

# Frodsham Solar Outline Flood Warning and Evacuation Plan

#### October 2025



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# **Frodsham Solar**

# **Outline Flood Warning & Evacuation Plan**

October 2025



Project Information			
Project:	Frodsham Solar		
Report Title:	Outline Flood Warning & Evacuation Plan		
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Author:	BSc (Hons) MCIWEM C.WEM	
Checker:	BSc (Hons) MSc MCIWEM	
Approver:	BEng (Hons) CEng MICE	

	Document History		
Revision	Date	Comment	
01	09/05/2025	First Issue	
02	20/10/2025	Second Issue – Updated following meetings with Cheshire West and Chester Emergency Planning Team and Chesire Fire and Rescue Service.	

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#### Introduction

This Outline Flood Warning and Evacuation Plan (FWEP) sets out how to prepare for and respond to a flood event. This FWEP has been prepared for Frodsham solar located to the north of the M56, Frodsham, Cheshire West, referred to as 'the site' herein. A site Location Plan and Aerial Image are in included in Appendix A.

#### **Operational Arrangements**

The solar farm is monitored and controlled completely remotely, meaning there will be no permanent employees at the site, and there can be prolonged periods with no personnel on site whilst equipment remains operational.

On average, approximately 2No. service personnel will be on site twice a week. This would be to undertake planned or unplanned maintenance, landscape maintenance, and any other works. Personnel visits can be scheduled to a time that's most suitable, for example to avoid adverse weather conditions. Site visits will occur during normal daylight hours (typically between 9am – 5am, however varies seasonally). No overnight working will take place.

#### **Understanding the Flood Risk**

The site is bordered by the River Weaver to the north and east, and the Manchester Ship Canal to the north-west. The River Mersey is located approximately 250m north-west of the site at its nearest point.

The site is intersected by several watercourses namely Red Wall Ditch, The Lum, Marsh Green and Ship Street Course. The water levels in the watercourses intersecting the site are controlled by an existing Environment Agency pumping station and the associated flood risk is very low.

The River Weaver (river flooding) and the River Mersey (tidal flooding) present the main sources of flood risk to the site.

#### **River Weaver Flooding**

Detailed river modelling of the River Weaver shows that the site is flood free during all events up to and including the 1.33% (1 in 75) Annual Exceedance Probability (AEP) event. As shown in Figure 1, during the 1% (1 in 100) AEP event, the flood defences on the eastern site boundary are overtopped and the easternmost extent of the site is estimated to flood with depths generally less than 300mm. All site access routes are flood free.



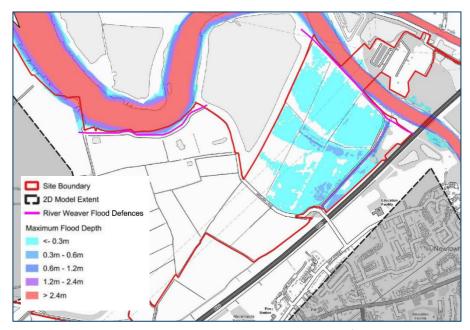


Figure 1 - 1% AEP Weaver Fluvial Event - Defended

As shown in Figure 2, during the 1% AEP event with 67% climate change, the lower lying eastern extent of the site is estimated to flood. Flood water overtops the River Weaver defences on the eastern boundary of the site. Flood depths generally vary from 740mm to 1.14m.

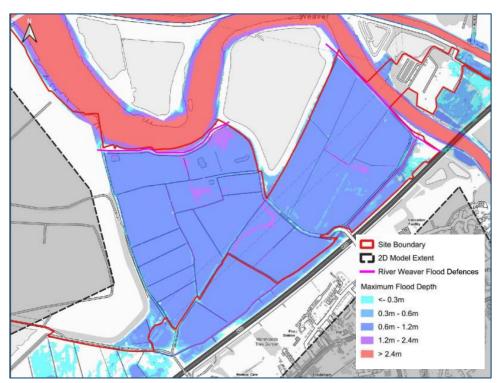


Figure 2 - 1% AEP plus 67% CC Weaver Fluvial Event – Defended

Flooding from the River Weaver can also occur from a breach of the flood defences. When accounting for a breach of the flood defences on the northern site boundary during the 1% AEP plus 67% CC event, flood depths generally vary from 0.79m to 1.19m. The flood extent is unchanged relative to the defended scenario.



When accounting for a breach of the flood defences on the eastern site boundary during the 1% AEP plus 67% CC event, flood depths generally vary from 0.96m to 1.36m. The flood extent is unchanged relative to the defended scenario.

#### **River Mersey Flooding**

Detailed river modelling of the Mersey Estuary shows that the site is partially shown to flood during the present day 0.5% (1 in 200) AEP event. As shown in Figure 3, floodwater from the Mersey Estuary enters the River Weaver and results in overtopping of the River Weaver flood defences on the northern site boundary. Flooding is concentrated to land south of the River Weaver flood defences and flood depths are less than 350mm.

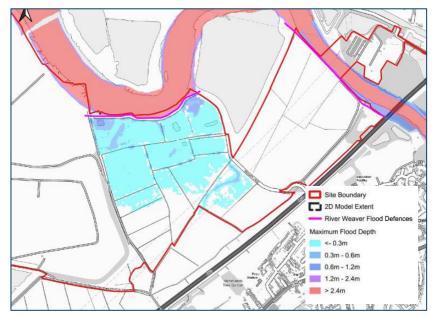


Figure 3 – 0.5% AEP Mersey Tidal Event – Defended

As shown in Figure 4, when accounting for climate change on the 0.5% AEP event up to the year 2075, the eastern extent of the site is estimated to flood. Floodwater from the Mersey Estuary enters the River Weaver and results in overtopping of the River Weaver flood defences on the northern site boundary. Flood depths vary from approximately 800mm - 1.32m.



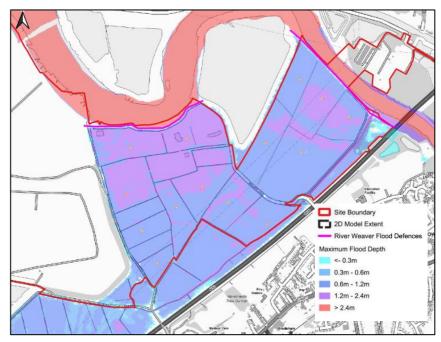


Figure 4 – 0.5% AEP Mersey Tidal Event (Year 2075 – Upper End Allowance) – Defended

Flooding from the River Mersey can also occur from a breach of the Mersey defences. Figure 5 shows that during the present day 0.5% AEP breach event, flooding is concentrated to land south of the River Weaver flood defences and flood depths are less than 350mm.

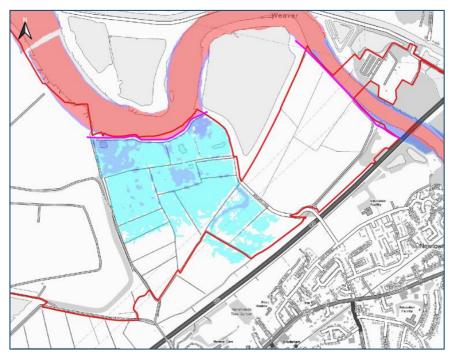


Figure 5 – 0.5% AEP Tidal Event (Breach Scenario)

The flood extent and depths during the 0.5% AEP breach event with climate chage up to the year 2075 are similar (less than 80mm difference) when compared to the defended scenario.



