Bridge Soffit Levels

Access Bridge	Proposed Soffit Level including 600mm freeboard (m AOD)
CP14	5.34
CP17	
CP22	5.36

A detailed Technical Note providing justification for the design of watercourse access crossings is provided in Appendix S.

Permits & Consents

A Flood Risk Activity Permit is normally required from the EA for any works within 8m of a designated Main River, or 16m of a tidal river (Weaver) / tidal flood defence.

Under Section 23 of the Land Drainage Act 1991, an Ordinary Watercourse Consent is normally required for any works which obstruct or alter the flow of an ordinary watercourse.

Consent is also required to erect a culvert, however no culverts are proposed as part of the development (all watercourse crossings will be formed from open span structures).

It is proposed that the requirement for a Flood Risk Activity Permit and Ordinary Watercourse Consent is disapplied under the provision of Section 150 of the Planning Act 2008, through the DCO, with the regimes replaced with Protective Provisions for the benefit of the EA and LLFA included in the DCO.

14.Conclusions

The Proposed Development is for a solar PV array with associated access tracks, substation and battery energy storage system (BESS). The proposed development also includes the associated infrastructure for connection to the local electricity distribution network, as well as a private wire electricity connection to nearby businesses that would utilise the renewable energy by the proposed development.

The Proposed Development includes an ecological mitigation area which is being designed to mitigate effects on non-breeding birds, for which the Mersey Estuary Special Protection Area (SPA) is designated for. This area is located to the west of the SADA and is referred to as the Non-Breeding Bird Mitigation Area (NBBMA).

Flood Risk

The Environment Agency 'Flood Map for Planning' (March 2025 update) shows that the western extent of the Site is located within Flood Zone 1, an area outside of the extreme flood extent, considered to have a less than 0.1% annual probability of flooding. The eastern extent of the Site is located within Flood Zone 3a – an area considered to be at flood risk with a 1% or greater annual probability of flooding from rivers and/or a 0.5% or greater annual probability of flooding from the sea. The Site is in an area which benefits from the protection offered by flood defences.

The main potential sources of flooding to the Site are fluvial flooding from the River Weaver and tidal flooding from the River Mersey. Existing flood models from the EA have been updated by Waterco to understand the potential impact of flooding from the River Weaver and the River Mersey.

As agreed with the EA, the design flood event is the 0.5% AEP upper end climate change (year 2075) defended River Mersey tidal flood event. A 600mm freeboard is required above the design flood level.

A flood level of up to 5.89m AOD is estimated in the eastern extent of the SADA during the 0.5% AEP plus Upper End CC (2075) defended tidal flood event. All panels and other infrastructure including inverters will be set at a minimum height of 6.52m AOD. A design level of 6.52m AOD provides 630mm freeboard above the 0.5% AEP plus upper end CC (2075) defended tidal flood level. A design level of 6.52m AOD also provides freeboard above tidal breach events and all considered fluvial (River Weaver) flood events (including defence breach).

The proposed mitigation measures will ensure that the development can remain operational during and following a flood event.

The proposed Frodsham Solar Substation and BESS are sequentially located in the higher western extent of the Site and are flood free in all considered fluvial and tidal flood events.

Flood warnings cover this Site. When a flood warning is in place, any construction works would not take place. During the operational phase, maintenance visits would not be undertaken when a flood warning is in force. If Site operatives are on Site upon receipt of flood warning, they will leave the Site immediately ensuring it is secured on leaving. The Site can be operated remotely, and routine maintenance works can be temporarily suspended. Where flooding occurs without warning when the Site is staffed, evacuation from the lower eastern extent of the Site would be undertaken via either Brook Furlong or Weaver Lane.

All inverter / transformer substations which are distributed across the Site have been designed with a floor level above the design flood level. Each inverter / transformer substation therefore provides an area of safe refuge should flooding occur without warning and evacuation is not possible. The elevated western extent of the Site (Frodsham wind farm) also provides a place of refuge.

A Flood Warning & Evacuation Plan has been prepared by Waterco and includes full details on how to prepare for and respond to a flood event, and also details information on the time of inundation of flood water for a range of events.

Detailed hydraulic modelling has confirmed that the proposed development will not increase flood risk elsewhere (any impact is localised within the Site). It is noted that no ground raising is proposed as part of the development. Any flood water volume displacement as considered by the hydraulic modelling is as a result of the cumulative footprint of all solar module supporting columns, fence posts, CCTV posts and any other posts / stilts used to raise infrastructure above flood levels.

All access crossings over watercourses on Site will be formed from open span bridge structures and will not reduce the capacity of the watercourse channels. The watercourse crossings will therefore have negligible impact on flood risk.

Drainage

The proposed ground-mounted solar arrays will not significantly alter the existing surface water drainage regime. Runoff from the ground-mounted solar arrays will continue to infiltrate into the permeable ground below. Surface water runoff from the proposed Frodsham Solar Substation and BESS will discharge to an adjacent watercourse at a limited greenfield discharge rate. Attenuation will be provided in the sub-grade of the compound's stone surfacing and will be sized to accommodate the 1 in 100 year plus 45% CC event.

The access tracks and any parking or turning areas will comprise porous stone material. If considered necessary at detailed design stage, filter drains would be provided adjacent to the roads to control any surface water runoff.

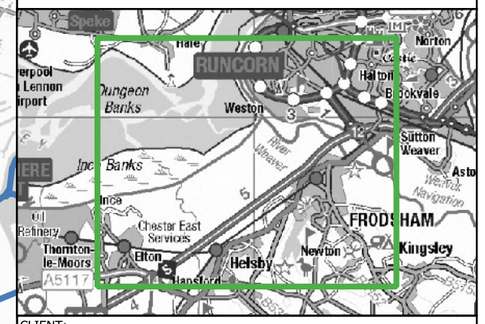
The implementation of the BESS introduces the potential risk of contaminated fire water runoff. A designated fire water management system is proposed to separate contaminated fire water from the surface water drainage system of the BESS compound and substation. Fire water will be managed within the BESS compound and substation and will not be released to the wider water environment.

Appendix A Location Plan & Aerial Image

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Land Not Within Site Boundary
- Watercourses
- Waterbodies



CLIENT:
Frodsham Solar Ltd

waterco
www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
Location Plan

PLOT STATUS:	DATE:
FINAL	30-04-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:30000

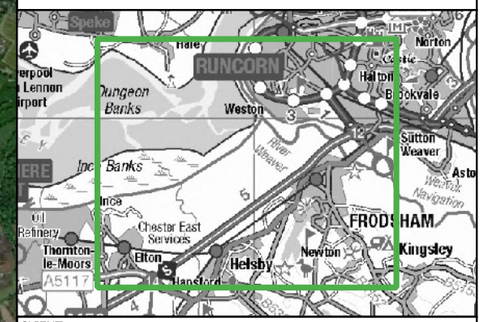
PLOT NAME:	REVISION:
14740_Location_Plan	-

0 600 1,200 1,800 2,400 3,000 m

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Land Not Within Site Boundary



CLIENT:
Frodsham Solar Ltd

waterco
www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
Aerial Plan

PLOT STATUS:	DATE:
FINAL	30-04-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:30000

PLOT NAME:	REVISION:
14740_Aerial_Plan	-

Appendix B Topographical Information

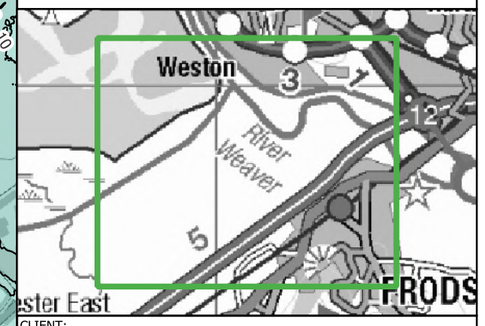
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Land Not Within Site Boundary
- Site Levels (m AOD)

Ground Elevations (m AOD)

- <= 0
- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- > 40



0 500 1,000 1,500 2,000 m

CLIENT:
Frodsham Solar Ltd

waterco
www.waterco.co.uk

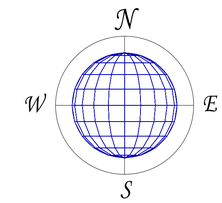
SCHEME:
Frodsham Solar

PLOT TITLE:
LiDAR Plan
1m Resolution
Data from Environment Agency

PLOT STATUS:			DATE:
FINAL			30-04-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
IH	AP	LS	1:15000

PLOT NAME:	REVISION:
14740_LiDAR_Plan	-

Site Grid North



Symbols/Abbreviations (Where Applicable):

+ AV:	AIR VALVE
+ BB:	BELISHA BEACON
⊕ BH:	BOREHOLE
▽ BM:	BENCHMARK
○ BOL:	BOLLARD
○ B/S:	BUS STOP
+ CAM:	CAMERA
+ CS:	CABLE STAY
◘ CATV:	C.A.T.V INSPECTION CHAMBER
+ CBOX:	ELECTRICITY BOX, CABLE BOX, ETC.
◇ CCTV:	C.C.T.V CAMERA
+ C.PIT:	CATCH PIT
□ EC:	ELECTRICITY COVER
○ EP:	ELECTRICITY POLE
+ ER:	EARTH ROD
+ FH:	FIRE HYDRANT
○ FP:	FLAG POLE
▣ G:	GULLY
○ G:	GULLY (ROUND)
+ GV:	GAS VALVE
□ IC:	INSPECTION COVER (SQUARE)
○ IC:	INSPECTION COVER (ROUND)
+ IL:	INVERT LEVEL
+ KO:	KERB OUTLET
+ LB:	LETTER BOX
○ LC:	LIGHTING COLUMN
○ LP:	LAMP POST
○ LP/BS:	LAMP POST/BUS STOP
□ MH:	MANHOLE (SQUARE)
○ MH:	MANHOLE (ROUND)
+ MKR:	MARKER
○ P:	POST
+ RE:	RODDING EYE
+ R/S:	ROAD SIGN
+ S/P:	SIGN POST
+ SNP:	STREET NAME PLATE
+ ST:	STOP TAP
+ SV:	STOP VALVE
+ TCB:	TELEPHONE CALL BOX
+ TL:	TRAFFIC LIGHT
○ TP:	TELEGRAPH POLE
○ TP/EP:	TELEGRAPH POLE/ELECTRIC POLE
+ T/IC:	TELECOM INSPECTION COVER
+ WO:	WATER OUTLET
+ WM:	WATER METER
	GATE
×	DEFINED POINT
△	CONTROL POINT
	TREE (CONIFEROUS)
	TREE (DECIDUOUS)
	FOLIAGE
	HEDGE

DPC 99.99m DAMP PROOF COURSE LEVEL
EL 99.99m EAVES LEVEL
FL 99.99m FLOOR LEVEL
RL 99.99m RIDGE LEVEL
SL 99.99m SOFFIT LEVEL
TL 99.99m THRESHOLD LEVEL

FENCE DESCRIPTIONS:

B/W:	BARBED WIRE FENCE
C/B:	CLOSE BOARDED FENCE
C/L:	CHAIN LINK FENCE
C/P:	CHESTNUT PALING FENCE
CONC/P:	CONCRETE PANEL FENCE
I/R:	IRON RAILING FENCE
P/R:	POST AND RAIL FENCE
P/W:	POST AND WIRE FENCE
P/C:	POST AND CHAIN FENCE
S/PAL:	STEEL PALISADE FENCE
S/B:	SAFETY BARRIER
T/PAL:	TIMBER PALISADE FENCE

SITE LAYOUT:

Revision Information

Rev	Date	Description
A	9/12/22	Levels in fields added (taken from drone & GPS)

INFORMATION

1) Ordnance Survey co-ordinates and level are derived from OSTN15 and OSGM15, transformed from WGS84.

2) Only services located during the site survey are shown on this plan. Further investigation may be required to ascertain the full extent of the site services.

3) Copyright of this drawing remains the property of PM Surveys UK Ltd. Do not scale from this drawing. In the event of any discrepancy, refer query to PM Surveys UK Ltd.

NOTES

PM SURVEYS UK

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Client Info
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Tel:
Email: alardeur@peellandp.co.uk

Project
Land East of Frodsham Windfarm

Project No PMS22250	Sheet A0	Surveyed By	PD HBB TW
	Scale 1:500	Drawn By	JW
		Approved By	PM
Dwg PMS22250-01A		Issued	05/12/22

Appendix C BGS Borehole Logs and Location Plan

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Land Not Within Site Boundary
- BGS Historical Borehole Record

SJ57NW155
SJ57NW63
SJ57NW72
SJ57NW70
SJ47NE23
SJ57NW41
SJ57NW42
SJ57NW17/C
SJ57NW15/I
SJ57NW17/B
SJ57NW316
SJ57NW15/H
SJ57NW154
SJ57NW17/A
SJ57NW15/G
SJ57NW15/F
SJ47NE5
SJ57NW15/E
SJ57NW15/D
SJ57NW112
SJ47NE92

Weaver Navigation
Weston
Rocksavage
Clifton
River Weaver
Frodsham Marsh Farm
Newtown
FRODSHAM
Marsh Green
Overton
Netherton

0 500 1,000 1,500 2,000 m

CLIENT:	Frodsham Solar Ltd
	www.waterco.co.uk
SCHEME:	Frodsham Solar
PLOT TITLE:	Historical BGS Borehole Location Plan Data from British Geological Survey (BGS)
PLOT STATUS: FINAL	DATE: 30-04-2025
DRAWN: MJW / CHECKED: AP / APPROVED: LS	PLOT SCALE AT A3: 1:15000
PLOT NAME: 14740_BGS_Borehole_Location_Plan	REVISION: -

Window Sampler Hole Log

Soil Mechanics

Drilled RT Logged DAS Checked NH	Start 23/03/2010 End 23/03/2010	Equipment, Methods and Remarks Competitor 130 Hand Dug Inspection Pit to 1.20m. Windowless Sampling to 4.70m	Depth from / to / Diameter / Casing Depth	Ground Level +5.12 mOD Coordinates E 351697.81 National Grid N 378684.98 Chainage

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Grass onto dark brown slightly sandy CLAY. Sand is fine to coarse. (TOPSOIL)	0.20 +4.92		
Soft to firm orange brown mottled grey slightly sandy silty CLAY.	(2.10)		
Soft black slightly sandy clayey SILT. Sand is fine to medium.	2.30 +2.82		
	(2.40)		
4.50 m Brown lenses becoming sandy			
EXPLORATORY HOLE ENDS AT 4.70 m	4.70 +0.42		SP

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	2.80	-	-

Depth Related Remarks * From / to (m)

Chiselling Depths (m) / Time / Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project: Ince Marshes
Project No.: F0604-10
Carried out for: Entec UK Ltd

Borehole DP6
Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled RT Logged DAS Checked NH	Start 23/03/2010 End 23/03/2010	Equipment, Methods and Remarks Competitor 130 Hand Dug Inspection Pit to 1.20m. Windowless Sampling to 4.00m	Depth from / to / Diameter / Casing Depth	Ground Level +4.68 mOD Coordinates E 351096.05 National Grid N 378754.64 Chainage

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Grass onto soft brown slightly sandy CLAY. Sand is fine to medium. (TOPSOIL)	(0.30) 0.30 +4.38		
Firm to stiff grey mottled orange slightly sandy silty CLAY. Sand is fine and medium.	(2.70)		
Dark grey silty fine and medium SAND. 3.60 m Becoming clayey.	3.00 +1.68 (1.00)		
EXPLORATORY HOLE ENDS AT 4.00 m	4.00 +0.68		SP

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	1.20	-	-

Depth Related Remarks
From / to (m)

Chiselling
Depths (m) / Time / Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project: Ince Marshes
Project No.: F0604-10
Carried out for: Entec UK Ltd

Borehole: DP8
Sheet 1 of 1

Appendix D UU Sewer Plan

United Utilities
Water for the North West

[redacted]

Waterco Ltd
Waterco Ltd., Lon Parcwr
Ruthin,
LL15 1NJ

FAO:

How to contact us:

United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

Your Ref: Frodsham DCO Site
Our Ref: UUPS-ORD-440732
Date: 19/10/2022

Dear Sirs

Location: Frodsham

I acknowledge with thanks your request dated 18/10/2022 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. http://www.unitedutilities.com/work-near-asset.aspx .

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please contact us .

Yours Faithfully,

[redacted]

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP

Water for the North West

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5609		FO		100			VC	14.20486	
5803		FO		150			VC	8.43585	
5701	8.92	FO	5.84	375			VC	70.66515	1 in 228
3722		FO		100			VC	13.04521	
3706		FO	0	150			VC	14.01998	
3711		CO		100			VC	40.04392	
3724		CO		150			VC	7.164462	
3801		FO	0	150			VC	65.45002	
3810		FO		150			VC	12.29659	
2502		FO	0	300			VC	46.67237	
3504	11	SW	9	300			VC	25.19176	1 in 51
2802		FO	0	225			VC	17.57057	
2804		FO	0	225			VC	4.960748	
2703		FO	0	525			VC	4.606973	
9602		CO	0	825			CO	90.33146	
9602		FO	0	825			CO	90.33146	
1701		FO	0	825			CO	88.68379	
1706		FO	0	300			VC	38.46999	
2606	8.29	FO	6.49	300			VC	31.99076	1 in 44
5503		FO		100			VC	9.221305	
2608	8.55	SW	7.41	150			VC	18.27494	1 in 141
2604	8.45	FO	6.55	300			VC	19.16367	1 in 319
5002	5.54	OV	4.32	600			CO	100.2451	1 in 132
4715		FO		100			VC	7.392374	
3602	9.07	FO	6.11	225			VC	75.58701	
3806		FO		150			VC	9.127151	
3505	11.28	SW	9.61	300			VC	21.05529	1 in 35
3601	9.87	FO	6.54	225			VC	75.03185	1 in 153
4602		FO		150			VC	16.11696	
3604		FO		150			VC	20.68856	
2801	6.3	FO	5.07	225			VC	26.17624	
3609		FO		150			VC	16.52928	
0701		FO	0	825			CO	91.14423	
1702	6.23	FO	4.58	825			CO	49.28206	
1709		CO		100			VC	7.525078	
1703	6.32	FO	4.63	750			CO	7.609185	
1802	6.36	FO	4.91	225			VC	27.08744	1 in 143
2813		FO		225			VC	18.29765	
1705	6.32	FO	0	825			CO	5.857551	
2501		FO	0	300			VC	75.71774	
2601	7.67	FO	6.05	300			VC	22.01085	
2706		FO		150			VC	18.46855	
3501	10.12	FO	0	300			VC	22.96575	
3501	10.12	FO	7.35	300			VC	32.12695	
2605	9.36	FO	6.81	300			VC	33.57264	1 in 129
2609	8.08	SW	7.28	225			VC	16.94958	
5813		FO		100			VC	9.671432	
4716		FO		100			VC	2.83041	
4714		FO		100			VC	8.786653	
4710		FO		150			VC	23.12665	
5812		FO		150			VC	3.466064	
5602	9.99	FO	9.08	225			VC	106.678	1 in 35
3703		FO	0	150			VC	12.80248	
3704		FO	0	150			VC	9.980081	
4702	7.7	FO	5.35	450			VC	25.32203	1 in 7
4701		FO	0	300			VC	5.566359	
3718		FO		100			VC	21.01167	
3816		FO		150			VC	8.765599	
3802		FO	0	150			VC	19.96502	
3803		SW	0	150			VC	30.82368	
3503	10.48	SW	8.51	300			VC	19.79734	1 in 24
3818		FO		150			VC	1.361994	
3804		SW	0	150			VC	25.1101	
3717		FO		100			VC	3.57296	
2701	6.76	FO	0	525			VC	65.04765	
2811		FO		100			VC	5.2248	
3701		FO	0	525			VC	92.79592	
1712		CO		100			VC	14.95358	
1704	6.32	FO	0	825			CO	4.507605	
2607		FO	0	300			VC	53.92633	
2503		SW	0	300			VC	128.7925	
2602		FO	0	300			VC	34.34456	
2613		FO		150			VC	9.965567	
2610	9.13	SW	7.78	150			VC	14.14365	1 in 38
3811		FO		150			VC	9.502913	
4704	8.22	FO	5.46	450			VC	23.11703	1 in 330
3725		CO		150			VC	13.37344	
3705		SW	0	150			VC	51.9594	
2401	13.98	FO	12.58	300			VC	65.8687	
3502		FO	0	300			VC	28.59952	
2504	9.28	SW	7.68	300			VC	26.45662	
3618		FO		150			VC	5.068946	
3610		FO		150			VC	5.450648	
2803		FO	0	225			VC	16.05879	
2805	6.32	SW	5.42	375			VC	13.74158	
2807		FO	0	225			VC	33.82488	
2808		FO		100			VC	2.144567	
2702		FO		100			VC	11.78185	
3707		FO	0	525			CO	41.47945	
3708		FO	0	150			VC	9.145327	
3710		FO	0	150			VC	6.599735	
3709		FO	0	150			VC	6.674916	
1601	7.25	SW	6.25	375			VC	8.819818	
2603	8.2	FO	5.73	300			VC	127.3428	1 in 153
							VC	46.7978	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned	Foul	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

All point assets follow the standard colour convention:

red - combined blue - surface water

brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Frodsham,

OS sheet Number: SJ5177NW

Scale: 1:1250 **Date:** 19/10/2022

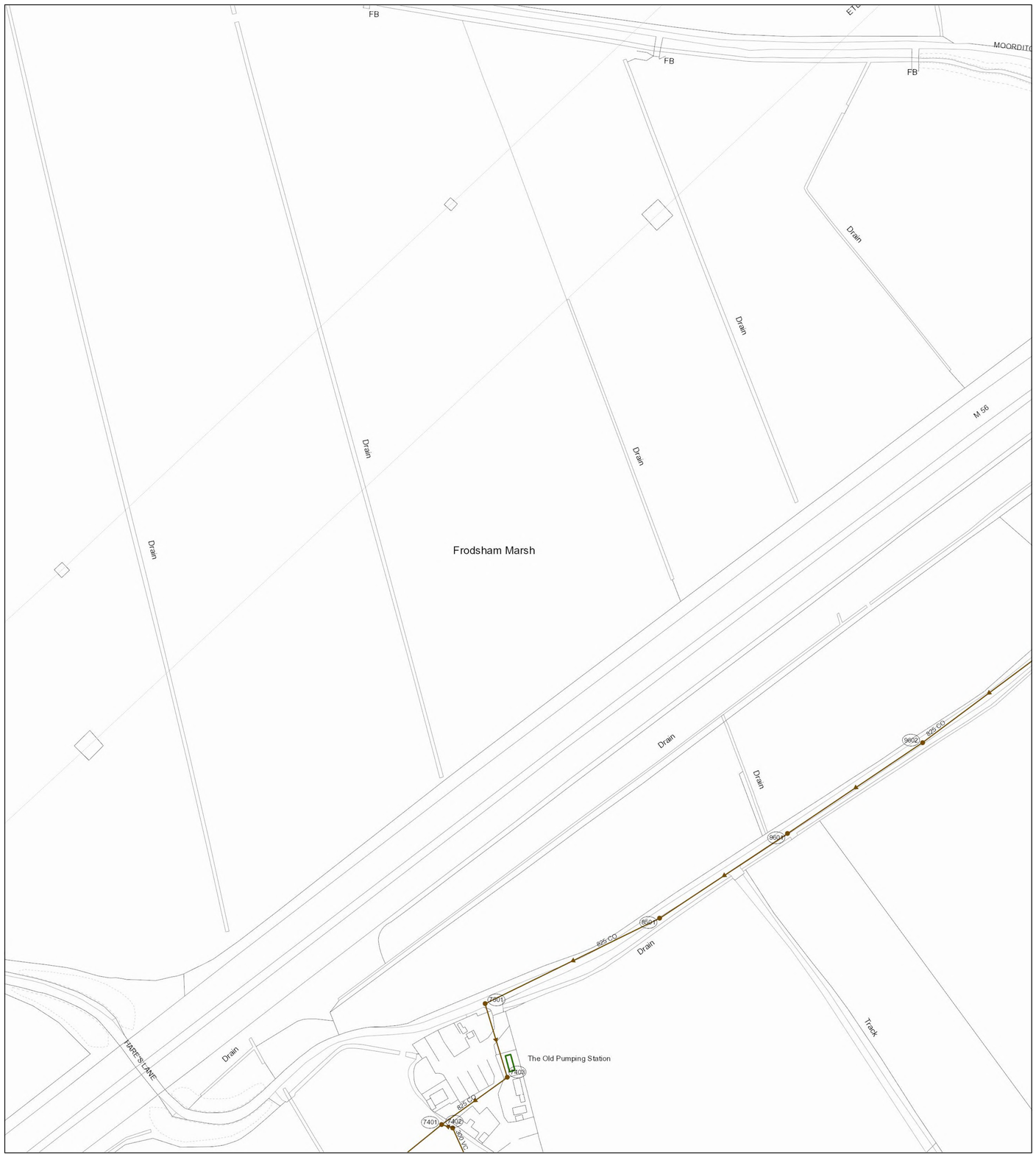
Nodes: 95

Sheet: 1 of 5

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
9602		FO	0	825			CO	90.33146	
9602		FO	0	825			CO	90.33146	
0701		FO	0	825			CO	91.14423	
7402		FO	0	300			VC	6.391189	
7501	5.56	FO	4.16	825			CO	42.7268	
7401		FO	0	825			CO	68.88691	
7403		FO	0	825			CO	44.78925	
8501	5.82	FO	4.24	825			CO	107.8091	1 in 1797
9601		FO	0	825			CO	85.06628	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned	Foul	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

All point assets follow the standard colour convention:

red - combined blue - surface water

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- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
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PSC	Plastic / Steel Composite
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DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Frodsham,

OS sheet Number: SJ5077NE

Scale: 1:1250 **Date:** 19/10/2022

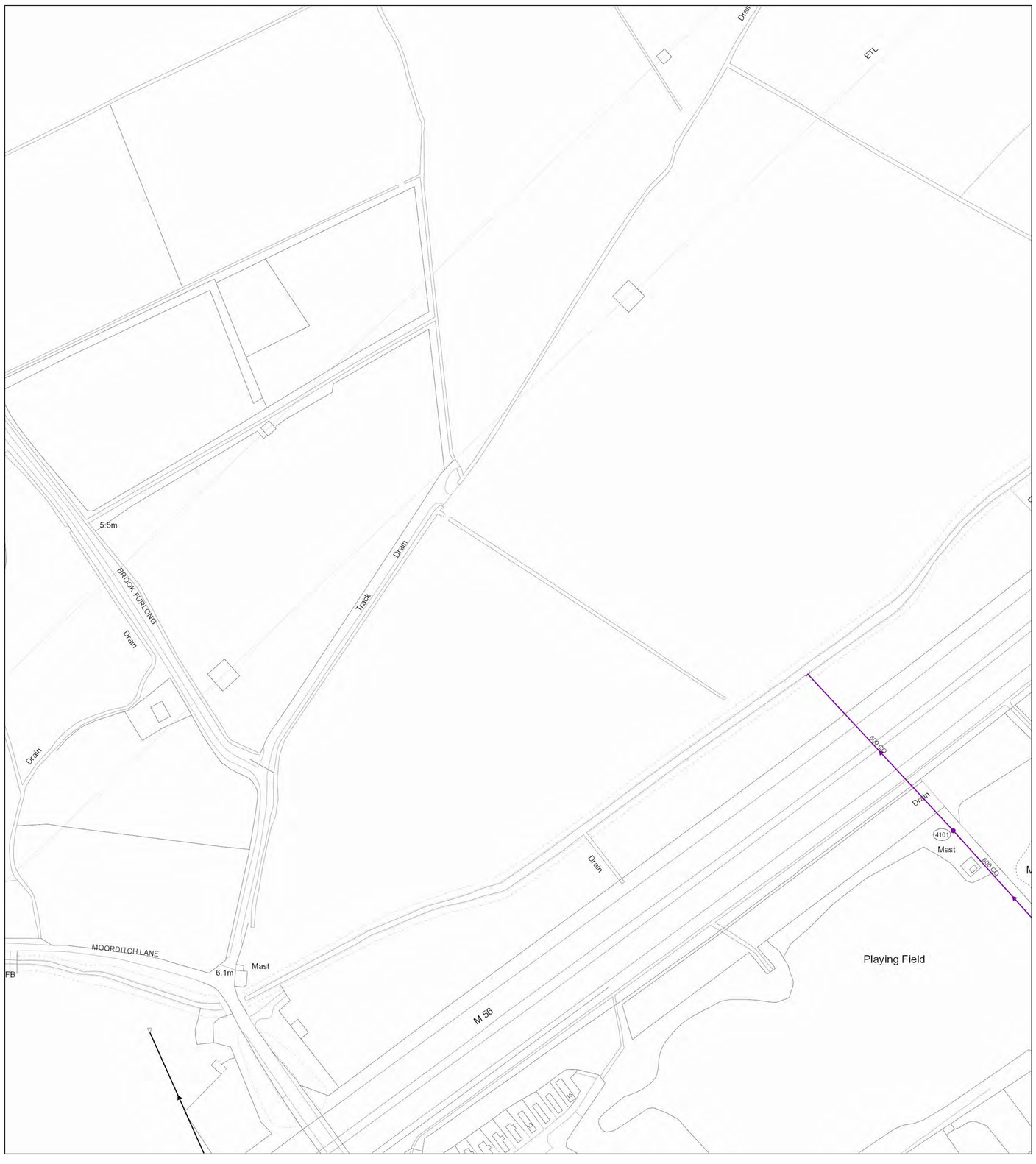
Nodes: 9

Sheet: 2 of 5

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
4101	5	OV	3.56	600			CO	118.7363	
4101	5	OV	3.56	600			CO	118.7363	
5002	5.54	OV	4.32	600			CO	100.2451	1 in 132

