Flood Risk Factsheet

Background

Flood risk is defined as a combination of the probability of an event occurring and the impact if it were to occur. For something to be deemed at risk of flooding or for it to increase flood risk elsewhere there must be a source, a pathway and a receptor. For this project, the potential pathways and sources are considered to be as follows:

- Fluvial Flooding when the capacity of the River Cam is exceeded.
- Surface Water Flooding when rainfall intensities exceed the infiltration capacity such that water collects on the ground surface.
- Groundwater Flooding from rising groundwater (due to either local rainfall percolating into permeable stratum or lateral movement of water from elsewhere in an aquifer); and
- Other Flooding Sources such as overwhelmed sewers and drainage systems.

What is fluvial flood risk?

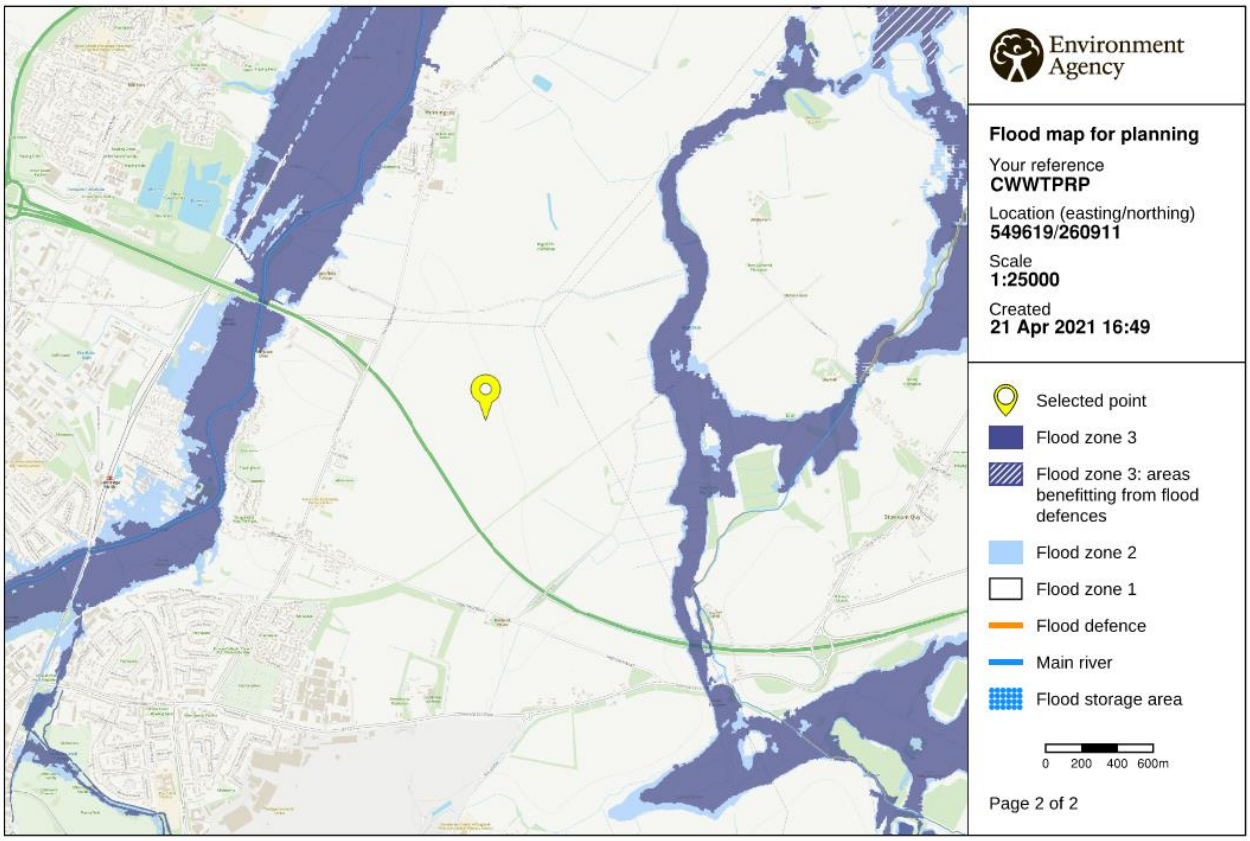
The initial source of information used to determine the fluvial flood risk to the project is the Environment Agency (EA) Flood Zone Mapping. The Flood Zones are defined as:

- Flood Zone 1 – Areas with a 'Low Probability' of flooding and where the annual probability of flooding is lower than 1 in 1000 (0.1%) for either fluvial or tidal flooding. Fluvial flood risk occurs when the capacity of a watercourse is exceeded such that the water overspills the channel.
- Flood Zone 2 – Areas with a 'Medium Probability' of flooding and where the annual probability of flooding is between 1 in 1000 (0.1%) and 1 in 100 (1%) for fluvial flooding or between 1 in 1000 (0.1%) and 1 in 200 (0.5%) for tidal flooding.
- Flood Zone 3 – Areas with a 'High Probability' of flooding and where the annual probability of flooding is 1 in 100 (1%) or greater for fluvial flooding or 1 in 200 (0.5%) or greater for tidal flooding.

What is the Fluvial Flood Risk at the site?

The new facility will be located in Flood Zone 1, with a low probability of either fluvial or tidal flooding, as shown on the EA Flood Zone map of the area overleaf[1]. However, the indicative project boundary includes other infrastructure works located in Flood Zone 2 and 3. As a consequence, a Flood Risk Assessment (FRA) will be carried out. As part of this assessment, discussions will be held with the Environment Agency, navigation authorities (such as The Conservators of the River Cam), highway authorities and other local authorities, to identify the likelihood, possible extent and nature of the flood risk.

[1] https://flood-warning-information.service.gov.uk/long-term-flood-risk/map



Environment Agency Flood Zone Map

What is surface water flood risk?

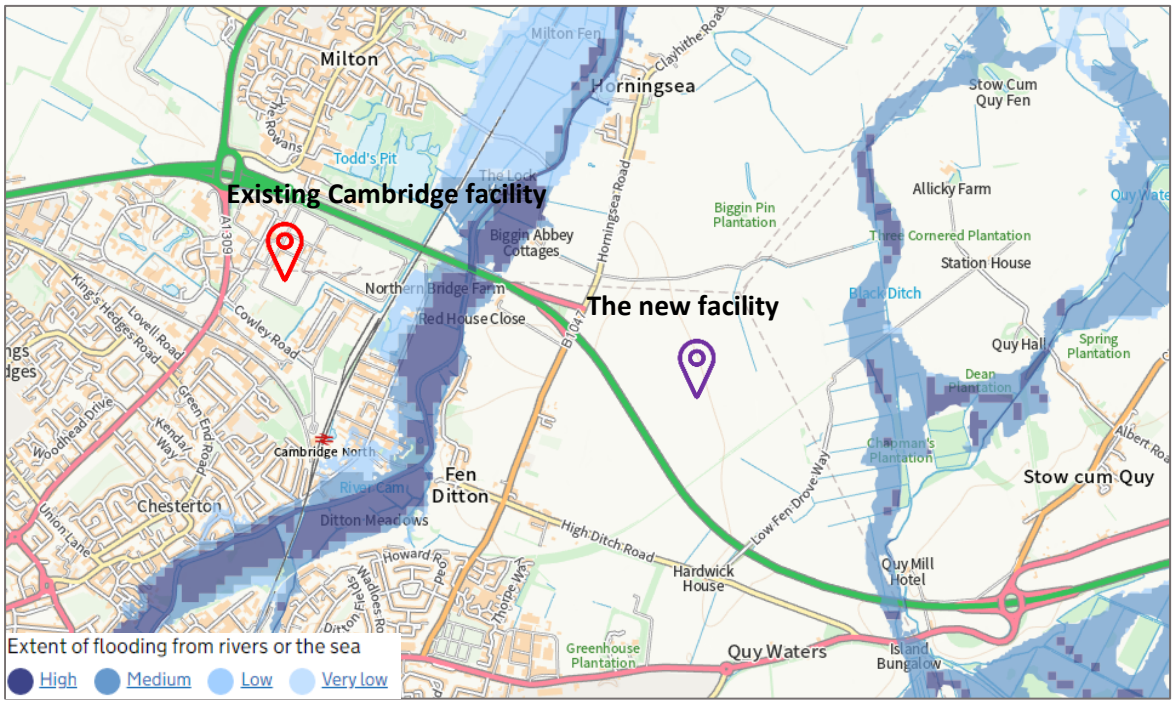
Surface water flooding occurs when rainfall intensities exceed the infiltration capacity and water collects on the ground surface. The EA also publish mapping showing areas at risk from surface water flooding with the following three event categories:

- High Risk – means that each year the area has a chance of flooding of greater than 3.3%;
- Medium Risk – means that each year the area has a chance of flooding of between 1% and 3.3%; and
- Low Risk – means that each year the area has a chance of flooding of between 0.1% and 1%.

