# FLOOD RISK ASSESSMENT
# FOR RESIDENTIAL DEVELOPMENT AT
# BURR LANE, SPALDING

**FINAL REPORT**

**ECL0376**

**DATE DECEMBER 2020**

**ELLINGHAM CONSULTING LTD**

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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 Aberdale Nursery in respect of a proposed development that consists of two dwellings at Burr Lane, Spalding.

# 2.0 SITE LOCATION AND DESCRIPTION

## 2.1 Site Location

The site is located at Aberdale Nursery, Burr Lane, Spalding, PE12 6AZ. The National Grid Reference of the site is 52438/32052.

The location of the site is shown in Figure 1.




Figure 1 – Location Plan (© OpenStreetMap contributors)

## 2.2 Existing Site

The site is on the northern side of Burr Road and forms part of Aberdale Nursery. The site is vacant and comprises bare earth and rough grass. The area of development is approximately 0.10 hectares.

Environment Agency LIDAR information shows that the site is between +2.4m OD and +2.5m OD with a slight fall to the north. The level of Burr Lane adjacent to the site is approximately +2.8m 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 is a riparian drain on the northern boundary of the site. There is an IDB High Priority Watercourse 700m 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 application is submitted in outline and the proposed development consists of two dwellings. The dwellings will be two storeys. An indicative layout is provided in Attachment 1.

## 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 as shown in Figure 2.

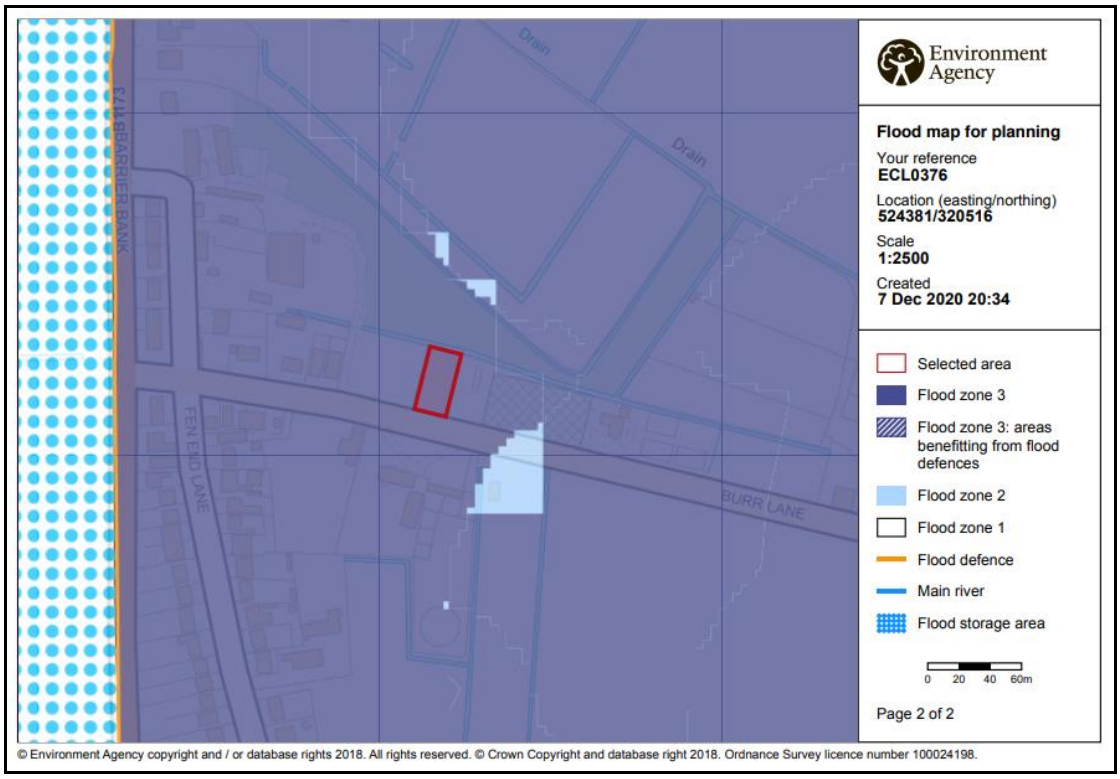



Figure 2 – Environment Agency Flood Map for Planning

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 | 2116 |
|---|---|---|
| Residual Flood Hazard Map for the 1% fluvial and 0.5% tidal event | The site is in 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 dwellings and is classified as 'More 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 3 and the development is 'More Vulnerable' therefore it is necessary to complete 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, taking advice from the Environment Agency as appropriate, to consider the Sequential Test.

Large parts of the South Holland district between the River Welland and River Nene lie within Flood Zone 3. As such, opportunities to undertake the development at an alternative site with a lower flood risk are limited and there are no known sites at available for development in the limited areas of lower flood risk. In this context it is noted that SE Lincolnshire Local Plan residential 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 1% annual probability (1 in 100 chance each year) fluvial event including climate change. The site therefore has a low probability of flooding and is considered to pass the sequential test.

