FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
WIGNALS GATE, HOLBEACH

FINAL REPORT

ECL0399b/ANDREW M WRIGHT LTD

DATE APRIL 2022

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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 D Brown Building Contractors in respect of a development that consists of seventy nine dwellings at Wignals Gate, Holbeach.

An outline planning application was granted for 77 dwellings at the site. The full application is for 79 dwellings. The south western corner of the site that included three proposed dwellings has been reconfigured so that there are five proposed dwellings.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at Wignals Gate, Holbeach, Spalding, Lincolnshire, PE12 7HR. The National Grid Reference of the site is 53460/32424.

The location of the site is shown in Figure 1.

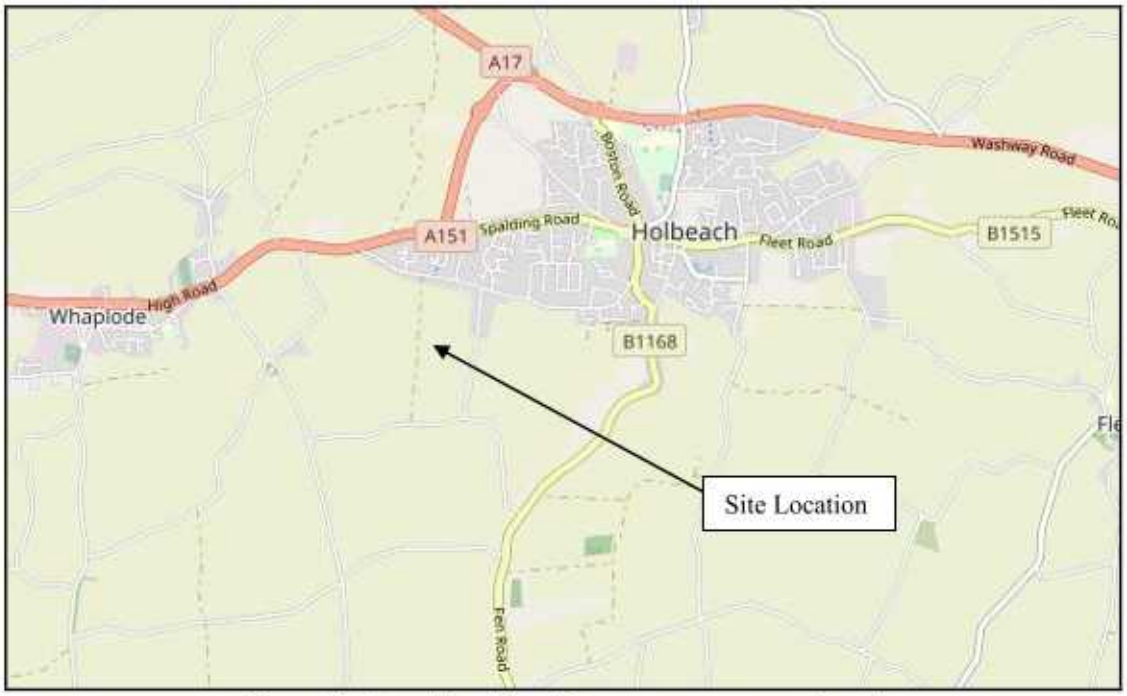


Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is located on agricultural land to the south of Wignals Gate. The site is to the south of the previously approved Phase 1 and Phase 2 of the proposed residential development. The area of development is approximately 4 hectares.

A topographic survey of the site has been undertaken and is provided in Attachment 1. Ground levels within the site to be developed are typically between +2.5m OD and +2.8m OD. The lowest levels are on the eastern side of the site.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site drains naturally through soakaway and hence to the IDB drain system. There are riparian drains on the western and southern boundaries of the site and an IDB High Priority Watercourse is on the eastern boundary of the site.

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

2.3 Proposed Development

The overall development consists of 79 dwellings. The development includes both single storey and two storey dwellings. A 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 as shown in Figure 2.