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:

red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

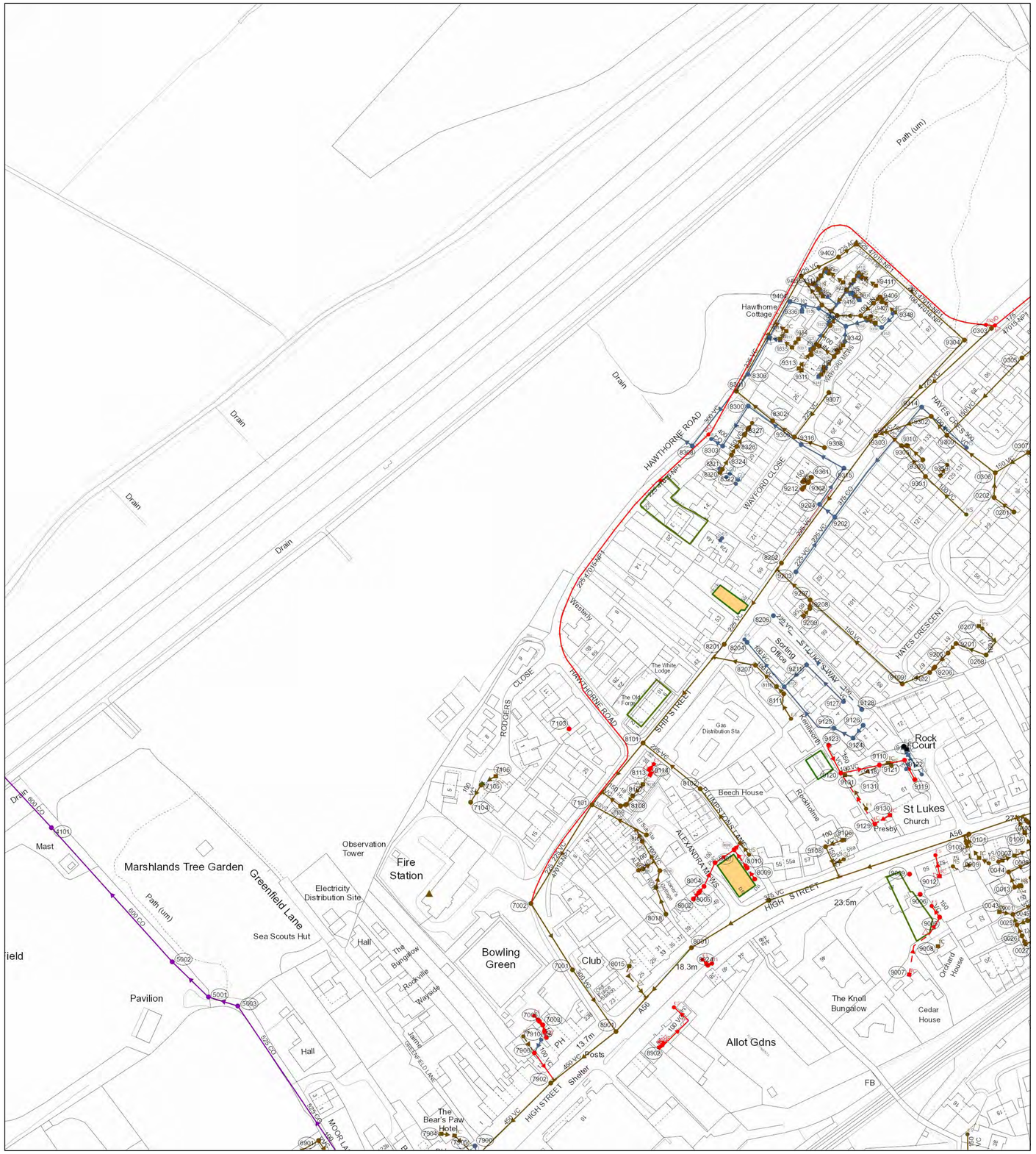
Frodsham,

OS sheet Number: SJ5178SW
Scale: 1:1250 **Date:** 19/10/2022
Nodes: 3
Sheet: 3 of 5

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
9303		FO	0	100			VC	21.87039	
0306		FO	0	150			VC	33.88778	
0307	18.14	FO		150			VC	21.63214	
9109		FO		150			VC	69.25225	
9206		FO		100			VC	4.122075	
9205		FO		100			VC	10.60659	
9326		FO		100			UN	1.776262	
9319	9.73	SW	7.86	225			VC	17.92425	1 in 25
9417		SW		0			UN	16.45549	
9414		FO		0			UN	14.74317	
9433		SW		100			UN	12.41623	
9431		FO		0			UN	3.661262	
9125		SW		100			VC	37.98496	
9208		FO		150			VC	4.849283	
9124		SW		100			VC	12.12792	
8009		CO		100			VC	7.587949	1 in
9315		SW	0	375			CO	27.10956	
8325		FO		150			VC	4.09925	
8308		SW	5.95	300			VC	7.971007	1 in 57
8324		FO		150			VC	5.55124	
8301	8.27	FO	6.26	225			VC	73.46395	1 in 1837
9316		SW	0	375			CO	36.29829	
9212		FO		150			VC	4.640605	
8201	14.76	FO	12.34	225			VC	71.02592	1 in 68
8207		FO		100			VC	23.70897	
8103		FO	0	150			VC	34.68409	
8101	12.57	FO	11.3	225			VC	44.54639	
0026		FO		0			UN	6.713656	
0001		FO		150			VC	20.02878	
7001	13.15	FO	9.81	300			VC	41.89144	1 in 78
7002	12.05	FO	0	300			VC	43.50714	
8008		CO		225			VC	5.110874	
7906		CO		100			VC	18.82048	
7910		CO		100				4.306648	1 in
5003		OV	0	600			CO	17.13785	
7105		FO		100			VC	11.17522	
0303	14.63	FO	13.44	225			VC	87.78675	1 in 200
0305		FO	0	150			VC	59.85818	
9349		FO		0			UN	12.90197	
9412		FO		100			UN	4.800912	
9309	15.42	FO	0	100			VC	13.76012	
0201	19.17	FO	17.42	150			VC	13.60005	1 in 25
9126		SW		100			VC	9.029962	
9318		FO		100			UN	3.085499	
9338		SW		0			UN	4.709406	
9317	9.46	FO	7.71	150			VC	10.39895	1 in 25
9320	9.03	SW	7.14	225			VC	16.63931	1 in 64
9403	8.31	FO	6.81	225			VC	23.16421	
9429		FO		100			UN	4.685061	
8111		FO		100			VC	5.92374	
9211		SW		100			VC	17.36347	
9127		SW		100			VC	29.03016	
0013		FO		0			UN	8.951546	
9306	12.12	FO	8.99	225			VC	15.07	1 in 22
8303		SW		400			CO	7.310983	
8300		SW	0	375			CO	26.43642	
9404	8.7	SW	6.87	300			VC	46.63095	1 in 101
9207		FO		150			VC	25.00072	
9362		FO		150			VC	3.611343	
9204		SW	0	375			CO	24.14692	
8102	15.56	FO	14.46	225			VC	40.6277	1 in 13
8202	15.09	FO	12.66	225			VC	55.10888	1 in 172
8117		SW		100			VC	32.1483	
8118		FO		100			VC	16.50045	
8109		FO		150			VC	12.78242	
8001	18.06	FO	14.46	375			VC	62.59281	1 in 21
8007		CO		100			PVC	12.95022	
8105		FO		100			VC	7.63149	
6901		FO		100			PVC	11.48974	
9304	14.23	FO	13.33	225			VC	72.48062	1 in 302
9342		SW		0			UN	8.600156	
9352		SW		100			UN	9.223797	
9314		SW	1.77	375			CO	77.77087	
9310		FO	0	150			VC	11.30561	
9305		FO	0	100			VC	3.39	
9121		CO		100			VC	14.15416	
0208		FO		100			VC	17.87272	
9321		FO		0			UN	12.84834	
9401	9.04	FO	7.29	150			VC	19.83315	1 in 19
9432		SW		100			UN	4.346026	
9402		FO	0	225			AC	12.50819	
9128		SW		225			VC	71.644	
0103		FO		150			VC	4.69601	
9308	12.93	FO	0	225			VC	17.62615	
8322		FO		150			VC	1.983302	
8302	11.5	FO	8.25	225			VC	25.94224	1 in 9
8326		FO		150			VC	7.617781	
8327		FO		150			VC	3.75416	
9303	13.86	FO	13.02	225			VC	87.97233	1 in 244
9203		SW	0	225			VC	37.37154	
7101		FO	0	225			VC	64.31643	
0027		FO		0			UN	4.798621	
0025		FO		0			UN	6.169337	
9009		CO		150			VC	7.543643	
8901	14.91	FO	9.15	450			VC	46.2656	
8024		CO		150			VC	4.279051	
8003	21.44	FO	17.43	375			VC	50.40717	1 in 17
8005		CO		100			PVC	4.696909	
8016		FO		100			VC	19.06324	
7005		CO		100				4.203877	1 in
4101	5	OV	3.56	600			CO	118.7363	
4101	5	OV	3.56	600			CO	118.7363	
9353		SW		0			UN	12.09661	
9413		FO		100			UN	6.668446	
9407		FO		100			UN	10.09305	
9406		FO		100			UN	4.776564	
9302	14.41	FO	13.42	150			VC	26.3063	
9300		FO	0	100			VC	11.60772	
0202	18.08	FO	16.83	150			VC	13.73225	
9120		CO		100			VC	21.86162	
9102		FO	0	150			VC	16.56826	
9201		FO		100			VC	6.810092	
9322		FO		0			UN	6.772485	
9430		FO		100			UN	5.652401	
9123		CO		150			VC	17.27767	
0101		FO	0	375			VC	117.0392	
9108		FO		150			VC	18.44142	
9122		CO		100			VC	12.33348	
0014		FO		0			UN	15.38127	
9307		FO	0	225			VC	31.26491	
8306	8.4	SW	6.41	300			VC	50.27789	1 in 109
8321		FO		150			VC	9.608068	
9202		SW	0	375			CO	11.00638	
8204		SW		100			VC	2.262661	
0045		FO		0			UN	6.341251	
8018		FO		100			VC	15.80643	
8017		FO		100			VC	9.49321	
8004		CO		100			PVC	14.36445	
8022		FO		100			VC	7.411078	
8108		FO		150			VC	3.352512	
8107		FO		150			VC	5.814806	
7902	12.58	FO	10.48	450			VC	59.93533	1 in 76
7003		CO		100				2.784468	1 in
5001	6.06	OV	4.66	600			CO	28.0391	1 in 82
5002	5.54	OV	4.32	600			CO	100.2451	1 in 132

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Frodsham,

OS sheet Number: SJ5178SE
Scale: 1:1250 **Date:** 19/10/2022
Nodes: 136
Sheet: 4 of 5

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned	Foul	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

All point assets follow the standard colour convention:

red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Frodsham,

OS sheet Number: SJ5078SE
Scale: 1:1250 **Date:** 19/10/2022
Nodes: 0
Sheet: 5 of 5

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West

Appendix E Proposed Development Plan

Q:\3251-3300\3272-01 Frodsham Solar DCO\Dwgs\GIS\Workspaces\ES\ES Workspace.qgz

Non-Breeding Bird Mitigation Area (NBBMA)

Frodsham Wind Farm Access Tracks

Protos Development Area

Grinsome Road Roundabout

Marsh Lane

Former CF Fertiliser Plant

Encirc Glass Manufacturing Facility

Grinsome Road

Pool Lane Roundabout

Pool Lane

Ince

Elton

A5117

J14

M56

Helsby

Frodsham

Solar Array Development Area

SPEN / National Grid Substation and Access to the Substation Compound

SPEN Grid Connection

Skylark Mitigation Area

Main Site Access with Private Wire Connection

Main Site Access without Private Wire Connection

BESS and Substation Compound (Option 1)

BESS and Substation Compound (Option 2)

N

0 500 1,000 1,500 2,000 2,500 m

Case Reference: EN010153
Document Reference: EN010153/DR/6.3
Regulation 5(2)(a) Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Cubico SUSTAINABLE INVESTMENTS

0344 8700 007
axis.co.uk

Document

Environmental Statement: Volume 3

Project

FRODSHAM SOLAR

Figure Number

Figure 1-2

Figure Title

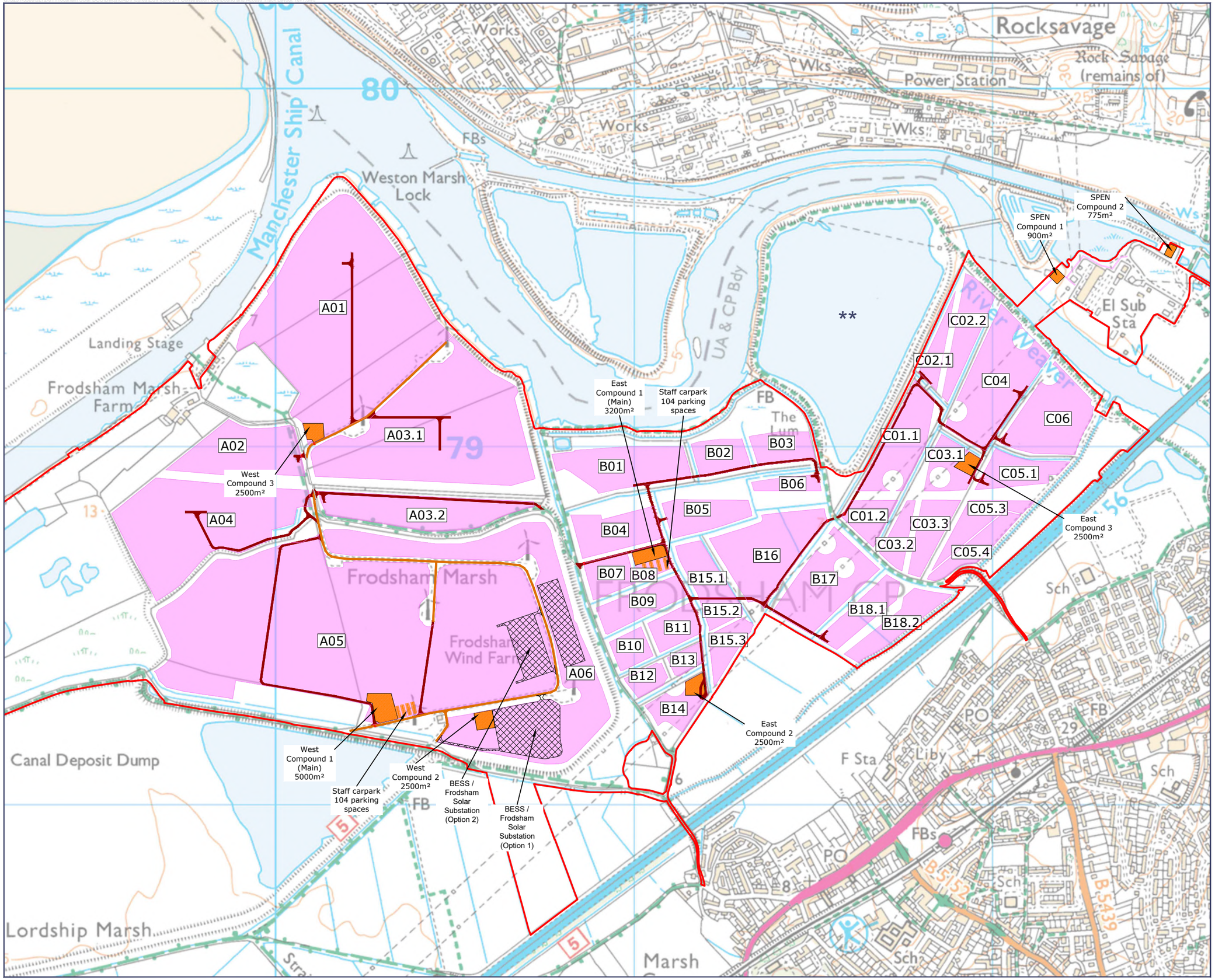
The Proposed Development Areas

Scale

1:25000@A3

Date

May 2025



Order Limits

Solar PV Array Areas

Access Track - Existing

Indicative Proposed Access Track Positions

Temporary Access Track for SPEN Substation

Indicative Location of Principal Construction Compounds

** Not open water - area now covered with grassland and scrub, see Figure 1-4

Case Reference: EN010153
Document Reference: EN010153/DR/6.3
Regulation 5(2)(a) Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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Document
Environmental Statement: Volume 3

Project
FRODSHAM SOLAR

Figure Number
Figure 2-1

Figure Title
Indicative Construction Compound and Access Track Layout

Scale
1:10,000 @A3

Date
May 2025

NB. This area is not open water, but is now covered by grassland and scrub

Easement for Utilities

Easement for Utilities

Easement for Utilities

No access by construction or operational traffic

Site Access

BESS / Frodsham Solar Substation (Option 2)

BESS / Frodsham Solar Substation (Option 1)

Car Park

A01 A02 A03.1 A03.2 A04 A05 A06

B01 B02 B03 B04 B05 B06 B07 B08 B09 B10 B11 B12 B13 B14 B15.1 B15.2 B15.3 B16 B17 B18.1 B18.2

C01.1 C01.2 C02.1 C02.2 C03.1 C03.2 C03.3 C04 C05.1 C05.3 C05.4 C06

N

0 500 750 1000m

- Order Limits
- Permanent Fencing
- Access Track - Existing
- Access Track - Proposed
- Solar PV Tables
- A00.0 Panel Reference Area
- Power Conversion Unit (Inverter / Transformer Station)
- Proposed 132kV Overhead Line to SPEN Substation (Option 1)
- Proposed 132kV Overhead Line to SPEN Substation (Option 2)
- Proposed 132kV Underground Line to SPEN Substation
- Proposed 132kV Underground Line to nearby businesses
- Non-Breeding Bird Mitigation Area
- Existing Trees and Hedgerows
- Areas of landscape management and habitat creation

Case Reference: EN010153
Document Reference: EN010153/DR/6.3
Regulation 5(2)(a) Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Cubico SUSTAINABLE INVESTMENTS

0344 8700 007
axis.co.uk

axis

Document

Environmental Statement: Volume 3

Project

FRODSHAM SOLAR

Figure Number

Figure 2-2

Figure Title

Indicative Operational Site Layout

Scale

1:10,000 @A3

Date

May 2025

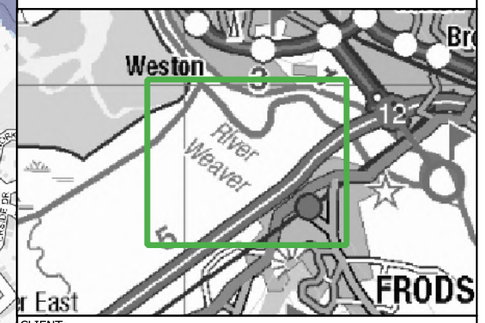
Appendix F EA Maps & Correspondence

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Flood Zone 2
- Flood Zone 3
- Solar PV Panels
- Power Conversion Units (PCUs)
- 132kV OHL options
- BESS - Substation Option 1
- BESS - Substation Option 2
- Access Roads - Existing
- Access Roads - Proposed

Panels placed on elevated land above the Flood Zone 3 extent



0 0.5 1 km

CLIENT: Frodsham Solar Ltd

waterco
www.waterco.co.uk

SCHEME: Frodsham Solar

PLOT TITLE: EA Flood Map for Planning
Rivers and Sea
with Indicative Key Infrastructure Shown
Data published March 2025

PLOT STATUS:	DATE:
FINAL	08-07-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:10000

PLOT NAME:	REVISION:
14740_EA_FMfP	-

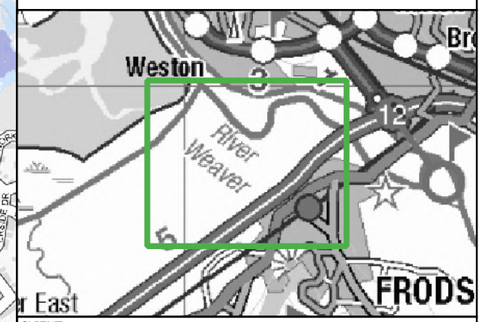
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Annual Likelihood of Flooding

- 1 in 30
- 1 in 100
- 1 in 1000
- Solar PV Panels
- Power Conversion Units (PCUs)
- 132kV OHL options
- BESS - Substation Option 1
- BESS - Substation Option 2
- Access Roads - Existing
- Access Roads - Proposed



0 0.5 1 km

CLIENT:
Frodsham Solar Ltd

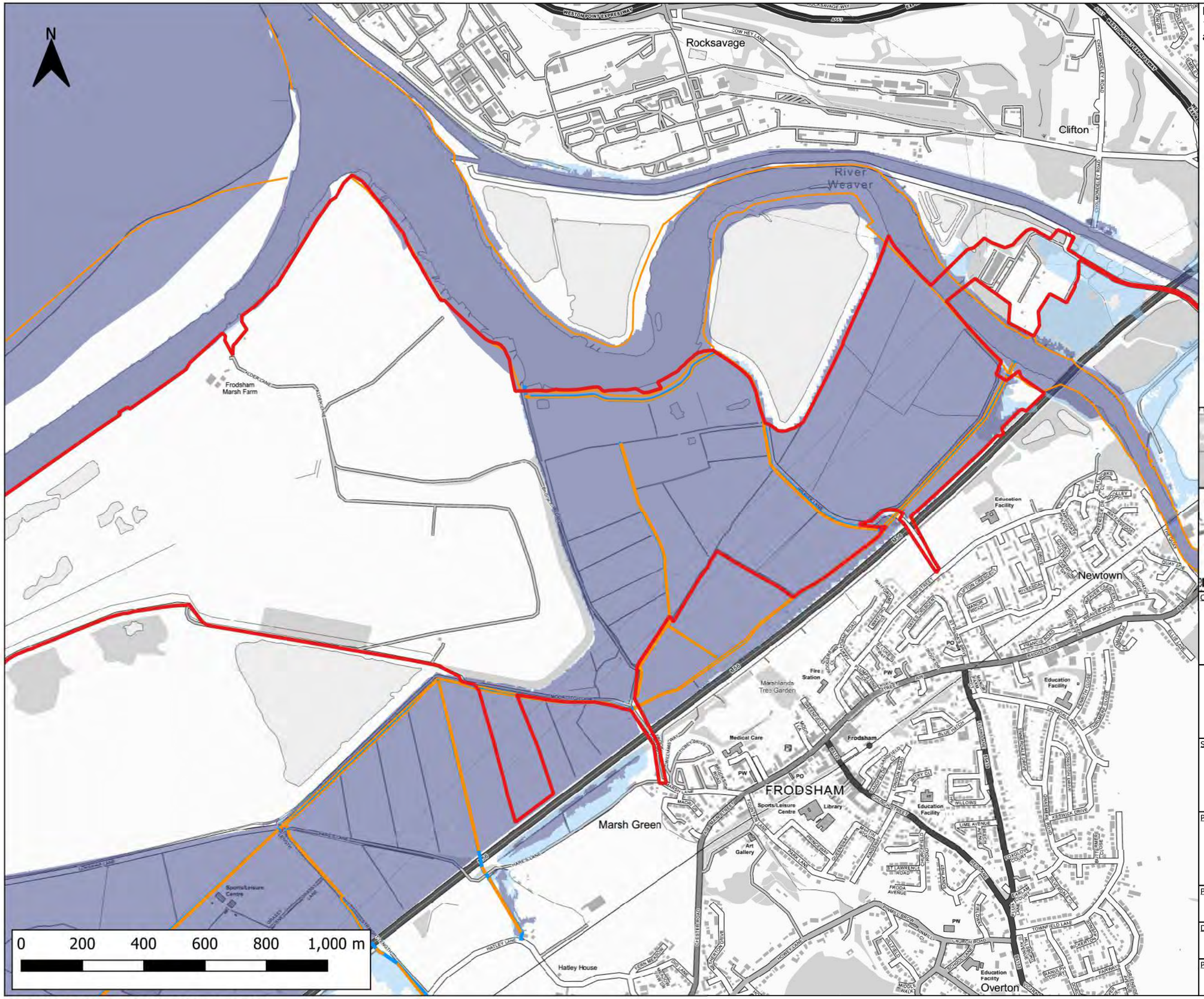
waterco
www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
EA Risk of Flooding from Surface Water with Indicative Key Infrastructure Shown
Data published January 2025

PLOT STATUS:			DATE:
FINAL			08-07-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:10000

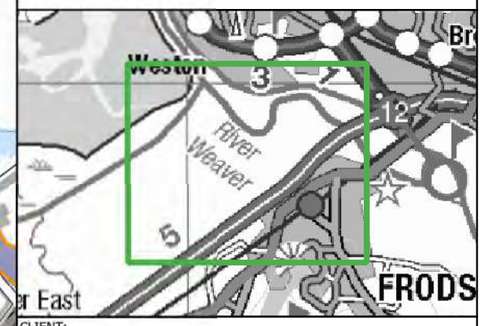
PLOT NAME: 14740_EA_RoFSW
REVISION: -



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- AIMS Spatial Flood Defences
- Main River
- Flood Zone 1
- Flood Zone 2
- Flood Zone 3



CLIENT:
Frodsham Solar Ltd

waterco
www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
EA Flood Map for Planning
Data published March 2025

PLOT STATUS:	DATE:
FINAL	30-04-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:12000

PLOT NAME:	REVISION:
14740_EA_FMfP	-

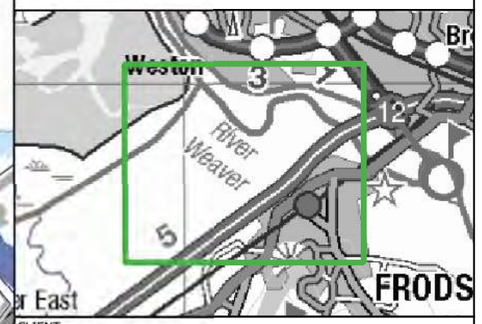
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Present Day Extents (defended)

- Rivers and sea 1 in 30
- Rivers 1 in 100, Sea 1 in 200
- Rivers and sea 1 in 1000



0 200 400 600 800 1,000 m

CLIENT:
Frodsham Solar Ltd

www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
EA Flood Map for Planning - Present Day Extents - Rivers and Sea (defended)
Data published March 2025

PLOT STATUS:			DATE:
FINAL			30-04-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:12000

PLOT NAME: 14740_EA_FMfP_RS_PD_DEF

REVISION: -

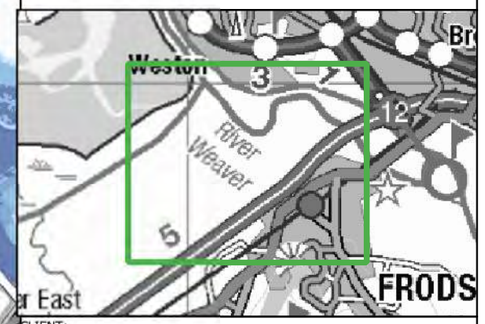
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Climate Change Extents (defended)

- Rivers and sea 1 in 30
- Rivers 1 in 100, Sea 1 in 200
- Rivers and sea 1 in 1000



0 200 400 600 800 1,000 m

CLIENT:
Frodsham Solar Ltd

waterco
www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
EA Flood Map for Planning - Climate Change Extents - Rivers and Sea (defended)
Data published March 2025

PLOT STATUS:			DATE:
FINAL			30-04-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:12000

PLOT NAME:	REVISION:
14740_EA_FMfP_RS_CC_DEF	-

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

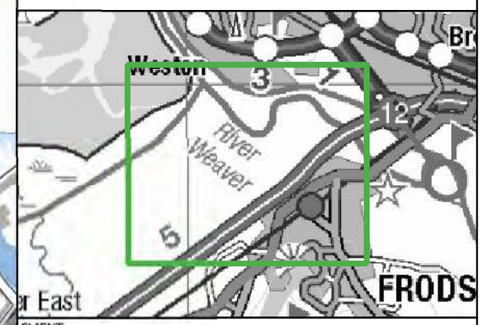
LEGEND

Site Boundary

Present Day Extents (undefended)