The site access points off Brook Furlong and Weaver Lane to the south (bridges over the M56) are flood free in all considered flood events. The western extent of the site (Frodsham windfarm site) is flood free during all considered flood events and would provide a safe area of refuge during all flood 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. Marsh Lane 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 6.

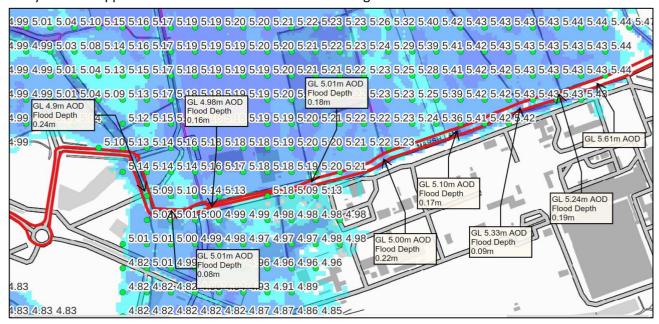


Figure 6 - 0.5% AEP Year 2075 Upper End Breach Event - Tidal Mersey - Marsh Lane Flood Depths

#### **Flooding Time of Inundation**

The time of inundation of floodwater represents the time that flood water takes to distribute across the site from first entry (from when flood water first overtops a flood defence or flows through a defence breach).

Detailed time of inundation mapping is provided as Appendix B. During a fluvial flood event of the River Weaver, flood inundation times are slow. During the 1% AEP plus 67% climate change event, floodwater takes 23 hours to disperse across the site. From when flood defences are first overtopped, little to no flooding is witnessed on site for up to 12 hours. A similar scenario is witnessed during the River Weaver defence breach event.

During a tidal flood event of the River Mersey, flooding inundation times are faster relative to a fluvial flood event. During the present day 0.5% AEP event, floodwater takes 2 hours to disperse across the flood extent. During the defended 0.5% AEP plus climate change (year 2075) event, flood water takes 1 hour to disperse across the site. Land in the southern extent of the site (near the access bridges at Brook Furlong and Weaver Lane) is flood free for up to 30 minutes following floodwater ingress into the site. It is however noted that



tidal flooding can be predicted and flood warnings would be available (ensuring the site is not occupied in times of tidal flooding).

During the 0.5% AEP plus climate change (year 2075) breach event, flood water takes 1 hour to disperse across the site. Land in the southern extent of the site (near the access bridges at Brook Furling and Weaver Lane) is flood free for up to 30 minutes following floodwater ingress into the site.

The shortest time of flooding inundation (from water entering the site at the River Weaver defences on the northern boundary and reaching the access bridges at Brook Furlong and Weaver Lane) is therefore 30 minutes during the 0.5% AEP plus climate change (year 2075) event. The distance between the River Weaver defences on the northern boundary and the access bridge at Brook Furlong is 1km. The average speed of floodwater inundation across the site during the 0.5% AEP plus climate change (year 2075) event is therefore 2km per hour (1.24mph / 0.56 metres per second). In context, the average walking speed is 4.8km per hour (3mph) (walking speed obtained from British Heart Foundation).

#### National Guidance on Weather and Flood Alerts/Warnings

#### **Flood Alerts and Warnings**

The Environment Agency flood forecasting and warnings service operates in areas at risk of flooding from rivers or the sea and relies on direct measurements of rainfall, river levels, tide levels, in-house predictive models, rainfall radar data and information from the Met Office. This service operates 24 hours a day, 365 days a year.

Flood Alerts are available for the area. Flood Alerts is a free service that provides Flood Alerts direct to telephone, mobile and email.

Flood Warnings are also available for the area. Flood Warnings is a free service that provides Flood Warnings direct to telephone, mobile and email.

Flood Alerts and Warnings are also published online and are available to view on the Environment Agency website: Flood alerts and warnings - GOV.UK (check-for-flooding.service.gov.uk).

Registration to receive Flood Alerts/Warnings can be done online by following the link below. It is also possible to register to receive Flood Alerts/Warnings by calling Floodline on 0345 988 1188.

Register for Flood Alerts/Warnings: Sign up for flood warnings - GOV.UK (environment-agency.gov.uk)

A summary of Flood Alerts and Warnings, and government advice is provided below.

#### **Flood Alert**

A Flood Alert is issued to warn people of the possibility of flooding and encourage them to be alert, stay vigilant and make early / low impact preparations for flooding. A Flood Alert icon is made up of a black house with 1 waved line of water covering the bottom, all within an orange triangle.





# Flood Alert Flooding is possible - be prepared

The Environment Agency issues a Flood Alert when forecasts show that flooding may be possible from:

- Rivers.
- High tides, surges or strong winds at sea.

The Environment Agency usually issues a Flood Alert between 2 and 12 hours before flooding. Flood Alerts are usually issued during waking hours where possible.

#### **Flood Warning**

A Flood Warning is used to warn people that flooding is expected, and action should be taken immediately. A Flood Warning icon is made up of a black house with 2 waved lines of water covering the bottom, all within a red triangle.



Flood Warning
Flooding is expected - immediate action
required

The Environment Agency issues a Flood Warning when forecasts show that flooding is expected from:

- Rivers.
- Heavy rain that will cause rivers to flash flood.
- High tides and surges coupled with strong winds at sea.

The Environment Agency usually issues a Flood Warning 30 minutes to 2 hours before flooding.

#### **Severe Flood Warning**

A severe flood warning means that flooding could cause danger to life and significant disruption to communities. You must act now. A Severe flood warning icon is made up of a red house with 3 waved lines of water covering the bottom, all within a red triangle.



**Severe Flood Warning** Severe flooding - danger to life

The Environment Agency issues a severe flood warning when flooding threatens life and communities.

#### **UK Weather Warnings**

The Met Office issues weather warnings when severe weather has the potential to impact the UK. The Met Office issues warnings for rain and other extreme weather conditions. The weather warnings are given a



colour depending on a combination of both the impact the weather may have and the likelihood of those impacts occurring:

**Red** - Extreme weather is expected. Red means that people should take action now to keep themselves and others safe from the impact of the weather. Widespread damage, travel and power disruption and risk to life is likely. People must avoid dangerous areas and follow the advice of the emergency services and local authorities.

**Amber** - There is an increased likelihood of bad weather affecting people, which could potentially disrupt plans and possibly cause travel delays, road and rail closures, interruption to power and the potential risk to life and property. Amber means that people need to be prepared to change plans and protect themselves, family and community from the impacts of the severe weather based on the forecast from the Met Office.

**Yellow** - Severe weather is possible over the next few days. Yellow means that people should plan ahead thinking about possible travel delays, or the disruption of your day-to-day activities. The Met Office is monitoring the developing weather situation and yellow means keep an eye on the latest forecast and be aware that the weather may change or worsen.

Met Office weather warnings are available online on the link below:

https://www.metoffice.gov.uk/weather/warnings-and-advice/uk-warnings#?date=2023-11-02

Weather warnings are also available from the Met Office social media platforms and can be sent by signing up to receive email alerts.

