

Ms J Jacklin

**10 Mill Lane
Whaplode
Lincolnshire PE12 6TP**

FLOOD RISK ASSESSMENT

Report No: 5342/01

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0. EXECUTIVE SUMMARY

- 0.1. The application site is located to the rear of 10 Mill Lane, Whaplode, Lincolnshire, PE24 and is within the South Holland District Council administrative area. The Ordnance Survey grid reference for the site is TF32582415. A location plan of the development is contained within Appendix A.
- 0.2. The site is currently used as a garden, and the proposal is for the construction of a bungalow. A block plan of the development is contained within Appendix A.
- 0.3. A previous application outline planning application (ref H23-0353-13) for a bungalow on the site was submitted in in 2013
- 0.4. The ground level on the site is approximately 3.6m AoDN and on the highway in front of the site 3.15m (from Government Lidar Data).
- 0.5. The site is within a flood risk area with potential tidal flooding from The Wash which is 12km to the north-east, and from statutory main rivers maintained by the Environment Agency. The Coronation Channel/River Welland 6km to the west, and River Nene 15km to the south-east. The flood defences are maintained by the Environment Agency.
- 0.6. The site is shown on the Flood Map for Planning as being within Flood Zone 3 which is considered to have a risk of flooding less than 1 in 100 (1%) fluvial, and 1 in 200 (0.5%) tidal if defences are ignored.
- 0.7. Using the LIDAR ground level data that is used by the Environment Agency for flood modelling, the estimated level of flooding for flood zones 3 and 2 is 3.3m and 3.4m respectively in the site locality. Ground levels within the plot site are at approximately 3.6m Therefore the site can be considered as being within Flood Zone 1.
- 0.8. The site is within the 'More Vulnerable' uses of land as defined in Table 2 of the National Planning Policy Framework (NPPF) Technical Guidance. Table 3 Flood Zone "compatibility" indicates that a development of this nature in Flood Zone 3 requires both a sequential and exception test. Ground levels indicate that the site is actually within Flood Zone 1
- 0.9. Although the site is considered to be in Flood Zone 1 rather than flood zone 3 (as shown on mapping) both sequential and exception tests have been undertaken and are considered to have been passed.
- 0.10. The Environment Agency flood hazard map for the 0.1% (1 in 1000) for the year 2115, shows that should a breach of the tidal defences occur the site is outside areas of predicted flooding.
- 0.11. The Strategic Flood Risk Assessment Standing Advise matrix was followed for a dwelling considered to be within flood zone 3, the development would be acceptable and no mitigation. A single storey building on the site is considered acceptable as floor levels will be above the 0.1% (1 in 1000 years) flood level including predicted climate change (for year 2115).
- 0.12. Based upon the Environment Agency data and SFRA matrix a single storey dwelling in this location is be considered to be acceptable.

1. INTRODUCTION

This report has been prepared in support of a planning application for a bungalow on Mill Lane, Whaplode.

2. APPLICATION SITE

- 2.1. The application site is located to the rear of 10 Mill Lane, Whaplode, Lincolnshire, PE24 and is within the South Holland District Council administrative area. The Ordnance Survey grid reference for the site is TF32582415. A location plan of the development is contained within Appendix A.
- 2.2. The site is currently used as a garden, and the proposal is for the construction of a bungalow. A block plan of the development is contained within Appendix A.
- 2.3. A previous application outline planning application (ref H23-0353-13) for a bungalow on the site was submitted in in 2013
- 2.4. The ground level on the site is approximately 3.6m AoDN and on the highway in front of the site 3.15m (from Government Lidar Data).
- 2.5. The site is within a flood risk area with potential tidal flooding from The Wash which is 12km to the north-east. The flood defences are maintained by the Environment Agency.
- 2.6. The site is also at risk from statutory main rivers maintained by the Environment Agency. This is from both fluvial and tidal flooding from the Coronation Channel/River Welland 6km to the west, and tidal from the River Nene 15km to the south-east.
- 2.7. Drainage within the local area is within the South Holland Internal Drainage Board (IDB) catchment area. The two nearest watercourses are shown as high priority on the IDB plans and flow from west to east. These are a culverted drain North of Middle Lane (ref DRN197P7001) and a watercourse on the south edge of the village (ref DRN197P6901).