Rivers 1 in 100, Sea 1 in 200

Rivers and sea 1 in 1000



CLIENT:

Frodsham Solar Ltd

www.waterco.co.uk

SCHEME:

Frodsham Solar

PLOT TITLE:

EA Flood Map for Planning - Present Day Extents - Rivers and Sea (undefended) Data published March 2025

PLOT STATUS:	DATE:
FINAL	30-04-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:12000

PLOT NAME:	REVISION:
14740_EA_FMfP_RS_PD_UNDEF	-

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Site Boundary

Climate Change Extents (undefended)

Rivers 1 in 100, Sea 1 in 200

Rivers and sea 1 in 1000

0 200 400 600 800 1,000 m

CLIENT:
Frodsham Solar Ltd

www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
EA Flood Map for Planning - Climate Change Extents - Rivers and Sea (undefended)
Data published March 2025

PLOT STATUS:	DATE:
FINAL	30-04-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:12000

PLOT NAME:	REVISION:
14740_EA_FMfP_RS_CC_UNDEF	-

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Site Boundary

Annual Likelihood of Flooding

1 in 30

1 in 100

1 in 1000

0 200 400 600 800 1,000 m

CLIENT:	Frodsham Solar Ltd
	www.waterco.co.uk
SCHEME:	Frodsham Solar
PLOT TITLE:	EA Flood Map for Planning - Present Day Extents - Surface Water Data published January 2025
PLOT STATUS: FINAL	DATE: 30-04-2025
DRAWN: JP / CHECKED: AW / APPROVED: NJ / PLOT SCALE AT A3: 1:12000	
PLOT NAME: 14740_EA_FMfP_SW_PD	REVISION: -

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

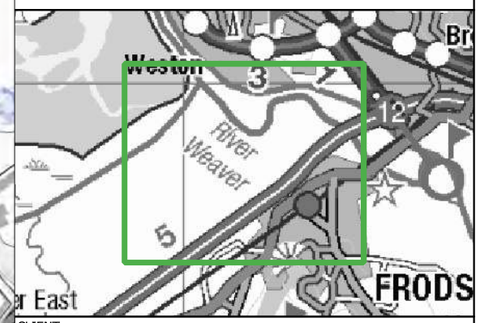
Site Boundary

Annual Likelihood of Flooding

1 in 30

1 in 100

1 in 1000



CLIENT:

Frodsham Solar Ltd

www.waterco.co.uk

SCHEME:

Frodsham Solar

PLOT TITLE:

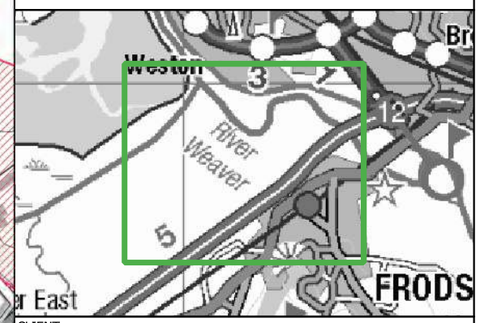
EA Flood Map for Planning - Climate Change Extents - Surface Water
Data published January 2025

PLOT STATUS:			DATE:
FINAL			30-04-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:
PLOT NAME:			REVISION:
14740_EA_FMfP_SW_CC			-

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- When river levels are normal
- When there is also flooding from rivers



CLIENT:
Frodsham Solar Ltd

www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
EA Flood Risk from Reservoirs
Data revised March 2025

PLOT STATUS:	DATE:
FINAL	30-04-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:12000

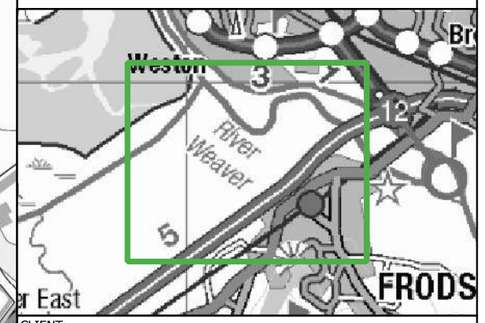
PLOT NAME:	REVISION:
14740_EA_Flood_Risk_from_Reservoirs	-

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise
2) The Historic Flood Map is a GIS layer showing the maximum extent of individual Recorded Flood Outlines from river, the sea and groundwater springs that meet a set criteria. It shows areas of land that have previously been subject to flooding in England. This excludes flooding from surface water, except in areas where it is impossible to determine whether the source is fluvial or surface water but the dominant source is fluvial.
3) If an area is not covered by the Historic Flood Map it does not mean that the area has never flooded, only that the EA do not currently have records of flooding in this area that meet the criteria for inclusion.
4) The Historic Flood Map takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding. It will include flood extents that may have been affected by overtopping, breaches or blockages.

LEGEND

Site Boundary

Historic Flood Map



CLIENT:	Frodsham Solar Ltd
	www.waterco.co.uk
SCHEME:	Frodsham Solar
PLOT TITLE:	EA Historic Flood Risk Data revised February 2025
PLOT STATUS: FINAL	DATE: 30-04-2025
DRAWN: JP / CHECKED: AW / APPROVED: NJ	PLOT SCALE AT A3: 1:12000
PLOT NAME: 14740_EA_Historic_Flood_Risk	REVISION: -

Environment Agency
By email only: NITeam@environment-agency.gov.uk

15/07/2024

Scheme: **Frodsham Marshes (Frodsham Solar)**

Subject: **FRA Advice**

EA Reference: XA/2024/100097/01-L01

Dear [redacted],

Thank you for providing the Environmental Agency review of the draft Flood Risk Assessment for the Frodsham Solar Scheme. Further to the FRA review we would like to clarify points raised which will influence the design of the site and seek to agree the scope of an updated FRA.

1. Climate Change and Flood Events

Your response clearly sets out which climate change allowances should be assessed. We propose to update the existing EA Mersey and Lower Weaver hydraulic models with the correct climate change allowances. We will also consider a defence breach as requested. Please could you confirm that the flood events detailed in the following tables are satisfactory:

Table 1 – Tidal Mersey Flood Events

Watercourse / Source	Scenario	Event (% AEP)
Mersey Tidal	Defended	0.5% AEP (year 2024)
		0.1% AEP (year 2024)
		0.5% AEP Higher Central CC to the year 2100
		0.5% AEP Upper End CC to the year 2100
		0.5% AEP H++ Scenario (+1.9m of sea level rise)
	Breach (of the Mersey defences only)	0.5% AEP (year 2024)
		0.1% AEP (year 2024)
		0.5% AEP Higher Central CC to the year 2100
		0.5% AEP Upper End CC to the year 2100
		0.5% AEP H++ Scenario (+1.9m of sea level rise)

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For the River Mersey Breach, there are flood defences along the River Mersey with secondary defences bordering the site (along the River Weaver). We propose to only consider a breach of the River Mersey defences in a tidal event as the probability of a breach of the River Mersey and River Weaver defences occurring simultaneously is very low. Please advise if this approach is acceptable.

Figure 1 shows the proposed breach location. Please can you confirm the breach location is acceptable.

Figure 1 – Mersey Breach Location

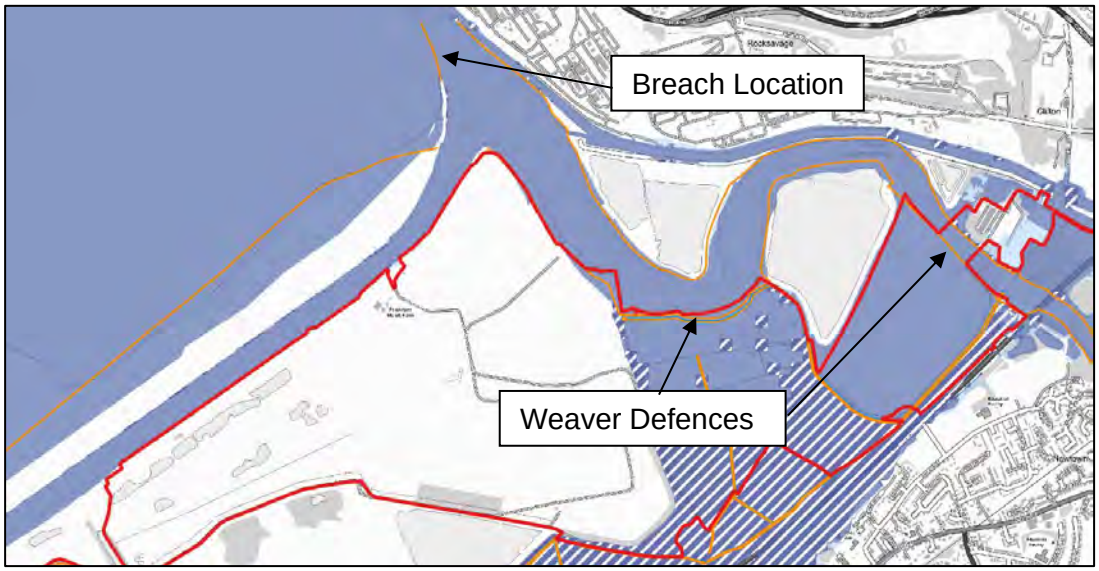

Table 2 – Lower Weaver Flood Events

Watercourse / Source	Scenario	Event (% AEP)
Lower Weaver Fluvial	Defended	1% AEP present day
		0.1% AEP present day
		1% AEP plus 67% CC event
		1% AEP plus 106% CC event (sensitivity test)
		Joint probability 1% AEP plus 67% CC fluvial event with 0.5% AEP Upper End CC (year 2100) tidal event.

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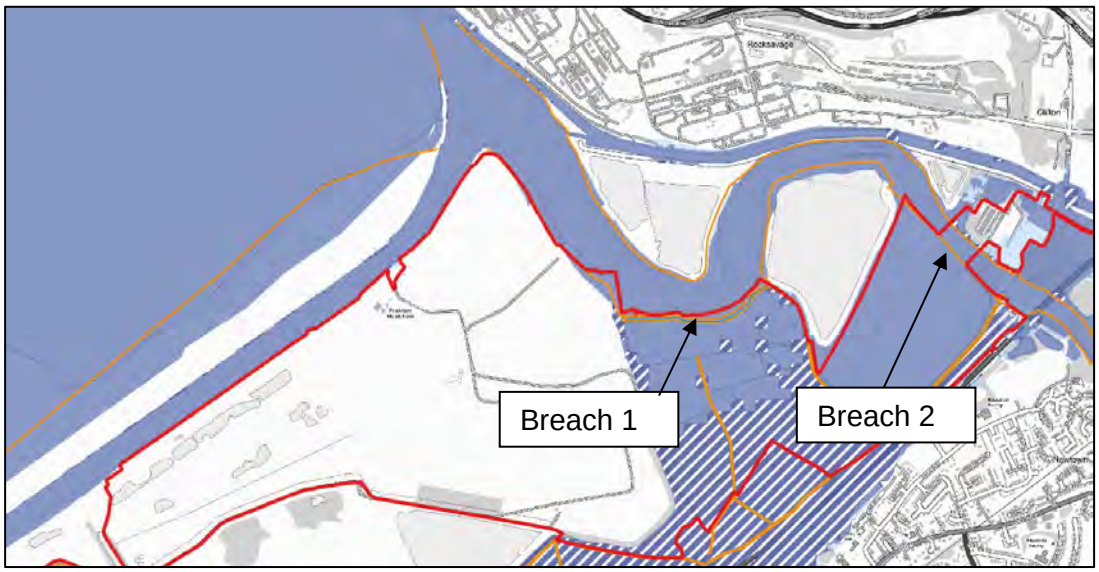
	Breach (2no. breach scenarios allowed for, one of the flood defence on the eastern site boundary and one of the flood defence on the northern site boundary)	1% AEP plus 67% CC event
		1% AEP plus 106% CC event (sensitivity test)
		Joint probability 1% AEP plus 67% CC fluvial event with 0.5% AEP Upper End CC (year 2100) tidal event.

For the River Weaver breach scenario, we propose 2no. breaches in separate locations shown in Figure 2 below. Please can you confirm that the breach locations are acceptable?

Figure 2 – Weaver Breach Location



We do not intend to update the Ince and Frodsham Hydraulic Model. The justification for this is:

- The water levels are significantly lower for the Ince and Frodsham flood events when compared with the Lower Weaver and Mersey Estuary flood levels. As such, the Ince and Frodsham flood events will not inform the design levels of infrastructure on site.

Please advise if it is acceptable to not update the Ince and Frodsham hydraulic model.

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2. Sensitivity Scenarios

We note that there is a requirement to consider sensitivity scenarios for fluvial and tidal flood events (106% climate change on fluvial flows, and the +1.9m sea level rise allowance). Please can you confirm how you will view the sensitivity scenario modelling on the basis that in the tidal H++ event, the lower eastern extent of the site is likely to be inundated to a significant depth. The +1.9m sea level rise is almost 1m above the upper end climate change sea level rise to the year 2100.

Please can you confirm that mitigation design is not expected to accommodate the flood depths in the sensitivity scenario events? We are happy to detail in the FRA how the site would be managed in such an event i.e. how the site would recover to become operational, what equipment would need replacing etc.

3. Flood Risk Activity Permits

In your response its states that *'We note that the developer intends to disapply Flood Risk Activity Permits (FRAPs). However we would need a level of detail within the FRA in order to allow for their disapplication'.* Please can you confirm what information you would require for FRAP's to be disapplied. Multiple watercourse crossings are proposed. Would a typical cross-sectional drawing of a proposed watercourse access road crossing be acceptable?

4. Flood Storage Compensation

In your response you request that flood compensation storage would be required for all structures within the design flood event, including the mounting structures for the panels, the inverter stations and changes in level from the roads.

We consider that any proposed structures within the design flood event would have negligible impact on flood storage.

Figures 3 and 4 show examples of the typical inverter and panel sections (design heights to be confirmed). Structures within the design flood event would be limited to the foundation supports of the inverters and mounting structures of the panels. Both have a minimal footprint and would have negligible impact on flood storage and flood flows (flood water can flow and be stored beneath the structures).

Would the EA accept a limited assessment of impact on flood risk elsewhere, whereby:

- The total footprint of structures (foundation supports of the inverters and mounting structures of the panels) is calculated.
- A simple calculation is provided demonstrating what the water level increase would be when accounting for the relationship between the volume of flood storage displaced and the area

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of the associated floodplain. The aim is to demonstrate that any water level increase caused by flood water displacement is negligible. By way of an example calculation only: if 100m³ of flood storage was displaced, and the impact of this displacement was considered across a 1km² flood extent, then the water level increase (volume in m³ divided by area of flood extent in m²) would be 0.0001m (0.1mm).

Figure 3 – Typical Inverter Section

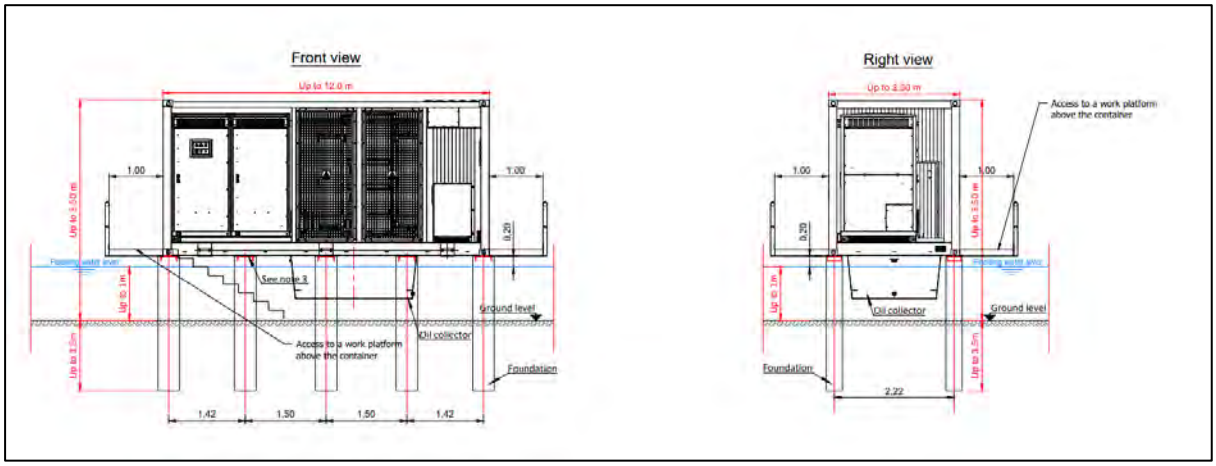

Figure 4 – Typical Solar Panel Mounting Structure

5. Design of Access Crossings

In relation to the proposed watercourse access road crossings, the EA response states: *'These proposed crossings may require modelling to consider flow routes in a flood scenario, and flood storage compensation if within the design flood plus climate change flood extent. A bridge should be designed to a soffit of 600mm above design flood level, with a consideration of climate change.'*

We propose open span crossings which will not impact on the channel capacity. The bridge crossings will be similar to existing (see Figure 5) and simple in nature i.e. a slab tying in with existing ground levels either side of the watercourse as to avoid any ground raising. As the crossings will not impact the channel capacity or flood flows, please confirm that modelling of the proposed crossings will not be required.

Figure 5 – Existing Watercourse Crossing

The watercourses on site ultimately drain to an EA pumping station which pumps flows into the River Weaver. The watercourses have very limited fall, and limited flow is witnessed in the watercourses due to their shallow gradient. The water levels in the watercourses are influenced by the EA pumping station (water levels rise following heavy rain and fall as the EA pump operates). Given the unique characteristics of the watercourse on site, please advise if there is room for reduction on the 600mm freeboard requirement? Ideally, we request a limited freeboard of 150mm – 300mm as:

- The preference is for the bridge deck to tie in with existing ground levels either side of the

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watercourse (negating the need for ground raising).

- There is no out of channel flooding from the watercourses at the access road crossing locations.

- There is no discernible flow in the watercourses meaning the risk of debris being conveyed in the watercourse and blocking the bridge is very low.

6. Offsets

As requested, we will provide a 16m offset to the flood defences adjoining the River Weaver. We note that there are designated flood defences along the watercourses within the site. The flood defences along the watercourses within the site are classified as both fluvial and tidal defences. From visiting the site, the 'defences' along the watercourses within the site are not embankments or formal structures. Figure 6 shows a watercourse on site (main river) which is classified as having formal flood defences along it. The 'defences' appear to be slightly higher ground on the watercourse bank. We would therefore consider the flood defences on site as being 'fluvial' as they would serve no benefit in a tidal inundation event. Please could you therefore advise if an 8m offset is acceptable for all defences along the watercourses within the site.

Figure 6 – Main River Within the Site

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7. Surveys

The EA response states *'The development site is located in an area which benefits from flood defences. The developer should survey the flood defences within the Order Limits, which will protect the proposed development and consider remediation.'*

Please could you expand on why the surveys are required i.e. to confirm the crest heights, structural condition etc, and which defences should be surveyed? Are surveys required at pre-application stage or pre-construction?

With the design of flood mitigation being made against extreme scenarios i.e. breach events, and the defences being maintained by the EA, we are trying to establish why the survey is required and if it is essential for the application.

8. Culverts

We will install open span crossings and avoid the use of culverts. On the basis that open span bridge crossings will be used (meaning there will be no impact on the watercourse channel or capacity), please confirm that there is no requirement for a study on effects on hydrology and geomorphology for the watercourse crossings (no work within the river channel will take place).

9. Surface Water Drainage

The EA response states that *'We require more information on how surface water from inverters will be managed. The loss of footprint for runoff may require an engineered solution.'*

As shown in Figure 3, the inverters will be minimal in footprint (30m²) and as such rainfall runoff quantities will be minimal. The inverters will not have a formal rainwater collection system (no guttering or downpipes) and we propose a simple drainage solution for the inverters whereby rainfall runoff will be directed to a stone surround (filter trench or similar). Please advise if this approach is acceptable.

Any discharge from the BESS will be made at the 1 in 1 year limited greenfield runoff rate, ensuring no increase in runoff rates to the receiving watercourse or downstream pumping station. A 45% climate change (upper end allowance for 2070's epoch) will be applied for the design of the BESS drainage system.

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Yours sincerely,

[redacted]

[redacted]@waterco.co.uk

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Eden Court, Lon Parcwr Business Park, Ruthin, LL15 1NJ
Form Ref: F-17.T-Letter-General Letter Format Ruthin

[redacted]

From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Sent: 15 November 2022 15:45
To: [redacted]
Subject: GMMC286755AB Response attached from the Environment Agency

Dear [redacted],

Thank you for your enquiry which was received on 03/11/22.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

We do operate and maintain Frodsham and Ince Pumping stations and have no plans to stop pumping or maintaining the pumps. We will require 24hr vehicle access to Frodsham Pumping Station including during construction.

Environmental permit - advice to applicant
The Environmental Permitting (England and Wales) Regulations 2016 require a permit or exemption to be obtained for any activities which will take place:

- on or within 8 metres of a main river (16 metres if tidal)
- on or within 8 metres of a flood defence structure or culverted main river (16 metres if tidal)
- on or within 16 metres of a sea defence
- involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert
- in a floodplain more than 8 metres from the river bank, culvert or flood defence structure (16 metres if it's a tidal main river) and you don't already have planning permission

For further guidance please visit https://www.gov.uk/guidance/flood-risk-activities-environmental-permits or contact our National Customer Contact Centre on 03708 506 506 (Monday to Friday, 8am to 6pm) or by emailing enquiries@environment-agency.gov.uk.
The applicant should not assume that a permit will automatically be forthcoming once planning permission has been granted, and we advise them to consult with us at the earliest opportunity.

Please refer to the Open Government Licence which explains the permitted use of this information.

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Kind regards,

[redacted]

[redacted] | Customer and Engagement Officer
Greater Manchester, Merseyside and Cheshire

Direct email: **Inforequests.GMMC@environment-agency.gov.uk**
Office address: Richard Fairclough House, Knutsford Road, Latchford, Warrington, WA4 1HT

Please consider this a "thanks" in advance.
Every email has a carbon footprint. So if you don't hear back from me,
it's not because of you, it's because of the planet.
#WhatWeCanDo

From: [redacted]@waterco.co.uk>
Sent: 03 November 2022 15:16
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 221109/ic08 14740 EA Comments

Proposed development at: Frodsham DCO Site, NGR: 350921, 378604

Dear Sir / Madam,

We are currently preparing a Flood Risk Assessment and Drainage Strategy and accompanying ES Chapter for the site at the above address and are seeking EA comments on flood risk infrastructure in the area. Please note a pre-planning enquiry has been submitted separately.

The proposed development is for a solar farm covering 280 ha. I attach a site plan for your reference.

Our current understanding is that there are 2no. 900 l/s pumping stations serving Frodsham Marsh, discharging water to the Weaver Navigation and that there are a further 4no. 238 l/s pumping stations serving the adjacent Ince Marsh, discharging low lying drains to the River Mersey and Manchester Ship Canal. We understand that these pumps are owned / maintained by the EA.

Please could you advise if the EA propose to continue maintaining the pumps and whether you require any specific maintenance arrangements for the Frodsham Marsh pumps (we propose to retain the existing access road).

Please do not hesitate to contact me if you have any questions.

Many thanks,

[redacted] [redacted]
Environmental Consultant

DDI: [redacted]
Teams: [redacted]@waterco.co.uk

We're recruiting! For more information, please take a look at our website.

Environment Agency
By email only: NITeam@environment-agency.gov.uk

29/08/2024

Scheme: **Frodsham Marshes (Frodsham Solar)**

Subject: **FRA Advice – Watercourse Crossings and Flood Defence Easements**

EA Reference: XA/2024/100097/02-L01

Dear [redacted],

Thank you for providing your additional response dated 1st August 2024. The purpose of this letter is to seek agreement and clarification regarding the required offsets to on-site flood defences, and the design of access crossings.

1. Flood Defence Offsets

In relation to flood defences offsets, the site layout design provides a 16m offset to the flood defences which adjoin the River Weaver. It is acknowledged that these defences would play a role in defending the site from tidal flooding. We seek further clarification on the offset for the flood defences along the designated 'main rivers' which flow through the site. The defences in question are identified in Figure 1.

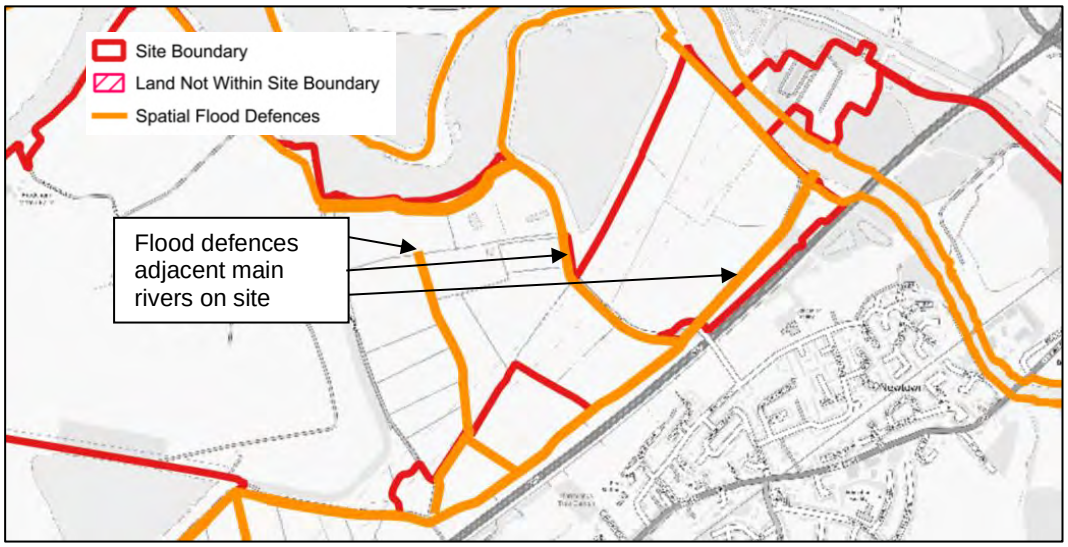

Figure 1 – Flood Defence Locations

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Using the EA 'Asset Information and Maintenance Programme' data (data.gov.uk), the main rivers on site are designated as being 'fluvial'. This is shown in Figures 2 – 4 below. The watercourses do not convey any tidal flows. As such, the flood defences adjacent to these watercourses, designated as high ground, do not have any role in protecting the site from tidal flooding (from the Mersey). We therefore propose that an 8m offset is applied as the defences provide protection against a fluvial flood source.

Cross sections through the flood defences, obtained using LiDAR data, are provided in Appendix A and show that the flood defences (high ground) are approximately 300mm higher than adjacent ground levels. This further supports that the low level flood defences adjacent to fluvial watercourses on site would have no bearing on tidal flooding, or protecting the site or its surrounds from tidal flooding.

Please could you advise if the 8m offset is agreeable to the flood defences classified as 'high ground' within the site. Should further clarification be required, please provide further guidance on the measurement of horizontal offset i.e. do the EA have guidance on how this should be measured.

