FLOOD RISK ASSESSMENT

Proposed Waste Water Treatment Plant

Lenzing Fibres

Energy Park Way

Grimsby

DN31 2TT

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LOCATION

The proposal development site is located at Lenzing Fibers, Grimsby Limited, Energy Park Way, Grimsby, United Kingdom, DN31 2TT (National grid Reference: TA 23425 12721) and is currently a flat, level area of shingle / course sand covered, permeable ground adjacent to the existing main production area on the site.

To the south east is the drainage ditch that runs through the Lenzing site and to the south west a large expanse of uninterrupted, open ground.

Electrical and communication services are available in this area as are on site transport routes.

The entire Lenzing Fibers Grimsby Limited site lies within Flood Zone 3 and therefore to satisfy the planning application a flood risk assessment is deemed to be required.

PROPOSED DEVELOPMENT

This is an expansion of an existing industrial production facility The new site is adjacent to the existing Lenzing Fibres Plant at the following address. Lenzing Fibres Grimsby Ltd, Energy Park Way, Healing, Grimsby, DN31 2TT. The new facility will be constructed on land already owned by Lenzing fibres to the east of the current plant, set back approximately 250m from the new through road, Energy Park Way.
The proposed development is a new Waste Water Treatment facility designed to improve the treatment of liquid waste from the existing production facility to comply with new regulatory requirements for effluent discharge.

The development includes a new site entrance from the existing dedicated site access road called Fifth Avenue. Also, two large steel Anoxic and one Bioreactor tanks, two smaller settlement tanks, transformer building, sludge treatment building, chemical storage area and various other smaller ancillary storage tanks and structures.

Civils works largely comprise; erection of site compound (offices, welfare, parking etc.), site roads, below ground demolition of existing concrete substructures and plinths, excavation, piling, RC concrete, and landscaping.

FLOOD ZONE

Based on information taken from the 2011 North and North East Lincolnshire Strategic Flood Risk Assessment (SFRA) and Environment Agency flood zone guidance and mapping, the Lenzing Grimsby site lies entirely within Flood Zone 3. The mapping shows that the site has a 1 in 100 year (or greater) annual probability of river flooding and / or a 1 in 200 year (or greater) annual probability of flooding from the sea if no flood defence were present.
North East Lincolnshire Council published the North and North East Lincolnshire Strategic Flood Risk Assessment (SFRA) in November 2011 which now includes a Strategic Flood Risk Assessment Addendum.
The document contained maps showing the degree of flood risk hazard would arise from the failure of tidal flooding defences, and this is referred to as breach inundation events. This modelling takes account of climate change up to 2115.
At the time of publication of the SFRA, the Environment Agency (EA) was undertaking additional modelling. This modelling became

available to the Council during November 2011 at the time that the SFRA was published. The SFRA maps were therefore based on older data. The Council uses breach hazard mapping to inform planning decisions.

The addendum provided the Level 2 Assessment November 2011 breach hazard maps, and maps showing the depth of water that would be expected should breach events occur.