3. FLOOD RISK ANALYSIS

Fluvial and Tidal Flooding

Historic Flooding

- 3.1. The Historic Flood Extents Map (online) shows no flooding has been recorded within the Whaplode area.

Flood Risk Vulnerability

- 3.2. The Environment Agency Flood Map for planning shows that the site lies within Flood Risk Zone 3 and close to the boundary with Flood Risk Zone 2. Flood Zone 3 has a greater than 1 in 100 (1%) annual probability of fluvial (river) flooding; or greater than 1 in 200 annual probability of flooding from the sea (tidal). This assumes that no flood defences or protection exist. The Flood Map for Planning therefore does not reflect the fact that flood defences exist and is therefore not representative of the actual risk of flooding. See appendix B.

- 3.3. Using LIDAR data it was noted that land at the edge of Flood Zone 3 is approximately 3.3m AoDN. This would indicate that the Flood level is 3.3m. Similarly for Flood Zone 2 the flood level is approximately 3.4m. Therefore Mill Lane in front of the development site would be within Flood Zone 3, but the level of the land within the plot site is approximately 3.6m placing it within Flood Zone 1. It was also noted that the driveways of adjacent bungalows slope upward from the highway such that ground levels at the buildings are approximately 3.8m again lifting those buildings above flood levels.
- 3.4. Applying the Flood Risk Vulnerability Classification in accordance with Table 2 of the National Planning Policy Framework (NPPF) Technical Guidance, the proposed development is classified as 'More Vulnerable'. In Table 3 of the guidance, Flood Risk Vulnerability and Flood Zone 'compatibility' a development of this nature in Flood Zone 3 requires sequential and exception tests to be passed. As ground levels show the site is within Flood Zone 1 then it would be considered acceptable.

NPPF Table 3					
Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

- 3.5. The government Long term flood risk plans consider the site as having a low risk of flooding (between 0.1 and 1%) taking into account flood defences. Assuming no breach or failure of the flood bank occurs.

Environment Agency Data Received

- 3.6. A request for flood mapping data was submitted to the Environment Agency in addition to information already available on the government website.
- 3.7. Predicted tidal levels within the River Welland at Marsh Road Sluice Spalding. River Nene at Wisbech and the Wash at Lawyers Sluice and West Lighthouse. The 1 in 200 year (0.5%) levels for the year 2006 were up to 6.01m. With climate change levels are expected to increase.
- 3.8. Tidal defences are described as being earth embankments and in a fair condition reducing the risk of flooding to 0.67% (1 in 150) chance of occurring in any one year.

- 3.9. Environment Agency breach hazard mapping has been received and shows no flooding at the 0.1% (

4. SEQUENTIAL AND EXCEPTION TESTS

- 4.1. Although the site is shown on the flood map for planning as being in Flood Zone 3, ground levels show that the site is actually within Flood Zone 1. Therefore both the sequential and exception tests should not be required.
- 4.2. As the site is shown on flood mapping as flood zone 3, both the sequential and exception tests have been attempted below.