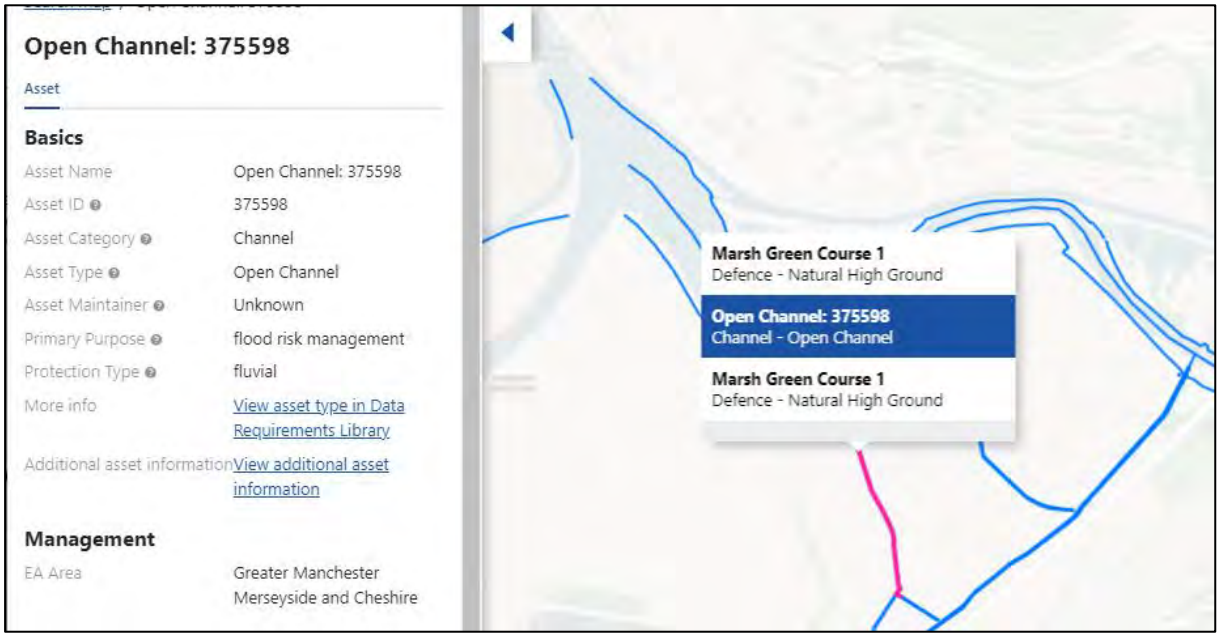

Figure 2 – On Site Watercourse Designation

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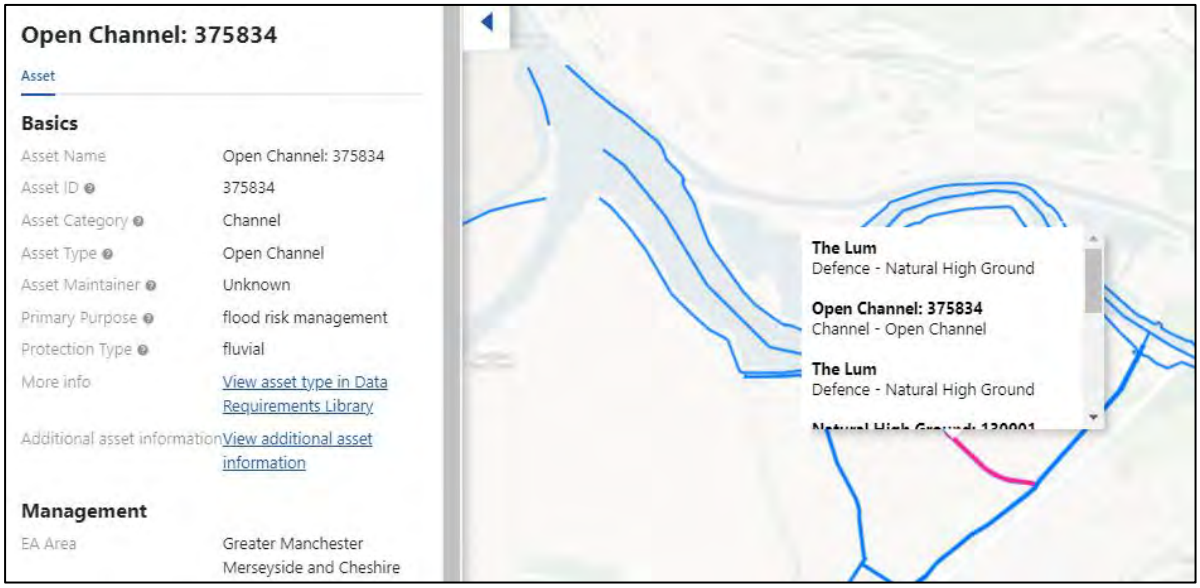

Figure 3 – On Site Watercourse Designation

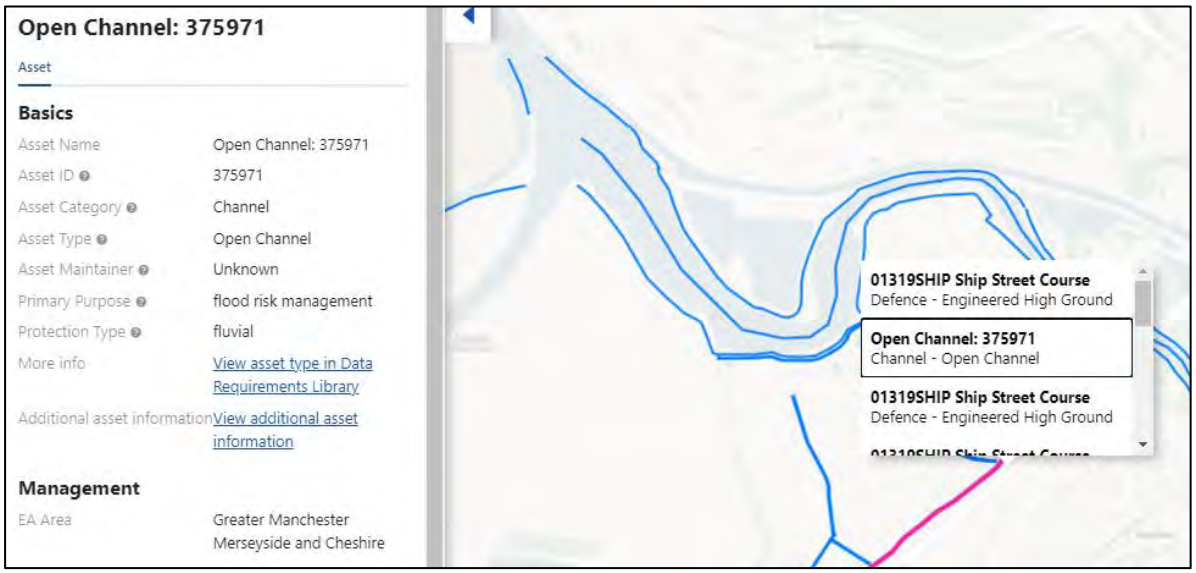

Figure 4 – On Site Watercourse Designation

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2. Design of Access Crossings

The latest EA response states that site-specific hydraulic modelling would be required to inform the risk of flooding associated with each access crossing location. Plans identifying the watercourse crossing locations are provided in Appendix B. 4no. Main River crossings are proposed (plan reference CP20, CP17, CP14 and CP22). Crossings CP14 and CP22 are existing access crossings.

Existing hydraulic modelling is available in the form of the EA Ince and Frodsham Fluvial Model (2011). In-channel flood levels are provided for the 1% Annual Exceedance Probability (AEP) event (the most extreme event considered by this model) and are provided in Table 1. The associated node points are shown in Figure 5.

Table 1 – Ince and Frodsham Model – In-channel Flood Levels

Node Label	Q100 Maximum Water Level (m AOD)
MARG_0793	4.227
MARG_0048	4.062
TLUM_0396	3.389
TLUM_0041	3.389

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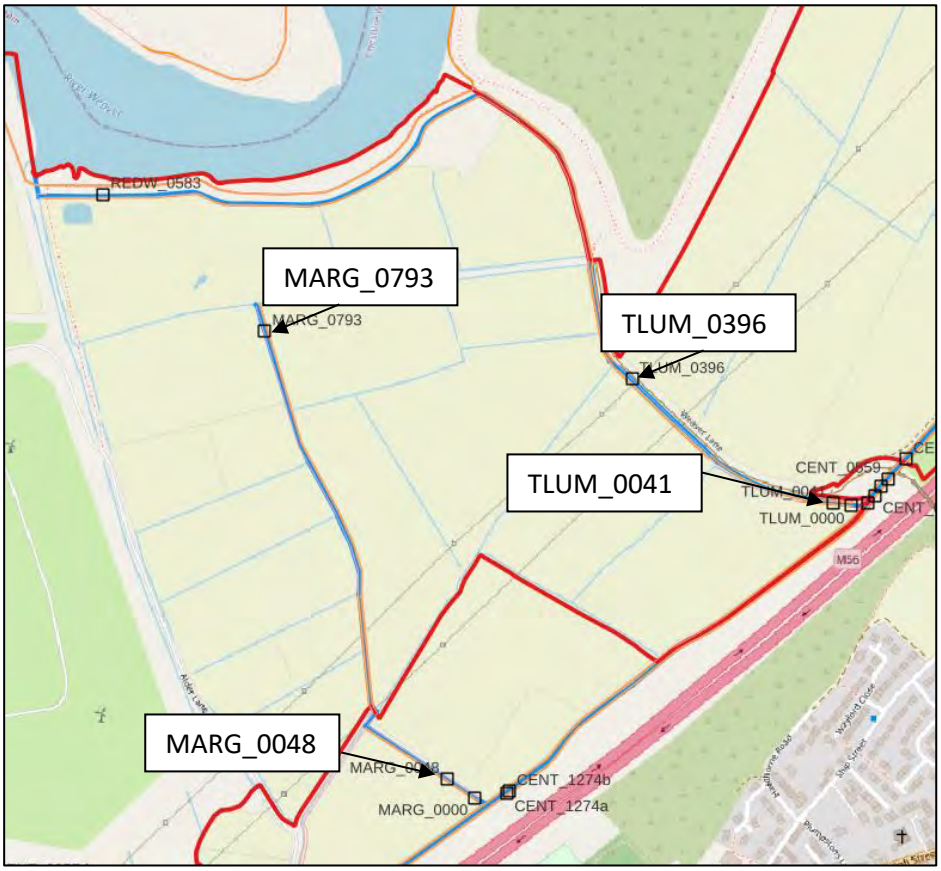

Figure 5 – In-channel Node Locations

New (or replacement) watercourse access crossings would be formed so that the bridge soffit is no lower than the crest height of the adjoining flood defences (high ground). Flood defence crest heights are shown on the cross sections in Appendix A. A comparison of the in-channel water levels and adjoining flood defence crest heights (relating to new bridge soffit levels) is shown in Table 2.

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Table 2 – Ince and Frodsham Model – In-channel Flood Levels

Crossing Reference (see Appendix B for map location)	Q100 Maximum Water Level (m AOD)	Defence Crest Height / Bridge Soffit at Nearest Access Crossing (m AOD)	Difference between 1% AEP flood level and bridge soffit (m)
CP14	4.227	5.08	0.853
CP20	4.062	5.23	1.168
CP17	4.227	5.04	0.813
CP22	3.389	5.15	1.761

Whilst the EA Ince and Frodsham modelling does not include an allowance for climate change, the soffit levels (for new or replacement crossings) are significantly above the in-channel water levels. The freeboard amount provided above the flood levels (minimum of 0.813m at crossing CP17) would mitigate against the future impacts of climate change.

Based on the data provided we would like confirmation that the existing EA Ince and Frodsham model can be used to inform the design of access crossings and that a new hydraulic model would not be required to inform access crossing design.

Yours sincerely,

[redacted]

[redacted]@waterco.co.uk

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Appendix A – Defence Cross Sections

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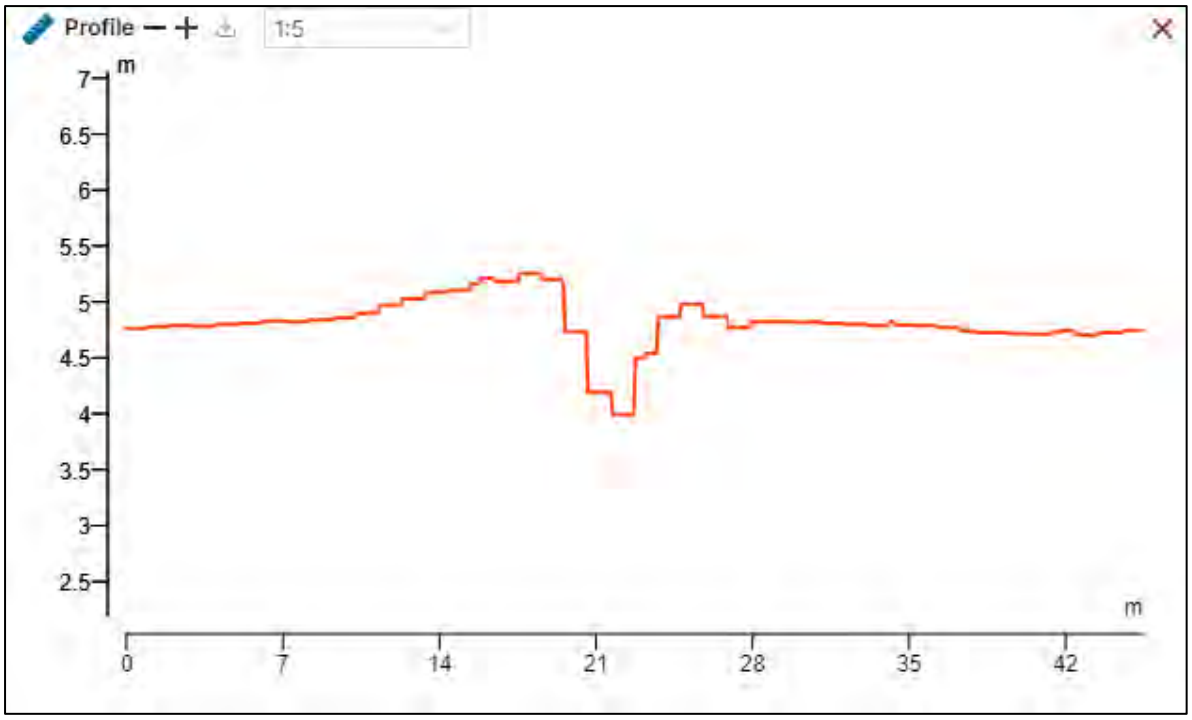
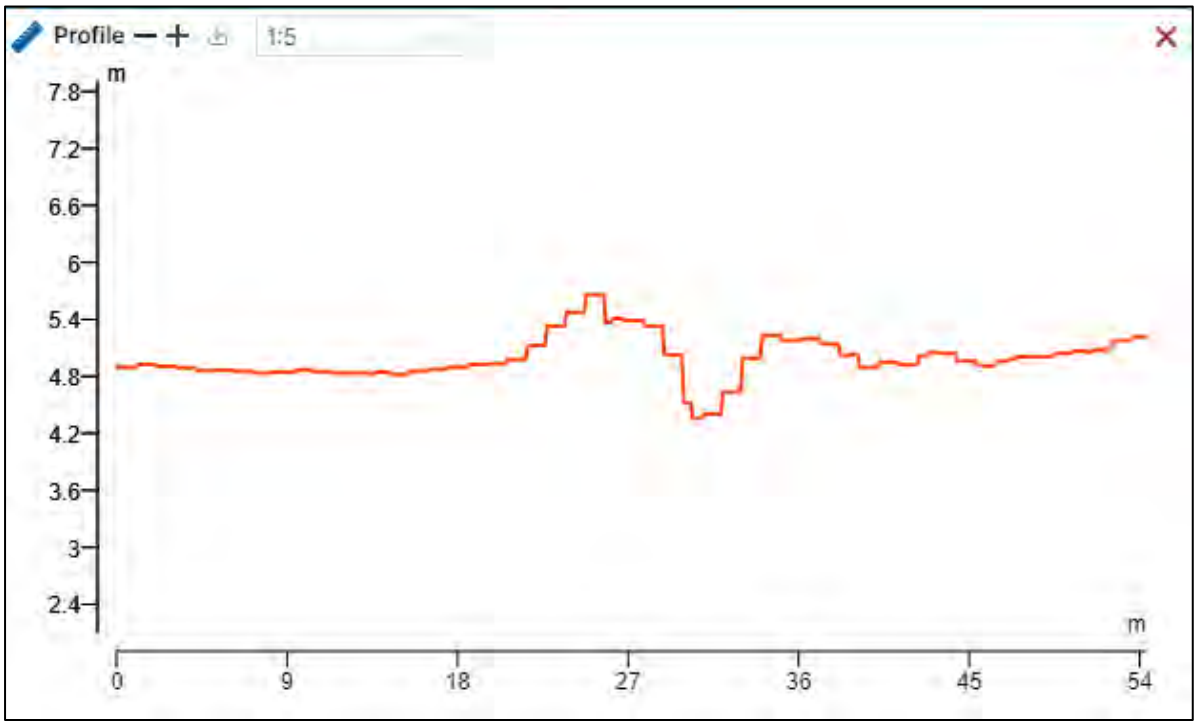
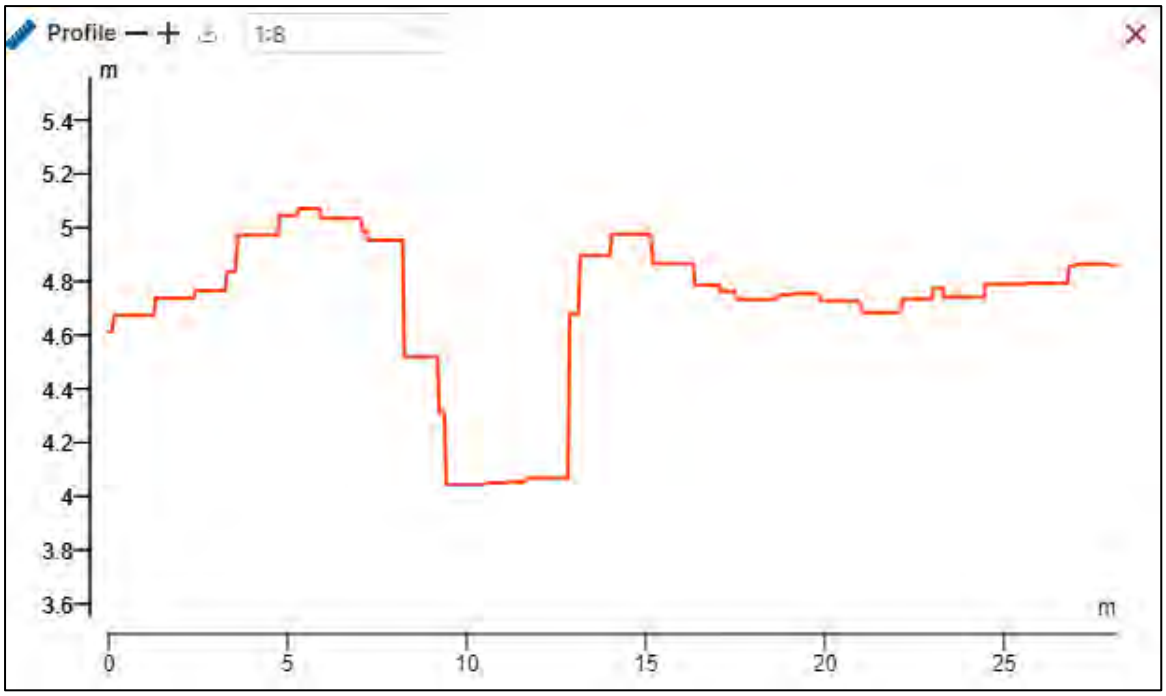
Crossing CP14



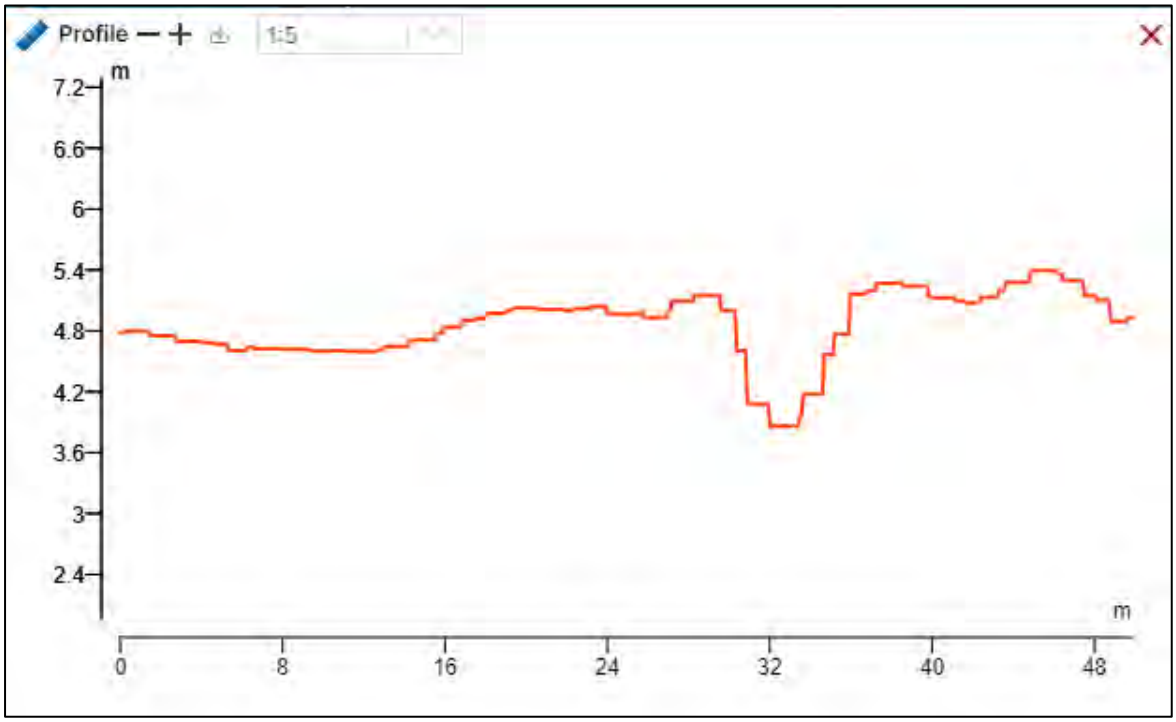
Crossing CP20



Crossing CP17



Crossing CP22



Appendix B – River Crossing Locations

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Q:\3251-3300\3272-01 Frodsham Solar DCO\Dwgs\GIS\Workspaces\Environmental Designations\Frodsham DCO PEIR Waterbodies v1.qgz

Crossing Points
Main Rivers
Ditches
Order Limits

W1
W2
W3
W4
D1
D2
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Project
Frodsham Solar PEIR

Figure Number
Appendix 2-1 Figure 1

Figure Title
Watercourse Crossing Points

Scale
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Date
October 2024

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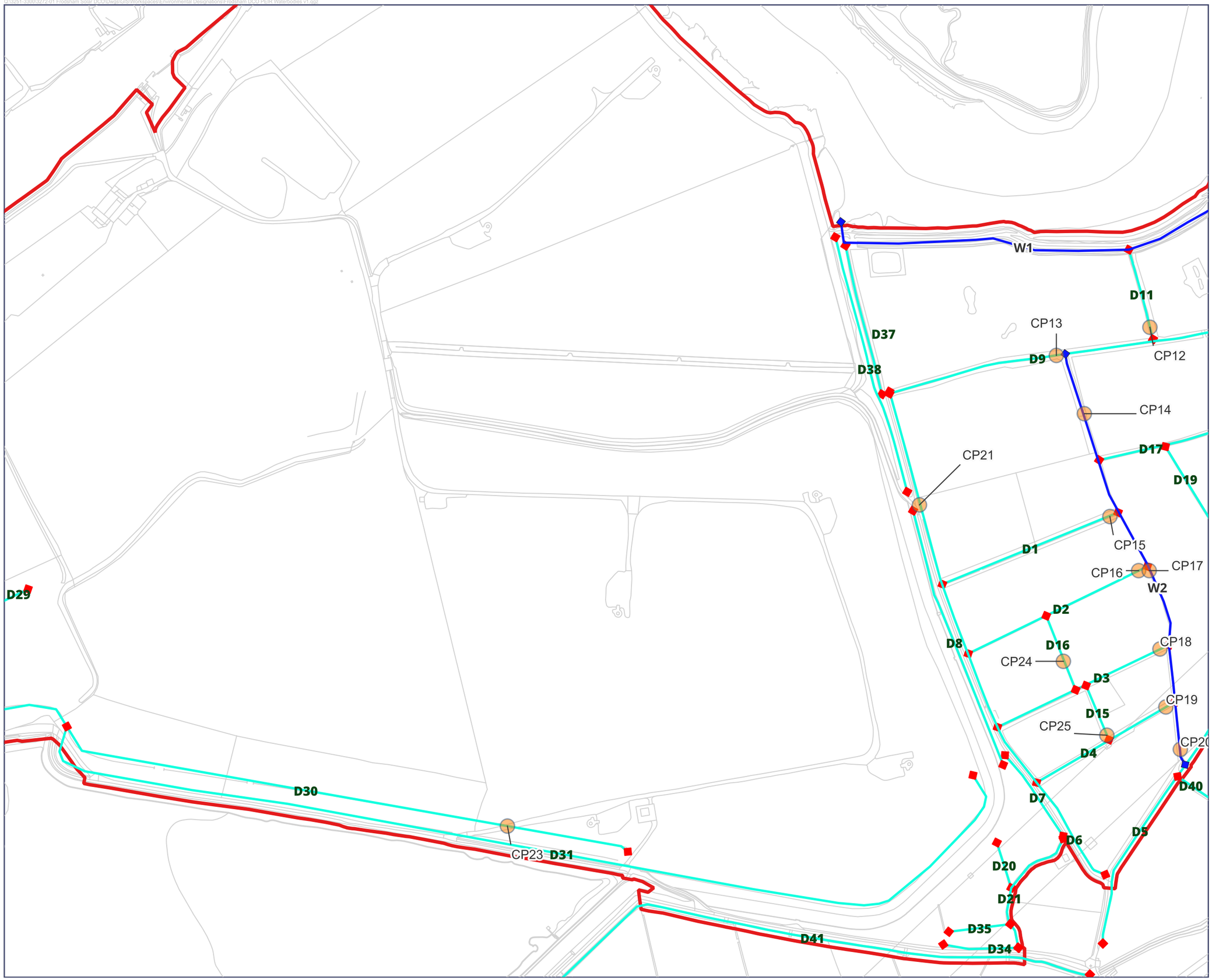

Crossing Points

Main Rivers

Ditches

Order Limits

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Project

Frodsham Solar PEIR

Figure Number

Appendix 2-1 Figure 2

Figure Title

Watercourse Crossing Points

Scale

1:5000@A3

Date

October 2024

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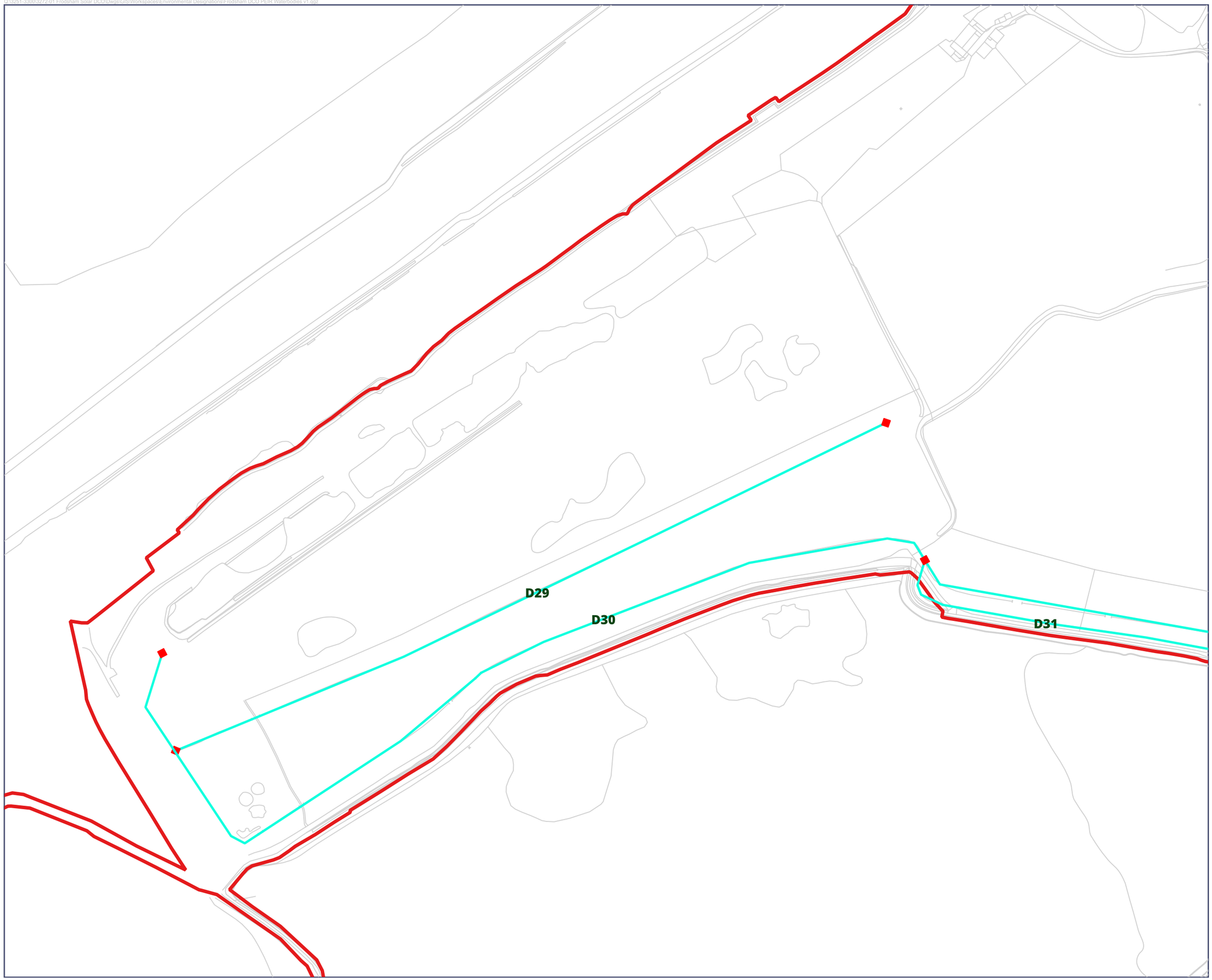

Ditches

Order Limits

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Project

Frodsham Solar PEIR

Figure Number

Appendix 2-1 Figure 3

Figure Title

Watercourse Crossing Points

Scale

1:5000@A3

Date

October 2024

Andrew Russell
AXIS
Unit 11 (Well House Barns)
Bretton
Chester
CH4 0DH

Our ref: XA/2024/100097/01-L01
Your ref: 01FRA

Date: 01 July 2024

Dear Andrew Russell

Flood Risk Assessment draft review (non-statutory)

Frodsham Marshes, Frodsham, Cheshire West and Chester

Thank you for consulting us on the "*Flood Risk Assessment & Drainage Strategy"* (dated 15 May 2024 reference: 14740-FRA & Drainage Strategy-02) by Waterco.