#### **Local Guidance**

In addition to the national flood and weather warnings, useful information is available locally through the following sources:

- Cheshire Fire & Rescue Incidents Page: https://www.cheshirefire.gov.uk/news-events/incidents/
- Cheshire Fire & Rescue social media pages
- Cheshire West and Chester social media pages.

#### **Preparing for a Flood at Frodsham Solar**

#### The following measures should be undertaken in preparation for a flood event:

Site management and operatives will be required to register to receive EA Flood Alerts / Warnings and Met Office Weather Warnings. Flood and weather warnings would inform site operatives of potential flooding on site and in the locality.

A copy of this Flood Warning and Evacuation Plan will be made readily accessible to all site operatives.



In preparation for a flood event, site operatives and where relevant site management, will be required to:

- Receive training on procedures to follow in the event of a flooding. This includes being aware of:
  - The Flood Evacuation Route Plan provided as Appendix C. The Flood Evacuation Route Plan shows the fastest route to high ground and is based on a flood event from the Mersey (where flooding inundation times are fastest). Separate evacuation routes are shown to Brook Furlong and Weaver Lane. The applicable evacuation route depends on the operative's position on site at the time of flooding.
  - Locations of safe refuge on site. All inverter / transformer substations which are distributed across the site have been designed with a floor level above flood levels. Each inverter / transformer substation therefore provides an area of safe refuge should flooding occur without warning. The elevated western extent of the site (Frodsham wind farm) also provides a place of refuge.
  - The operation, layout and design of the site. All infrastructure including the panels and inverter / transformer substations have been designed so that they are above estimated flood levels and can remain operational during a flood event. Site operatives will be required to understand the layout of the site and its access tracks to ensure they can quickly access a point of safe refuge should flooding occur without warning.
- Prepare and maintain emergency kits which are to be stored in each place of safe refuge (all inverter / transformer substations). The kit should include a torch, protective (warm and waterproof) clothing, bottled water, ready to eat non-perishable foods and a fist aid kit.
- Always carry a mobile phone (communication method) when working on site.
- Always carry a supply of any prescribed essential medication when working on site.
- Ensure they have access (keys or padlock combinations) to all security gates and buildings on site.
- Be familiar with emergency contact numbers provided below.
- Be familiar with the flood protocols detailed in the following sections.
- Designate a member of staff i.e. a site manager to ensure that flood and weather warnings are distributed and received by all.

#### **Actions Following a Flood or Weather Warning for Frodsham Solar**

The following actions should be undertaken on receipt of an EA Flood Alert or Warning / Yellow, Amber or Red Met Office Weather Warning:

No site operatives should be on site when an EA Flood Alert, Flood Warning or Met Office Amber or



Red Weather Warnings are in place. Should a flood or weather warning be received when operatives are on site, then immediate evacuation should take place. Operatives should not travel to site when flood or weather warnings are in place.

If on site when a flood or weather warning is received, ensure the site is secured on leaving and where time permits, ensure signage is displayed informing the public that permissive pathways are closed. The site can be operated remotely, and routine maintenance works can be temporarily suspended. Once off-site, check travel routes and public transport schedules (for any road closures, cancelations etc.) to ensure safe travel to a place of residence. The Site Manager is responsible to ensure that all operatives have left the site and to inform operatives on the next shift of the potential flooding.

#### The following actions will be required where flooding occurs without warning:

If a site operative is on site when flooding occurs i.e. where no warning is received, the site operative will be required to:

- Raise the alarm, ensuring all staff / visitors on site are aware of the flooding.
- Where safe to do so, evacuate immediately. The evacuation route detailed in Appendix C should be followed when leaving the site. Based on the inundation time of floodwater, sufficient time is available to walk or drive off-site.
- For any reason that evacuation is not possible, proceed to the nearest point of safe refuge. Places of safe refuge include the elevated western extent of the site (Frodsham wind farm) and all inverter / transformer substations on site (shown on the Flood Evacuation Route Plan provided as Appendix C).
   Operatives will be required to stay in the place of safe refuge until flood waters have receded. In an emergency, dial 999 and await rescue.

#### **Actions Following a Flood**

Flood water can contain pollutants including raw sewage. Contact with remnant flood water should be avoided as it may be contaminated. Cleaning and disinfectant of infrastructure (fencing, CCTV posts, panel supporting columns) on site may be required following a flood event.

Following a flood event, a formal debrief should be undertaken to consider any improvement actions. This Flood Warning & Evacuation Plan should be supplemented by any improvement suggestions which are made following the flood event debrief. An incident debrief form, supplied by Cheshire West and Chester Council, is provided as Appendix D.



#### **Additional Recommendations**

Cheshire Fire and Rescue Service have been consulted and offer a 'tabletop' session with developers to examine emergency scenarios to ensure that both parties have thought through potential issues in the event of an emergency. The developer should arrange a 'tabletop' session with Cheshire Fire and Rescue Service prior to construction works commencing.

#### **Emergency Contact Details**

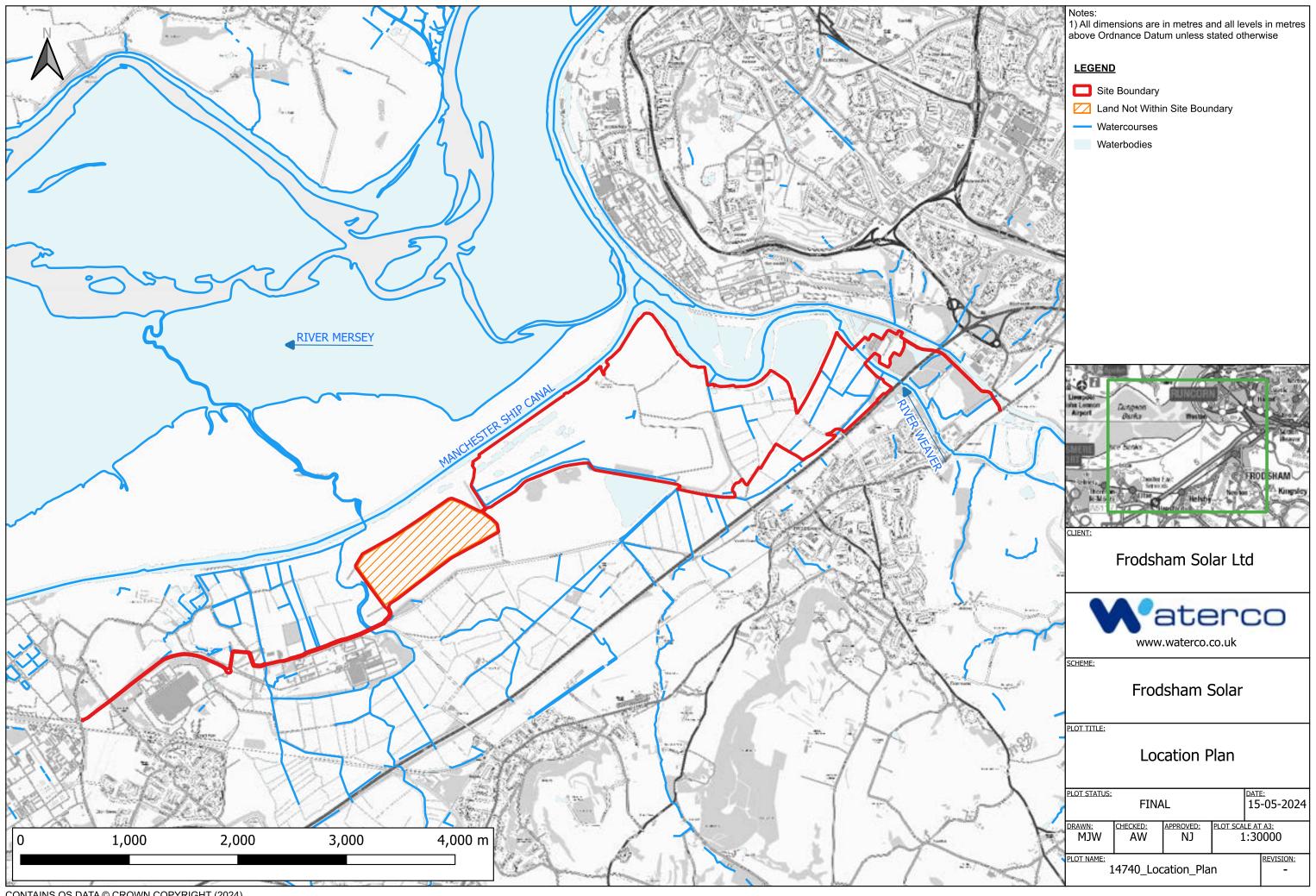
IN THE EVENT OF AN EMERGENCY DIAL 999				
Floodline - 0345 988 1188	EA Incident Hotline - 0800 80 70 60			
NHS 111 Service (non-emergency) - 111	Cheshire Fire and Rescue Service / Frodsham Fire Station (non -emergency) 01606 868906			
Electricity (24-hour Emergency Service) – 0800 40 40 90	Gas (24-hour emergency service) – 0800 111 999			
Other useful Contacts (to be provided by site manage	er / residents)			