Sequential Test

- 4.3. The aim of the Sequential Test, is to steer new development to Flood Zone 1 where there is a low probability of river or sea flooding. Where there are no reasonably available sites in Flood Zone 1, local planning authorities should consider reasonably available sites in Flood Zone 2 where there is a medium probability of river or sea flooding. Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in higher flood risk areas in Flood Zone 3 be considered.
- 4.4. The majority of the wider area including Spalding is within flood zone 3. The only existing residential areas not within flood zone 3 are the village of Moulton and parts of Whaplode. Therefore within such small villages there are limited available sites for further residential developments.
- 4.5. Although the site is shown within flood zone 3 an assessment of the flood levels and ground levels on the site would place it within Flood Zone 1. The property and residents would be safe from flooding, although access to the property would be restricted by flood water in the highway. It should be noted however that this flooding assumes that all flood defences have been removed and is therefore not realistic. Flood hazard maps show that the site and highway are not at risk of flooding due to a breach for flood events of 0.1%(1 in 100 years)
- 4.6. It was noted that South Holland District Council have recently approved housing developments in the area including those in Flood Zone 3.
- 4.7. Taking into account the above the sequential test should be considered passed for the following reasons:
- a. The ground level at the site is already above the Zone 3 flood level, placing it in Flood Zone 1. Therefore no sequential test is required.
 - b. There is limited opportunity for developing sites within existing village boundaries within flood zones 1 and 2.

Exception Test

- 4.8. There are two parts of the test that must be passed if the site is considered to be in Flood Zone 3.
- It must be demonstrated that the development provides wider sustainability benefits to the community
 - That the development will be safe for its lifetime taking into account of the vulnerability of its users, without increasing flood risk elsewhere, and where possible will reduce flood risk overall.

- 4.9. The site is an infill development within a well-developed area of the village and makes use of an existing highway and utility services. Valuable agricultural land on the periphery of the village is not being lost by extending the urbanised area. The site is therefore considered more sustainable than building on a greenfield site.
- 4.10. The new dwelling is not considered to be at risk of flooding as the ground and floor levels will be above the flood level of flood zone 3, placing it within flood zone 1. The map showing flood zone 3 does not take account of any flood defences. If these are taken into account, even if a breach were to occur the site would not flood in a 0.1% (1 in 1000) flood event taking into account climate change.
- 4.11. The exception test is considered to be passed as the site is not considered to be at risk of flooding, and is considered more sustainable than building elsewhere.

Strategic Flood Risk Assessment

- 4.12. In order to meet the requirements of PPS25 South Holland and Boston Borough Council commissioned a Strategic Flood Risk Assessment (SFRA) that was published in March 2017.
- 4.13. The SFRA advises the following of a standing advice matrix to determine the requirements of the flood risk assessment. The site is for less than 10 dwellings (row 8 applies) and within Flood Zone 3 (column G). The matrix advises “no comment”.
- 4.14. Residual Risk maps are presented within the SFRA. These consider the extent of flood risk after taking into account flood defences. For the site location the following residual risks remain.

Year	Scenario	Residual Peak Depth	Residual Peak Velocity	Residual Hazard
Present Day	1% fluvial/0.5% tidal event	Zero (No flooding)	None	None
Year 2115	1% fluvial/0.5% tidal event	Zero (No flooding)	None	None

- 4.15. Residual Flooding adjacent to Whaplode village is denoted as tidal dominated. No specific flood risk has been assessed for Whaplode village.
- 4.16. *Standing Advice Matrix*
- 4.17. The Standing Advice Matrix must be followed when determining the suitability of a new development. The matrix is available as a spreadsheet, and further requirements are only visible when hovering over the cells.
- 4.18. The development is for a single dwelling in the more vulnerable category, and therefore row 8 “Non Major More Vulnerable” of the matrix applies.

Row B does not apply as the site is not near a watercourse.

Rows C to F refer to the hazard rating. Appropriate mitigation includes setting floor levels for single storey buildings above the 0.1% (1 in 1000) event breach

depth. The Hazard Map for this scenario shows no flooding or hazards at the site and therefore columns C to F are not applicable to the site.

Row G/H. The site is within flood zone 3. The matrix states “No comment” for this category of development.