Planning policy
The Overarching National Policy Statement for Energy (EN-1) states under section 5.8.15 that a Flood Risk Assessment (FRA) should:

- *"Take the impacts of climate change into account, across a range of climate scenarios, clearly stating the development lifetime over which the assessment has been made"*
- *"Consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure and exceedance"*
- *"Consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the project may affect drainage systems. Information should include..."*

- *"Detail those measures that will be included to ensure the development will be safe and remain operational during a flooding event throughout the development's lifetime without increasing flood risk elsewhere"*

Climate change uplift and epoch

The FRA states that:

"A climate change allowance up to the year 2065 has been considered in this report. Modelled outputs with climate change up to the year 2115 has also been provided by the EA (and included in Appendix K) however are not considered further in this report, as the climate change amount (year 2115) exceeds the estimated decommission year (2070) by 45 years."

We appreciate that in previous advice provided by the Environment Agency (dated 10 February 2023, Reference: SO/2022/122782/01-L01) a climate change uplift of +30% was proposed. A +30% climate change allowance reflects the central estimate for the 2050's epoch for the Weaver Gowy Management catchment. However, this does not adequately consider flood risk throughout the lifetime of the development. Fluvial flood risk would therefore be underestimated based on the type of development proposed.

As the proposal is essential infrastructure, this means that climate change projections should conform to the following:

- the developer should use the 2080s higher central allowance for the climate change projections pertaining to peak river flow. The credible maximum scenario is the upper end allowance
  - the 2050s epoch is not appropriate, as the development's design life is 40 years. Using the 2080s epoch would include an uplift of +67% on fluvial flows
  - the Upper scenario should be run as a sensitivity test
  - ensure the corresponding tidal boundary conditions for the fluvial events within the Weaver model are uplifted to account for sea level rise, as a result of climate change
- the developer should use the higher central and upper end allowances for sea level rise. The credible maximum scenario is the H++ scenario and is based on sea level rise of 1.9 metres plus an allowance for surge
- regarding peak rainfall intensity, the developer should consider the 1% and 3.3% annual exceedance probability events using the central allowance for the 2070s epoch (2061 to 2125). In some locations the allowance for the 2050s epoch is higher than that for the 2070s epoch. If so, and development has a lifetime beyond 2061, use the higher of the two allowances

More information can be found here: Flood risk assessments: climate change allowances - GOV.UK (www.gov.uk)

Flood Risk

General

The FRA has not addressed flood risks associated with the construction and decommissioning phases. Within the FRA we would need to see details of specific risks associated with activities during these phases, and how these risks will be managed to avoid increasing flood risk on site. The issues we raise in this response letter should be considered in the assessment of those activities and the risks they pose.

We note that the developer intends to disapply Flood Risk Activity Permits (FRAPs). However we would need a level of detail within the FRA in order to allow for their disapplication.

The Environmental Permitting (England and Wales) Regulations 2016 require a permit to be obtained for any activities which will take place:

- on or within 8 metres of a main river (16 metres if tidal)
- on or within 8 metres of a flood defence structure or culverted main river (16 metres if tidal)
- on or within 16 metres of a sea defence
- involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert
- in the floodplain of a main river if the activity could affect flood flow or storage and potential impacts are not controlled by a planning permission

The developer should state what is included within the "Do Minimum" scenario (page 12).

The developer should state whether the proposed development may alter the risk category of the nearby reservoir(s) (pages 23 and 24).

The developer should consider how the porosity of the proposed roads will be maintained, in the context of compaction from vehicular use, throughout the lifetime of the development. This could be included within the maintenance schedule for permeable surfacing (pages 27 and 28).

The developer should assess future flood zones with consideration of climate change in the application of a sequential approach for components of the development.

Flood Storage Compensation

The developer will need to consider flood storage compensation for all structures within the design flood plus climate change flood extent. This includes the mounting structures / post for solar panels, the inverter stations, and changes in level from the roads. The developer should also consider the fluvial-tidal interaction. Flood storage compensation should:

- be level for level

- be volume for volume
- be localised
- achieve net gain where possible
- not disrupt flood flow routes

Please provide a crossing register for the proposed crossings, stating the type and precise position. These proposed crossings may require modelling to consider flow routes in a flood scenario, and flood storage compensation if within the design flood plus climate change flood extent. A bridge should be designed to a soffit of 600mm above design flood level, with a consideration of climate change (page 29).

Vertical offset

There is no vertical threshold over a main river beyond which a permit would not be needed (e.g., 20 metres above the river or bank would require a FRAP). There exists an exemption for power lines which are proposed to cross a main river, with a minimum acceptable height. This can be found here:

Guidance Exempt Flood Risk Activities: Environmental Permits

The developer should provide a freeboard of 600mm above the design flood level with consideration of climate change for sensitive equipment. The design flood is the more extreme event of either the 1 in 200-year tidal event, or the 1 in 100-year fluvial event; therefore the fluvial-tidal interaction may need to be considered.

Offset

The River Weaver is a main river until it approaches the confluence with the Manchester Ship Canal, and has tidal flood defences running alongside it. We would therefore require a 16-metre offset from these defences to ensure that there is appropriate access for maintenance, inspection, future raisings and replacement when required. A FRAP would be required for any works on or within 16-metres of tidal flood defences.

Structures need to be setback from the flood defences to allow for access, inspection, maintenance, replacement, and future raisings.

The FRA states that:

“Maintenance access to the Main Rivers and Ordinary Watercourses on site will be retained. Maintenance access will be secured by providing a minimum 8m buffer either side of the watercourses.”

Please clarify how 8m has been derived to be sufficient setback for access, inspection, maintenance, replacement, and future raisings. As mentioned above, a permit will be required for any works within 16m of tidal flood defences.

Surveys

The development site is located in an area which benefits from flood defences. The developer should survey the flood defences within the Order Limits, which will protect the proposed development and consider remediation.

Culverts

We would oppose the culverting of any watercourses and instead prefer the installation of a clear-span bridge crossing. This is in line with the Environment Agency's anti-culverting policy. We will normally only grant a permit for a culvert if there is no reasonably practical alternative, and if the detrimental effects would be sufficiently minor that a more costly alternative would not be justified, or there are reasons of overriding public/economic interest. The developer should consider the effects of proposed crossings on hydrology and geomorphology. The developer will need to model the hydrology of culvert installation and how this relates to flood risk.

Drainage Strategy

The drainage strategy should ensure that surface water flood flow routes are not adversely affected, such as with the placement of inverters and receiving watercourse(s) from formal surface water management for the BESS and substation. It is unclear whether the discharge to pumping stations from the development will increase. The Lead Local Flood Authority or Internal Drainage Board should be consulted on the proposed management of surface water.

We require more information on how surface water from inverters will be managed. The loss of footprint for runoff may require an engineered solution.

We require more information on the proposed watercourse into which the formal drainage for the substation and BESS will discharge into. An increase in discharge to the pumping stations would not be acceptable.

The FRA states that:

"Attenuation will be provided in the sub-grade of the compound's stone surfacing and will be sized to accommodate the 1 in 100 year plus 30% CC event."

We require more information on how this will work.

Modelling

General

The developer should consider the following scenarios:

- pump failure
- breach scenario - residual flood risk can lead to a different flood extent when compared with the undefended scenario
- the interaction between fluvial and tidal flood risks, for example the Lower Weaver (2020 model considered the impact of a 1% (1 in 100) annual

exceedance probability flow with a 0.5% (1 in 200) annual exceedance probability tide. Such scenarios can lead to greater flood depths and wider extents

If the developer utilises an existing model, it is important to check that it:

- represents current risk
- uses the latest available datasets
- complies with current modelling standards
- is at a scale suitable for the assessment being undertaken
- captures the detail required for a site-specific assessment
- makes use of current climate change allowances

We require access to the models for scrutiny to ensure that they are a sufficient evidence base for the FRA.

Please be aware that:

- Environment Agency models are not designed to assess third-party developments. The developer should not assume that the model is suitable for assessing the flood risk associated with the proposed development
- it is the developer's responsibility to assess the suitability of a model for the project
- the developer should provide evidence of any modelling checks and subsequent updates and document these in the FRA model reporting

It is always important to review hydraulic modelling information that is used for site specific FRAs. Recent guidance has been produced (December 2023) which is available online at: Using modelling for flood risk assessments - GOV.UK (www.gov.uk). In the case of the River Weaver, Manchester Ship Canal, Mersey Estuary, and Ince and Frodsham hydraulic models, please see further details which are provided below.

Manchester Ship Canal Hydraulic Model (Ch2m, 2018)

Despite a 30% climate change allowance being applied to the Manchester Ship canal model, given the freeboard available between the 100 year plus 30% climate change water levels and defence crest levels, updating the fluvial climate change uplifts within the model is not likely to change the flood risk to the site from the Manchester Ship Canal. Even for the 100 year plus 70% climate change scenario, there is still reasonable freeboard to top of bank levels as illustrated in **figure 1** within the appendix. We agree with the statement noted on page 19 of the Flood Risk Assessment that Flood Risk from the Manchester Ship Canal is very low.

Lower Weaver

The Lower Weaver Flood Mapping Study Hydraulic Model (JBA, 2020) has been reviewed recently by the Environment Agency (July, 2023), and is considered reasonable for assessing fluvial flood risk to the site from the River Weaver.

Mersey Estuary Hydraulic Model (JBA, 2016)

This model has been reviewed by the Environment Agency in September 2023. The tidal boundary conditions applied in the Mersey Estuary hydraulic model (JBA, 2016) have since been superseded by updated coastal flood boundary conditions (CFB, 2018) and updated climate change allowances for sea level rise.

Tidal flood risk to the proposed development site from the Mersey Estuary could be underestimated. The 200-year tidal level applied to the Mersey Estuary hydraulic model (JBA, 2016) peaks at a level of 6.13 metres above Ordnance Datum (mAOD). In comparison, the latest Coastal Flood Boundary data (CFB, 2018) suggests a 200-year tidal level of 6.42 mAOD at the outlet of the Mersey Estuary (chainage 1168). **Table 1** in the appendix outlines the differences in tidal water levels across a range of scenarios in further detail.

Please re-run the Mersey Estuary hydraulic model (JBA, 2016) with boundary conditions which reflect the latest available coastal boundary conditions and climate change uplifts, so that the impact to the proposed development site can be understood. **Table 1** provides some detail on tidal levels across a range of scenarios. Please also consider running an Upper and H++ scenario for sea level rise to test the resilience of your proposed development. Further guidance is available online at https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#credible-maximum-scenarios

Ince and Frodsham hydraulic model (Halcrow, 2011).

The Ince and Frodsham (2011) model may need to be updated to represent future flood risk (2080's epoch higher central and upper scenarios), particularly if the future flood risk has the potential to exceed the future flood risk from the River Weaver and Mersey Estuary.

Whilst the Ince and Frodsham model is over 10 years old and hydrological methods have been updated since this modelling was undertaken, the do-nothing water level modelling, where the Ince and Frodsham pumping stations are turned off, shows much lower water levels when compared to the tidal design (defended) scenario and River Weaver undefended scenarios.

Yours sincerely

[redacted]
Planning Specialist

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

Appendix 1

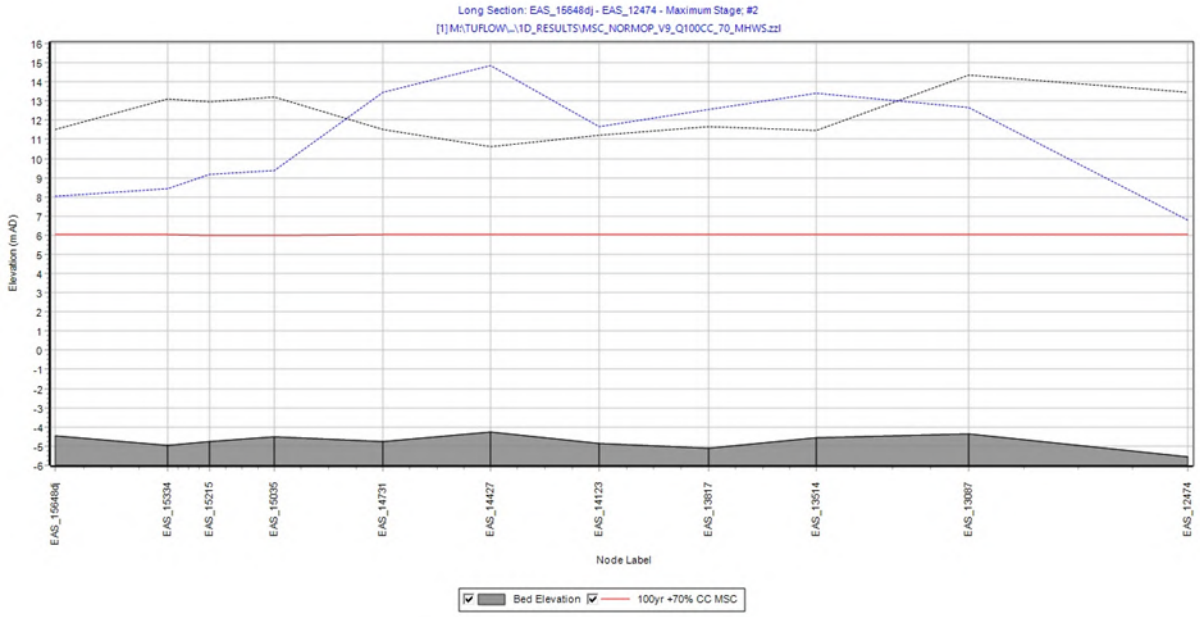
Table 1*: Tidal downstream boundary conditions for the Mersey Estuary taken from the Mersey Estuary hydraulic model (JBA, 2016) and the Coastal Flood Boundary dataset (2018). Sea level uplifts for different time periods are also shown (table 2) which have been added onto the CFB 200-year water level to determine updated climate change levels.*

Annual Exceedance Probability tide	Mersey Estuary 2016 model downstream Boundary level (mAOD)	Coastal Flood Boundary (CFB, 2018) level at chainage 1168 (mAOD)
0.5% (1 in 200)	6.13	6.42
0.5% (1 in 200) sea level rise to 2065	6.42	6.72
0.5% (1 in 200) sea level rise to 2070	Not applicable	6.77
0.5% (1 in 200) sea level rise to 2100	Not applicable	7.08
0.5% (1 in 200) sea level rise to 2115	6.83	7.24

Table 2*: Sea level rise estimates from 2018 based on uplifts presented for the North West river basin available online at:* Flood risk assessments: climate change allowances - GOV.UK (www.gov.uk)

Year	Sea level rise from 2018 higher central climate change (metres)
2065	0.30
2070	0.35
2100	0.66
2115	0.82

***Figure 1**: Manchester Ship Canal 100 year plus 70% climate change water levels between cross sections EAS_15648dj and EAS_12474 which represents the reach adjacent to the proposed Frodsham Marshes solar farm.*



Andrew Russell
AXIS
Unit 11 (Well House Barns)
Bretton
Chester
CH4 0DH

Our ref: XA/2024/100097/02-L01
Your ref: 01FRA

Date: 01 August 2024

Dear Andrew Russell

Re-consultation flood risk assessment draft review (non-statutory)

Frodsham Marshes, Frodsham, Cheshire West and Chester

We have reviewed the documents titled *"14740-EA FRA Letter-01"* (dated 15 July 2024) by Waterco. We respond as follows.

Table 1 page 1 – Tidal Mersey Flood Events

The scenarios presented in table 1 for the Mersey Tidal events are reasonable. For the sea level rise uplifts for future climate change, please see table 1 within the climate change guidance available online at Flood risk assessments: climate change allowances - GOV.UK (www.gov.uk). This provides the sea level uplifts for the Northwest to apply for different epochs.

Figure 1 page 2 - Mersey Breach location

The approach and location with regards breaching of the Mersey Estuary Flood Defences is considered reasonable. Please note, the defences at the suggested breach location are represented in the Mersey Estuary hydraulic model (JBA, 2016) using a Flood Modeller Spill unit, rather than a Tuflow elevation (z) line. The Flood Modeller spill unit will need to be edited to account for the breach. With regards to representing breaches within the hydraulic model, please refer to the attached guidance on undertaking breach assessments (LIT 56413). Table 1 within this document suggests breach widths and closure times for different defence types.

Table 2 page 2 and 3 – Lower Weaver Flood Events

The Lower Weaver scenarios presented in table 2 are reasonable. The climate change scenarios are the 1% (1 in 100) plus 67%, which reflects the higher central allowance

for the 2080's epoch for the Weaver and Gowy management catchment. In addition, an upper end scenario is proposed which is the 1% (1 in 100) plus 106%. This is reasonable. A joint probability scenario is also proposed which is welcomed. This combines the 1% (1 in 100) plus 67% higher central scenario with the 0.5% (1 in 200) tidal level plus upper end sea level rise to 2100. Whilst the fluvial and tidal uplifts do not align for the joint probability scenario, this combination is considered precautionary and therefore reasonable.

Figure 2 page 3 - Weaver Breach location

The location of breaches 1 and 2 on the River Weaver are considered reasonable. Embankments along the River Weaver within the Lower Weaver hydraulic model (JBA, 2020) are represented within Tuflow. Incorporating breaches within the Lower Weaver hydraulic model at the proposed locations should be achievable using variable elevation (V_zsh) shapes. Please refer to the guidance on undertaking breach assessments (LIT 56413) for breach widths and closure times for earth embankments.

Page 3 - River Ince and Frodsham modelling

The justification to not update the Ince and Frodsham hydraulic model is considered reasonable. Design water levels for the Mersey Estuary defended scenario are higher than both the defended and pump station failure water levels, from the Ince and Frodsham modelling.

Page 4 - Sensitivity Scenarios

Running a credible maximum scenario is required, so that the resilience of the site to more severe climate change can be understood. There is no requirement to design to accommodate the credible maximum scenario; although testing a credible maximum scenario helps us to understand the resilience of the development, and helps you to understand how the site would be managed if more severe climate change were to occur. Some potential purposes of the sensitivity testing are as follows:

- This allows us to find areas where a small increase in level would cause inundation of a large area – the "cliff edge" effect.
- It may help to inform the placement of infrastructure to ensure resilient design.
- It may help to inform the access routes to ensure safe ingress and egress during a flood event.

The CCA .gov page states that you should check the relevant National Policy Statements to see if it is necessary to assess a credible maximum scenario. Most energy generating development will need to consider a credible maximum scenario, and demonstrate how proposals can be adapted to remain resilient in such a scenario.

Page 4 - Flood risk Activity Permits

We would require site-specific details for works within 16 metres of tidal defences, or 8 metres of fluvial defences, as measured from the most landward extent of the flood assets or within the channel itself. As a starting point, we need a comprehensive list of works within this buffer and the proposed methodology. We can then advise further on the appropriate level of details needed, to help manage flood risks within the context of disapplying FRAPs.

The constraints at each crossing (vehicular or cable) are distinct and the design is likely to depend on site-specific hydraulic modelling, we would therefore require site-specific technical drawings of each crossing proposed and a Crossing Register showing the coordinates and type. Additionally, we will require:

- A pre-works and post-works survey of flood assets adjacent to the proposed crossing locations and a commitment to remediate defects identified.
- The developer should obtain as-built drawings of flood assets to help inform their proposed design and methodology, this may need to be informed by site investigation (e.g., trial pits).
- The developer should assess vibration from proposed works within close proximity to the flood assets.
    - They may need to install real-time monitoring of vibration to ensure that works are within a safe threshold such that there is no detriment to the flood assets.
    - Further to this, the developer should assess whether changes in level such as ground raising, or excavation, could have a detrimental effect on flood assets.
    - The surcharge caused by vehicles and plant would need to be assessed if in close proximity to flood assets.

Ultimately, we require more details about the activities proposed, to form a view of what information we will require to help manage the flood risks.

Our legal department is currently reviewing our wording for the disapplication of FRAPs. If you wish to proceed with disapplying the FRAPs for your project, please be aware that we will need to use this current wording, and therefore we may need to review it in due course.

Page 4 - Flood Storage Compensation

The proposed calculation to assess the displaced volume from the mounting supports for the solar panels and inverters is considered reasonable and is a good starting point.

In line with paragraph 165 of the National Planning Policy Framework, we cannot allow an increase in flood risk on site or elsewhere. Flood storage compensation is required even if the increase in level is relatively small. This should be considered in the context of climate change throughout the lifetime of the development.

Flood storage compensation should:

- Be level for level.
- Be volume for volume.
- Be localised.
- Achieve net gain where possible.
- Not disrupt flood flow routes.

Page 6 - Design of access crossings

We require a crossing register to help us understand the risks at each crossing location. The crossing design should be informed by site-specific hydraulic modelling. This will allow the developer to accurately assess the appropriate bridge soffit level, ensuring that there is appropriate freeboard (i.e., 600mm) above the design flood plus climate change flood level. Without hydraulic modelling it is not clear how the developer has determined *"There is no out of channel flooding from the watercourses at the access road crossing locations."* Please provide evidence in support of this position.

Page 7 - Offsets

In line with the Environment Agency's Condition Assessment Manual, "high ground" is categorised as a type of flood defence. As the defence is categorised as both fluvial and tidal, we would require an offset of 16 metres.

The asset data and an estimate of the crest line is available online at Asset Information and Maintenance Programme (data.gov.uk). We would suggest that for assets categorised as "high ground", that the developer use the crest level data here to help inform the measurement of horizontal offset. Otherwise, the horizontal offset should be measured from the most landward extent of the flood defence.

Page 8 - Surveys

Where crossings of the watercourse are proposed, we will require a pre-works and post-works condition survey of adjacent flood assets, and a commitment to remediate defects identified.

Page 8 - Culverts

The use of open span crossings over culverts is welcomed. Please see the response to the design of access crossings above for further details.

Page 8 - Surface Water Drainage

We are concerned about the FFL of the inverters. Sensitive equipment should be 600mm above the design flood plus climate change level. The site must remain operational in a flood event.

Raising the inverters off the ground level may negate the influence on surface water flood risk by minimising the impermeable area. As this area has pumped drainage surface water flood risk has direct implications on fluvial flood risks. We would encourage the developer to seek the LLFA's "buy-in" on surface water management.

Yours sincerely

[redacted]
Planning Specialist
Direct e-mail NITeam@environment-agency.gov.uk

[redacted]
Waterco Ltd
Eden Court Business Centre
Lon Parcwr Industrial Estate
Ruthin
Clwyd
LL15 1NJ

Our ref: XA/2024/100199/01-L01
Your ref: Stat Con: PEIR

Date: 19 December 2024

Dear [redacted]

SECTION 42 OF THE PLANNING ACT 2008: STATUTORY CONSULTATION ON PROPOSED FRODSHAM SOLAR FARM DEVELOPMENT CONSENT ORDER.

FRODSHAM MARSHES, FRODSHAM, CHESHIRE WEST AND CHESTER

Thank you for consulting the Environment Agency on the Preliminary Environmental Impact Report for Frodsham Solar Farm.

We have reviewed the documents (listed in appendix A) and have listed the key issues below. Detailed comments have been made in Appendix B-H, with additional information in Annex I.

We recommend using our pre-application advice service to discuss and resolve any planning matters in advance of the Inquiry process.

Our views are in response to the materials provided as part of the consultation only.

Our headline issues are:

1. **Fisheries:**
    - 1.1. Further survey data needs to be collected, to ensure that species' baselines are characterized appropriately
    - 1.2. Sufficient mitigation needs to be incorporated into the design to ensure that impacts to fish species are minimized, and habitats are not damaged.

2. **Flood Risk:**

2.1. We require the most conservative flood level - tidal - to derive the design flood level.

2.2. Climate change needs to be taken into account for the flood modelling, to ensure the development's resilience.

3. **Geomorphology:**

3.1. Watercourse crossings should be designed to ensure they do not interfere with the natural processes in the area, and the watercourse bed.

4. **Biodiversity:**

4.1. Survey datasets need to be more robust, to understand the baseline for Biodiversity Action Plan (BAP) species.

4.2. The impacts to a BAP habitat of principle importance needs to be assessed to a greater extent.

5. **Groundwater and Contaminated Land:**

5.1. Risk assessments and monitoring are required for any works within the area of dredged refill.

5.2. The inclusion of a drainage plan in the outline Environmental Management Plan (oEMP) is necessary. This should demonstrate how contaminated water from Battery Storage Systems (BESS) will be contained, in the event of a fire.

5.3. Clarity should be provided on the scope of Foundation Works Risk Assessment (FWRA) and the Piling Risk Assessment (PRA).

6. **Water resources:**

6.1. Water supply, demands, activities and usages need to be clearly identified, developed and outlined in a water supply strategy

Any requests to disapply any permits or consents should be sent to us in writing as soon as possible, to allow us sufficient time for their consideration (minimum 6 months). Sufficient time is required to ensure we can appropriately respond to discharge of requirements and protective provision consultations. Please ensure in your Development Consent Order (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.

Our advice has been provided under our chargeable service agreement: **ENVPAC/1/NIT/00026.**

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.

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.

Yours sincerely

[redacted]
Planning Specialist

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

LIST OF APPENDICES

APPENDIX A – REVIEWED DOCUMENTS

Preliminary Environmental Information Report Volume 1 – Main report, Chapter 1: Introduction. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 1 – Main report, Chapter 2: Proposed Development. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Appendix 2-1: Indicative Watercourse Crossing Schedule. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Appendix 2-2 Indicative Construction Phasing and Resource Schedule. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Appendix 2-3: Outline Construction Environmental Management Plan. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Figure 2-1 Construction Compound and Access Track Layout. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Figure 2-2 Indicative Operational Site Layout. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Figure 2-3 Illustrative Environmental Masterplan Sheets. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Figure 2-4 Public Rights of Way and Permissive Paths and other Recreational Routes. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 1 – Main report, Chapter 4: Methodology. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 1 – Main report, Chapter 7: Terrestrial Ecology. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Appendix 7-1: Baseline Habitats and Desk Study Report. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 1 – Main report, Chapter 9: Flood Risk, Drainage and Surface Water. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Appendix 9-1: Flood Risk Assessment and Drainage Strategy. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Appendix 9-2: Water Framework Directive Assessment. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Appendix 9-3: Hydraulic Modelling Report. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Appendix 9-4: Consultation Responses Report. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 1 – Main report, Chapter 10: Ground Conditions. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 2: Technical Appendices, Appendix 10-1: Stage 1 Geo-Environmental Assessment. Dated October 2024. Reference EN010153

Preliminary Environmental Information Report Volume 4: Non-Technical Summary. October 2024. Reference EN010153

APPENDIX B – FISHERIES

Policy and legislation *(Chapter 7; Section 7.2, paragraph 7.2.1)*

Issue
The Salmon and Freshwater Fisheries Act 1975 has not been included in the list of legislation that is relevant to biodiversity. The legal responsibility on the developer pertaining to this fish specific legislation has not been considered.

Impact
This infers the impacts on fish from the construction, operation and decommissioning have not been fully considered.

Solution
This legislation should be listed in the biodiversity chapter of the Environmental Statement (ES). Steps need to be taken to ensure the requirements of the Salmon and Freshwater fisheries act are incorporated into the design.

Additional comment
Parts of The Salmon and Freshwater Fisheries Act 1975 relevant to this type of development and that should be considered, are (but not exhaustive) Part 1, Sections 2 and 4.

Pilling Mitigation *(Chapter 2; Section 2.4, paragraph 2.4.0 and Chapter 7; and Section 7.8, Paragraph 7.8.60)*

Issue
Mitigation from piling may not fully protect fish.

Impact
Noise may be generated during the installation of coffer dams, especially where any piling is to take place. Noise can kill fish over short distances and disrupt natural behaviours, like migration over medium to large distances.

Solution
Noise associated with piling (particularly percussive piling) should be assessed for impacts on fish. Mitigation measures for this may include sheet piling being installed by vibro-piling as the default method.