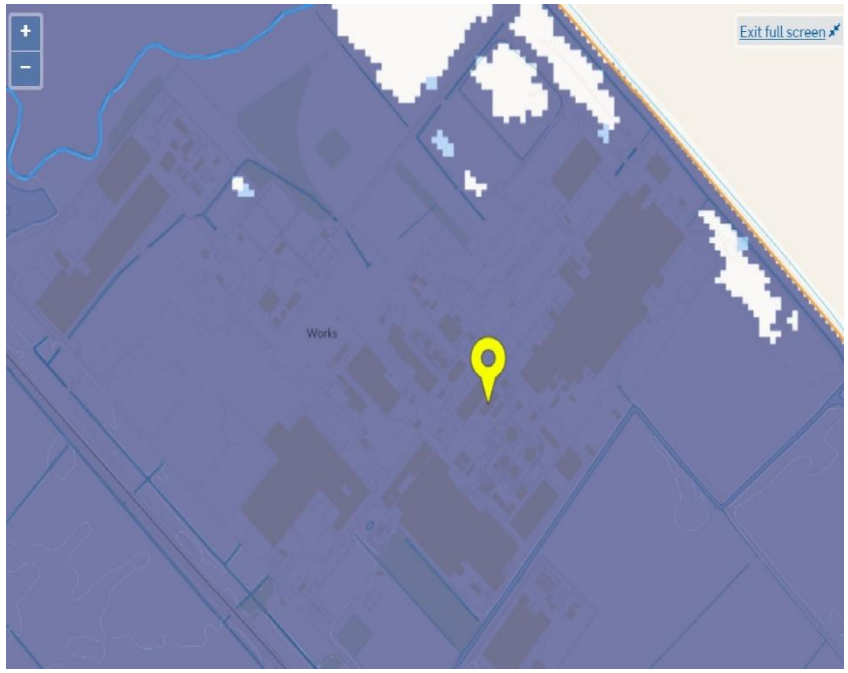


Figure One – Extract from the Environment Agency Hazard Map

SITE LEVELS

The site is generally flat, level area of shingle / course sand covered, permeable ground that lies between + 2.60 and + 2.80 metres above ordinance datum.

The proposed plant and equipment will be partially set below ground level (settlement and sludge tanks) but will be approximately 9.0m high and waterproof as part of their design characteristics

EXISTING FLOOD DEFENSES

Tidal Flooding

Based on the information in the SFRA and the information shown on SFRA Addendum Breach Depth Map 2 (Grimsby and Cleethorpes Area) the breach flood hazard modelled depth from the Level 2 assessment is 1m – 2m. This is taking in to account existing ground levels of between 2.5 mOD and 3.3 mOD.

From the North East Lincolnshire SFRA peak flood water height for flood compartment 1T2 sub compartment 2 – Grimsby and Cleethorpes with a 1 in 200 year annual probability would be less than 4.93 mOD. Taking in to account the current guidance suggestions that sea level could rise by 1.201m and wave heights increase by 10% by 2115, over the life of this complex (~20 years) there is likely to be only a small increase witnessed.

From the Stallingborough North Beck outfall to Pyewipe (near Grimsby), the compartment is protected against flooding from the estuary by an earth embankment with a concrete revetment on the front face and a concrete wave wall on the crest. The crest level is + 6.3 mOD and the condition is generally Grade 2 (Good) or 3 (Fair) although along some lengths to the tow is at risk because foreshores level are failing.

The Environment Agency is aware of this and it will be addressed in the long term programme of works being prepared for the Humber Estuary Shoreline Management Plan (HESMP). Work carried out for the HESMP indicates that these defences will protect the area behind events with a 0.2% annual probability of occurring or better. The SFRA states that this standard will remain above the 0.5% annual probability requirement set out in PPS25 for the next 50 years, taking the effect of climate change sea level rise into account.

The existing tidal defences protecting this site consist of earth embankments and concrete floodwalls. They are in good condition and reduce the risk of flooding (at the defence) to a 0.5% (1 in 200) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

No historical flood events have been witnessed on site due to tidal flooding since it was built in 1995.

Fluvial Flooding

Based on the hydraulic modelling information used in the SFRA fluvial flooding that could affect the Lenzing Fibers Grimsby Limited site would originate from Oldfleet Drain that runs from the west to the northeast of site in close proximity to the site boundary. Peak flooding with a 1 in 100 year annual probability, would be to a height

of 2.58 mOD. Due to existing ground elevations of the proposed development being between 2.75 mOD with a 150 mm increase to hardstanding fluvial flooding is assess to have a low level risk.
No historical flood events have been witnessed onsite due to fluvial flooding since it was built in 1995.
This site is not considered to be at risk of flooding from main rivers. The site may be at risk from local ordinary watercourses.