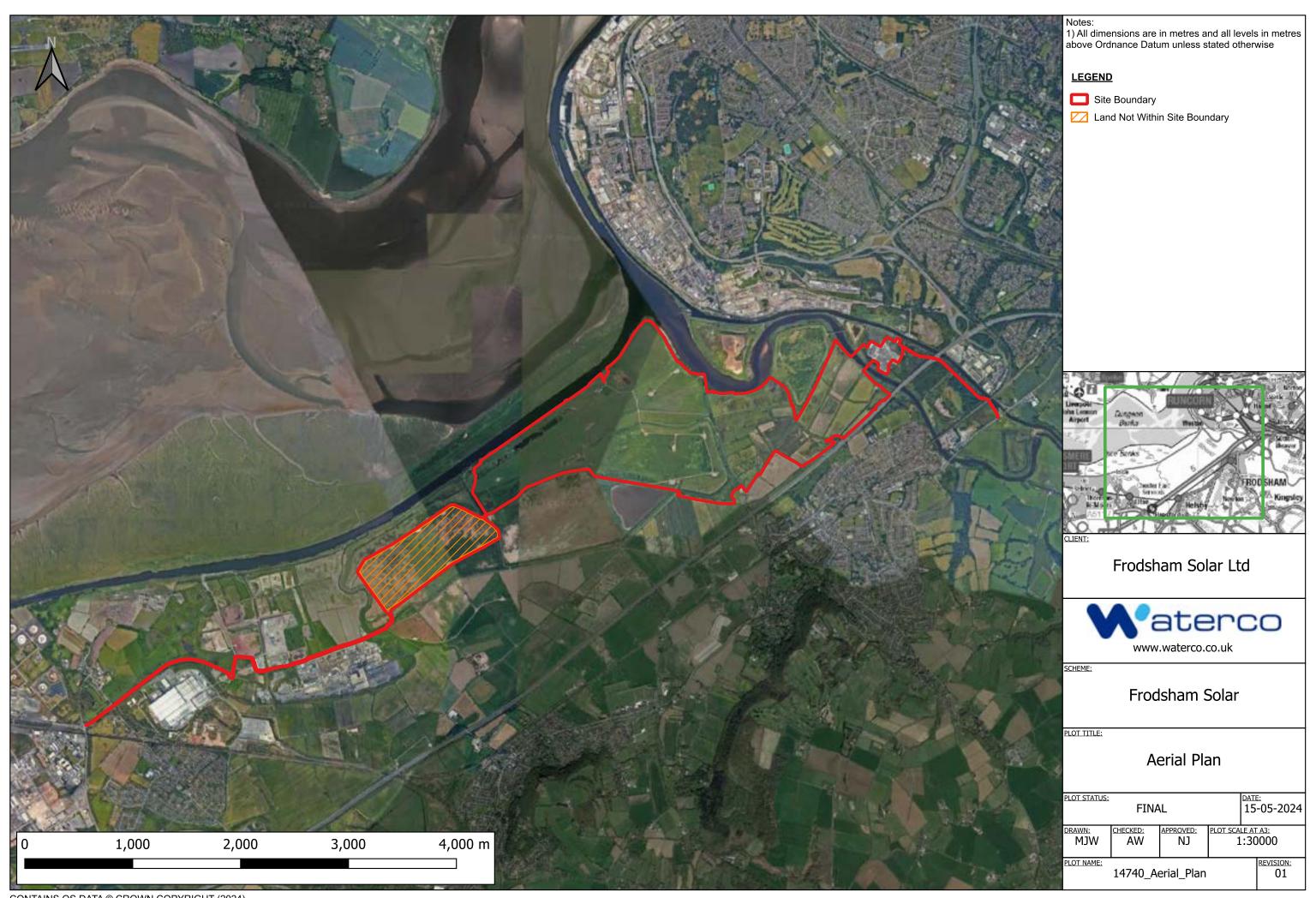
This FWEP should be updated every 5 years accounting for the latest flood risk information. Emergency contact details should be reviewed annually.



### Appendix A Location Plan & Aerial Image



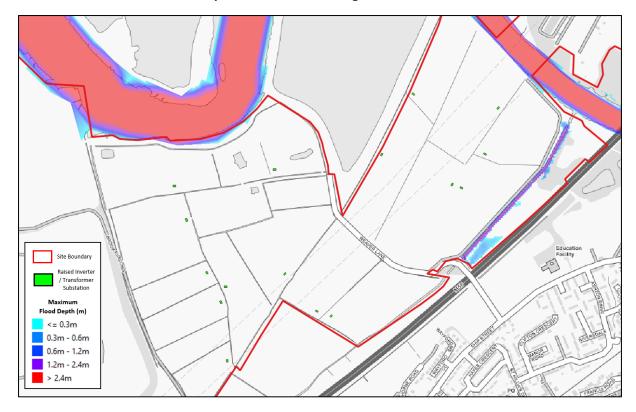




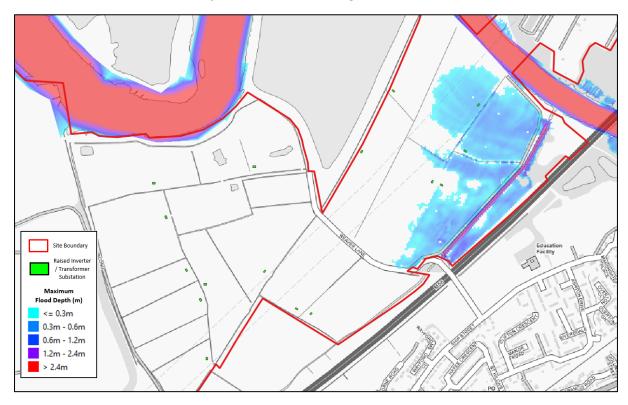
### Appendix B Flood Inundation Mapping



River Weaver Defended 1% AEP plus 67% Climate Change Event – Time of Inundation Ohrs