What is the Surface Water flood risk at the site?

The EA map showing areas at risk from surface water flooding in the area is reproduced overleaf[2]. It can be seen from this map that the proposed waste water treatment facility for Greater Cambridge is located in an area of low risk from surface water flooding.

[2] https://flood-warning-information.service.gov.uk/long-term-flood-risk/map (visited June 2021)



Environment Agency map showing risk of surface water flooding

What is groundwater flood risk?

Groundwater flooding generally occurs as a result of long duration rainfall events, when the associated recharge of permeable geological deposits raises the water table until it is above ground level. Groundwater flooding is generally of longer duration than fluvial or surface water flooding and may take weeks to recede as groundwater flow is much slower.

Carrying out a Flood Risk Assessment (FRA)

The FRA will assess our proposals for the site in detail against the risk of flooding from a source such as fluvial, groundwater or another source. The FRA will also consider whether the construction and operation of the site has the potential to increase the risk of flooding to receptors in the surrounding area. The FRA will consider joint and cumulative effects and the mitigation options available to reduce any risks identified to an acceptable level. It will also make allowances for the variations in climate as a result of climate change over the planned lifetime of the site.

Potential ways to mitigate flood risk

To reduce the risk of flooding to the site there are a number of Sustainable Drainage Systems (SuDS) measures for surface water drainage management that can be implemented to avoid or reduce the adverse impacts including the following measures:

- Filter drains and porous pavements to allow rainwater and run-off to infiltrate into permeable material below ground.
- Infiltration devices to allow water to soak into the ground.
- Basins, ponds, flood storage areas and other artificial features to hold excess water after rain and allow controlled discharge that avoids flooding.
- Vegetated features that hold and drain water.
- Flood routes to carry and direct excess water through the development to minimise the impact of severe flooding.

The surface water drainage arrangements for the site will be designed so that the volumes and peak flow rates of surface water leaving the site are no greater than the rates prior to its construction in accordance with the National Policy Statement for Waster Water.

Provisions for Future Growth

The facility is being designed and will be constructed to make an allowance for future growth that is planned to occur across the whole of Cambridge and Waterbeach up to at least the year 2050.

We will monitor growth through the adopted local plans of South Cambridgeshire District Council and Cambridge City Council, as well as the emerging Greater Cambridge Local Plan. This will involve liaising with the local authorities and developers to ensure we understand need requirements going forward, enabling the delivery of sustainable economic and housing growth. This growth projection assumes the following:

- An occupancy of 2.59 persons per dwelling; and
- A potable water consumption of 150l/head/day

Going forward from 2050 and beyond, the facility will have the flexibility to adapt and evolve within the proposed footprint as new technologies or treatment opportunities present themselves. These technologies or adaptations will either improve process efficiencies or increase capacity or both depending on the needs of the customers the facility serves.

Provisions for Climate Change

It is important to make allowances for the effects of climate change over the planned lifetime of the site. This is due to factors such as increased precipitation and temperatures that may impact the volume of wastewater being transported through the sewer network and received at the site. For instance, in an extreme storm event significant volumes of surface water run-off have the potential to enter the sewerage network requiring additional storage capacity once it reaches the facility. In order to design, construct and operate a facility that is considered climate change resilient a number of criteria need to be considered from a flood risk perspective:

- When designing the facility and associated pipework capacities the rainfall data will need to be based on the latest UKCEH Flood Estimation Handbook for 2013 and will need to include an additional allowance of 20% for climate change in line with the current guidance within the Anglian Water modelling specification.
- When designing the facility and associated pipework capacities, the design storm return periods of 30, 50 and 100 years will be assessed in order to determine stormwater management solutions within the facility.
- When modelling the sewer network, a conservative amount of infiltration to the sewer network equivalent to 60% of the dry weather flow will be assumed.
- An allowance for a 5m2 increase in impermeable area per property to account for urban creep will be assumed to help understand the volume of surface water runoff which might enter the sewer network and be received by the facility.