Surface Water Flooding

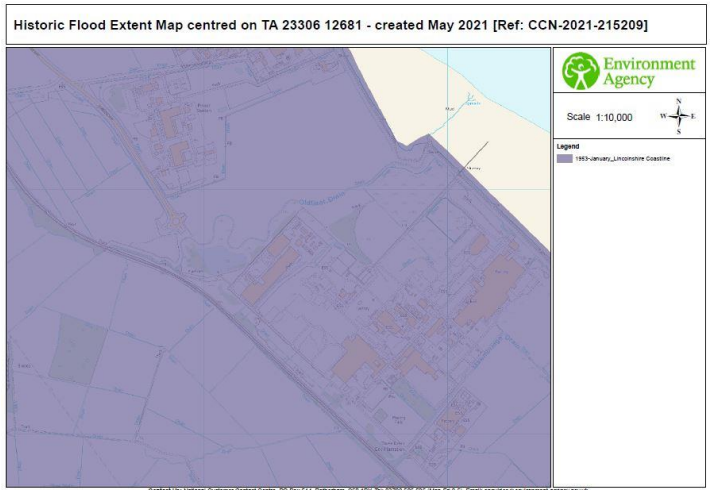
Surface water arrangements as detailed in the North East Lincolnshire SFRA, are managed by the North East Lindsey Internal Drainage Board and are mostly designed to cater to a 1 in 100 year annual probability. Due to more stringent modern rules being available (Flood estimation handbook) it is through that some localised flooding may occur at ground level during a 1 in 100 year event although due to Lenzing Fibers Grimsby Limited sites elevation of between 2.5 and 3.3 mOD this is unlikely and is assessed to have a low level of risk.
No historical flood events have been witnessed on site due to surface water flooding since it was built in 1995.

Ground Water Flooding

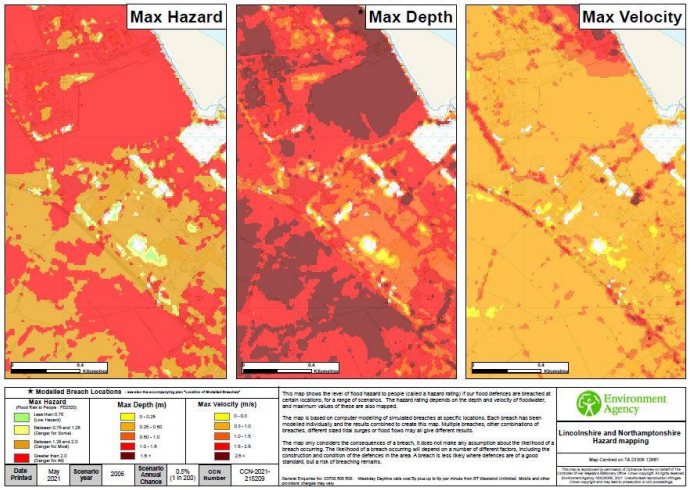
Flooding from ground water is not thought to pose significant risk in comparison to the flooding methods detailed above. No historical flood events have been witnessed on site due to ground water flooding since it was built in 1995.

FLOODING HISTORY

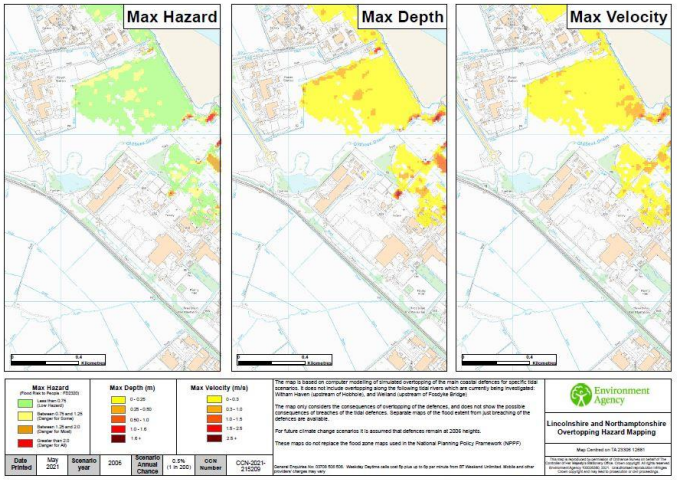
There are no historical examples of the Lenzing Fibers Grimsby site being subjected to flooding from any source since it was first build in the 1995. There is historic evidence of the site flooding in 1963.