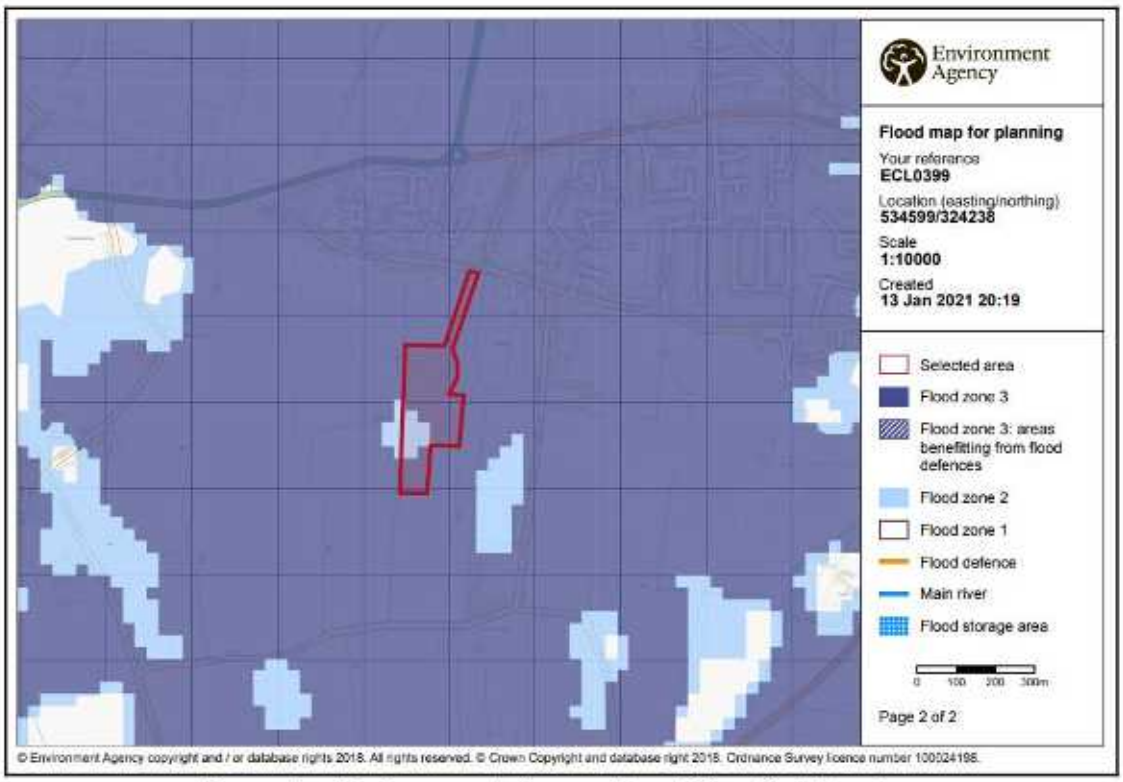


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a low risk of flooding from rivers or the sea (annual probability between 0.1% and 1%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is not 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 outside the 'Low Hazard' area	Part of the site is in the 'Low Hazard' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The site is outside the area at risk of flooding.	Part of the site has a peak flood depth between 0.0m and 0.25m.

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 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. 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. The site is identified within the Local Plan as a Reserve Site (Policy 12) and therefore has already been assessed as preferential. The site 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 South Holland IDB district is protected by the Wash tidal defences along the Holbeach Marsh frontage with embankment levels at a minimum of +7.0m OD. The Wash tidal defences are 11.7km from the site. The River Nene tidal defences are 13.6km to the east of the site. The River Welland tidal defences are 7.8km to the north west of the site. All three defences 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 on the eastern boundary of the site. The site and the surrounding land are within the Little Holland catchment and drains to the Little South Holland Drain which discharges to the South Holland Main Drain at the Little Holland Pumping Station. The South Holland Main Drain discharges to the tidal River Nene at the Sutton Bridge Tidal 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 IDB drainage system;
- an event in the local drainage network that exceeds the standard of protection;
- failure of Little Holland Pumping Station;
- failure of Sutton Bridge Outfall Sluice; and
- overtopping and breaching of the Wash, River Nene, or River Welland tidal defences.

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 site is within an area benefitting from defences. The flood embankments to the Wash and the River Nene and River Welland tidal defences provide protection during a 0.5% annual probability (1 in 200 chance each year) event. The flood risk from the Wash is lowered further by second line defences and various informal banks constructed during the reclamation of Holbeach Marsh.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded. Previous historic rainfall events of 1968 and 1978, estimated to be greater than 1% annual probability (1 in 100 chance each year), caused no flooding to any residential properties.

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 tide levels.

The tidal flood level during the 0.5% annual probability (1 in 200 chance each year) event inclusive of climate change to 2115 is estimated to be 7.2m AOD. The minimum defence level of the Wash, River Nene, and River Welland embankments is 7.0m AOD. There is a low risk during such an event for wave and wind action to cause overtopping and/or breaching of the tidal defences. However, the second line defences with embankment levels of 6.0m AOD would further reduce the probability of flood water reaching the development site.

4.6 Residual Risk

The South East Lincolnshire SFRA includes maps demonstrating the impact of climate change in 2116. The Residual Peak Depth maps within the SFRA indicate the maximum flood depths associated with a breach of the tidal defences. These show that 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 at the site would be between 0.0m and 0.25m. An extract from this map is shown in Figure 3 below.

