FLOOD RISK ASSESSMENT

INTRODUCTION

This Flood Risk Assessment has been prepared in support of a planning application by Corby Limited (referred to hereafter as 'the applicant') for a temporary construction access and compound area on Land East of Shelton Road (grid reference 491409,290980). It will facilitate the construction of the approved Energy Recovery Facility (ERF) at Willowbrook East Industrial Estate, Shelton Road, Corby, NN17 5XH (ref. 19/00027/WASFUL approved 04/10/19).

Site Context and Description

The application site is located to the northeast of the Willowbrook Industrial Estate, approximately 2.5km northeast of Corby's town centre. The application site, which is generally flat in terms of topography, has an area of 1.85 ha. It lies to the immediate west of the roundabout on the Corby Northern Orbital Road to the north and the east.

This area previously formed part of a quarry, which has now been infilled and the land is currently vacant. This site has previously been prepared for industrial development, including the construction of the spur road off the Corby Northern Orbital Route which the proposal will utilise. the majority of the site comprises of grassland, with some small areas of dense scrub and hardstanding.

The proposed site compound will house two groups of portable buildings and areas for managing the construction delivery vehicles. The main features of the development are as follows:

- New bound access road connecting Shelton Road to the west and the roundabout to the east. Wheel washing will be available if vehicles become muddy, as detailed in the Construction Transport Management Plan submitted with this application;
- Workshop and storage shed (up to 10m in height);
- Site welfare and contractor offices within two-storey portacabins, including changing accommodation and messing facilities (up to 5m in height);
- Laydown area with compacted gravel surface on geotextile;
- Security cabin, fencing and vehicle barriers;
- 15cm of topsoil will be removed and stored in mounds along the northern and eastern boundaries. The mounds will be 3m in height and seeded to provide screening of the activities; and
- Site management car parking with 48 car parking spaces. Each parking space will be 5m in length x 2.5m in width.

Consent for these proposals is sought for a temporary period until December 2025, which we expect will be controlled via a planning condition. Following construction of the ERF to the west of Shelton Road, the structures on the subject site will be removed and the ground reinstated using the topsoil stored as bunds along the north and eastern boundaries.

Hydrology

There are three main rivers that flow within 2 km of the Site; these are the Willow Brook North Arm, Gretton Brook and Willow Brook South Arm. The Willow Brook North Arm is located immediately adjacent to the Site and flows in a west to east direction. Gretton Brook is located approximately 815 m to the north-west and the Willow Brook South Arm is located approximately 1.8 km to the south-east.

There are several flood storage reservoirs (FSR) and balancing ponds located on the Willow Brook North Arm upstream of the Site.

- Stanier Road FSR, online reservoir with approximately 645 m3 of storage;
- Pen Green FSR, offline reservoir with approximately 15,500 m3 of storage;
- Pen Green Lane Balancing Pond, offline reservoir with approximately 4,000 m3 of storage; and
- Phoenix Parkway FSR, online reservoir with approximately 10,000 m3 of storage.

There are two pond areas identified on the OS mapping approximately 110 m to the north-west of the site, these are disused British Steel Corporation sludge beds and play no role in flood storage. Recent aerial imagery of this area identifies it as being well vegetated.

Flood Zone Classification

The EA's flood map for planning shows that the Site lies within Flood Zone 1 (low risk). Land in this flood zone is predicted to flood with an annual probability of less than 0.1% from rivers and the sea.

Historic Flooding

The British Hydrological Society database of historical flood events has been reviewed for records of flooding in the area and no specific data has been found for the Site.

In addition, the Corby SFRA Stage 2 (Faber Maunsell, August 2006) has been reviewed and no records of historical flooding have been reported for the Site or adjacent areas as a result of river, sewer or groundwater flooding.

Geology and Hydrogeology

According to the BGS Geology of Britain Viewer, the Site is directly underlain by Northampton Sand Formation bedrock consisting of Oidal Ironstone. No superficial deposits have been recorded.

There are limited remains of the Northampton Sand Formation aquifer due to previous mining activities at the Site. This is overlain by reworked boulder clay up to a depth of 19 m which has a low permeability and does not drain well. Natural groundwater levels are within or below the remaining Northampton Sand Formation with limited perched groundwater existing in the infill. This is contaminated where present in areas previously used as sludge lagoons.

EXTERNAL FLOOD RISK

Flooding Mechanisms

The flood map for planning shows that the Site lies within Flood Zone 1 (low risk). The EA Flood Zones are based on undefended scenarios, i.e. without the benefit of any flood defences.