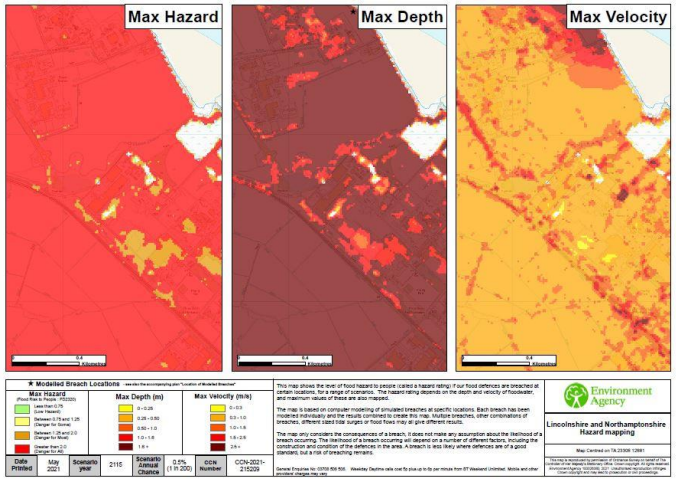
Historic Flood Event Outlines Map



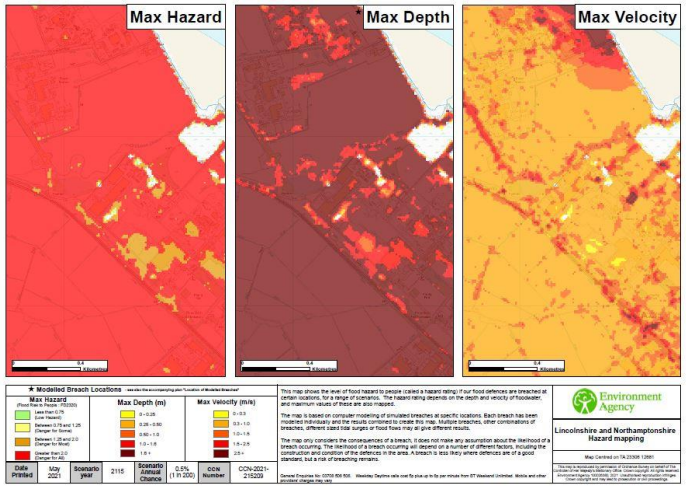
Hazard Mapping – Breaching – Current 1/200



Hazard Mapping – Overtopping – Current 1/200



Hazard Mapping – Breaching – 2115 1/200



Hazard Mapping – Overtopping– 2115 1/200

FLOOD RESILIENCE MEASURES

The proposal will incorporate the following measure to make the development flood resilient:

- The site is not subject to flooding but is immediately adjacent to a flood area; therefore, precautionary measures are proposed within the new development

- Lenzing Fibers Grimsby Limited actively subscribes to the Environmental Agency flood warning service and has plans in place to react to a flood warning.

WASTE WATER TREATMENT PLANT

With the initial risk of flooding indicated as medium Risk - 1% to 3.3% Risk/year. What are the potential implications if the site were to be flooded in respect too:

- The Potential Release of Chemicals
- Effluent Contamination
- Damage to Plant and Equipment

It must be pointed out that the WWTP design does not include for any specific defences against flash, River or Sea flooding. The design does however as part of good engineering practise elevate plant and equipment by way of concrete plinths, building bases and steelwork to provide limited protection to flooding (subject to the ultimate depth of the flood water).

Potential Release of Chemicals

- All chemicals used as part of the waste water treatment process are held in suitable non degradable storage tanks which in turn are housed on either mobile chemical bunds or within their own integral bunds providing protection (minimum depth of flood water required to breach integral bunds - >1.1m AFGL.
- All chemical interconnecting transfer pipework are dual contained and located on appropriate tray works located >1m AFGL. Please note the chemical transfer pumps would be located in free standing chemical cabinets >1.2m AFGL. Overall risk of potential release of chemicals during a flood event is Low.

Effluent Contamination

- The risk of effluent contamination is limited to that of the effluent collection, transfer and drainage sumps which

have a finished coping level of approximately 0.3m AFGL.

- All sumps have limited storage volume limiting the risk of effluent contamination. All large process storage tanks are constructed from concrete requiring flood levels >4.5m AFGL.
- Overall risk of potential effluent contamination to flood water is limited to sumps during a flood event.

Mechanical Plant and Equipment

- All plant and equipment would be located on either supporting steel frames or concrete plinths providing limited protection from potential flood events up to 0.35m AFGL.
- Power and Control Systems
- Unless specifically stated, all Power and Control systems would be at risk from failure if the flood level were to exceed 0.4m AFGL. Even though most enclosures including MCC's and other switchgear have some protection from water ingress that does not usually include immersion during a flood. There is likely to be increased corrosion which weakens the materials, supports etc and also.