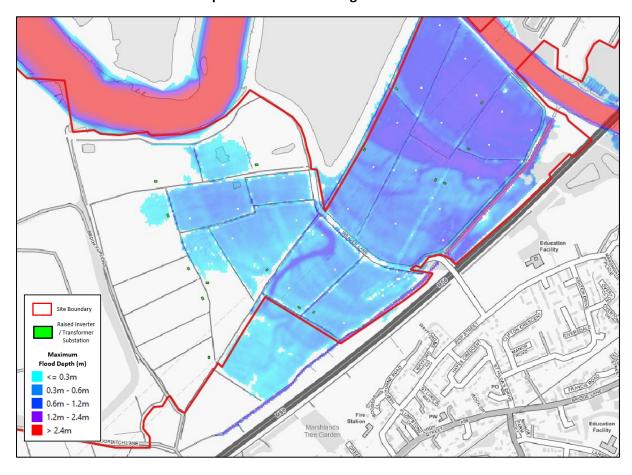
River Weaver Defended 1% AEP plus 67% Climate Change Event – Time of Inundation 12hrs



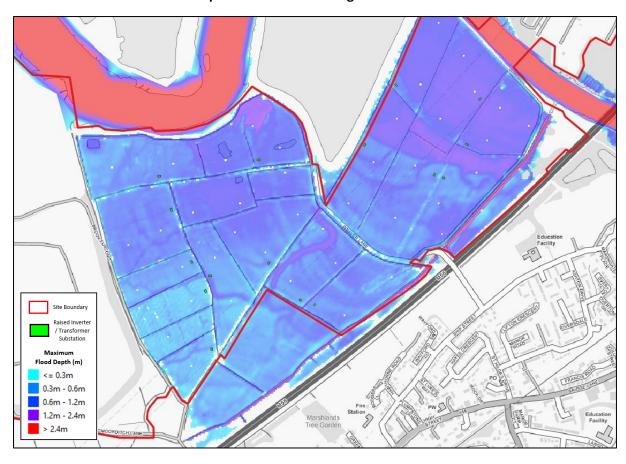
River Weaver Defended 1% AEP plus 67% Climate Change Event – Time of Inundation 13hrs



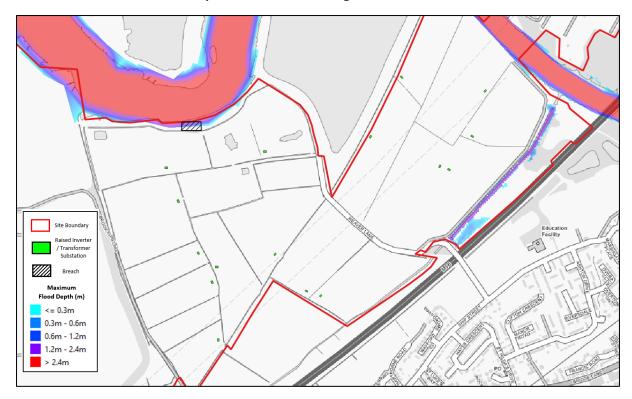
River Weaver Defended 1% AEP plus 67% Climate Change Event – Time of Inundation 17hrs



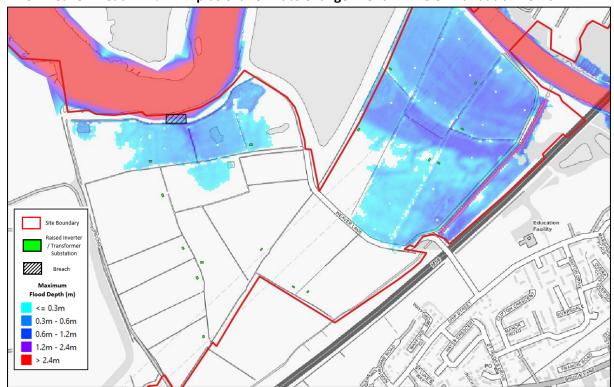
River Weaver Defended 1% AEP plus 67% Climate Change Event – Time of Inundation 23hrs



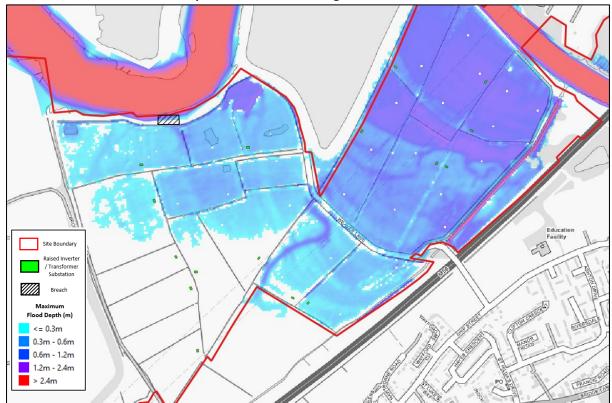
River Weaver Breach 1 1% AEP plus 67% Climate Change Event – Time of Inundation Ohrs



River Weaver Breach 1 1% AEP plus 67% Climate Change Event – Time of Inundation 13hrs



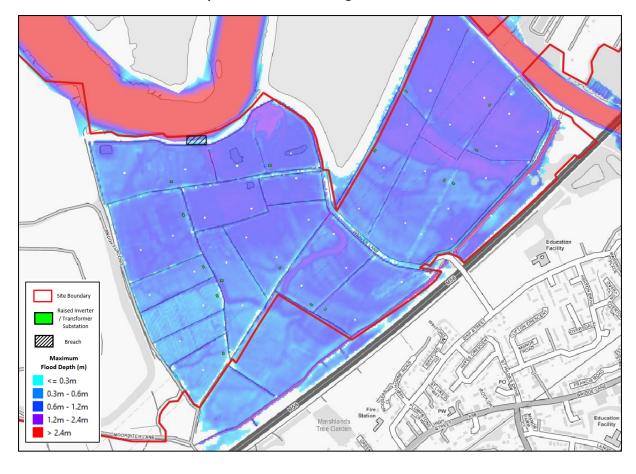
River Weaver Breach 1 1% AEP plus 67% Climate Change Event – Time of Inundation 15hrs



River Weaver Breach 1 1% AEP plus 67% Climate Change Event – Time of Inundation 16hrs



River Weaver Breach 1 1% AEP plus 67% Climate Change Event – Time of Inundation 23hrs