Based on a review of the Corby SFRA, no other recorded sources of flooding, i.e. from sewers, groundwater or reservoir, have been identified for the Site.

Flood Levels

There are no formal flood defences for the Willow Brook North Arm, with the natural channel providing nominal protection against a 1% annual probability event. The channel is maintained by the EA and is regularly inspected.

To the north of the Site, topographic levels are set at approximately 105.65mAOD to the north-east adjacent to the Corby Northern Orbital Road and 103mAOD to the north-west at the junction with Shelton Road. Topographic levels therefore provide the Site with a freeboard of approximately 9.78m above the 0.1% annual probability event.

DRAINAGE ASSESSMENT

Introduction

The NPPF states that those proposing development are responsible for drainage designs which reduce flood risk to the development and elsewhere, preferably through the use of Sustainable Drainage Systems (SUDS).

Surface water arising from a developed site should, as far as is practicable, be managed to mimic the surface water flows arising from the site prior to the proposed development while reducing the flood risk to the site itself and elsewhere.

The North Northamptonshire Core Spatial Strategy (NNCSS) was adopted in was adopted in June 2008 and sets out the following relevant policy:

- Policy 13 – General Sustainable Development Principles: subsection Protect Assets (Q) – *"development should not cause a risk to (and where possible enhance) the quality of the underlying groundwater or surface water, or increase the risk of flooding on the site or elsewhere, and where possible incorporate Sustainable Drainage Systems (SUDS) and lead to a reduction in flood risk."*

Table 1 provides an overview of the feasibility of a range of SUDS techniques in order to identify which may be suitable for the proposed development. Table 1 concludes that there are relatively few SUDS measures that could potentially be adopted on the Site to provide the desired rate of attenuation given that the use of the land is temporary.

Table 1 SUDS Feasibility Matrix

Techniques	Comments	Feasibility
Green Roofs	Requires flat or minimal slope roofs. Limited value for runoff attenuation in comparison with other techniques. Rooftop solar panels are anticipated to be included within the design limiting space for green roof.	**Not Feasible**
Soakaways and infiltration Trenches	Require infiltration rates of 1 x 10-6 m/s or greater. Shallow soakaways or infiltration trenches would be required where groundwater is shallow (i.e. less than 2.0 mbgl). Use of infiltration at the Site not feasible due to impermeable capping layer.	**Not Feasible**

Infiltration basins / swales	Are widely applicable for attenuation and treatment of surface runoff by infiltration into the ground. Require slope of no more than 4-10% and can act as a substitute for soakaways where groundwater is shallow. Use of infiltration at the Site not feasible due to impermeable capping layer.	**Not Feasible**
Bio retention – landscaped infiltration areas	Primarily used to remove pollutants from runoff and due to their shallow nature are not as effective at runoff attenuation as other SUDS techniques. Use of infiltration at the Site not feasible due to impermeable capping layer.	**Not Feasible**
Permeable Pavement	Ideally requires a level Site and favourable underlying ground conditions. Could be implemented on parking and pedestrian pavement if linked with conveyance system. Not suitable for areas of HGV traffic.	**Limited Feasibility**
Non-infiltration basins and Swales	Used in the same way as carrier ditches or storage bunds. These could be used for storage and/or conveyance to a balancing pond. Feasible for the site.	**Feasible**
Filter Drains	These are normally used adjacent to areas of car parking or roads and convey runoff via flow through an engineered substrate. Potential use in the treatment train for the Site.	**Feasible**
Balancing Ponds	These are permanent ponds that provide storage above the resting water level in the pond. Are appropriate for most Sites but require suitable space. Require impermeable soils or can be lined. Space is potentially available within the areas designated for landscaping but will be limited in depth due to underlying capping layer disturbance.	**Potentially Feasible**

Geo-cellular Storage	Geo-cellular storage or similar sub-base medium beneath car parking areas and/or other areas of hardstanding and/or other forms of underground attenuation. Potential use for high volume to minimum depth ratio.	**Potentially Feasible**

A detailed drainage design will be undertaken in due course by the EPC contractor who has yet to be appointed to consider the implementation of SUDS on the Site. The total volume of attenuation required could be reduced through the combination of several SUDS components.

The attenuation system would discharge through the dedicated surface water sewer on-site to the mains surface water sewer located on Shelton Road, adjacent to the western boundary of the Site which subsequently discharges to the Willow Brook North Arm watercourse. All drainage would be routed to the ultimate point of discharge by gravity.

The final decision on which solution to put forward will be made by the EPC contractor when they are appointed.