The Exception Test requires consideration of the wider sustainability benefits of a development and that the development would be safe and residual risks managed.

The Local Plan has a target of a net increase of at least 11,681 dwellings in South Holland over the 25-year local plan period. The Plan considers this new housing is required to ensure the sustainability of the Local Plan area. The proposed development will contribute to this target.

Section 5 of this Flood Risk Assessment describes the flood mitigation measures and the management of the residual risks, demonstrating that this development will be safe and not increase flood risk elsewhere. The development is considered to pass the Exception Test.

# 4.0 SITE SPECIFIC FLOOD RISK

## 4.1 Local Flood Assets

The site is 0.5km south east of the River Welland. Cowbit Wash is the floodplain to the River Welland and the site is protected from the River Welland by the Cowbit Wash Barrier Bank.

The site is 1.2km south 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 offer 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 every 5 years.

There is an extensive local drainage network managed by South Holland IDB. There is an IDB High Priority Watercourse 700m to the east of the site. The site and surrounding land drain into 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 Cowbit Wash Barrier Bank.

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 Cowbit Wash Barrier Bank is at a level of +5.90m OD and therefore provides 0.45m of freeboard above the flood level during the 1% annual probability (1 in 100 chance each year) event with climate change. The Cowbit Wash Barrier Bank falls within the Reservoirs Act 1975 legislation. As such it is inspected annually by a Supervising Engineer who will assess its structural integrity to provide protection to people and property.

## 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 southern part of the site is between 0.25m and 0.5m and in the northern part of the site between 0.5m and 1.0m. An extract from this map is shown in Figure 3 below.

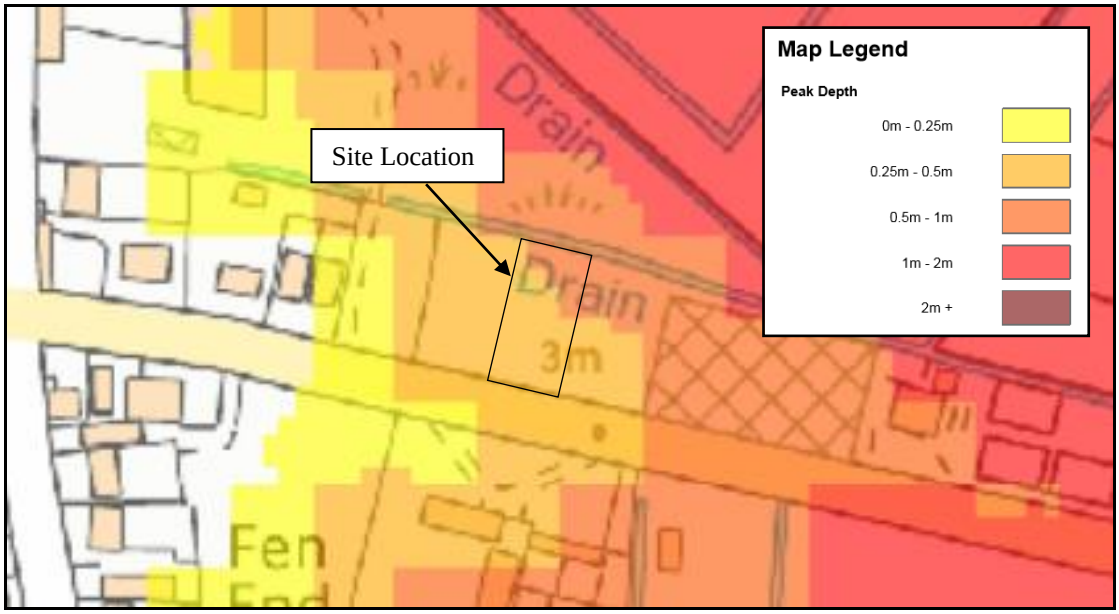



Figure 3 – SFRA 2116 Residual Peak Depth Map

The built footprint of the proposed dwellings is within the area with a peak depth of 0.5m OD. The estimated peak flood level at the site based upon the LiDAR and breach hazard maps is +3.0m OD.

# 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 proposed dwellings 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

The site has a low 'actual risk' of flooding. Based upon the information available during the preparation of this flood risk assessment, to mitigate against the remote risk of flooding it is recommended that the floor level of the dwellings is at +3.0m OD, approximately 0.5m above surrounding ground levels. It is recommended that there is 0.3m of flood resilient construction above finished floor level.

The developer should ensure that the eventual occupier of the dwelling is 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 occupier of the dwelling 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.

# 6.0 CONCLUSIONS AND RECOMMENDATIONS

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

- The proposed development consists of 2 two storey residential dwellings on Burr Lane, Spalding.