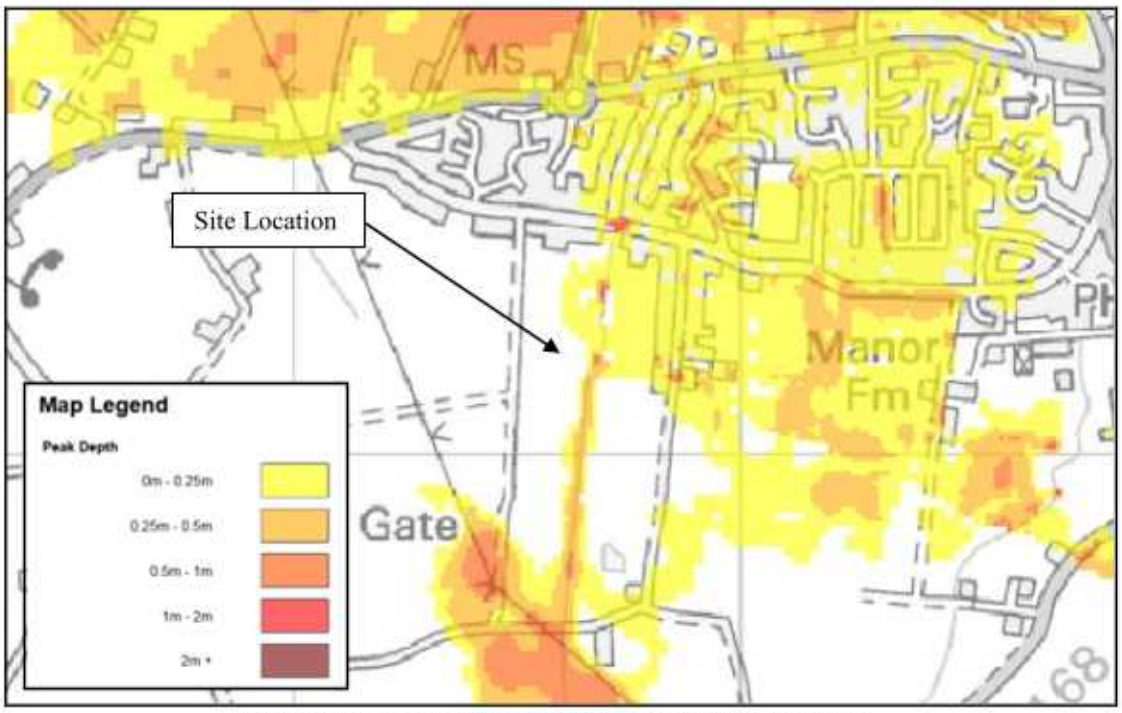


Figure 3 – SFRA 2116 Residual Peak Depth Map

The proposed development incudes single storey dwellings and therefore the finished floor levels within these dwellings needs to consider the 0.1% annual probability (1 in 1000 chance each year) event in 2115.

Environment Agency Tidal Breach Hazard Mapping for the 0.1% annual probability (1 in 1000 chance each year) event in 2115 shows that the maximum flood depths within the site are between 0.25m and 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 Little Holland Pumping Station or the Sutton Bridge Outfall Sluice 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 0.5% annual probability (1 in 200 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. During the 0.5% annual probability (1 in 200 chance each year) tidal event the peak depth at the site is between 0.0m and 0.25m and during the 0.1% annual probability (1 in 1000 chance each year) tidal event the peak depth at the site is between 0.25m and 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 flooding during a breach it is recommended that:

- the finished floor level of two storey dwellings is 0.3m above surrounding ground levels;
- the finished floor level of single storey dwellings is 0.5m above surrounding ground levels; and
- there is 0.3m of flood resilient construction above finished floor level.

The developer should ensure that the occupiers of the dwellings 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 occupiers of the dwellings should register with the Floodline Direct Warnings Service to receive any future flood warnings.

During an exceedance event it is anticipated that sufficient time would be available to take precautionary actions to limit the potential impact of flooding.

Should there be a failure of Little Holland Pumping Station or Sutton Bridge Outfall Sluice 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 using temporary pumping equipment.

The increase in surface water run-off associated with the development has been addressed within the Surface and Foul Water Drainage Strategy prepared for the development.

6.0 CONCLUSIONS AND RECOMMENDATIONS

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

- The proposed development consists of 79 dwellings on land to the south of Wignals Gate, Holbeach.

- The proposed development is in Flood Zone 3. Defences protected the site from the Wash, River Nene, and River Welland during the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200) tidal event including climate change.

- 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).

- To mitigate the risk of a breach in the tidal defences it is recommended that the finished floor levels are 0.5m (single storey) and 0.3m (two storey) above ground levels with 0.3m of flood resilient construction above finished floor level.

