FLOOD RISK ASSESSMENT FOR PLANT BASED PROTEIN EXTRACTION FACILITY AT LAND SOUTH OF RANGELL GATE (B1165) AND EAST OF A16, SPALDING

FINAL REPORT

ECL0563/P&R

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CONTENTS

1.0 INTRODUCTION

2.0 SITE LOCATION AND DESCRIPTION
- 2.1 Site Location
- 2.2 Existing Site
- 2.3 Proposed Development
- 2.4 Local Development Documents
- 2.5 Available Flood Risk Information

3.0 FLOOD RISK VULNERABILITY
- 3.1 The Sequential and Exception Test
- 3.2 Vulnerability Classification
- 3.3 Application of the Sequential Test

4.0 SITE SPECIFIC FLOOD RISK
- 4.1 Local Flood Assets
- 4.2 Sources of Flooding
- 4.3 Probability of Flooding
- 4.4 Historic Flooding
- 4.5 Climate Change
- 4.6 Residual Risks

5.0 FLOOD RISK MITIGATION
- 5.1 Summary of Risks
- 5.2 Mitigation Measures

6.0 CONCLUSIONS

ATTACHMENT 1 – Site Survey (Dwg Rangell 01)

ATTACHMENT 2 – Proposed Site Plan (Dwg 3899 P01)

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1.0 INTRODUCTION

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of Naylor Farms in respect of a proposed development that consists of the demolition of existing buildings and construction of a new Plant Based Protein Extraction Facility and ancillary office space together with landscaping, SuDs features, car park and associated infrastructure.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at Naylor Farms, Rangell Gate, Spalding, PE12 6EF. The National Grid Reference of the site is 52638/32269.

The location of the site is shown in Figure 1.



Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on land south of Rangell Gate (B1165) and east of A16, Spalding. The site is agricultural land and includes two agricultural buildings. The area of development is 2.85 hectares.

A topographic survey of the site has been undertaken and is provided in Attachment 1. Typical ground levels vary between +2.7m OD and +3.1m OD with the higher ground levels towards the northern boundary of the site. The area around the agricultural buildings is between +3.3m OD and +3.5m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site drains through a local network and hence to the IDB drain system. There are riparian drains on the northern and eastern boundaries of the site. There is an IDB High Priority Watercourse 400m south east of the site.

The online British Geological Survey maps indicate that the site is likely to be underlain by Oxford Clay Formation mudstone. The bedrock is shown to be overlain with superficial deposits of clay and silt.

2.3 Proposed Development

The proposed development consists of the demolition of existing buildings and construction of a new plant based protein extraction facility and ancillary office space together with landscaping, SuDs features, car park and associated infrastructure. The Proposed Site Plan is provided in Attachment 2.

2.4 Local Development Documents

The South East Lincolnshire Local Plan 2011 – 2036, adopted in March 2019, is the Local Plan for the district. Policy 4: Approach to Flood Risk states the requirements for flood risk reduction.

The South East Lincolnshire Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA) was prepared in June 2017.

The Joint Lincolnshire Flood Risk and Drainage Management Strategy has been prepared by Lincolnshire County Council as the Lead Local Flood Authority. The purpose of the Strategy is to increase the safety of people across Lincolnshire by reducing the number of people at risk of flooding, increasing the resilience of local communities, and reducing the impact of flooding

2.5 Flood Zones

The site is located within Flood Zone 3, an area with a high probability of flooding, of the Environment Agency Flood Maps for Planning. The Flood Map for Planning was prepared without the consideration of the benefit provided by defences.