- The proposed development is in a defended floodplain. It is in the floodplain of the River Welland and Coronation Channel and protected during the 1% annual probability (1 in 100 chance each year) fluvial event. During the design life of the development, including an allowance for climate change, the peak flood depth around the proposed dwellings is 0.5m.

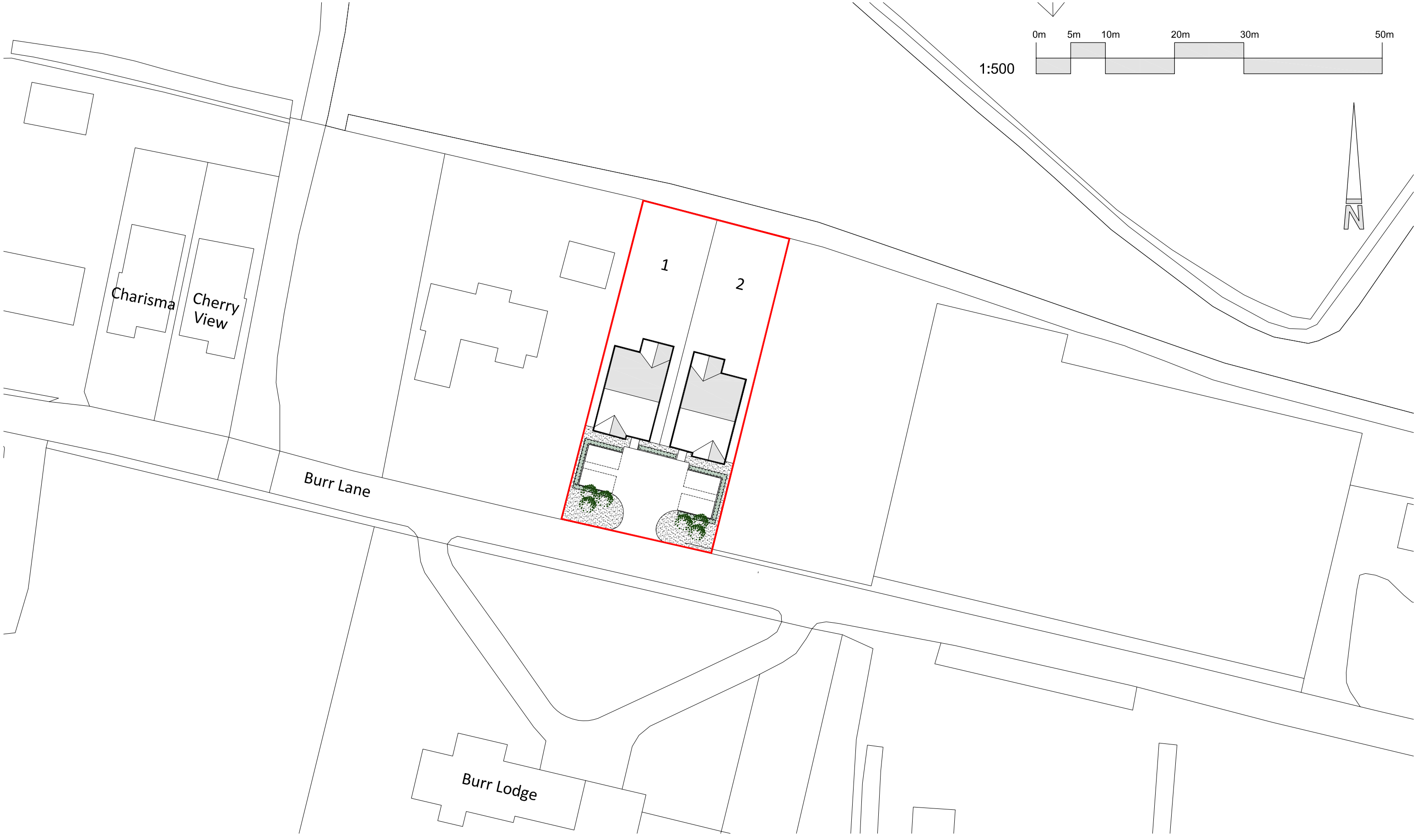
- The site is located within an Internal Drainage Board catchment with a minimum standard of drainage of 2% annual probability (1 in 50 chance each year) which accords with DEFRA guidelines for rural development. The risk of flooding is lowered further due to the South Holland IDB high priority watercourses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

- It is recommended that the finished floor level is +3.0m OD with 0.3m of flood resilient construction above finished floor level to mitigate against a breach of the defences.

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

# ATTACHMENT 1

# INDICATIVE LAYOUT
# (Dwg 1433-001)




**NOTES:**

All dimensions are to be checked before implementation.
Any descepancies are to be advised immediately.
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REVISIONS

Aberdale Nursery

Burr Lane, Spalding

Indicative Layout

| DATE | SCALE | Status |
|---|---|---|
| DEC 2020 | 1:500@A3 | PLANNING |

DRAWING NUMBER
1433-001

REVISION

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