FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
ST MARGARET'S, QUADRING, SPALDING

FINAL REPORT

ECL0543a/SEAGATE HOMES

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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 Seagate Homes in respect of a development that consists of thirty-one dwellings at St Margaret's, Quadring, Spalding.

An outline application for a development at the site was granted in February 2019. A new application is to be re-submitted by Seagate Homes.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at St Margaret's, Quadring, Spalding, PE11 4PR. The National Grid Reference of the site is 52285/33305.

The location of the site is shown in Figure 1.

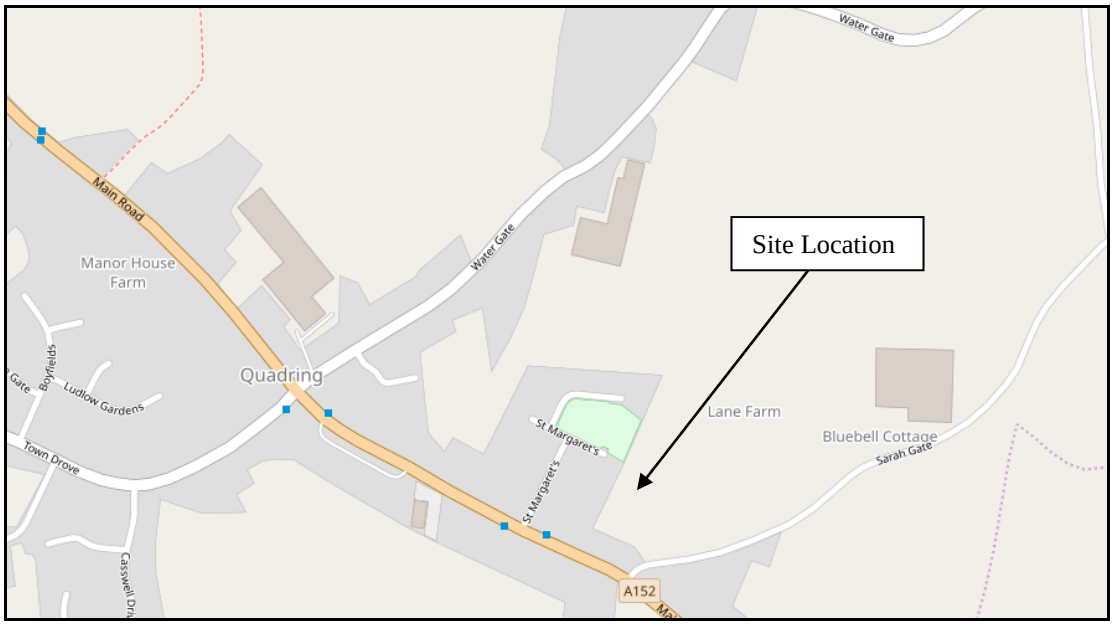


Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is to the east of the existing St Margaret's development which is on the northern side of the A152 Main Road. The site consists of agricultural land. The access to Lane Farm forms the eastern boundary of the site and residential dwellings for the western and southern boundary. There is agricultural land to the north. The area of development is approximately 1.05 hectares.

Environment Agency LiDAR data shows that the site is generally flat with ground levels between +3.0m OD and +3.2m OD.

The site is in the Welland and Deepings Internal Drainage Board (IDB) District. Surface water at the site would naturally drain through soakaway to the riparian drainage system and IDB network. There is a riparian drain on the northern boundary of the site and the nearest IDB Drain, Watergate Dyke, is 100m west 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 thirty-one dwellings. Twenty-nine dwellings will be 2 storey and two will be single storey.

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 Available Flood Risk Information

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.