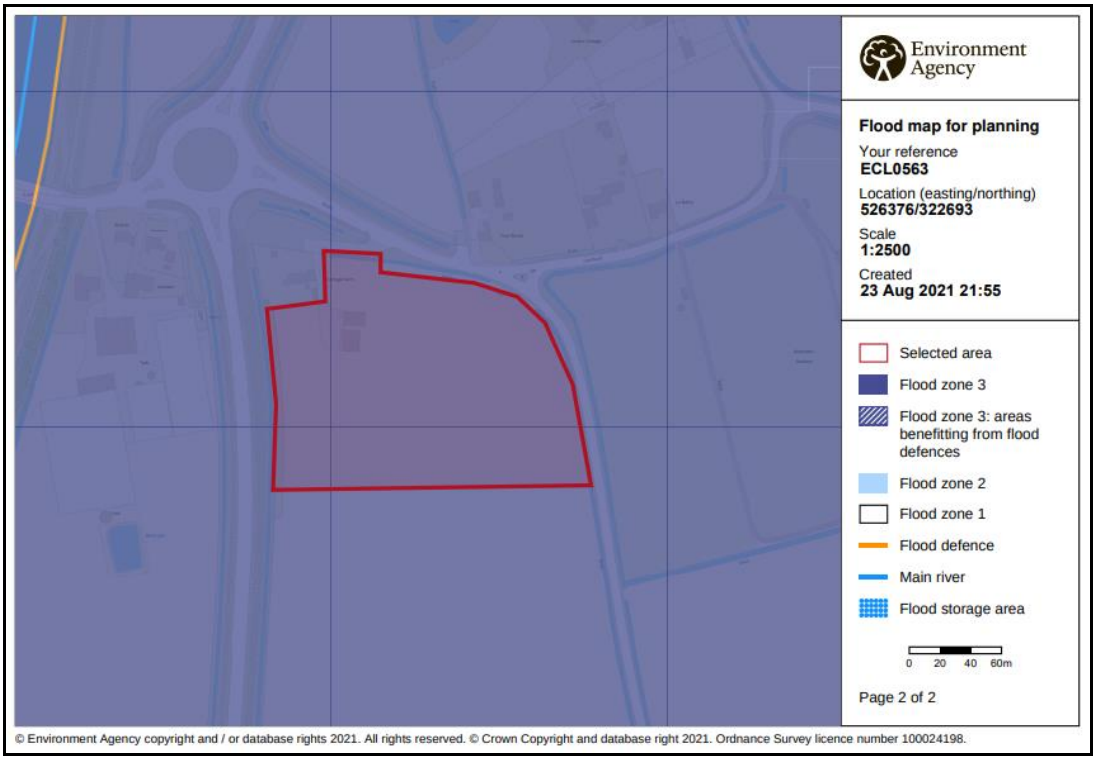


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a medium risk of flooding from rivers or the sea (annual probability between 1% and 3.3%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is within an area at risk of reservoir flooding.

Table 1 shows the level of risk at the site within the South East Lincolnshire SFRA.

SFRA Map	Present Day	Year 2116
Residual Flood Hazard Map for the 1% fluvial and 0.5% tidal event	The site is in the 'Danger for Some' and the 'Danger for Most' area	The site is in the 'Danger for Most' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal event	The peak flood depth at the site is between 0.5m and 1.0m	The peak flood depth at the site is between 0.5m and 1.0m

Table 1 – Flood Risk within SFRA Maps

3.0 FLOOD RISK VULNERABILITY

3.1 The Sequential and Exception Test

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

3.2 Vulnerability Classification

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The proposed development is covered by the description of buildings used for general industry and is classified as 'Less Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 3a and the development is 'Less Vulnerable' therefore the development is considered appropriate. The development therefore does not require the application of the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

3.3 Application of the Sequential Test and Exception Test

It is for the Local Planning Authority, using the evidence provided and taking advice from the Environment Agency as appropriate, to consider whether an application passes the Sequential Test.

Large parts of the South Holland district between the River Welland and River Nene lie within Flood Zone 3a. As such, opportunities to undertake the development at an alternative site with a lower flood risk are limited and there are no known sites available for development in the limited areas of lower flood risk. In this context it is noted that SE Lincolnshire Local Plan commercial allocations are within flood risk areas due to the lack of availability of sites within areas of lower flood risk. At this location it is not possible to position the development on higher ground within the proposed site.