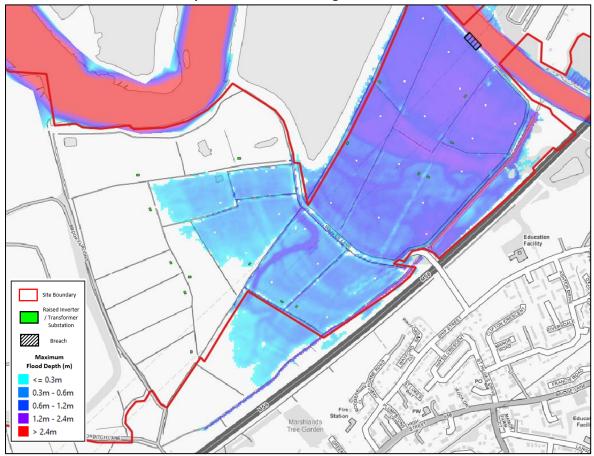
River Weaver Breach 2 1% AEP plus 67% Climate Change Event – Time of Inundation Ohrs



River Weaver Breach 2 1% AEP plus 67% Climate Change Event – Time of Inundation 12hrs



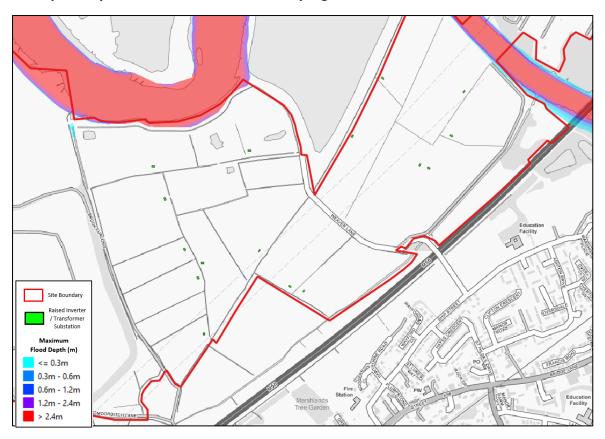
River Weaver Breach 2 1% AEP plus 67% Climate Change Event – Time of Inundation 14hrs



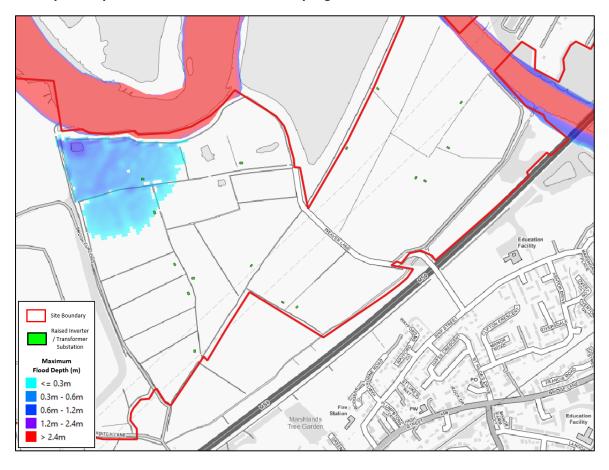
River Weaver Breach 2 1% AEP plus 67% Climate Change Event – Time of Inundation 23hrs



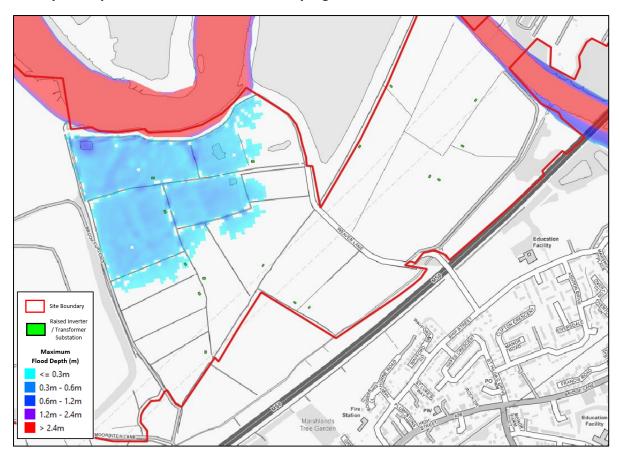
Mersey Estuary Defended 0.5% AEP Present Day Higher Central Event- Time of Inundation Ohrs



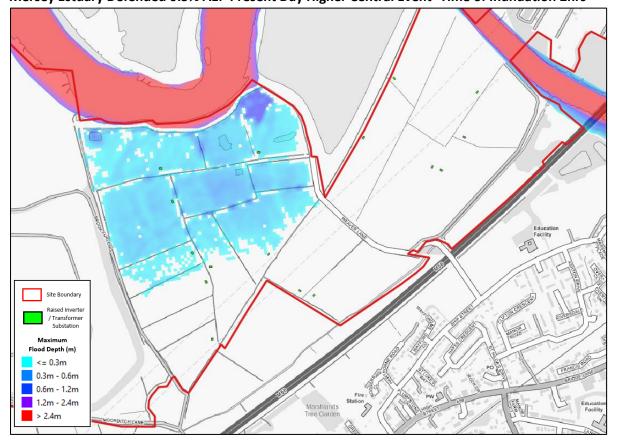
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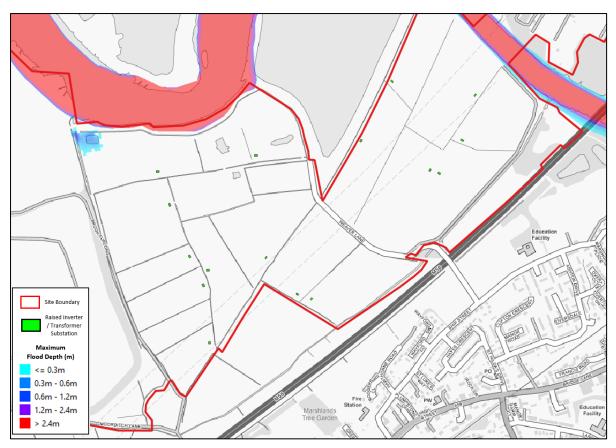
Mersey Estuary Defended 0.5% AEP Present Day Higher Central Event- Time of Inundation 1hrs



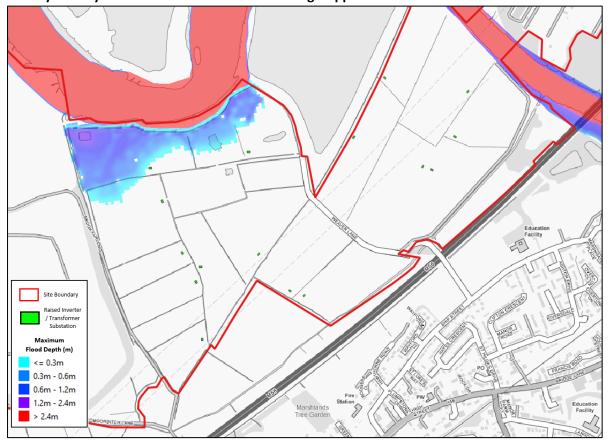
Mersey Estuary Defended 0.5% AEP Present Day Higher Central Event- Time of Inundation 2hrs