- A Surface & Foul Water Drainage Strategy has been prepared for the development to manage the increase in stormwater run-off.

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

ATTACHMENT 1

TOPOGRAPHIC SURVEY
(Dwg ALS7518/1250/04)



N

Grid North

SURVEY TO ORDNANCE SURVEY GPS DATUM AND GRID, OSGB36(02) TRANSLATED FROM ETRS89 USING OSGM02 AND OSTN02 MODELS

Co-Ordinates

M1	534677.55	324531.686	3.156
M2	534708.736	324527.775	3.099

FENCE TYPES

B/W	Barbed Wire	C/P	Chestnut Paling	P/S	Palisade
C/B	Close Boarded	I/R	Iron Railing	P/W	Post & Wire
C/I	Corrugated Iron	I/W	Interwoven		
C/L	Chainlink	P/R	Post & Rail		

LEGEND

AV	Air Valve	MH	Manhole		
BO	Bollard	MK	Marker		
BH	Borehole	NP	Street Name Plate		
CB	Cable Box	O/H	Overhead		
CHY	Chimney	OSBM	Ordnance Bench Mark		
CL	Cover Level	P	Post Or Pillar		
CONC	Concrete	PM	Parking Meter		
CTV	Cable Television	RE	Rodding Eye		
DK	Drop Kerb	RS	Road Sign		
DP	Down Pipe	SAP	Sapling		
DR	Drain	SC	Stop Cock		
ELC	Electricity	SL	Sump Level		
EP	Electricity Pole	ST	Stop Tap		
ER	Earth Rod	SV	Sluice Valve		
FB	Flower Bed	TAR	Tarmac		
FH	Fire Hydrant	TCB	Telephone Call Box		
FP	Flag Pole	TL	Traffic Lights		
GY	Gully	TP	Telegraph Pole		
GP	Gate Post	TV	Television Box		
GV	Gas Valve	UTL	Unable to Mt		
IC	Inspection Cover	VP	Vent Pipe		
IL	Invert Level	WL	Water Level		
JB	Junction Box	WM	Water Meter		
KD	Kerb Outlet	WO	Wash Out		
LB	Letter Box				
LP	Lamp Post				

Banking
Hedge
Tree
Bush
Gate
O/H Electric
O/H Telecom
CS1 Control Station

Drawn by:- AS | Surveyed by:- MK/AS | Checked by:- MK

Date: July 2016

Scale:- 1:1250

Drawing Number: ALS7518/1250/04 Topographical

Client: D Brown Building Contractors Ltd

Project: Holbeach, Land Behind 39 Wignal's Gate

Surveyed By:-

Anglia Land Surveys Ltd
EST 1976

Bowthorpe Hall,
Bowthorpe Hall Road,
Norwich, NR5 9AA

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ISO 9001 REGISTERED FIRM

ATTACHMENT 2

PROPOSED SITE LAYOUT
(DWG 071605 PD502 D4)



All dimensions to be verified on site by Main Contractor before the start of any shop drawings or work whatsoever either on their own behalf or that of sub-contractors.

Report any discrepancies to the Contract Administrator at once.

This drawing is to be read with all relevant Architect's and Engineer's drawings and other relevant information.

Andrew M Wright Ltd. Registered in England & Wales No. 9399024.
Registered office: 22 Church Street, Holbeach, Spalding, Lincs. PE12 7LL

LEGEND: DO NOT SCALE

- Affordable dwellings (shared ownership or rent)
- 2 no. bungalows (2 bed)
- 4 no. 2 storey houses (1 bed)
- 22 no. bungalows (3 bed) (with single or double garage)
- 4 no. 2 storey houses (2 bed)
- 8 no. 2 storey houses (2 bed)
- 8 no. 2 storey houses (4 bed) (with double garage)
- 1 no. 2 storey house (4 bed)
- 26 no. 2 storey houses (3 bed) (with single or double garage)
- 4 no. 2 storey houses (3 bed)
- Public open space
- RCP Refuse collection point

0 5 10 15 20 25

N

Revision:	Date:	Description:	Drw:	Chk:
D4	30.03.22	Draft Issue	AMW	AMW
D3	25.03.22	Draft Issue	AMW	AMW
D2	04.03.22	Draft Issue	AMW	AMW
D1	03.03.22	Draft Issue	AMW	AMW

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Project:
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Wignals Gate
Holbeach
Lincs

Drawing Title:
Proposed Site Layout

Client:
Loosegate Developments Ltd

Drawn:	Checked:	Date:	Scale:	Paper Size:
AMW	AMW	01.03.22	1:500	A1

Job No.:	Dwg No.:	Stage:	Revision:
071605	PD502	Planning	D4