The River Welland has defences that provide protection during the 0.5% annual probability (1 in 200 chance each year) tidal event including climate change. The site therefore has a low probability of flooding and is considered to pass the Sequential Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The site is 1.5km from the tidal River Welland. The tidal River Welland is a main river and has defences that are maintained by the Environment Agency.

The site is 200m east of the Coronation Channel, a bypass channel of the River Welland. The embankments of the Coronation Channel were constructed in the 1950's to convey river flows around Spalding. The Coronation Channel together with the Crowland and Cowbit Washes upstream of Spalding offer fluvial flood reduction to Spalding and the surrounding district. The Cowbit Wash Barrier Bank and the Coronation Channel are the responsibility of the Environment Agency.

There is a long-term strategy for the maintenance of the Environment Agency defences which is reviewed and updated periodically.

There is an extensive local drainage network managed by South Holland IDB. There is an IDB High Priority Watercourse 400m south east of the site. The site and surrounding land are within the Wisemans catchment and drain by gravity to Wisemans Pumping Station. The pumped water enters the South Holland Main Drain that discharges to the tidal River Nene at the Sutton Bridge Outfall Sluice.

During the operation and maintenance of its pumping stations, associated structures, and channel systems, the IDB seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought.

Current maintenance standards of the South Holland Internal Drainage Board and the Environment Agency are generally good.

4.2 Sources of Flooding

The potential sources of flooding that have been identified during this assessment are:

- local blockages to the South Holland IDB drainage system;
- an event in the local drainage network greater that exceeds the standard of protection;
- failure of Wisemans Pumping Station;
- overtopping and breaching of the fluvial Coronation Channel defences; and
- overtopping and breaching of the tidal River Welland.

The Environment Agency Long Term flood maps show that the site is not at risk of flooding from surface water. The risk of flooding from Anglian Water assets including the foul sewerage system and water supply infrastructure is considered to

be a residual risk. Based upon the underlying geology groundwater flooding is not considered likely at the site.

4.3 Probability of Flooding

The probability of flooding associated with blockages in the South Holland IDB drainage system is low due to the maintenance standards achieved and managed by the IDB.

The standard of drainage provided by South Holland IDB is assessed at 2% annual probability (1 in 50 chance each year), compatible with the Department of the Environment, Food and Rural Affairs (DEFRA) target level of service for rural drainage and flood defence works. The risk associated with flooding due to events greater than 2% annual probability (1 in 50 chance each year) is lowered due to the South Holland IDB high priority watercourses incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

The Coronation Channel earth embankment has a minimum crest level of +6.0m OD. The 1% annual probability (1 in 100 chance each year) peak flood level inclusive of climate change during the next 100 years in the River Welland is +5.45m OD. The Coronation Channel embankment provides a standard of protection of 1% annual probability (1 in 100 chance each year) with a minimum 0.55m freeboard.

The River Welland tidal defences provide protection during a 0.5% annual probability (1 in 200 chance each year) event.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded.

4.5 Climate Change

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and increased flood levels in the River Welland.

The River Welland defences have been designed to include an allowance for climate change.

In summary the existing systems and defences are appropriate for the design life of the development (i.e. 100 years).

4.6 Residual Risk

There is a residual risk of flooding at the site should a breach occur. The South East Lincolnshire SFRA includes maps demonstrating the impact of a breach in 2116. When the climate change allowances are applied to the combination of a 1% annual

probability (1 in 100 chance each year) fluvial event and a 0.5% annual probability (1 in 200 chance each year) tidal event the peak depth in the site is between 0.5m and 1.0. An extract from this map is shown in Figure 3 below.