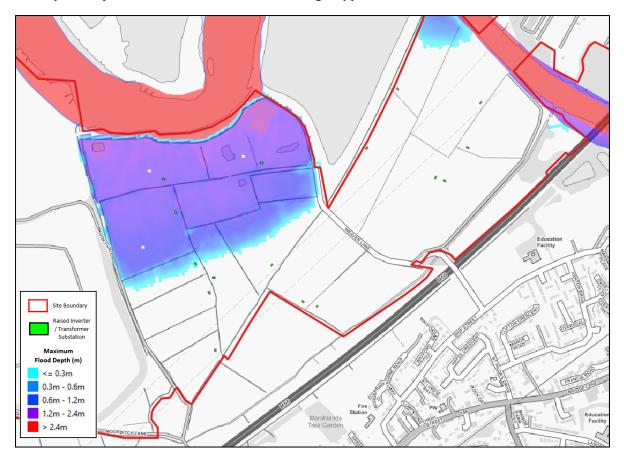
Mersey Estuary Defended 0.5% AEP Climate Change Upper End Event- Time of Inundation Ohrs



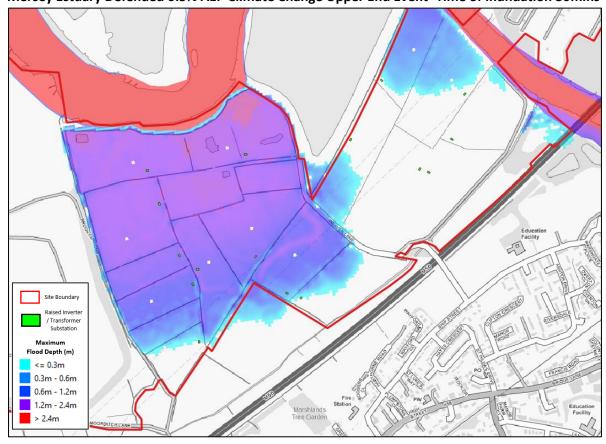




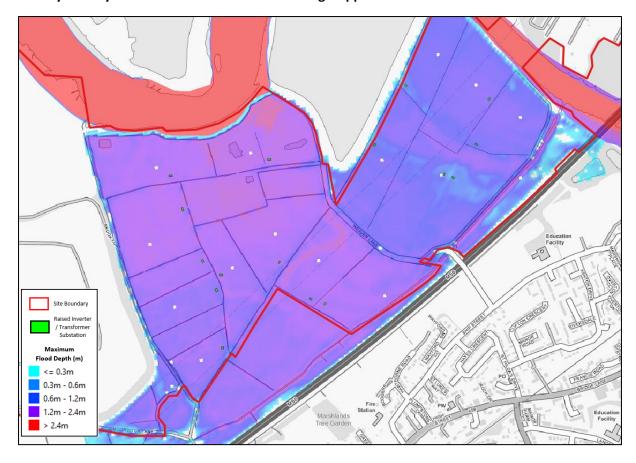
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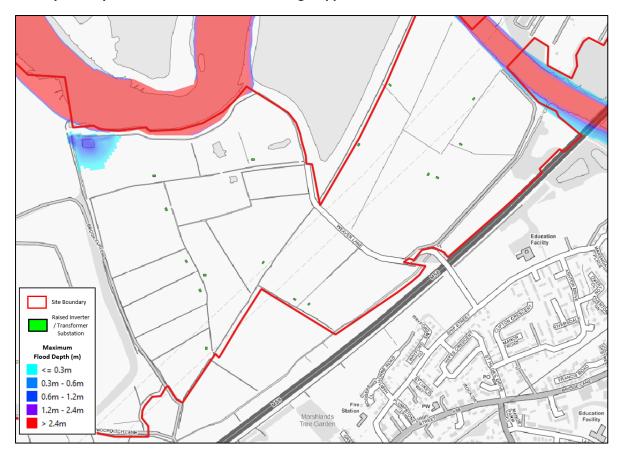
Mersey Estuary Defended 0.5% AEP Climate Change Upper End Event-Time of Inundation 30mins



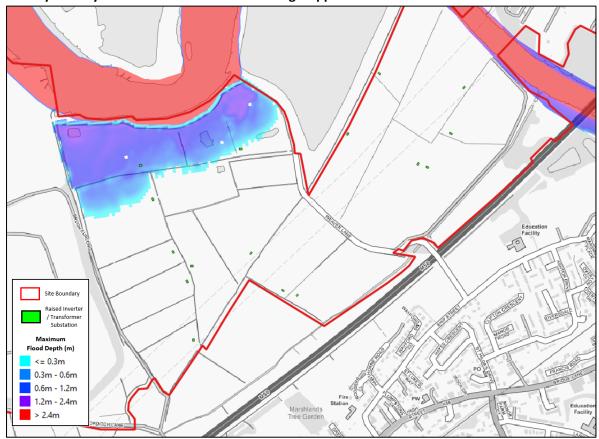
Mersey Estuary Defended 0.5% AEP Climate Change Upper End Event-Time of Inundation 1hrs



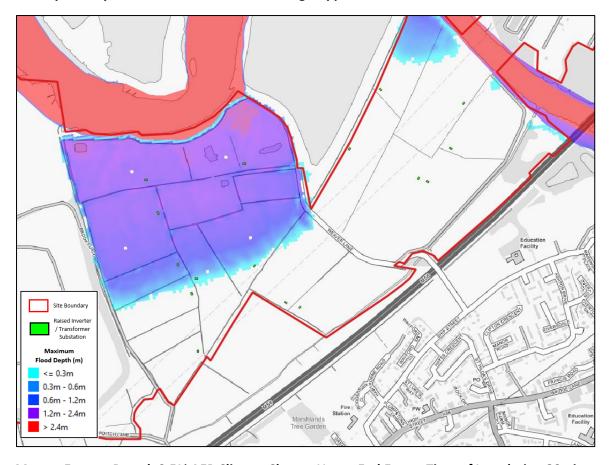
Mersey Estuary Breach 0.5% AEP Climate Change Upper End Event- Time of Inundation Ohrs



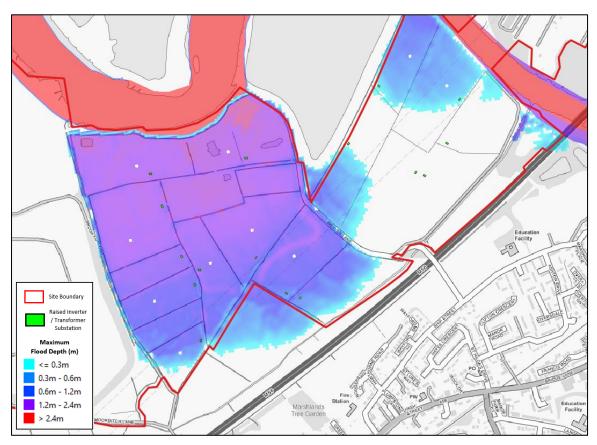
Mersey Estuary Breach 0.5% AEP Climate Change Upper End Event-Time of Inundation 10mins