IDB Drainage Area (see also SFRA section above)

- 4.19. South Holland IDB is responsible for drainage of all low lying areas within the local area. The IDB were contacted via the Water Management Alliance who maintain and operate the drainage systems for six IDB's. No response has been received.
- 4.20. The two IDB watercourses to the north and south of the site discharge to the south via the IDB's drainage system.
- 4.21. IDB drainage systems in low lying areas usually have sufficient capacity to cope with rainfall events. The SFRA does not raise any concerns with regard to flooding from IDB watercourses.

Flooding from other Sources

Surface Water Flooding

- 4.22. The Government long term flood map shows that the site has a very low risk of surface water flooding. No flooding is shown within the property boundary, adjacent properties or Mill Lane.
- 4.23. Surface water flooding can occur from an intense rainfall event, often over a short period in time, where the water is unable to soak into the ground or enter the drainage system. However, as the surrounding area is generally flat it is unlikely that a rapid inundation of the site will occur. It is more likely that local ponding of water with a shallow depth and low velocity would occur.

Ground water flooding

- 4.24. There is no indication that the application site suffers from any ground water problems.

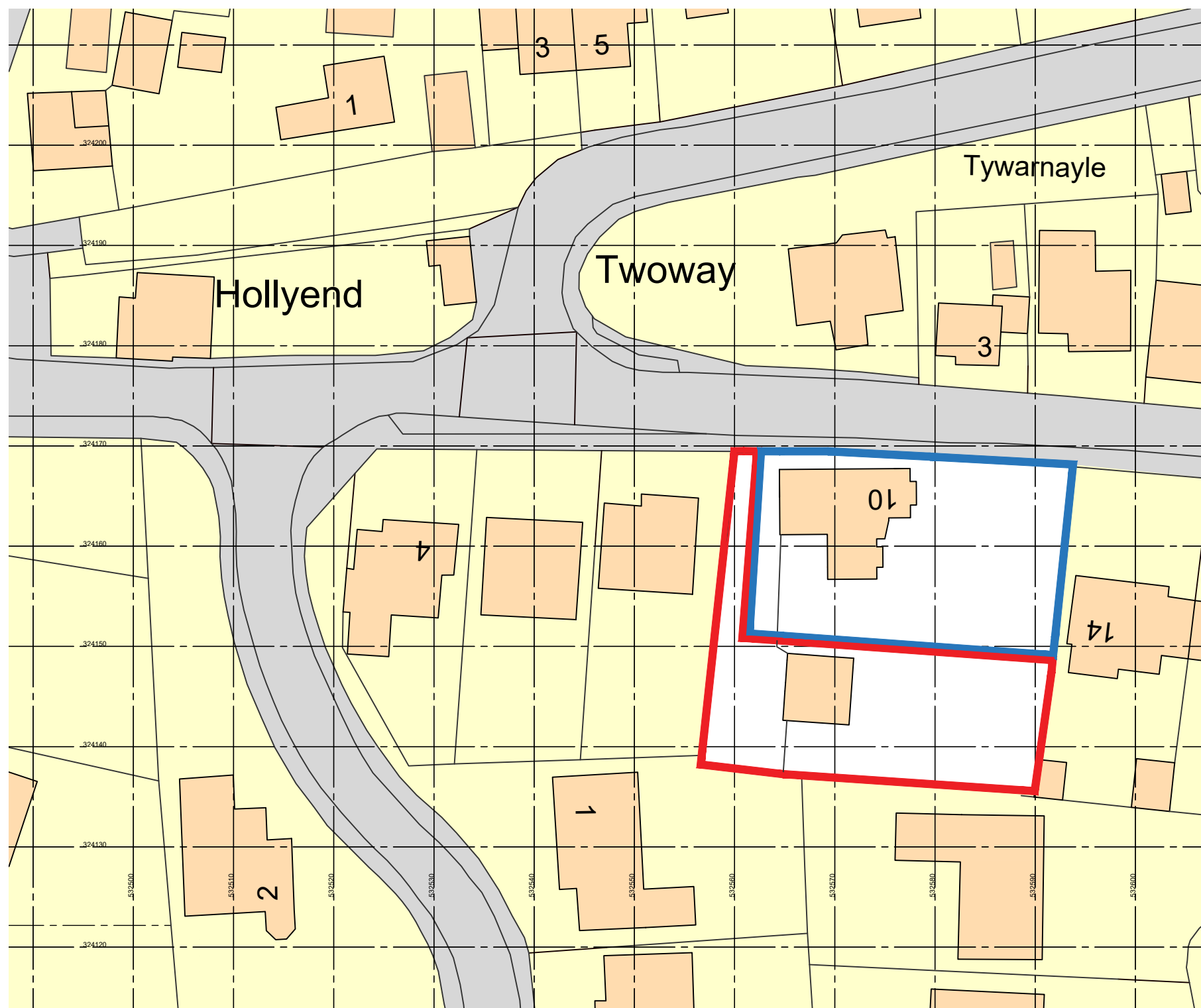
5. CONCLUSIONS

- 5.1. The site is shown on the Flood Map for Planning as being within Flood Zone 3 which is considered to have a risk of flooding less than 1 in 100 (1%) fluvial, and 1 in 200 (0.5%) tidal if defences are ignored.
- 5.2. Using the LIDAR ground level data that is used by the Environment Agency for flood modelling, the estimated level of flooding for flood zones 3 and 2 is 3.3m and 3.4m respectively in the site locality. Ground levels within the plot are at approximately 3.6m Therefore the site can be considered as being within Flood Zone 1.