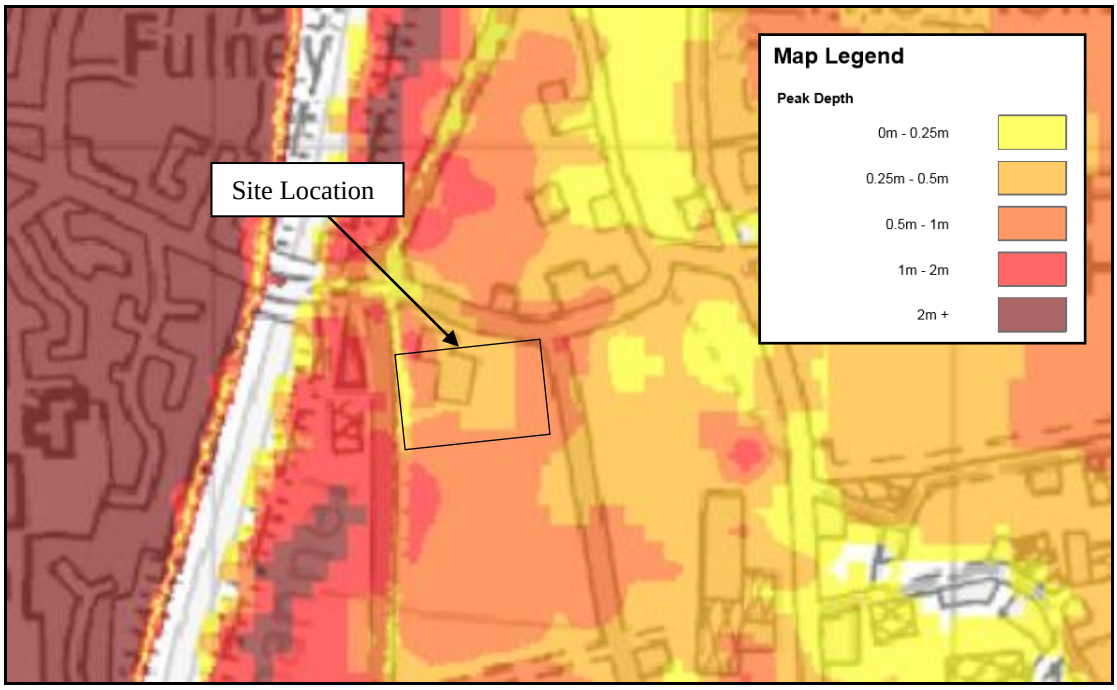


Figure 3 – SFRA 2116 Residual Peak Depth Map

The built footprint of the facility is predominantly within the area with a peak depth of 0.5m.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Wisemans Pumping Station could lead to an increased level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 1% annual probability (1 in 100 chance each year) because of the standards of the existing flood defences. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development, it is not anticipated that the site would flood from overtopping of the defences.

The SFRA considers the residual risk associated with a breach in the defences in 2116. The maximum flood depth around the built footprint of the facility is 0.5m.

The proposed arrangement increases the impermeable area and therefore there will be an increased volume of surface water that has the potential to increase flood risk.

These risks will be addressed through the mitigation measures set out below.

5.2 Mitigation Measures

Based upon the information available during the preparation of this flood risk assessment, to mitigate against the risk of a breach, the following flood resilience measures are recommended:

- there is a water entry strategy allowing flood water to enter the facility and drain freely from it;
- the main electrical supply and switchboard are elevated above the estimated level of flood water; and
- the user of the site should identify the actions to be undertaken in the event of receiving a flood warning.

The applicant will ensure that their employees are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding. The user of the facility should register with the Floodline Direct Warnings Service to receive any future flood warnings.

Should there be a failure of Wisemans Pumping Station and conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take

emergency action to maintain the drainage level of service by utilising temporary pumping equipment.

Surface water run-off will be managed so that stormwater from the development will not affect any adjoining properties or increase the flood risk elsewhere. A surface water strategy has been prepared to support the application.

6.0 CONCLUSIONS

As a result of the assessment, the following conclusions have been reached.