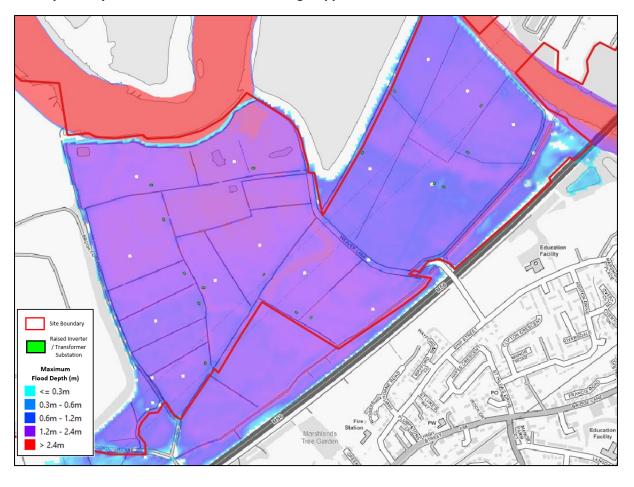
Mersey Estuary Breach 0.5% AEP Climate Change Upper End Event-Time of Inundation 20mins



Mersey Estuary Breach 0.5% AEP Climate Change Upper End Event-Time of Inundation 30mins

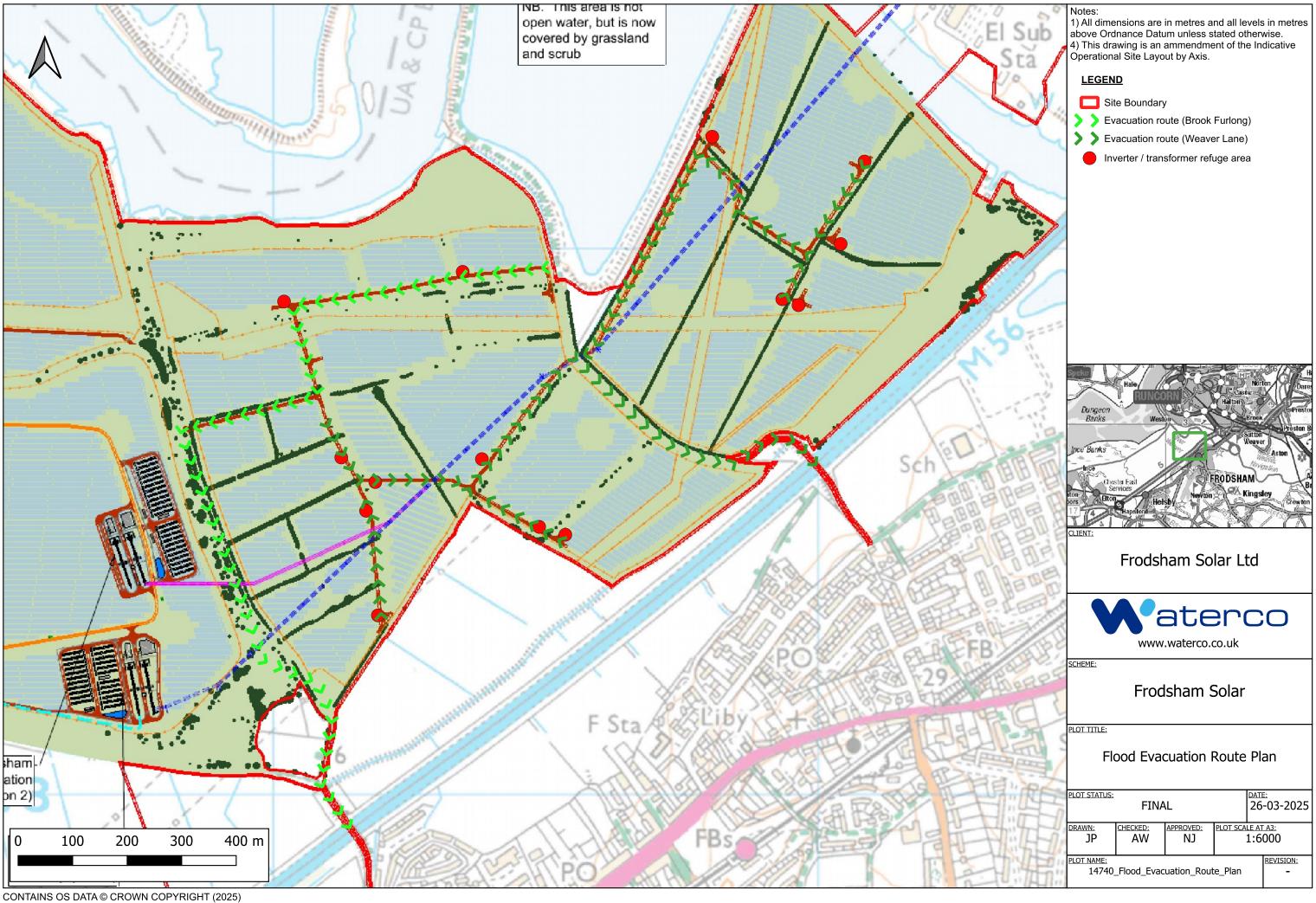


Mersey Estuary Breach 0.5% AEP Climate Change Upper End Event- Time of Inundation 1hrs



### Appendix C Flood Evacuation Route Plan





## Appendix D Incident Debrief Form



### **DEBRIEF**

# INCIDENT: DATE:

#### AIM AND OBJECTIVES OF A STRUCTURED DEBRIEF

- The overarching aim of this debrief process will be to capture key learning from any Incidents which may happen on site PUT IN BUSINESS NAME AND ADDRESS.
- · Objectives are as follows:
  - To review all onsite plans and evacuation plans.
  - o To identify any lessons learnt to assist in the planning of and response to similar incidents in the future.
  - o To identify recommendations for consideration by Multi-Agency partners.
  - Feed in learning to the appropriate bodies H&S, Cheshire Fire etc.

#### **CONDUCT OF THE DEBRIEF**

- The debrief will be conducted by using this debrief form.
- Debrief forms should be completed openly and honestly.
- Facilitates personal, group or organisational understanding and learning and enhance to improve future response and performance it is not about assigning blame.
- Enables stakeholders/contractors to openly communicate their experiences and perspective.
- Provides a process that is inclusive and maximises the opportunity to capture identified lessons.
- Ensures that identified lessons and recommendations inform change and future practice.
- Is consistent with the businesses professional responsibilities.
- Respects the rights of individuals.
- Values equally all those involved.
- Comments regarding the incident will be filled to compare to future events to identify any reoccurring issues.

#### **AUDIT AND DISCLOSURE**

- A record of the debriefs, including the time, location and those present will be retained for auditing purposes.
- Debrief documentation should be retained and may be disclosable under provisions of the Criminal Procedures and Investigation Act 2006.
- May be subject to disclosure under the Freedom of Information Act 2000 and Subject Matter Requests.

#### PLEASE COMPLETE THIS FORM AND E-MAIL TO:

Enter in contact person details here who is conducting the debrief

Incident		Date of incident		
Name		Service/ Company		
		11		
Email Address				
Please provide details of the role you performed during the incident				

# DEBRIEF

Good Practice				
From your perspective, what went well and should be highlighted as good practice for the future?				
Response:	Recovery:			
Koy Loarning				
Key Learning What key learning has resulted from this incident?				
Response:	Recovery:			
Areas for Improvement	The state of the s			
Based on your own experience which aspects did not go				
Response:	Recovery:			