- 5.3. The site is within the ‘More Vulnerable’ uses of land as defined in Table 2 of the National Planning Policy Framework (NPPF) Technical Guidance. Table 3 Flood Zone “compatibility” indicates that a development of this nature in Flood Zone 3 requires both a sequential and exception test. Ground levels indicate that the site is actually within Flood Zone 1
- 5.4. Although the site is considered to be in Flood Zone 1 rather than flood zone 3 (as shown on mapping) both sequential and exception tests have been undertaken and are considered to have been passed.

- 5.5. The Environment Agency flood hazard map for the 0.1% (1 in 1000) for the year 2115, shows that should a breach of the tidal defences occur the site is outside areas of predicted flooding.
- 5.6. The SFRA recognises that the South Holland area is low lying, and that few areas are outside of Flood Zone 3. The SFRA considers the residual flood levels which take into account the presence of flood defences. A Standing Advice Matrix has been created to allow a more pragmatic approach to be followed. Using the matrix, the development would be acceptable and no mitigation. A single storey building on the site is considered acceptable as floor levels will be above the 0.1% (1 in 1000 years) flood level including predicted climate change (for year 2115).
- 5.7. Based upon the Environment Agency data and SFRA matrix a single storey dwelling in this location is be considered to be acceptable.
- 5.8. It is recommended that the site owner, if they have not already, sign onto the Environment Agency Floodline (FWD) system and produce an Evacuation Plan.

6. APPENDIX A –PLANS

<u>Dwg. No.</u>	<u>Rev</u>	<u>Date</u>	<u>Title</u>
2			Existing Site Plan
3			Proposed Block Plan



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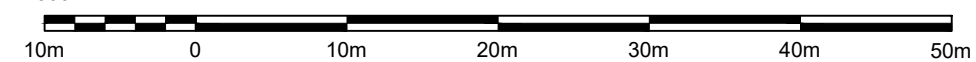
Existing Site Block Plan