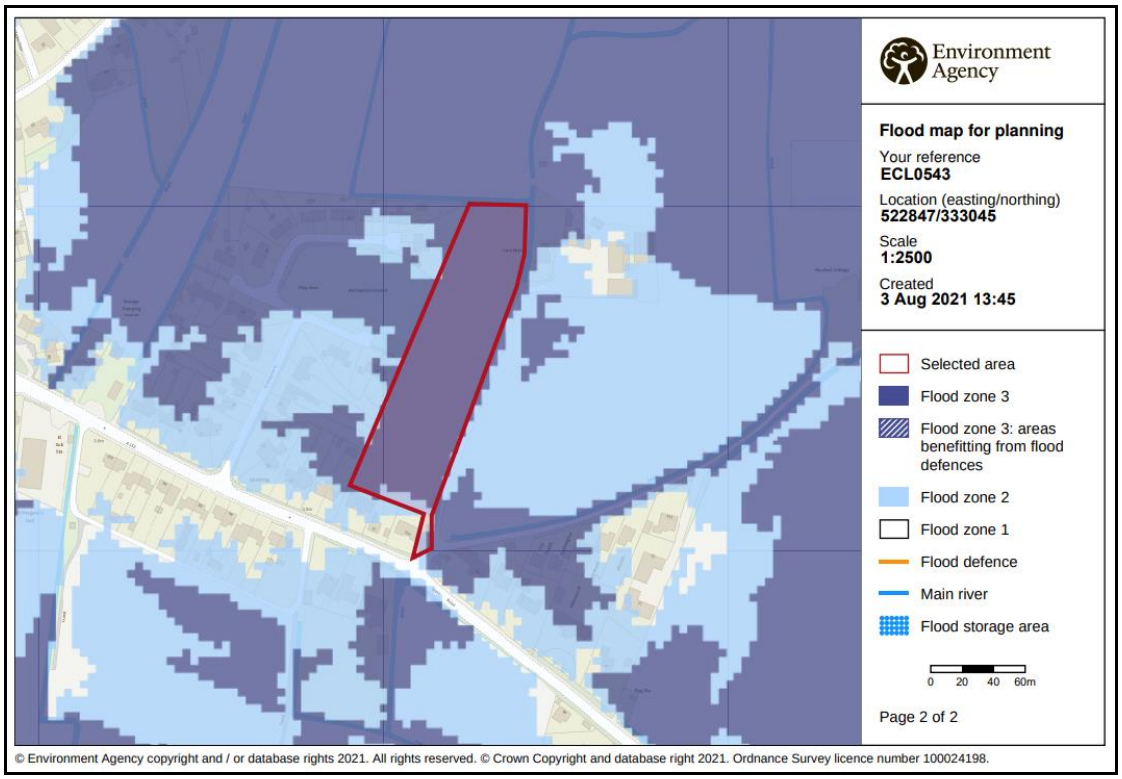


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a medium risk of flooding (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 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	The site is outside the 'Low Hazard' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The site is outside the area at risk during a breach	The site is outside the area at risk during a breach

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 close to the River Welland lie within Flood Zone 3. As such opportunities to undertake the development at an alternative site within Flood Zone 1 are very limited. At this location it is not possible to position the development on higher ground within the proposed site.

The SFRA states that it is necessary to use the refined flood risk information (hazard and depth maps) to assist with the application of the sequential test. The refined flood risk information contained within the SFRA demonstrates the site is not at risk during the 1% fluvial event and 0.5% tidal event. 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 approximately 6km north west of the tidal River Welland downstream of Spalding. The River Glen, a tributary of the River Welland, is a similar distance to the south of the site. The defences on the River Welland and the River Glen 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 Welland and Deepings IDB. There is an IDB maintained watercourse, the Watergate Dyke, 100m to the west of the site. The site and the surrounding land drains to the Risegate Eau which is 2.5km south of the site at its closest. The catchment drains in an easterly direction to Risegate Eau Pumping Station which discharges to the tidal River Welland.

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.

Approximately 6km west of the site is the South Forty Foot Drain. This is the primary channel for drainage of the Black Sluice Level and is the responsibility of the Black Sluice IDB. The drain discharges to the River Witham in Boston.

Current maintenance standards of the Welland and Deepings IDB, Black Sluice IDB and the Environment Agency are generally good.

4.2 Sources of Flooding

The potential sources of flooding identified during this assessment are:

- local blockages to the Welland and Deepings IDB main drain system;
- an event in the local drainage network greater that exceeds that standard of protection;
- failure of Risegate Eau Pumping Station;
- overtopping and / or breaching of the River Glen defences; and
- overtopping and / or breaching of the River Welland tidal defences.

4.3 Probability of Flooding

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

The standard of drainage provided by Welland and Deepings IDB and Black Sluice 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 Welland and Deepings IDB and Black Sluice IDB main drains incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

The River Welland tidal defences provide protection during the 0.5% annual probability (1 in 200 chance each year) tidal event. The River Glen has defences that provide protection during the 1% annual probability (1 in 100 chance each year) fluvial 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 tide levels.

The River Welland tidal defences provide protection during the 0.5% annual probability (1 in 200 chance each year) event inclusive of the effects of climate change. The estimated tide level during this event is +7.13m OD and typical defence levels are in excess of +7.5m OD. In summary the existing systems and defences are appropriate for the design life of the development (i.e., 100 years).