- The proposed development consists of the demolition of existing buildings and construction of a new plant based protein extraction facility and ancillary office space together with landscaping, SuDs features, car park and associated infrastructure at Rangell Gate, Spalding.

- The proposed development is in Flood Zone 3. The site benefits from defences on the tidal River Welland and Coronation Channel which provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event including climate change and the 0.5% annual probability (1 in 200 chance each year) tidal event including climate change.

- There is a residual risk associated with a breach of the defences. During the design life of the development, including an allowance for climate change, the peak flood depth around the proposed facility is 0.5m.

- The site is located within an Internal Drainage Board catchment with a minimum standard of drainage of 2% annual probability (1 in 50 chance each year) which accords with DEFRA guidelines for rural development. The risk of flooding is lowered further due to the South Holland IDB high priority watercourses incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

- It is recommended that flood resilience measures are adopted to manage the risk of a breach. These include a water entry strategy, elevating services above the flood level, and reducing the vulnerability of people.

- The development passes the Sequential Test and is therefore suitable for the proposed location.

ATTACHMENT 1

SITE SURVEY
(Dwg Rangell 01)

526250 E
526300 E
526350 E
526400 E
526450 E
526500 E
526550 E
322800 N
322750 N
322700 N
322650 N
322600 N
322550 N
322500 N
322450 N
322400 N
322350 N

Low Road
B1165
A16
Track
Mixed Hardcore
Scrub
Building
Tank
Building
Arable
Arable
Arable
Arable
Arable
Rangell Gate
B1165
A16
B1165
A16
450m
450m
450m

North.
(Indicative)

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Job Title : Site survey - Land to east of A16 at Rangell Gate - Spalding - Lincs

Client : Naylor - Project 1 - J Kirk

Drawn : MDS Date : 22nd March 2021

Drawing number: Rangell 01 Scale 1:500 on A0 sheet

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Drainage information is as a result of surface inspection only, no chambers have been accessed. Manhole and pipe diameters should be checked before design and construction

This plan should only be used for its original purpose. No responsibility will be accepted if this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

DO NOT SCALE FROM THIS DRAWING

All trees marked as "indicative" have approximate heights and spreads
Trees marked with a "T" or "TAG" have been measured on site and should be referenced in conjunction with the Tree Survey Report carried out for SHDC by others

The data used for the computation of horizontal & vertical control for this survey was recorded using survey grade GPS receivers and corrected data from Trimble VRS Services using Geoid model OSTN15 with OSGM 15 .
Station establishment was carried out in accordance with best practice guidelines issued by The Survey Association.

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ATTACHMENT 2

PROPOSED SITE PLAN
(DWG 3899 P01)

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L O W R O A D

F U L N E Y R O A D S O U T H

R A N G E L L G A T E

A 1 6

Modena

Graewin

Mast

Cottage Farm

Four Winds

La Notre

Allotment Gardens

2.4m*70m Visibility Splay

Proposed Highway Layout

Path

Tarmac

Disabled

EV

Paving

Gate

Security Hut

Waiting Parking

Bikes

Potential EV

Storage Yard Gravel

Motor Bikes

Staff Welfare

Plant Room

Storage

Steam Generators

Ditch

Swale

Wild flower meadow

Attenuation Pond

Farming Access

Arable Field

Red Line (Development Area)
28628sqm
7.05 Acres
2.85 hectares

N

0 25 50

SCALE 1:500

NAYLOR FARMS EST. 1909

Project
PLANT BASED PROTEIN EXTRACTION FACILITY

Address
NAYLOR FARMS
RANGELL GATE, SPALDING
LINCOLNSHIRE

Client
NAYLOR FARMS

Drawing
PROPOSED
SITE PLAN

Date	Scale	
SEPT 2021	1:500 @ A1 - 1:1000 @ A3	
Project No. 3899	Drawing No. P01	Revision

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