Fish Species Management *(Chapter 2, Section 2.4, paragraph 2.4.136 and Chapter 7, Section 7.7; paragraph 7.7.5-7.7.6)*

Issue

The construction of the Non-Breeding Bird Mitigation Area (NBBMA) does not include how native and (potentially) non-native fish species will be managed in the existing ponds in cell 3.

Impact
Protected fish species may be harmed or killed during the construction works.

Solution
The Construction Environment Management Plan (CEMP) should include details on managing any fish (native and non-native) within the existing ponds. This is particularly applicable should ponds be infilled and thus drained down.

Invasive Non-Native Fish Species Management *(Chapter 2, Section 2.4, paragraph 2.4.136 and Chapter 7, Section 7.7; paragraph 7.7.5-7.7.6)*

Issue
The construction of the Non-Breeding Bird Mitigation Area does not include how native, and (potentially) non-native fish species, will be managed in the existing ponds in cell 3.

Impact
The construction works may lead to the spread of non-native fish species and/or associated pathogens.

Solution
The Construction Environment Management Plan (CEMP) should include details on managing any fish (native and non-native) within the existing ponds. Where invasive non-native fish species are present in the ponds, this should include a Requirement for an invasive non-native species management plan.

Decommissioning Fish Mitigation *(Chapter 2, Section 2.8, paragraph 2.8.25)*

Issue
Mitigation for fish species and their habitat does not cover the decommissioning and removal of cables.

Impact
Removal of decommissioned cables may lead to damage of habitat and/or disturbance/harm to fish species.

Solution
Where underground cables are removed, similar precautions and protocols for fish during the installation of cables (as outlined in 2.4.147, 2.4.148, 7.7.36 and 7.7.37) should be followed. Consideration should also be given in the ES as to whether

removal of decommissioned cables is necessary. The removal of cables could lead to unnecessary disturbance to habitats and species on the site.

Baseline Survey Data *(Chapter 7, Table 7-2)*

Issue
Baseline survey data is not appropriate. Third party fish data not being guaranteed, or sufficient fish baseline data not being available.

Impact
The level of impact on fish from the development may not be captured/assessed in the EIA. As such, mitigation design may not be sufficient in protecting fish species.

Solution
Where third party data is not available, then a contingency needs to be in place to ensure the baseline fish characteristics of the site are captured. We would expect to see details of the third-party data, including location of surveys, methodology, and when surveys were conducted.

Over Pumping and Cofferdam Mitigation *(Chapter 7, Section 7.7, paragraph 7.7.36)*

Issue
Insufficient detail in the mitigation for fish when over pumping and coffer damming sections of watercourse.

Impact
Fish fry, lamprey, elvers and glass eel may be entrained into pumps, where screens are not designed correctly. Fish may also be missed during inspections of coffer dammed areas.

Solution
Screens on pumps should be suitable to protect elvers and glass eel from entrainment, the default screen aperture size would be 2mm. Inspection of coffer dammed area for fish should be done using electric fishing, or fine mesh seine netting techniques. The term inspecting assumes a visual check, where small fish (such as juvenile eel, lamprey, fish fry) may be missed.

Dewatering Mitigation *(Chapter 7, Section 7.7, paragraph 7.7.37)*

Issue
Insufficient detail in the mitigation for fish when dewatering coffer dammed sections of watercourse.

Impact
An increase in fine sediment running into watercourses could have a negative impact on fish. This may include smothering important spawning gravels, clog interstitial spaces in gravel, impact on fish egg and larval development, and reduce fish's ability to respire due to clogging of gills.

Solution
In terms of dewatering mitigation measures, considerations should also be given to using Silt Busters, to protect downstream watercourses from silt inputs during prolonged dewatering. Trench digging may cut into elevated water tables, necessitating an extended period of water level management in a 'de-watered' watercourse footprint. In such a scenario, water may need to pass through a Silt Buster prior to release.

APPENDIX C – FLOOD RISK

Climate Change Flood Modelling (*Appendix 9-1: Flood Risk Assessment and Drainage Strategy, Paragraph 9.6.32 - 9.6.39 and Non-Technical Summary, Paragraph 2.1.6.)*

Issue
The Ince and Frodsham modelling does not consider climate change.

Impact
The modelling does not represent flood risk throughout the lifetime of the development.

Our approach is supported by Section 5.8.15 of EN-1 Overarching National Policy Statement for Energy, which states that Flood Risk Assessments (FRA) should consider a range of flooding events and be supported by appropriate data.

Solution
Carry out the modelling with a 67% increase in peak flow rate.

Bridge and Cable Crossings of Watercourses *(Non-Technical Summary, Paragraphs 2.4.118, 2.5, 3.2.2. Appendix 2-1 Indicative Watercourse Crossing Schedule. Table 2-9: Further associated development within the draft Order Limits in connection with the delivery of Work Nos 1 – 6. Figure 2-5j Indicative Permanent Watercourse Crossing.)*

Issue
We are concerned with details of the proposed crossings, namely the:

- the soffit level of the bridges
- the potential extension of existing culverts

Impact
The bridges may restrict future maintenance of the watercourse and works to flood assets. Culverts can lead to an increase in flood risk, have a risk of blockage, and pose a maintenance burden.

Solution
Alternative cable crossing options should be considered. The soffit levels of bridges should be raised 600mm above the design flood level. We recognise this may have knock on effects to the proposed development, and would encourage the developer to liaise with us further on this issue.

Instead of installing / extending (existing) culverts, the applicant should consider installing a clear-span bridge crossing. Given that there are circa 25 crossings as part of this proposal, the applicant will need to model changes in flood risk from the proposed crossings.

Our position on this is supported by paragraphs 2.10.87 and 2.10.88 of National Policy Statement EN-3, which state that:

- culverting existing watercourses should be avoided
- 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.

Construction Phase Flood *(Non-Technical Summary, Paragraphs 3.2.5, 3.2.6, 2.4.169, 2.5.2, 2.5.9, 2.5.13. Table 2-7: 132kV Electrical Connection Design Parameters. Figure 2-1 Construction Compound and Access Track Layout. Table 9-8: Significance of Construction Effects.)*

Issue

A significant area of the site has been demonstrated to be at risk of flooding, and specific mitigations for these areas should be considered for the construction phase. It is unclear why the applicant has asserted that flooding during construction is unlikely (see Table 9-8).

Impact

There is a risk of flooding during the construction phase, which may jeopardize construction efforts, and increase flooding elsewhere. For example, the present-day tidal design event may inhibit safe access and egress to receptors on site during the construction phase.

Solution

The applicant should provide justification for assertions relating to the categorisation of construction phase flood risk significance. A sequential approach should be applied to the placement of the construction compounds (two main construction compounds, four secondary compounds, and two construction compounds north of the River Weaver) and mobile welfare units. East Compound 1, 2 and 3 (PEIR Volume 3 Figure 2-1) may be at risk of flooding, which should be avoided where possible***.***

Additional comment

As stated in section 2.5.2, the construction phase could last longer than the assumed 30-month programme assessed; therefore we would expect a conservative estimate of the construction phase duration, in the context of assessing flood risks.

Setbacks and Buffers *(Chapter 1 Introduction, Paragraph 1.3.10, 2.4.29, 2.4.162, 9.8.23, Appendix 9-1: Flood Risk Assessment and Drainage Strategy.)*

Issue
It is unclear whether setback/buffers are applicable to all phases of the development.

Impact
The proposed works may adversely affect flood assets (such as engineered embankments) and prevent access to the flood assets for inspection, remediation and replacement during all phases.

Solution
Where possible, we would seek setback from the watercourses for all phases. We require clarity on the proposed setback distance, including where this is measured from, and where this is applicable to all watercourses within the Order Limits.

Submerged Modules / Remaining Operational *(Appendix 9-1: Flood Risk Assessment and Drainage Strategy and Non-Technical Summary, Paragraph 6.6.12)*

Issue
The applicant has suggested that some solar PV modules would be allowed to flood in extreme events. We would not consider it acceptable for solar PV modules to be submerged in the (tidal) design flood event. If electrical infrastructure in specific areas of the site is isolated, then it is no longer operational.

EN-1 section 4.10.11 applicants should demonstrate that proposals have a high level of climate resilience built from the outset and should demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario.

Impact
The solar PV modules may no longer be operational during the design event and could inhibit flood flow routes.

Our approach is supported by Section 5.8.9 of the National Policy Statement for Energy (EN-1), which states that the sequential approach should be taken regarding locating development within a site. If this cannot be done, then the development should satisfy both elements of the exception test, particularly whether the development is safe for its lifetime.

Solution
The applicant needs to ensure that the site remains operational in times of flooding; this includes all solar PV modules being 600mm above the design flood level.

Impermeable Areas
(Chapter 1 Introduction, Paragraph 1.3.13. Chapter 2 Proposed Development, Paragraph 2.4.141, 2.4.152, 2.6.11.)

Issue
The applicant should ensure that proposed impermeable areas (such as the new public car parking area on Moorditch Lane and road matting) do not significantly increase the rate of runoff.

Impact
As the surface is impermeable, there would not exist natural processes to reduce the rate of runoff, such as interception and infiltration, leading to an increase in the rate of runoff. An increase in runoff rate can lead to an increase in fluvial flood risk.

Solution
Where feasible, we advise the applicant to include SuDS for all proposed impermeable areas utilising the SuDS Manual. Further consultation with the Lead Local Flood Authority (LLFA)/Local Planning Authority (LPA) on this matter is recommended to ensure a joined-up approach.

Flood Modelling Design event and 600mm Freeboard
(Chapter 2 Proposed Development, Paragraphs 2.4.17, 2.4.18, 2.4.35, 2.4.39, 2.4.41, 2.4.48. Images 2-2, 2-3, 2-4. Figure 2-5a Indicative Solar PV Modules, Figure 2-5b Indicative String Inverter. Figure 2-5c Indicative Power Conversion Unit (PCU). Figure 2-5j Indicative Permanent Watercourse Crossing. Appendix 9-1: Flood Risk Assessment and Drainage Strategy, Paragraphs 9.7.4, 9.7.12, 9.8.30, 9.8.31.)

Issue
The applicant has not used the most conservative design flood event to derive the design flood level. In this case, the tidal design event is more conservative than that of the fluvial design event (for example see 9.7.4 and 9.7.12). Notably there seems to be an inconsistency in the proposed tidal design flood level (see 9.7.12, Appendix 9-1: Flood Risk Assessment and Drainage Strategy pages: 25, 26, 30, and 39).

Impact
The proposal is not derived using the appropriate design flood level, and therefore hasn't adequately assessed flood risk to the site and elsewhere.

Our approach is supported by Section 5.8.15 of the National Policy Statement for Energy (EN-1), which states that FRAs should consider a range of flooding events and be supported by appropriate data.

Solution
Baring the assessment of cumulative impacts of fluvial and tidal sources, with consideration of joint probability analysis being more extreme, we anticipate that the applicant utilises the level derived from the Upper End tidal hydraulic model for the defended scenario. Sensitive equipment should then be positioned with a 600mm freeboard above the design flood level.

Bridge soffits, solar PV modules, combiner boxes, string inverters, and junction boxes need to be 600mm above the (tidal) design flood level. Centralised Inverters, transformers, power conversion units, standalone inverters finished floor levels need to be 600mm above the (tidal) design flood level. The applicant needs to clarify the tidal design flood level, and adjust the design as required. This may also influence the calculations relating to flood storage compensation, which should be updated.

Watercourse Crossings *(Chapter 2 Proposed Development, Paragraph 2.4.152)*

Issue
Temporary, pre-fabricated ditch crossings are proposed for use, with no detail provided regarding their form and installation. Permanent watercourse vehicular crossings are shown (figure 2-5j), but not temporary crossings.

Impact
Without an understanding of how the temporary crossings are designed, we are unable to determine a potential increase in flood risk.

Solution
We require more information about the proposed prefabricated bridges and whether these will be safe in a flood event.

Flood Flow *(Chapter 2 Proposed Development, Paragraph 2.4.157, 2.4.159. Table 2-9: Further associated development within the draft Order Limits in connection with the delivery of Work Nos 1 – 6.*)

Issue
Fencing is proposed in flood zones.

Impact
Fencing may impede flood flow routes.

Solution
The applicant should demonstrate that the solar panel permitter fencing will not increase flood risk elsewhere.

Additional comment
In a meeting with the applicant on 11 November 2024, we discussed floodplain compensation for the proposed scheme. The applicant has presented information on volume of storage lost because of the solar panel supports and other associated infrastructure. The applicant suggested that they would test the impact of solar panel supports within the hydraulic model. A similar approach could be taken for the permitter fencing. We acknowledge this will be difficult to test explicitly, however, this could be achieved using a flow constriction layer or elevated roughness approach. We welcome the opportunity to discuss this further with the applicant.

Drainage
(Chapter 2 Proposed Development, Paragraph 2.4.145, 2.4.155. Table 2-9: Further associated development within the draft Order Limits in connection with the delivery of Work Nos 1 – 6.)

Issue
Stone access tracks are likely to become decreasingly permeable from compaction and repeated vehicular use.

Impact
May lead to an increase in the rate of runoff due to a reduction in void ratio and capacity for effective drainage, by forming an impermeable surface throughout the lifetime of the development. An increase in runoff rate can lead to an increase in fluvial flood.

Solution
Assuming appropriate ground conditions swales are likely to be needed. Further consultation with the LLFA / LPA on this matter is recommended to ensure a joined-up approach.

Phasing of Works
(Chapter 2 Proposed Development, Paragraph 2.5.3, 2.5.4. Appendix 2-2 Indicative Construction Phasing and Resource Schedule.)

Issue

Flood storage compensation is not proposed to be completed before construction of components.

Impact
Increased flood risk to third parties.

Solution
Flood storage compensation is needed as part of the proposal, and should be completed before the construction of components which require flood storage compensation.

CEMP / OCEMP *(Non-Technical Summary, Paragraph 5.2.2, 6.2.11,6.6.15. Appendix 2-3: Outline Construction Environmental Management Plan. Table 5-9: Summary of the construction mitigation and management measures)*

Issue
The CEMP/OCEMP should contain a comprehensive list of mitigations to ensure that flood risk is managed safely during the construction phase.

Impact
If the proposed mitigations are insufficient, then the construction phase could be vulnerable to and increase flood risk.

Solution
We require a comprehensive list of mitigation measures, to ensure they are sufficient to safely manage flood risks during the construction phase.

We would advise consideration of the below within the CEMP.

- Vibration: Realtime vibration detection adjacent to flood assets to ensure that vibration is within safe limits and agreed thresholds for action and remediation.
- Scaffolding: If using scaffolding, then fix boards in place.
- Flood Warnings / Alerts: Sign up for flood warnings and alerts with works to stop and site made safe and evacuated during a flood event.
- SuDS: Temporary SuDS should be provided for all impermeable surfaces.
- Debris: Measures to prevent debris entering the watercourse during a flood event.
- Surveys: Where works are proposed close to a flood defence, we will require a survey to better understand it's geometry, condition, composition, structure, etc. Where possible the survey should be corroborated by as-built drawings.

- Buffer: There should be an appropriate buffer from the watercourse which could be demarked by Heras fencing, this helps to ensure no adverse effects to the watercourse and flood assets.

Tree Planting *(Figures 2-3 Illustrative Environmental Masterplan Sheets a, b, c, d and e)*

Issue
Planting trees within easements of both tidal (8m) and fluvial (16m) flood assets.

Impact
The roots of these trees have the potential to undermine the stability of flood defence assets.

Solution
Assets will require root protection.

Use of Third-party Data *(Chapter 9 Flood Risk, Drainage and Surface Water, Paragraph 9.3.1)*

Issue
The use of third-party data for the assessment of flood modelling.

Impact
Flood modelling will not assess the full extent of flood risk of the proposed development.

Solution
The applicant should provide evidence of any modelling checks, subsequent updates and document these in the FRA model reporting.

All our models are built for our own specific purposes and are made available as is. It is the responsibility of all applicants to ensure that the models are fit for their intended purposes and in line with the following government guidance:

- https://www.gov.uk/guidance/using-modelling-for-flood-risk-assessments
- https://www.gov.uk/government/publications/river-modelling-technical-standards-and-assessment/river-modelling-standards-who-theyre-for-and-how-to-use-them
- https://www.gov.uk/government/publications/river-modelling-technical-standards-and-assessment

If modelling is used to support an application, then it will need to be reviewed and confirmed as meeting the above standards.

Additional comment
Please be aware that:

- Environment Agency models are not designed to assess third-party developments. The applicant should not assume that the model is suitable for assessing the flood risk associated with the proposed development.
- It is the applicant's responsibility to assess the suitability of a model for the project.

Ince and Frodsham Pumping Station *(Chapter 9 Flood Risk, Drainage and Surface Water, Paragraph 9.6.27)*

Issue
The proposal adds receptors into the catchment drained by the Ince and Frodsham pumping station.

Impact
This creates additional burden on these facilities (Pumping Stations).

Solution
Form a contingency plan for the Ince and Frodsham pump failure scenario (which includes access to temporary pumps), with the consideration of the tidal design flood event. Additionally, discussions should be held regarding financial contributions or asset ownership to help with the maintenance burden or future options to decommission the assets, noting the proposal is dependent on the Ince and Frodsham pumping stations.

Additional comment
Our position is supported by the following:

- Section 5.8.15 of EN-1 Overarching National Policy Statement for Energy which states that FRAs should:
    - "consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure and exceedance."
- Policy DM40 of the Cheshire West and Chester Local Plan Policies (2019) which states that FRAs must show:
    - "there is no adverse effect on the operational functions of any existing flood defence infrastructure."
    - "proposed resistance/resilience measures designed to deal with the current and future risks are appropriate".

Surveys *(Chapter 9 Flood Risk, Drainage and Surface Water, Paragraph 9.5.2, 9.6.1, 9.6.20, 9.6.22. Appendix 9-1: Flood Risk Assessment and Drainage Strategy.)*

Issue
It is unclear if flood defence crest heights have been derived from a topographic survey, LiDAR data, or the Environment Agency's asset data. The eastern section of the proposed development is heavily reliant on the flood defence system, and it seems the applicant is relying on third-party data to assess the condition of these flood defences (e.g., page 10 and 11 of the FRA).

Impact
The proposed crossing designs and hydraulic modelling may have inaccurate assumptions if there has not been a level survey of the flood defences. There may be insufficient residual-life in flood defences, which protect the proposed development throughout the design-life (40 years of operation).

Solution
We request the applicant carry out condition surveys, to ensure that there is sufficient residual life within the flood defences which will protect the proposed development.

Residual Flood Risk *(Chapter 9 Flood Risk, Drainage and Surface Water, Paragraph 9.7.7, 9.7.10, 9.7.14)*

Issue
The applicant has not demonstrated how they will safely manage residual flood risk.

Impact
Safely manage residual flood risk to the proposal from the assessed breach scenarios (tidal and fluvial).

Solution
Adjust the proposal as required to ensure that residual flood risk is being managed safely and provide further explanation.

Flood Storage Compensation *(Appendix 9-1: Flood Risk Assessment and Drainage Strategy. Table 5 – Summary of Flood Displacement (1% AEP plus 67% CC Defended Event)*

Issue

The applicant has assumed the less conservative fluvial design flood event rather than the tidal design flood event.

Impact

Inaccurate calculations due to an underestimate of the design flood level. Therefore, flood risk may increase elsewhere and to thirds parties.

Solution

The applicant should use the more conservative tidal design flood event in assessing flood storage compensation.

APPENDIX D - GEOMORPHOLOGY

Crossing Point Installations (*Chapters 2,7 and 9 plus figures and appendices)*

Issue
Inappropriate design and installation of new crossing points.

Impact
Damage to the integrity of embankments, channel bed and reduced mammal passage.

Solution
For the design and installation of new crossing points, abutments should be set back at-least 8m from the top of the bank, not embedded in the bank as is illustrated in Figure 2-5j. This approach would avoid the necessity of over-pumping to ensure a dry environment for construction (PEIR, Chapter 7; Section 7.7; paragraph 7.7.36). This would not damage the integrity of the banks and channel bed. Setback abutments would also allow the bridge deck to be constructed at a higher level, reducing areas of deep shade and allowing free mammal passage.

APPENDIX E – BIODIVERSITY

Water Vole Habitat Assessment *(Chapters 7, Section 7.3, Paragraph 7.3.2 and Table 7.3)*

Issue
We note that due to accessibility issues, crossing points U, W and X were not included in the Water Vole Crossing Point Preliminary Habitat Suitability Assessment.

Impact
The Preliminary Habitat Suitability Assessments help to inform whether water voles are likely to be impacted by the development. If areas have not been included, there is a risk that water vole habitat will be impacted.

The Environment Agency have a statutory duty to ensure the conservation of water vole and their environment, under the Environment Act 1995. Water voles are listed as a BAP species.

Our approach is supported by section 5.4.17 of EN-1 Overarching National Policy Statement for Energy which states “Where the development is subject to EIA, the applicant should ensure that the ES clearly sets out any effects on…protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity, including irreplaceable habitats.”

Solution
We request the applicant confirm these assessments will be carried out at the next suitable survey window.

Otter and Water Vole Surveys *(Chapters 7, Section 7.3, Paragraph 7.3.3 and Table 7.3)*

Issue
We note that the otter and water vole survey was undertaken following a period of prolonged rainfall, as such impacting results. Signs of water vole and otter may have been washed away by the rainfall impacting results. Robust data is needed to inform and adequate baseline, to understand the potential impacts of the project to these species.

Impact
There is a risk that survey data is not robust, leading to an inaccurate baseline of otter and water vole species at the site. Any mitigation measures prepared based on this may not be sufficient.

The Environment Agency have a statutory duty to ensure the conservation of water voles and otters, and their environment, under the Environment Act 1995. Water voles and otters are listed as BAP species.

Our approach is supported by section 5.4.17 of EN-1 Overarching National Policy Statement for Energy which states “Where the development is subject to EIA, the applicant should ensure that the ES clearly sets out any effects on…protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity, including irreplaceable habitats.”

Solution
We request the applicant confirm these assessments will be carried out at the next suitable survey window. We have a preference for long-term datasets, based on a consistent methodology, to account for variability.

Removal of Habitat *(Chapters 7, Section 7.3, Paragraph 7.3.9 and Table 7.3)*

Issue
The applicant has assumed the existing ponds and scrapes currently present within the NBBMA would all be temporarily removed, prior to the creation of new ponds and scrapes.

Section 7.8 omits information regarding this, and therefore it has not been listed to be assessed for its likely impacts or effects.

Impact
Removing habitat for species within our remit (such as water vole and otters), with no alternative for them to move to, may displace them or remove an important food source; this will impact their population.

Our approach is supported by section 5.4.35 of EN-1 Overarching National Policy Statement for Energy which states “Applicants should include appropriate avoidance, mitigation, compensation and enhancement measures as an integral part of the proposed development.”

Solution
It would be preferable to provide alternative habitat prior to removing the existing habitat. We recommend consulting with Natural England regarding this issue, as-well as ourselves.

Additional comment
We are pleased to see the precautionary approach being used in the PEIR. We request further engagement with the project team and investigation into the best approach.

Aquatic Invertebrates *(Chapters 7, Section 7.5, Table 7.2),* and **Assessment of Likely Impacts and Effects** *(Chapters 7, Section 7.8, Paragraph 7.8.17- 124)*

Issue
Solar farms that have wetland habitats on site, or are near wetland habitats, should implement mitigation to prevent adverse impacts on aquatic invertebrates.

Impact
Many species of aquatic invertebrates mistake the polarised light reflected from solar panels for open water, leading them to try and lay eggs on panels, which ultimately fail.

Solution
Low-cost mitigation measures can be taken that do not impact on energy generation, such as including a pattern of roughened or painted glass, or a horizontal light blocking grid so that they are no longer attractive to aquatic invertebrates.

Additional comment
The impacts of polarised light and mitigation approaches are discussed in 'A Review of the Impacts of Artificial Light on Invertebrates' report, which Buglife produced in 2011.

Another source of information is the document:

- Taylor, R., Conway, J., Gabb, O. & Gillespie, J. (2019). Potential ecological impacts of ground-mounted photovoltaic solar panels. [Online] Accessed: BSG Ecology.

Mink Invasive Non-Native Species Management *(Chapters 7, Section 7.5, Table 7.2 and Appendix 7.1, section 3.3.27),* and **Assessment of Likely Impacts and Effects** *(Chapters 7, Section 7.8, Paragraph 7.8.17- 124)*

Issue
Environment Agency records show recorded sightings of American Mink between 2001 and 2023. These sightings are mentioned in Appendix 7-1, Paragraph 3.3.27, but not in the body of the PEIR itself.

Section 7.8 omits information regarding Mink, and they have not been listed to be assessed for their likely impacts or effects.

Impact
Water voles are particularly vulnerable to predation by American Mink. The American Mink is a generalist predator and mink predation alone can reduce water vole populations by up to 60%. The risk could be further increased by any temporary or permanent loss of habitat.

The Environment Agency have a statutory duty to ensure the conservation of water vole and their environment, under the Environment Act 1995. Water voles are listed as a BAP species.

Solution
We advise the applicant to conduct Mink surveys and include any management, monitoring and eradication of in their Invasive Non-Native Species (INNS) management plan.

Watercourse Uplift *(Chapters 7, Section 7.7, Paragraph 7.7.65)*

Issue
The applicants aim of no net loss of watercourse units, rather than the minimum increase of 10%.

Impact
A missed opportunity to achieve elements of Biodiversity Net Gain (BNG) for the development.

Solution
Engage with us to establish aims that deliver and increase in watercourse units. Please note, we will not review metric calculations, as this falls within the remit of local authorities. Please see additional comments for further details regarding BNG implementation.

Additional comment
The watercourse Metric is an opportunity to deliver watercourse enhancements, especially when aligned with River Basin Management Plans, Local Nature Recovery Schemes, Water Framework Directive objectives/mitigation measures, and Catchment Plans.

The enhancement of biodiversity in and around development should be led by a local understanding of ecological networks, and should seek to include:

- habitat restoration, re-creation and expansion
- improved links between existing sites
- buffering of existing important sites
- new biodiversity features within development
- securing management for long term enhancement

The Environment Act 2021 looks to ensure that the overall impact from development on the environment is positive. The Act includes measures to strengthen local government powers in relation to net gain and a minimum requirement of 10% BNG. Although we recognise that provision of BNG is not yet mandatory for Nationally Significant Infrastructure Projects (2025), we encourage the applicant to consider an approach to development that results in measurable net gains in biodiversity, having taken positive and negative impacts into account.

Assessment of Likely Impacts and Effects *(Chapters 7, Section 7.8, Paragraph 7.8.17- 124)*

Issue
Section 7.8 omits information relating to entrapment in construction areas.

Impact
Otters and other species within our remit can become trapped in construction areas.

Solution
Include mitigation measures in the CEMP.

Assessment of Likely Impacts and Effects *(Chapters 7, Section 7.8, Paragraph 7.8.17- 124)*

Issue
Section 7.8 omits information relating to the impacts on reedbeds.

The Environment Agency have a statutory duty to ensure the conservation of reedbeds under the Environment Act 1995. Reedbeds are listed as a BAP habitat.

Impact
The loss of a Habitat of Principle Importance.

Solution
The applicant should include reedbeds into the assessment of likely impacts and establish appropriate mitigation and compensation measures.

APPENDIX F - GROUNDWATER AND CONTAMINATED LAND

Mobilisation of contaminants *(PEIR Chapter 10, Section 10.9, Paragraph 10.9.2 and Appendix 10.1, table 9.5)*

Issue
Further risk assessment and monitoring has not been proposed for the Private Wire Connection and proposed SADA within MSCDDG, although it has been proposed for the NBBMA area of the scheme.

Impact
Excavation works across the areas of dredging infill could mobilise contaminants that could migrate into ground and surface waters.

Solution
Include risk assessments and monitoring for all areas of the scheme where the dredging infill material will be excavated and disturbed. The proposed monitoring strategy should be submitted to the Environment Agency for approval.

BESS Risk to Groundwater *(Chapter 10, Section 10.7, Paragraph 10.7.5)*

Issue
The report details the design of the Battery Energy Storage Systems (BESS) drainage strategy. It is not clear whether the system will be automated with a backup system in place in case of power failure.

Impact
The current BESS drainage design may pose an unacceptable risk to groundwater.

Solution
The oEMP must include a detailed drainage plan which demonstrates, in the event of an emergency, that contaminated firewater can be adequately contained within the site, to ensure that there is no discharge of polluted water to ground or surface water bodies.

Additional comment
The National Fire Chief's Council has published detailed guidance on recommended fire protection measures for BESS sites. We recommend the applicant refers to this when designing the scheme: Grid Scale Battery Energy Storage System planning – Guidance for FRS (nfcc.org.uk)

River Weaver Crossing *(PEIR Chapter 2 & 10)*

Issue

The scoping report referred to the use of horizontal directional drilling (HDD) to navigate beneath the River Weaver. The PEIR report makes no reference to this technique.