4.6 Residual Risks

The South East Lincolnshire SFRA includes maps demonstrating the impact of climate change in 2116. The Residual Peak Depth maps within the SFRA show that when the climate change allowances are applied to the 1% annual probability fluvial (1 in 100 chance each year) and the 0.5% annual probability tidal (1 in 200 chance each year) event the site is not at risk.

The proposed development includes single storey dwellings and therefore the finished floor level needs to consider the 0.1% annual probability (1 in 1000 chance each year) event in 2115. The South East Lincolnshire SFRA includes 0.1% annual probability (1 in 1000 chance each year) maps for specific locations but theses do not cover the site. Through a comparison of flood depths during the 1% and 0.1% annual probability events for 2115 for the areas that the maps cover it can be estimated that the flood depths are 0.1m higher for the more extreme event. Based upon the topography of the site and ground levels in the areas at risk during the 0.5% annual probability tidal (1 in 200 chance each year) event the site is not considered to be at risk during the 0.1% annual probability (1 in 1000 chance each year) event in 2115.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Risegate Eau 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.

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.

5.2 Mitigation Measures

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 0.3m above ground levels with 0.3m of flood resilient construction above finished floor level.

The developer should ensure that the eventual 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.

Should there be a failure of Risegate Eau Pumping Station and conditions were such to put properties and land at risk of flooding, the IDB would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment.

A scheme for the management of surface water that mitigates the risk of flooding from the site has been developed by Jackson Consulting Engineers.

6.0 CONCLUSIONS

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

- The proposed development consists of twenty-nine 2 storey dwellings and two single storey dwellings at St Margaret's, Quadring, Spalding.

- The proposed development is in Flood Zone 3. The development is protected by defences during the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200 chance each year) tidal event including an allowance for climate change. The site is not at risk during a breach of the tidal defences.

- 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 Welland and Deepings IDB main drains 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 floor level is 0.3m above ground level with 0.3m of flood resilient construction above finished floor level to mitigate against the risk of flooding during the lifetime of the development.

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

ATTACHMENT 1

SITE PLAN
(Dwg SMQ-SH-SL-AR-01 E)

ST MARGARET`S, QUADRING.



House Type Schedule

	Type	No	Plots
2 Bedroom Bungalow	S211(57.2m² / 615.7 ft²)	4	7, 8, 9, 10
2 Bed Houses	S213 (68.61m²/738.518ft²)	4	5, 25, 26, 30
	S200 (72.0m²/775ft²)	8	3, 4, 14, 15, 16, 17, 28, 29
3 Bed Houses	S319 (83.46m²/898.36 ft²)	3	6, 24, 31
	S304v (76.2m² /820ft²)	4	18, 19, 22, 23
	S301 (86.4m²/930ft²)	3	1, 12, 13
	S305 (86.6m²/932 ft²)	2	2, 11
	S310 (89.4m² / 962.3ft²)	1	27
4 Bed Houses	S427v2 (97.4m²/1048.418ft²)	2	20, 21
	Total =	31	

S106 AFFORDABLE RENT PLOT

S106 SHARED OWNERSHIP PLOT

LEGEND

- Proposed Trees
- Proposed Shrubs
- Proposed Hedges
- 1.8m high living screen fence
- 1.8CBF 1.8m high Timber close board fence
- Buff paving slabs to all paths
- SW Filter drain/Swale
- Tarmac adoptable roads and footpaths
- Block Paving Areas

Please also refer to landscaping and boundary for further details.

NOTES:

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All dimensions to be checked on site prior to construction or off-site fabrication by the Contractor, his Sub-contractor or Supplier.

Do not scale plans - use figure or grid dimensions where given. Any deviation from the drawing is to be reported to the originator immediately.

IF IN DOUBT ASK !

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Revision	Notes	Date
E	House type names & Landscaping updated following changes to layout (rev d).	27.04.23
D	Amendments to layout following discussions with Planning services, Boundaries, house types and legend updated.	28.02.2023
C	Existing tree indicated in r/o No 48 St Margarets	25.10.22
B	Amendment to parking for plots 8, 9, 30, 31, 34-36. (as discussed with Planning services)	18.10.2022
A	Amendments to layout as requested by Planning Services. Legends updated.	9.8.22

SEAGATE HOMES

Project:
PROPOSED RESIDENTIAL DEVELOPMENT,
ST MARGARET`S, QUADRING,
SPALDING, LINCS.

Drawing:
SITE LAYOUT (PLANNING)

Drawn: MD Date: 04.08.2021

Status: PLANNING Scale: 1:500 @ A1

Drawing Number:
SMQ-SH-SL-AR-01 - E