Impact
HDD could involve the use of drilling muds, and their use will require risk assessment to ensure they do not pose a risk to controlled waters.

Solution
We require confirmation that HDD will not be used, or information included in the CEMP detailing how risks to controlled waters from this activity will be managed. In future documents, we request consistent levels of information are given for all aspects of the scheme where relevant.

Unexpected Contamination Protocol *(Chapter 10, Sections 10.7, Paragraphs 10.7.3 (v) and 10.7.7 (iv)*)

Issue
A discovery strategy protocol for unexpected contamination is proposed to be included in the CEMP and the Decommissioning Environment Management Plan (DEMP).

Impact
If works in the affected area continue while the potential contamination is investigated, there is a potential for contamination to be spread further before its extent and severity is identified, and appropriate remediation is agreed.

Solution
We request the addition of an unsuspected contamination requirement for the construction works. The unsuspected contamination requirement should mention stopping works in the affected area, while further investigation is carried out.

Additional comment
The inclusion of this protocol in the DEMP is satisfactory, but we prefer a requirement for the reporting of unsuspected contamination during the main construction works.

<u>Unsuspected Contamination Requirement Wording:</u>

(1) In the event that contaminated land, including groundwater, is found at any time when carrying out the authorised development, which was not previously identified in the environmental statement, then no further development (unless otherwise approved in writing by the relevant authorities) shall be carried out within the identifiable perimeters of the area in which the suspected contamination is located. It must be reported as soon as reasonably practicable to the local planning authority, and where necessary, the Environment Agency, and the undertaker must complete a

risk assessment of the contamination in consultation with the local planning authority, and where necessary, the Environment Agency.

(2) Where the undertaker determines that remediation of the contaminated land is necessary, a written scheme and programme for the remedial measures to be taken to render the land fit for its intended purpose must be submitted to and approved in writing by the local planning authority, following consultation with the Environment Agency.

(3) Remediation must be carried out in accordance with the approved scheme under sub paragraph (2).

(4) Following the implementation of the remediation strategy approved under sub-paragraph (2), a verification report, based on the data collected as part of the remediation strategy and demonstrating the completion of the remediation measures must be produced and supplied to the relevant planning authority and the Environment Agency.

Risk Assessment Clarity *(Chapter 10, section 10.9, Paragraph 10.9.1 (i) & (ii))*

Issue
The report mentions that a Foundation Works Risk Assessment (FWRA) will be produced to support the construction phase and will be agreed in consultation with the Environment Agency. It also states that a PRA will be produced and included in the oCEMP. It is not clear how these assessments will differ.

Impact
Lack of clarity about the content and scope of these documents.

Solution
For the avoidance of confusion, we expect all works relating to foundations and any potential mobilisation of contamination associated with those foundations (including piling), to be covered by a FWRA, that will be included in the CEMP, with the EA as a named consultee for approval.

Inclusion of Private Pipelines *(Chapter 10, Section 10.9)*

Issue
The scoping report identified that several utilities pass beneath the site, including ‘private pipelines associated with nearby petrochemical plants.’ They have not been mentioned in the PEIR report.

Impact
Disturbance or damage to these pipelines could lead to pollution of the underlying aquifers.

Solution
Extreme care should be taken during construction to ensure that these. This matter should be included in the CEMP.

Boreholes *(Chapter 10, Section 3, Paragraph 10.3.3 (xii), Section 6, Paragraphs 10.6.22 - 58)*

Issue
Two active permitted sites lies adjacent to the site boundary. The INEOS Inovyn Deposit Ground (ref EPR/KC3591CN/V004) and Cell 6 of the MSCDDG (ref WML53719 & EPR/XP3196CU/V003). Both permits have associated leachate and groundwater monitoring boreholes. The locations of these boreholes in relation to the site boundary of the proposed development is not made clear in Chapter 10.

Impact
Lack of clarity around the location of monitoring boreholes could result in them being destroyed or disturbed during development.

Solution
Provide a plan showing the development boundary with the monitoring boreholes clearly shown.

APPENDIX G – WATER RESOURCES

Construction Consumptive Water Supply *(Appendix 2.3 oCEMP, Section 2.6.3, Table 5-4 and Table 5-10)*

Issue
Sources to supply consumptive water uses have not been specified for the following:

- dust suppression
- bentonite clay mixing and HDD operation
- concrete production
- wheel wash
- potable and domestic uses.

Impact
Water demand for these activities in projects of this scale should not be underestimated. This could result in unforeseen permits being required at construction commencement, if the water company cannot provide it.

Solution
We recommend early engagement with the water company to establish security of supply. We also recommend that a basic water supply strategy is provided with the oCEMP outlining quantities, locations and sources of water to supply the activities included (but not limited to) those listed above.

Additional comment
These activities may not require treated water, and it is unclear if water is to be used from local groundwater or surfacewater sources. It is inferred that water tankers and bowsers described are to be provided/filled by the local water undertaker or the water supply will be from mains connection.

Dewatering and Consumptive Uses of Water *(Appendix 2.3 oCEMP, Section 2.6.3, Table 5-4 and Table 5-10)*

Issue
Consumptive uses of groundwater and surface water on site is ambiguous.

Impact
The use of dewatering water for other consumptive uses will change the type of licence required and affects how it will be determined and issued.

Solution
We recommend the Abstraction licensing strategy for the catchment is reviewed and used to inform a water supply strategy which includes all water requirements of the construction (and operational) phase. This provides a basic options appraisal for the

use of public water supply, local SW or GW sources of supply and/or the use of stored dewatering water.

Additional Comment

The oCEMP states that any wastewater that is produced during the construction phase from activities such as dewatering, will be disposed of in accordance with relevant legislation, and will not be discharged directly to surface or foul drains without appropriate licences in place. It also states where practicable, utility supplies will be taken from main supply utility connections; however, where this is not possible, utilities will be provided from temporary facilities, such as local wastewater storage.

APPENDIX H – WASTE

Waste management *(Appendix 10-1: Stage 1 Geo-Environmental Assessment waste, and Section 2.8)*

Issue
Material excavated from areas A, B,1,2,C,3,4,5,6,D,E,F,G,H,11,12,13 on the waste and landfill map (page 55) is considered to be waste. Any excavations and reuse of waste material may attract contemporary waste legislation. Any material later identified to be deposited waste must be reported to the environment agency and included in the materials management plan.

Impact
Waste material can pose a risk of contaminating the surface and groundwater environment, if not managed correctly.

Solution
Consideration should be given to the following:

- a Deposit for Recovery (DfR) permit for waste material that is intended for reuse on site. Waste recovery plans and deposit for recovery permits - GOV.UK. registration of an appropriate waste exemption: Using waste: waste exemptions - GOV.UK
- If soils are to be removed offsite as waste, waste classification testing will be required to be compliant with WM3 Waste_classification_technical_guidance_WM3.pdf.
- Excavation of waste should not begin until a scheme for lawful reuse of the waste material on site has been submitted and agreed by the Environment Agency.

Additional comment
For information regarding the management, classification, and legislation relevant to waste, please review our response letter XA/2024/100098/01-L01 (dated 05 July 2024).

ANNEX I – ADDITIONAL INFORMATION

Dredging Waste Material *(Chapter 10, section 10.9, Paragraph 10.9.1 (iv), 10.12.7 and 10.12.8)*

Issue
Much of the site is underlain by dredging material which may be considered as waste. The movement of it around the site may therefore require an Environmental Permit or Material Management Plan.

Impact
Delays to the scheme.

Solution
Please ensure early discussions with the relevant teams at the Environment Agency.

Additional comment
We are currently discussing with our technical specialists whether your proposal to manage dredging deposit soils using DoWCoP, and a material management plan, are appropriate (as per your email dated 26 November 2024). We will respond in due course.

Watercourse Crossings *(Chapters 7, Section 7.3 and 7.7, Paragraph 7.7.1)*

Issue
The creation of 17 new permanent watercourse/ditch crossings and the upgrading of eight existing crossings.

Impact
Poorly designed river crossings can lead to the loss or damage of plants, animals and their habitats, and create a barrier to the movement of fish and other wildlife.

Solution
Follow the good practice guide linked below. Apply for Flood Risk Activity Permits (FRAPs) in advance. Further engagement with us should be pursued on the design and location of crossings.

Additional comment
Engineering in the water environment: good practice guide – River Crossings, 2nd Edition, November 2010. SEPA.

Safe Access and Egress Route (*Non-Technical Summary, Paragraph 2.2.7, 3.3.1, 3.3.3 and 3.3.4. Appendix 2-1: Indicative Watercourse Crossing Schedule*. *Figure 2-*

2 Indicative Operational Site Layout. *Figure 2-4 Public Rights of Way and Permissive Paths and other Recreational Routes. Appendix 9-1: Flood Risk Assessment and Drainage Strategy)*

Issue
The proposal consists of circa 25 crossings, excepting CP 25 (see Appendix 2-1: Indicative Watercourse Crossing Schedule) all of these are within Flood Zone 3. The Order Limits contain Public Rights of Way, and during operation, access is required for routine maintenance, the replacement of equipment, habitat management, and farming activities.

Impact
We have significant concerns about safe access and egress during a flood event (tidal rather than fluvial as this is more conservative). There is a risk to receptors during the design flood event. It is possible that access routes (see Figure 2-2 Indicative Operational Site Layout) within the design flood extent may become flooded making them unsafe.

Solution
The applicant should demonstrate safe access and egress during the design flood event. Consultation should be undertaken with the LLFA/local authority, to ensure a joined-up approach across the site as the proposal brings new receptors into an area of flood risk.

Additional comment
It is possible that parcels of land may be cut-off and that dry islands could form, preventing safe egress for receptors on site during a range of flood events up to the design flood. Within Appendix 9-1: Flood Risk Assessment and Drainage Strategy, the applicant has considered evacuation for the design fluvial event, but not for the design tidal event. It seems that Brook Furlong could be flooded in the design tidal event. We would recommend further discussion on this matter with the LLFA / local authority.

Waterco Limited
Eden Court
Ruthin
Clwyd
LL15 1NJ

Our ref: SO/2022/122782/01-L01
Agreement No: ENVPAC/1/GMC/00472
Your ref: 221021/KAY08

Date: 10 February 2023

Dear [redacted]

SOLAR FARM
FRODSHAM DCO SITE

Thank you for accepting our offer to provide detailed planning advice. We are providing this advice under Agreement No. ENVPAC/1/GMC/00472. Please note we have taken 5.5 hours to review this information and provide our advice.

Further to our preliminary advice sent to you on 28 October 2022, we would also like to give the following detailed planning advice which should support you in planning and designing your development proposals.

We would request that the following information is included within any Flood Risk Assessment or Drainage Strategy submitted with a planning application:-

- All development should be kept flood free, based on the 30% climate change level + 600mm freeboard, we would recommend trying to locate development to higher parts of the site, to the East, located in Flood Zone 1.

- Detailed designs showing the height at which the panels will be mounted.

- Take into consideration the Manchester Ship Canal, and Ince and Frodsham Modelling. We recommend requesting product information 4,5,6,7 and 8 for all the models and hazard outputs - this can be requested via inforequests.gmmc@environment-agency.gov.uk.

- Both the undefended and defended scenarios will need to be considered, likewise tidal and fluvial sources.

- Any loss of flood plain at this location will need to be compensated for, so the proposed development doesn't increase flood risk to our assets.

- Vehicle and plant access must be allowed to our pumping station, the watercourses and embankments at all times. There are also flood defence embankments on the proposed site which must be protected from any work.

- The construction and operation of the scheme must not increase the volume or rate of flow of water to the pumping station.

- During construction care must be taken to prevent debris and silt from entering the watercourse, as this is harmful to the habitat and could damage the pumps. The Environment Agency maintain the pumping station as a land drainage pumping station and we will not be increasing the pumping capacity. If the applicant would like to increase the rate of pumping we would consider handing over the pumping station ownership and maintenance to them.

- Land drainage in this area also relies on the Peel Ports owned siphon that takes water from Hoolpool Gutter under the Manchester Ship Canal to the Mersey, we strongly advice you consult with Peel Ports. This land does flood in high rainfall even with the siphon and pumping station operating at capacity.

Should you wish us to review the completed Flood Risk Assessment and Drainage Strategy for this site we will be happy to do this as part of this charged agreement. This will provide you with the opportunity to gain our views before submitting formally as part of your planning application.

Yours sincerely

[redacted]
Planning Advisor

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

End

[redacted]
Waterco Ltd
Eden Court Business Centre
Ruthin
Clwyd
LL15 1NJ

Our ref: XA/2024/100097/03-L01
Your ref: 01FRA

Date: 04 October 2024

Dear [redacted]

Re-consultation. Flood Risk Assessment further information - water course crossings, flood defence easements and flood compensatory storage

Frodsham Marshes, Frodsham, Cheshire West and Chester

Thank you for your consultation.

We have reviewed the following information:

- *"FRA Advice - Watercourse Crossings and Flood Defence Easements"* dated 29 August 2024
- *"FRA Advice - Flood Compensatory Storage"* dated 29 August 2024

Flood Compensatory Storage Technical Note

Existing Flood Risk to the Site

You have highlighted how the site is protected during the design flood for the fluvial flood event, but you have not considered the design flood for the tidal flood event in your analysis. We need clarification whether the flood risk to the site is residual for all design flood events, as it is currently unclear.

Additionally, the assessment of fluvial flood risk seems overly simplistic. The catchment for watercourses which dissect the site is relatively flat and drains into the River Weaver. The Frodsham and Ince pumping station has limited capacity, and the area may flood for a 1 in 2-year or 1 in 5-year flood event. We were willing to discount that simplification on the basis you have designed your proposal to what we suspect is the more extreme flood event - the tidal design flood.

Minimal Impact During a Residual Risk Event

As stated previously, this example is only considering fluvial flood risk and uses a simplistic representation (such as only consider the River Weaver as a source). You need to consider all sources of flood risk.

We welcome the sequential approach to the placement of components in line with paragraph 168 of the National Planning Policy Framework, and section 5.8.21 of the Overarching National Policy Statement for Energy (EN-1).

Page 2 of the *"FRA Advice - Flood Compensatory Storage"* states:

- *"As shown in Figure 1, the undefended fluvial flood extent is generally constrained to the confines of the site and covers an area of approximately 1.08km².*"

Any increase in flood risk elsewhere is considered unacceptable. If we allow a series of projects within the environs to increase flood risk elsewhere, because it seems "negligible" to the developer, then increases in flood risk elsewhere would compound. We appreciate the calculations presented in Table 1 of the *"FRA Advice - Flood Compensatory Storage"* technical note are for an undefended fluvial case; however we believe the site is also at risk in the defended tidal design event, and therefore flood risk to the site cannot be considered as residual only. The tidal design event could result in levels similar, if not greater than, the fluvial undefended water levels for the River Weaver. Based on the current information presented in table 1, a loss of flood storage volume of 1,501.82m³ is considered significant.

We therefore find your assessment as contrary to Paragraph 165 of the NPPF, which states that:

- *"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere."*

We require more information on the tidal design flood and how this is projected to affect the site. Specifically, the calculations presented in table 1 should reflect the defended tidal design event. In this case, we would not seek compensation for residual flood risk, however, flood compensatory storage should be provided to offset the loss which may occur due to the defended tidal design flood.

Please note that we cannot accept an increase in capacity demand to the pumping station(s) for any flood event. You need to provide evidence that this will not occur. You need to consider flood risks associated with blockage of the Hool Pool Gutter siphon(s) or provide justification for its exclusion.

Whilst the justification for exclusion of consideration of flood risks associated with the Ince and Frodsham pumping station failure may be considered acceptable, you should evidence this within your Flood Risk Assessment (FRA). Notably, we can accept the exclusion if a more extreme design flood is applied in the analysis of flood risk, as suggested in your response letter *"14740-EA FRA Letter-01"* dated 15 July 2024.

The developer should liaise with other stakeholders regarding the flood risks associated with watercourses within the study area (e.g., the Manchester Shipping Company, etc).

Precedents Set by Recently Approved Solar Schemes
At the time of writing a decision on the Helios Renewable Energy Project is yet to be determined. We consider projects on a case-by-case basis depending on the site-specific constraints. The link provided within the applicant's response (*"FRA Advice - Flood Compensatory Storage"*) did not work. Notably the FRA submitted to PINS is dated June 2024, rather than July 2024. The quotation cited could not be found within the June 2024 version, and notably this version of the FRA is cited within the Examination Library: EN010140-000453-Examination Library Helios.pdf (planninginspectorate.gov.uk)

We would like to highlight section 4.145 of part 1 of the FRA by PFA consulting (dated June 2024, reference 7.7) which states that:

- *"Level for level floodplain compensation could be provided to mitigate the effect of the earth flood defence bund on flood storage volume. To demonstrate that a floodplain compensation scheme could be provided, if necessary, a preliminary floodplain compensation scheme is set out on Drawing Nos. E216/161-162 contained in Appendix 19. The calculation is based on 200mm level bands and a 'credible maximum scenario sensitivity test' flood level of 4.751m AOD at this location. Inspection of these plans indicates that in all level bands the volume of floodplain compensation provided is greater than the volume lost as a result of the Substation and BESS Compound. The preliminary floodplain compensation scheme ensures that the Proposed Development would result in no net loss of floodplain storage, would not increase flood risk elsewhere and flood risk betterment would be provided during the fluvial 'credible maximum scenario sensitivity test'."*

Additionally, considering part four of the Helios FRA, we would like to highlight the flood storage compensation shown within drawing *"Preliminary Floodplain Compensation Scheme Sheet 2 of 2"*.

The DCO regime is an iterative process. We would therefore urge you to exercise caution when considering precedent to have been set by other schemes located elsewhere, which are yet to be determined. As shown above, compensation has and will continue to be considered as part of the Helios project. With Frodsham Solar Project,

you haven't considered the most conservative design flood event (i.e tidal), and you haven't proposed to do floodplain compensation based on this.

FRA Advice – Watercourse Crossings and Flood Defence Easements

Flood Defence Offsets

Considering assets 375598, 375834, and 375971, we can accept an offset of eight metres from the most landward extent of the adjacent flood defence assets (i.e., 75978, 33927, 36143, 33926, 33925, 33743, 33741, 32585, 131299, 33742, 144553, 130922, 130923, 130920, 130921).

As a precaution and considering the cross-sections provided in Appendix A, it is possible that the flood defence line is composed of earth embankments and high ground. You need to carry out an assessment of the flood defence to ensure it is categorised correctly. This can then be used to inform the offset which should be measured from the most landward extent of the asset (such as toe of embankment). Where the asset is high ground, you need to measure the offset from the crest line, or bank side; whichever provides the most precautionary measure. The horizontal accuracy of the crest line may be unreliable in places, hence why you need to consider a precautionary approach.

Design of Access Crossings

Regarding the use of the Ince and Frodsham hydraulic modelling (Halcrow, 2011) and the associated modelled water levels. The comparison provided in Table 2 of the technical note dated the 29 August 2024 between the peak modelled 1% (1 in 100) Annual Exceedance Probability (AEP) water level and the main river crossing locations is useful and shows a reasonable freeboard for all main river crossings. The soffit level for the proposed crossings should be 600mm above the design flood plus climate change level. Whilst the freeboard afforded to the bridge soffit levels above the 1% (1 in 100) year fluvial water level is reasonable, it is difficult to know how much of this would be taken up because of climate change. Furthermore, we have not seen the outputs from the updated modelling of the Mersey Estuary, in order to understand the risk during a tidal event. We require clarity on whether freeboard is still available during the design tidal event. We appreciate that some of these crossings are small, however, if the bridges and associated access floods during the design tidal event, this could put site operatives at risk and potentially compromise site operation. Please consider the design tidal water levels with respect to bridge soffit levels and access, bearing in mind that access may need to be maintained for the safety of site operatives and site operation.

In the context of the site needing to remain operational, then access would be required especially to critical elements (such as Battery Energy Storage Systems) during the design flood event. This is accordance with section 5.8.7 of EN-1, which states:

- *"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. It should also be designed and constructed to remain operational in times of flood."

We would welcome the opportunity to further engage and advise further on the matters outlined above, in order to provide you with confidence and clarity in relation to our position on the DCO proposals prior to formal submission.

Yours sincerely

[redacted]
Planning Specialist

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

Appendix G LLFA Response

Frodsham Solar - Flood Risk Assessment and Drainage Strategy, Waterco, May 2024

LLFA comments provided on 4th July 2024

The LLFA have the following comments:

- There are some isolated areas at risk of surface water flooding outside of the fluvial flood risk areas which needs to be considered in terms of elevations of solar arrays. The FRA has solely focussed on fluvial flooding from Main River.
- Surface water management assumes that no formal drainage is required for land occupied by solar arrays. As the rainfall off the panels is concentrated on a small area there is potential for compaction and increased runoff over time due to reduced soil infiltration potential which could initiate preferential overland flow paths through the site. This potentially could lead to increased runoff towards third party land on the southern boundary which needs to be assessed and where required mitigated with a land boundary drain or alternative solution.
- A plan of existing overland flow routes should be provided to demonstrate potential impacts from compaction of ground over time and the impact of access roads (slightly elevated above ground levels) on these overland flow paths. Confirmation should be provided on whether any other changes to land profile is to be undertaken across the site and their impacts on surface water runoff flow pathways.
- Locations of access crossings of ordinary watercourses has not been provided. A location plan, structural drawing and method of construction is required for each crossing.
- A plan should be provided showing the panel locations and watercourses including set back in accordance with CWAC Byelaw 10 which refers to the need for written approval from the LLFA for any development works within 8 metres of an ordinary watercourse.
- BESS is to be formally drained with connection into watercourse. A plan of outfall to watercourse and method of construction should be provided and assessment of whether the BESS site naturally drains to this watercourse.
- Confirmation should be provided of investigation into private water assets and easements to support the location of panels.
- A surface water management plan during construction should be provided to include for any site compounds.

[redacted]

From: LLFA <LLFA@cheshirewestandchester.gov.uk>
Sent: 02 November 2022 12:24
To: [redacted]
Cc: LLFA
Subject: RE: 14740 LLFA Email

Dear [redacted],

Thank you for your email.

Firstly with regards to the development, I would just highlight that as the statutory regulator for main river & reservoir, the Environment Agency will need to be consulted for comment on this application. They may also wish to make some design comments to ensure any equipment (service kiosks etc) are set at an appropriate level due to the fluvial flood risk at this location.

With regards to the drainage strategy, we would have no objections to the continued use of infiltration and informal connections to the ordinary watercourses on site. Please note that any alterations to these existing ditch lines would require formal consent from the LLFA via a Land Drainage Consent Application, under Land Drainage Act 1991.

The FRA / Drainage Strategy will need to demonstrate that the proposed development will not increase surface water runoff into the receiving ordinary watercourses. LLFA approval would be subject to all surface water flows being managed and retained on site, to ensure no exacerbation of any localised flood risk. Additionally, any changes in land levels will need to be agreed directly with both the LLFA and Local Planning Authority.

Any questions or queries please get in touch.

[redacted]
Flood Management and Project Officer

Cheshire West and Chester Council

To report a new service request, please use one of the following methods:

- Via the website
- Via Cheshire West and Chester reporting app

You can also check the status of your report or log another fault using our status checker

---

From: [redacted]@waterco.co.uk>
Sent: 02 November 2022 11:50
To: LLFA <LLFA@cheshirewestandchester.gov.uk>
Subject: RE: 14740 LLFA Email

Good afternoon Sir/Madam,

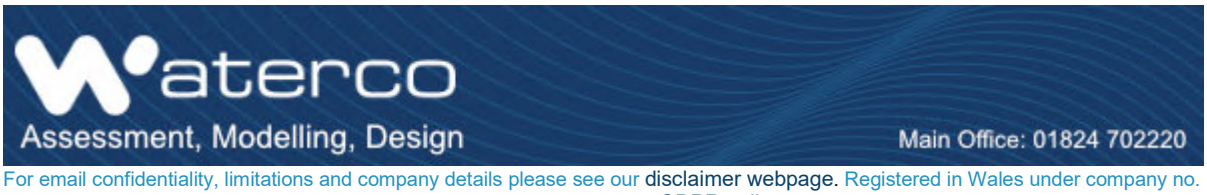
With regards to the email below, please could you advise when we can expect to receive a response with regards to our enquiry of Land adjacent to M56, Frodsham.

Kind regards,

[redacted] [redacted]
Environmental Consultant

DDI:
Teams: [redacted]@waterco.co.uk

We're recruiting! For more information, please take a look at our website.



From: [redacted]
Sent: 18 October 2022 15:33
To: 'LLFA@cheshirewestandchester.gov.uk' <LLFA@cheshirewestandchester.gov.uk>
Subject: 14740 LLFA Email

Proposed solar farm development located at: Land adjacent to M56, Frodsham. NGR: 350921, 378604

Dear Sir/Madam,

We are currently preparing a Flood Risk Assessment and Drainage Strategy for the site at the above address. We are seeking Lead Local Flood Authority comments in relation to drainage.

Development proposals are for a solar farm covering approximately 280 hectares. A location plan and topographical extract are attached for your reference.

Solar panels are to be mounted on steel supports and grass will remain beneath the panel surface. As per the attached LIDAR plan, the site is relatively flat and is served by a number of ditches. As ground cover will remain permeable and the flat nature of the site would not be conducive for the generation of surface water flow routes, a formal drainage system is not proposed. Surface water will continue to infiltrate and informally drain to the ditches on site.

Please advise if you have any comments in relation to flood risk or drainage.

If you have any questions or require any further information to process my request, please don't hesitate to contact me.

Kind Regards,

[redacted] [redacted]
Environmental Consultant

DDI:
Teams: [redacted]@waterco.co.uk

We're recruiting! For more information, please take a look at our website.

Appendix H Visual Flood Defence Asset Inspection Reports

TECHNICAL NOTE

Project:	Frodsham Solar	**Scheme No:**	14740
Subject:	River Weaver Flood Defence Visual Inspection/ Survey	**Revision:**	01
Client:	Frodsham Solar Limited	**Date:**	15/05/2025
Doc Ref:	14740-Frodsham T98 Technical Note		
Author:	Adam Noble Bsc EngTech MICE		
Checker:	Tristan Inman MEng (Hons) GMICE		
Approver:	Nigel Jones BEng (Hons) CEng MICE		

Introduction

Waterco have undertaken a visual inspection of the existing Environment Agency flood defences for the River Weaver which offer flood protection to a proposed solar development on land north of the M56, Frodsham, Cheshire, WA6 7BQ.

The flood defences include an earth embankment adjacent to the River Weaver on the eastern boundary of the Site and engineered high ground in the form of an embankment along the northern boundary of the Site adjacent to the River Weaver.

This Technical Note reports on the current condition of the River Weaver flood defence embankments on the date of inspection (18th March 2025), highlights any defects that could compromise their performance, and makes recommendations to ensure the defences continues to perform as designed for the duration of the development's operational lifespan (40 years).

Using the EA 'Asset Information and Maintenance Programme' data (data.gov.uk), the River Weaver flood defences bordering the Site fall into the following category:

- "Embankments," which are "all types of earthen structures found in fluvial, tidal, and coastal environments, that are used for flood defence and/ or erosion protection."

Information from the Environment Agency

The Information from the Environment Agency (EA) for the River Weaver flood defence assets has been tabulated in Table 1. This information was extracted from the EA's "Asset Information and Maintenance Programme" via the online portal: https://environment.data.gov.uk/asset-management/

The River Weaver EA flood defences are divided into three sections, each with a separate Asset ID number: ID: 132643, ID: 601936, and ID: 132223. The location plan in Appendix A shows the location of the fluvial flood embankment and the lengths covered by each asset reference.

Table 1: EA Fluvial Flood Defence Asset Information

Asset ID	West - 132643	East - 601936	East - 132223
Actual Condition	Poor	Fair	Fair
Target Condition	Fair	Fair	Fair
Include in Floodmap	Considered and Accepted	Considered and Accepted	Considered and Accepted
Last Inspection Date	05/09/2024	05/09/2024	05/09/2024
Asset Maintainer	Environment Agency	Environment Agency	Environment Agency
Maintained Asset	No	No	Yes
Designed Downstream Crest Level (mAOD)	6.00	6.90	5.00
Designed Upstream Crest Level (mAOD)	6.00	5.00	5.00
Actual Downstream Crest level (mAOD)	6.71	6.90	7.60
Actual Upstream Crest Level (mAOD)	6.89	7.45	7.30

After reviewing the available information from the EA, the following points have been identified:

- On the EA's Asset Management system, both Assets ID:132643 and ID:601936 do not show in the list of EA-maintained assets, although the asset sections are included on the EA Flood Maps as EA-maintained flood defences. This is believed to be an error in the asset register.
- Errors in the Designed Upstream Crest Level's,
    - **Asset ID: 601936:**

    The Crest level is defined as 5.00 m AOD. This is believed to be an error in the data, as the difference between the upstream and downstream crest level is 1.9m, which is a significant difference over such a short stretch of embankment.
    - **Asset ID: 132223:**

    The Designed Upstream Crest Level and the Designed Downstream Crest Level are both defined as 5.00 m AOD, this is believed to be an error in the data, this level is likely a continuation of the 5.00 m AOD level from Asset 601936.

T98 Assessment

Two T98-trained Waterco staff undertook a visual walkover inspection of the flood defences along the River Weaver on March 18th 2025. The weather was dry and sunny during the inspection, and the conditions had been dry for approximately four weeks.

Only the River Weaver defences have been inspected. The River Mersey defences were not inspected as they comprise natural high ground, and there are no formal defences i.e. embankments to inspect.

The EA Asset ID: 132223 & 601936 section of the River Weaver Embankment was inspected as a single section

because embankment sections are not distinctive.

The T98 inspection assessment reports are included in Appendix B. The following is a summary of the assessment's findings.

Summary of T98 Visual Inspection

EA Asset ID: 132643

- This section of The Embankment is in fair condition throughout, with minor defects due to undulations in crest height caused by the public right of way along the crest.
- Due to the extensive reed and bramble growth, it was not possible to visually inspect the full area of the exposed face (riverside) of the embankment. On the visible areas inspected, there was no evidence of deterioration. Therefore, this area was given a score of 3 for this assessment.
- Due to the extensive reed and bramble growth, it was not possible to visually inspect the full area of the embankment's landward face. In the visible areas inspected, there was no evidence of deterioration. Therefore, this area was given a score of 3 for this assessment.

EA Asset ID: 132223 & 601936

- The Embankment is in fair condition throughout, with minor defects due to the public right-of-way along its crest.
- Damage has occurred to the embankment, potentially due to vehicles accessing via the access ramp, potentially during wet weather.
- Due to the extensive reed and bramble growth, it was not possible to visually inspect the full area of the embankment's exposed face (riverside). In the visible areas inspected, there was no evidence of deterioration. Therefore, this area was given a score of 3 for this assessment.

This inspection has assumed that the significant overgrown embankment areas that are not visible are in “Fair” condition. If the vegetation growth is not removed before the next inspection, as per T98 guidance, these areas will be downgraded to “Poor” condition at the next inspection.

The previous assessment undertaken by the Environment Agency of the embankment has an overall lower condition rating of 4 – Poor condition, possibly due to the elements not being inspected during the last inspection.

Recommendations

Confirmation of the Environment Agency Data

Data from the Environment Agency Asset Information and Maintenance Programme is assumed to be incomplete; there was evidence of grass cutting on the landward face and crest of Asset ID: 601936 and 132223, which has been undertaken recently before the inspection, evidenced by grass cuttings present.

The maintenance data on AIMS suggests no maintenance has been undertaken within the past 5 years, which is unlikely. A look at other assets in other areas suggests that the data is incomplete on the publicly accessible data.

Clarity must also be sought on the Maintainer of Asset ID 132643 and 601936, the Environment Agency, and their inclusion in the flood maps; however, they are not defined as “Maintained Assets” within AIMS.

The crest level: The EA Asset information appears to have an error in the crest level for asset IDS 601936 and 132223. It is recommended, that the correct information is identified by EA.

Vegetation Management

Management of vegetation growth (reeds and brambles) is required to comprehensively assess the assets' condition. This significant vegetation cover should be cut outside of bird nesting season, and an additional T98 inspection carried out to confirm the condition of elements that were not able to be inspected should be completed.

The Landowner could undertake the vegetation clearance work under their own riparian landowner responsibilities. The landowner would be recommended to contact the Environment Agency in advance to inform them of the proposed work and to obtain approval, and to organise a T98 inspection is undertaken, either by the EA or a third party, while there is little vegetation cover in order to make an assessment of the embankments.

Tree Management

There are several assumed self-seeded trees on the embankment; if left to grow unmanaged, the trees could pose a risk to embankment stability, due to the risk of damage from the root plate moving during high winds and exposing the embankment core, through to localised shrinkage from the tree roots, both can result in embankment stability issues.

Due to the limited number of trees on the site, it is suspected that these are self-seeded trees. Most of the trees are less than 2m in height and immature. To ensure the long-term stability of the embankment, it is recommended that these trees be removed, along with the root balls, and the embankment areas be reinstated.

Any trees over 2m in height or more mature in nature could potentially require more significant works for the removal and reinstatement, potentially due to the depth of the root ball ~ 1.0m deep into the embankment. It is suggested that these trees be surveyed/reviewed by a qualified Arborist who can make an assessment of the existing health of the trees and provide a maintenance programme for the trees, including options for either removal, or to undertake pollarding to reduce the tree height and reduce foliage density, reducing the forces exerted by the tree on the underlying soil.

Conclusion

The asset visual inspection was requested to enable the following question to be answered:

- *"Are the defences in suitable condition to protect the development over its lifetime (to the year 2075), or would improvement/repair be required?"*

The visual inspection has identified that the River Weaver flood embankment adjoining the Site is in Fair Condition. However, this assumes the section of the embankment not visually inspected due to the significant vegetation is in Good to Fair condition. Assuming that regular maintenance and inspections are undertaken, there is no reason why the embankment would not offer protection to the proposed development over the 40 year operational design life.

It is important to note that regular inspections are critical to the performance of the asset. They reduce the likelihood of asset failure by addressing defects as they arise and mitigating appropriately.

Appendix A – Location Plan

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

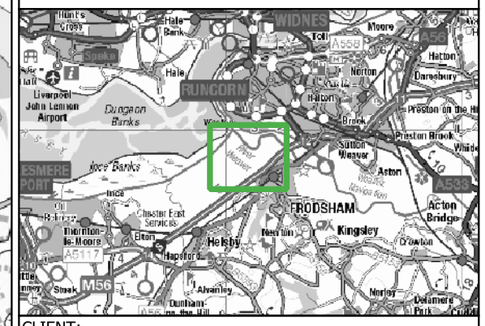
LEGEND

- Site Boundary
- River Weaver Flood Defences

East - 601936

East - 132223

West - 132643



CLIENT: Frodsham Solar Ltd

waterco
www.waterco.co.uk

SCHEME: Frodsham Solar

PLOT TITLE: T98 Flood Defence Map

PLOT STATUS:	DATE:
FINAL	13-05-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
IH	AP	LS	1:10100

PLOT NAME:	REVISION:
14740_Flood_Defences	-

0 0.5 1 km

Appendix B – T98 Inspection Reports

Frodsham Solar
T98 Flood Defence Visual Inspection

Asset Information

Asset Name	01320WEA1 River Weaver Reach 1
Asset ID	132223 & 601936
Asset Category	Defence
Asset Type	Embankment
Type	Defence

Action Information

T98 Type	Ad Hoc Inspection	**Asset Inspector**	Adam Noble & Dan Jones
Schedule Date	18/03/2025	**Completion Date**	18/03/2025
Assessment Reason	At the request of the Environment Agency in support of a Development Consent Order application for a new solar farm.		

Current Inspection Information

Target Condition	3 - Fair	**Calculated Condition**	3
Overridden Condition		**Override Reason**	
Element Not Inspected	1	**Data Quality Flag**	3

Condition Grade Assessment

Element	Weighting	Condition Grade	Weighting x Condition Grade
Exposed Face	7	3 (Element Not Inspected)	21
Landward Face	7	3	21
Crest	7	3	21
Berm	5	3	15
Access Strip	1	3	3

Sum	27		81
Overall Asset Grade	$\frac{Sum\ of\ Weighting\ \times Condition\ Grade}{Sum\ of\ Weighting}$	$\frac{27}{81}$ - Grade 3 - Fair	

Comments	The Embankment is in fair condition throughout, with minor defects due to the public right-of-way along its crest. Along with the damage to the access strip due to vehicles accessing via the access ramp. It was not possible to visually inspect the entirety of the exposed face (riverside) of the embankment due to the extensive reed and bramble growth. Of the grassed areas visible there was no evidence of deterioration. Therefore, this area was given a score of 3 for this assessment.
Recommendations	Plan T98 inspection of embankment following routine maintenance of reeds growing on the exposed face. Monitor and manage the growth of trees on the embankment. Large mature trees pose a significant risk to slope stability in storms. Suggest a maintenance schedule, including pollarding the trees to keep height to a minimum. Consult a qualified arborist to assess the health of the trees. Remove smaller trees where disturbance of the embankment core is likely to be minimal. Monitor erosion on PRoW on a yearly basis and undertake remedial works, seeding areas with loss of vegetation growth.

Photographs

Photographed Element	Photograph	Comment
Crest Southern Reach		Crest in overall acceptable condition, no evidence of burrowing, foreign objects or visible signs of overtopping, erosion or material loss, minor bare patches of grass throughout due to foot traffic.
Crest Northern Reach		Crest in overall acceptable condition, no evidence of burrowing, foreign objects or visible signs of overtopping, erosion or material loss, minor bare patches of grass throughout due to foot traffic**.**

Exposed Face Southern Reach		Dense reed growth along the entire embankment, small trees growing on embankment currently light foreign objects.
Exposed Face Centre of Embankment		Minor loss of grass cover to exposed face close to embankment access gate.

Exposed Face Northern Reach		Dense reed growth along the entire embankment, small trees growing on the embankment currently light foreign objects.
Landward Face Southern Reach		Landward face in overall good condition, no evidence of burrowing, foreign objects or visible signs of overtopping, erosion or material loss.

Landward face Northern Reach		Landward face in overall good condition, no evidence of burrowing, foreign objects or visible signs of overtopping, erosion or material loss.
Access Strip		Access Ramp onto embankment in fair condition, minor rutting of surface and loss of grass cover.

Frodsham Solar
T98 Flood Defence Visual Inspection

Asset Information

Asset Name	01320WEA1 River Weaver Reach 1
Asset ID	132643
Asset Category	Defence
Asset Type	Embankment
Type	Defence

Action Information

T98 Type	Ad Hoc Inspection	**Asset Inspector**	Adam Noble & Dan Jones
Schedule Date	18/03/2025	**Completion Date**	18/03/2025
Assessment Reason	At the request of the Environment Agency in support of a Development Consent Order application for a new solar farm.		

Current Inspection Information

Target Condition	3 - Fair	**Calculated Condition**	3
Overridden Condition		**Override Reason**	
Element Not Inspected	3	**Data Quality Flag**	4

Condition Grade Assessment

Element	Weighting	Condition Grade	Weighting x Condition Grade
Exposed Face	7	3 (Element Not Inspected)	21
Landward Face	7	3 (Element Not Inspected)	21
Crest	7	3	21
Berm	5	3 (Element Not Inspected)	15

Rock armour	6	3 (Element Not Inspected)	18
Sum	32		96
Overall Asset Grade	$\frac{Sum\ of\ Weighting\ \times Condition\ Grade}{Sum\ of\ Weighting}$	$\frac{32}{96}$ - Grade 3 - Fair	

Comments	The Embankment is in fair condition throughout, with minor defects due to undulations in crest height caused by the public right of way (PRoW) along the crest. It was not possible to visually inspect the entirety of the exposed face (riverside) or the landward face of the embankment due to the extensive reed and bramble growth. Of the grassed areas visible there was no evidence of deterioration. Therefore, this area was given a score of 3 for this assessment. There is no evidence of deterioration of the rock armour; however, only a small section was visually inspected, again due to the extensive reed growth a limited area was accessible and visible. Therefore, this area was given a score of 3 for this assessment.
Recommendations	Plan T98 inspection of embankment following routine maintenance of reeds growing on the exposed face and landward face. Monitor and manage the growth of trees on the embankment. Large mature trees pose a significant risk to slope stability in storms. Suggest a maintenance schedule, including pollarding the trees to keep height to a minimum. Consult a qualified arborist to assess the health of the trees. Remove smaller trees where disturbance of the embankment core is likely to be minimal. Monitor erosion on PRoW on yearly basis and undertake remedial works seeding areas with loss of vegetation growth.

Photographs

Photographed Element	Photograph	Comment
Crest		Crest in overall acceptable condition, no evidence of burrowing, foreign objects or visible signs of overtopping, erosion or material loss, minor bare patches of grass throughout due to foot traffic, minor undulations in crest height throughout.
Exposed Face Eastern Reach		Dense reed growth along the entire embankment.

Exposed Face Centre of Embankment		Dense reed growth along the entire embankment, large trees growing on embankment heavy foreign objects.
Exposed Face Northern Reach		Dense area of brambles on the embankment, heavy foreign objects.

Landward Face Southern Reach		Landward face covered with dense reeds, top towards crest visible and no visible signs of deterioration.
Landward face Northern Reach		Landward face covered with dense reeds. Large mature tree at end of embankment. Heavy foreign objects.

Rock Armour, exposed face		Small area of rock armour accessible to inspect, appears in fair condition with minor displacement of individual stones.

Appendix I PINS Scoping Opinion Extract

3.3 Flood Risk, Drainage and Surface Water

(Scoping Report Section 9.0)

ID	Ref	Applicant's proposed matters to scope out	Inspectorate's comments
3.3.1	Table 9.6	Water pollution from increased siltation – operation	The Applicant proposes to scope out water pollution from increased siltation during operation on the basis that impacts are unlikely to occur due to there being no exposed soils. Given the operational nature of the Proposed Development, the Inspectorate agrees to scope this matter out of further assessment.

ID	Ref	Description	Inspectorate's comments
3.3.2	Paragraphs 3.3.16, 9.5.3 and 9.5.4	Watercourse crossings	Paragraph 3.3.16 of the Scoping Report identifies that the underground grid connection option would be constructed by a combination of trench cut and backfilling, and Horizontal Directional Drilling (HDD) to navigate beneath the River Weaver. Further potential crossings of waterbodies are referred to in paragraphs 9.5.3 and 9.5.4 of the Scoping Report, but no further details are provided. The ES should describe the number, location and types of watercourse crossings required for the Proposed Development and assess impacts where there is the potential for significant effects to occur. Effort should be made to agree the approach and appropriate location(s) with the relevant consultation bodies and should drilling fluid be used in construction, a breakout plan should be produced, submitted and secured in the application.
3.3.3	Paragraph 9.2.1	Study area	The Scoping Report proposes a 1km study area to identify water bodies and downstream receptors that could be affected by the Proposed Development. The Inspectorate considers that the ES should clearly define the study area based on the ZoI, the hydrology

ID	Ref	Description	Inspectorate's comments
			of the site and potential for significant effects. Consideration of upstream receptors should also be included where appropriate.
3.3.4	Paragraphs 9.4.12 and 9.4.14	Flood Defences	The site lies within an area benefitting from flood defences however, limited information has been provided regarding these defences. Additionally, the Scoping Report highlights the potential for ground and fluvial flooding should a failure of the Environment Agency (EA) pumping stations which serve Frodsham Marshes and Ince Marsh occur. The ES should locate, identify and describe the type of flooding and flood defences as well as any other assets which may have implications on flooding/flood risk, their condition and who is responsible for their maintenance. Impacts to/from these flood defences and assets should be assessed in the ES where there is the potential for likely significant effects to occur and their influence on the impacts to/from flooding should be described. This should take into account the most up to date climate change projections to inform a worst-case scenario, particularly in relation to breach events.
3.3.5	Paragraph 9.6.2	Flood Risk Assessment (FRA)	The Inspectorate notes the Applicant's intention to include a FRA as a standalone report to be included within the Technical Appendices of the ES. The FRA should be based on the requirements of the Environment Agency standing advice. This should include a description of how the Proposed Development satisfies the requirements of the sequential and exception tests, where relevant. The sequential test should consider alternative development sites in addition to locating the development in areas of the site at lowest risk. The FRA should demonstrate that the Proposed Development includes suitable mitigation measures and flood resilient construction that will allow the development to remain operational for its 40-year lifespan. This includes confirming that all the flood sensitive equipment associated with the Proposed Development remains operational during a 0.1% event. Furthermore, the FRA should consider the surface water drainage/flood risk impacts that may occur

ID	Ref	Description	Inspectorate's comments
			off site and the potential of increased flood risk beyond the site boundary. This should include consideration of the potential for the solar installation to increase the rate of runoff from the site. The Applicant's attention is drawn to the comments from the Environment Agency (Appendix 2 of this Opinion) regarding the FRA.
3.3.6	Paragraph 9.4.22	Receptors	Paragraph 9.4.22 of the Scoping Report lists the receptors identified from the baseline review which could be potentially susceptible to environmental effects from flooding and drainage during the construction, operational and decommissioning phases. Groundwater has been included as a receptor, but no reference has been made to any abstractions. Any potentially impacted permitted or private water supplies should be identified and included in the assessment where there is the potential for likely significant effects to occur
3.3.7	N/A	Effects of vibration on flood defences	The Applicant should consider the effects of vibration on the structural integrity of flood defences located on site. This should include consideration of all works with potential to act as vibration sources in proximity to the flood defences for all phases. The Applicant should ensure any potential interaction of impacts are assessed for this matter with appropriate cross-referencing to relevant ES chapters.

ID	SR Reference	Description	CWCC Response	
8.1.56	8.7.5 (Table 8.4)	Table 8.4 Summary of Assessment Scope	Given the PEA findings, and that bird populations will not be able to use the Site as currently, it is not considered as stated in Table 8.4 of the SR that Operation impacts on wintering birds should be scoped out (the text in part of the table (Summary of Rationale) does state they will be scoped in). Operational impacts should be scoped back into the assessment.	
8.1.57	8.7.5 (Table 8.4)	Table 8.4 Summary of Assessment Scope	It is not agreed as stated in Table 8.4 of the main chapter that Operation impacts on breeding birds are scoped out, as ground nesting birds will not be able to use the site as currently, due to their requirement of large open areas, as stated in 3.3.17 of the Preliminary Ecological Appraisal. Ground-nesting birds have not been considered in the scoping table 8.4 of the chapter and operational impacts should be scoped back in.	
9. Flood Risk Drainage and Surface Water				
9.1.1	General		Please refer to the comments from CWCC's Lead Local Flood Authority **appended (appendix CWCC SR.3).**	
9.1.2	General		The Sequential Test and Exception Test need to be addressed via an accompanying Flood Risk Assessment, and the ES should demonstrate that a sequential approach has been applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk.	

ID	SR Reference	Description	CWCC Response	
9.1.3	9.2.1	Study Area	Paragraph 9.2.1 states that a study area of 1km from the Site is proposed to identify water bodies and downstream receptors that could be affected by the Proposed Development. As per the governments flood risk mapping (https://check-long-term-flood-risk.service.gov.uk/map), it appears the site has main rivers and a series of ordinary watercourses. Further investigation is required to determine their connectivity.	
9.1.4	9.2.1	Study Area	Whilst CWCC's LLFA recognises the nature of this application, CWCC Byelaw 10 which refers to the need for written approval from the LLFA for any development works within 8 metres of an ordinary watercourse is noted. This is to ensure appropriate maintenance access post development. Comments from the EA (letter of 28 June 2023 (Ref:XA/2023/100006/01-L01) are noted in relation to considering upstream receptors.	
9.1.5	9.3.6	Local Planning Policy	With regard to LP1 Policy ENV1: Flood Risk and Water Management, this states "Development proposals should comply with the Water Framework Directive by contributing to the North West River Basin Management Plan and Dee River Basin Management Plan objectives, unless it can be demonstrated that this would not be technically feasible.". No mention of these have been made in the SR and these should be addressed in the ES.	

ID	SR Reference	Description	CWCC Response	
9.1.6	9.4.6 to 9.4.9	Hydrological features (flood defences/pumping stations)	The ES should consider the consequences of a breach of the flood defences e.g. in terms of a breach of structural integrity, or as a consequence of changes to the maintenance regime.	
9.1.7	9.4.8 and 9.4.9	Hydrological features (pumping stations)	The ES should address the impacts associated with a potential change in the management regime associated with the pumping stations which serve Frodsham Marshes and Ince Marsh. Changes to the pumping regime may be planned or not, e.g. in the case of maintenance or pump failure (as referred to at 9.4.14 of SR).	
9.1.8	9.4.12	Flood Risk (flood defences)	As referred to above the ES is expected to consider flood risk and the consequences of a breach in the flood defences.	
9.1.9	9.4.14	Flood Risk	The ES should address whether there would be an increase or decrease in reliance on pumping e.g. in terms of a change to the volume of water pumped as a result of the Proposed Development. Consideration should be given to the impact of climate change in terms of the volume/flow of water to be pumped during the lifetime of the Proposed Development.	
9.1.10	9.4.14	Flood Risk	Further consultation with CWCC's LLFA (Lead Local Flood Authority) is recommended in preparation of the ES.	
9.1.11	9.4.18	Sewer Flood Risk	Consideration should be given by the ES to third party connections to the overflow sewers. The design of the Proposed Development should avoid loss of waste storage volumes in the existing network	

ID	SR Reference	Description	CWCC Response	
9.1.12	9.5.1	Potential Effects and Mitigation	There is little by way of detail for the Proposed Development in relation to the drainage strategy. CWCC LLFA highlight that consideration should be given to existing and proposed land profiles. Where land profiles are being altered, the applicant should assess whether any existing surface water flow routes need to be accommodated and retained. Any cable routing and potential associated impacts on watercourses and surface water flood routes should also be assessed. The ES should clarify whether/what raising the height of infrastructure referred to is in relation to existing levels in terms of the height parameters of the Proposed Development.	
9.1.13	9.5.3	Potential Effects and Mitigation – Construction and Decommissioning	The works cover an extensive area where it would not be unusual for any works to encounter unchartered drainage assets and natural surface water flow routes. The impact of the Proposed Development should assess any impact to the natural flow of surface water within the Site arising from the Proposed Development and any impact this could have on wider catchments.	
9.1.14	9.5.3	Potential Effects and Mitigation – Construction and Decommissioning	The location and confirmation of temporary compounds should be included in the ES. Any temporary impacts on surface water flow routes and ordinary watercourse should be adequately considered and mitigated.	
9.1.15	9.5.3	Potential Effects and Mitigation – Construction and Decommissioning	Any areas at risk of surface water flooding should be appropriately considered along with the wider impacts that this will have on flow paths for both during and post construction.	

ID	SR Reference	Description	CWCC Response	
9.1.16	9.5.3	Potential Effects and Mitigation – Construction and Decommissioning	Any third party connections or overflows from public sewers to impacted watercourses should be adequately investigated and assessed. Where diversion works are necessary, the applicant will need to ensure that these connections are retained to ensure no loss of connectivity.	
9.1.17	9.5.6	Mitigation	CWCC LLFA support locating development at least 10m away from all watercourses, including drainage ditches. Where this is not practical, the ES is expected to address the potential impacts. CWCC LLFA recommend the Applicant carries out consultation on any works within this easement/distance. Further investigation may be needed to confirm whether some of the existing drainage infrastructure falls within the LLFA's remit under the Land Drainage Act 1991, or whether this would be classified as an Environment Agency (EA) asset.	
9.1.18	9.5.7	Design for critical infrastructure	Reference to 1% annual probability of flood event pus 30% for climate change is understood to be based on the DCO application proposing a temporary duration for the Proposed Development.	
9.1.19	9.6.2	Assessment Methodology Site Specific Flood Risk Assessment (including	The proposed development is situated within Flood Zone 3, therefore a Flood Risk Assessment is required in accordance with NPS EN1 and the National Planning Policy Framework (NPPF). The EIA confirms a site-specific Flood Risk Assessment and Drainage Strategy will be prepared which will inform the	

ID	SR Reference	Description	CWCC Response	
		Sequential and Exception Test)	baseline assessment of flood risk associated with the Proposed Development. Comments from the EA (letter of 28 June 2023 (Ref:XA/2023/100006/01-L01) are noted in particular regarding the need for 600mm freeboard, compensation for any loss of flood plain, consideration of the effects of bunding, scope of the FRA, impact of culverting on flooding, interaction of various flooding mechansims.	
9.1.20	9.6.2	Site Specific FRA and drainage strategy	CWCC LLFA note that measures such as compensatory flood storage for works within Flood zone 3 will need to be assessed and confirmed, as changes to this measure may alter drainage design. Any impacts of access routes and haul roads on flood risk should also be assessed.	
9.1.21	9.6.2	Site Specific FRA and drainage strategy	CWCC LLFA support and encourage SuDs on sites where it practicable. SuDS should be designed to control surface water as close to its source as possible. The use of SuDS should also help achieve the sustainability objectives of the NPPF. It is imperative that any future development integrates sustainable drainage features for flood risk, water quality and environmental benefits. The suitability of sustainable drainage systems should be assessed in accordance with paragraphs 051, 079 and 080 of the revised NPPF Planning Practice Guidance for Flood Risk and Coastal Change (https://www.gov.uk/guidance/flood-risk-and-coastal-change).	

ID	SR Reference	Description	CWCC Response	
			Sustainable drainage systems should be designed in line with national Non-Statutory Technical Standards for SuDS (https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards) and local policies ENV1, DM40, DM41, DM42 and DM43 of the Core Strategy.	
9.1.22	9.6.4	SuDS	CWCC have also produced the following documents: 1) CWCC's Sustainable Drainage Systems (SuDS) Guidance – (volume 1) (v4) (June 2020) (JBA consulting 2) CWCC's Sustainable Drainage Systems (SuDS) Guidance - Council's Specific Information (volume 2) (v2) (June 2020) (JBA consulting).	
9.1.23	9.6.4	SuDS	Surface water attenuation requirements should be assessed that offer a reduction in surface water runoff rate in line with Policy DM 41 of LP2. CWCC LLFA confirm that all new connections to watercourses need to comply with reduction of flows to greenfield runoff rates. Surface water should be managed to ensure there is no increased surface water from the proposed development and runoff from extreme events should be retained within the site such that the adjacent third party land is not affected. Hydraulic calculations and drawings to support the design need to be provided along with an assessment of overland flow routes for extreme events that is diverted away from any key	

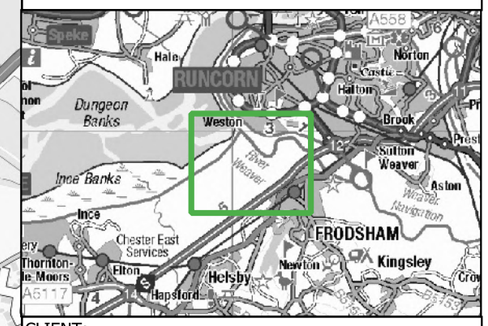
ID	SR Reference	Description	CWCC Response	
			infrastructure, such as service kiosks and key infrastructure for the solar panels.	
9.1.24	9.6.4	SuDS	Maintenance of SuDS is essential for its proper operation. Therefore, a clear management and maintenance plan for the lifetime of the development is required as part of the submitted drainage strategy.	
10. Ground conditions				
10.1.1	10.2.4 / 10.4.2	Study Area / Current Condition and Land Use	The ES should identify and address known landfill sites in the area, including Manchester Ship Canal Company's Frodsham Marsh Tipping Lagoon, East Clifton Marsh and Kemira Growhow Landfill. Consultation with CWCC's Environmental Protection and the Environment Agency is recommended in preparing the ES. The EA has provided some additional information on landfill sites in their response to the SR. Consideration of Environmental Permitted sites is also referred to in the EA response (recommending consultation with the Permit Holders).	
10.1.2	10.3.9	Local Planning Policy	The ES should address Policy M 4 - Proposals for exploration, appraisal or production of hydrocarbons in LP2.	
10.1.3	10.4.1	Preliminary Baseline Conditions	It is important that the ES is accompanied relevant reports as part of the Phase 1 Preliminary Risk Assessment report and Stage 2 Supplementary investigation to be submitted as a	

Appendix J Map of Watercourses

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Ditches (Ordinary Watercourses)
- Main Rivers



CLIENT:
Frodsham Solar Ltd

waterco
www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
Watercourse Plan (Ince Marshes)

PLOT STATUS:	DATE:
FINAL	14-05-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
MJW	AW	NJ	1:12000

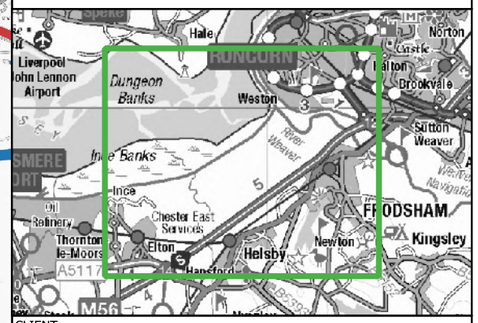
PLOT NAME:	REVISION:
14740_Watercourse_Plan	-

0 400 800 1,200 1,600 m

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Land Not Within Site Boundary
- Fluvial (Rivers)
- Tidal Waterbody
- Canal



CLIENT:
Frodsham Solar Ltd

waterco
www.waterco.co.uk

SCHEME:
Frodsham Solar

PLOT TITLE:
Watercourse Location Plan

PLOT STATUS:			DATE:
FINAL			08-07-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
JP	AW	NJ	1:27500
PLOT NAME:			REVISION:
14740_Watercourse_Location_Plan			-