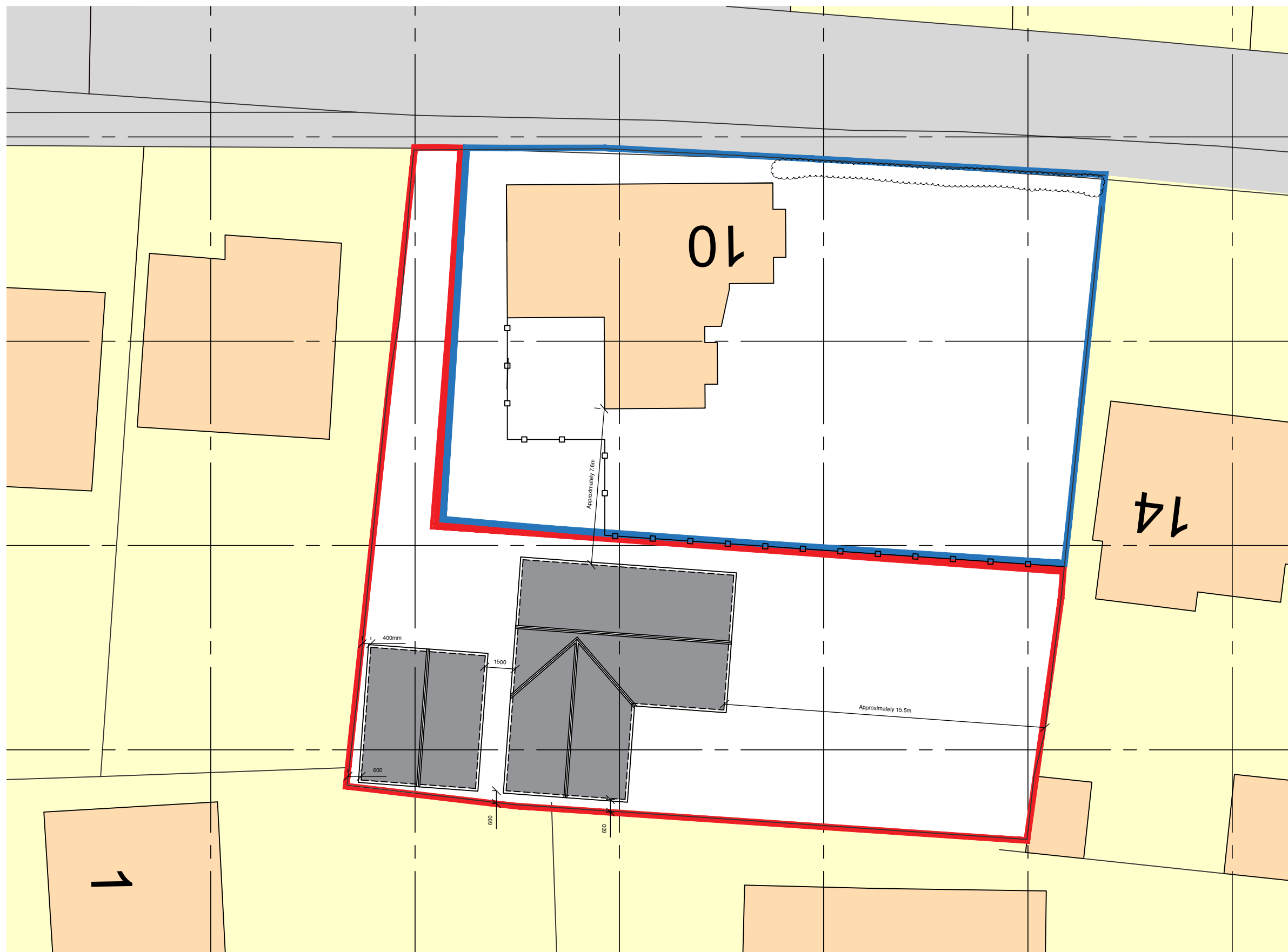
Scale 1:500

Red line denotes proposed site.

Blue line denotes adjacent land in the same ownership.

1:500





1:200

4m 0 4m 8m 12m 16m 20m

7. APPENDIX B – GOVERNMENT/ENVIRONMENT AGENCY DATA

Environment Agency Flood Mapping Data

Flood map for Planning

Surface Water Map

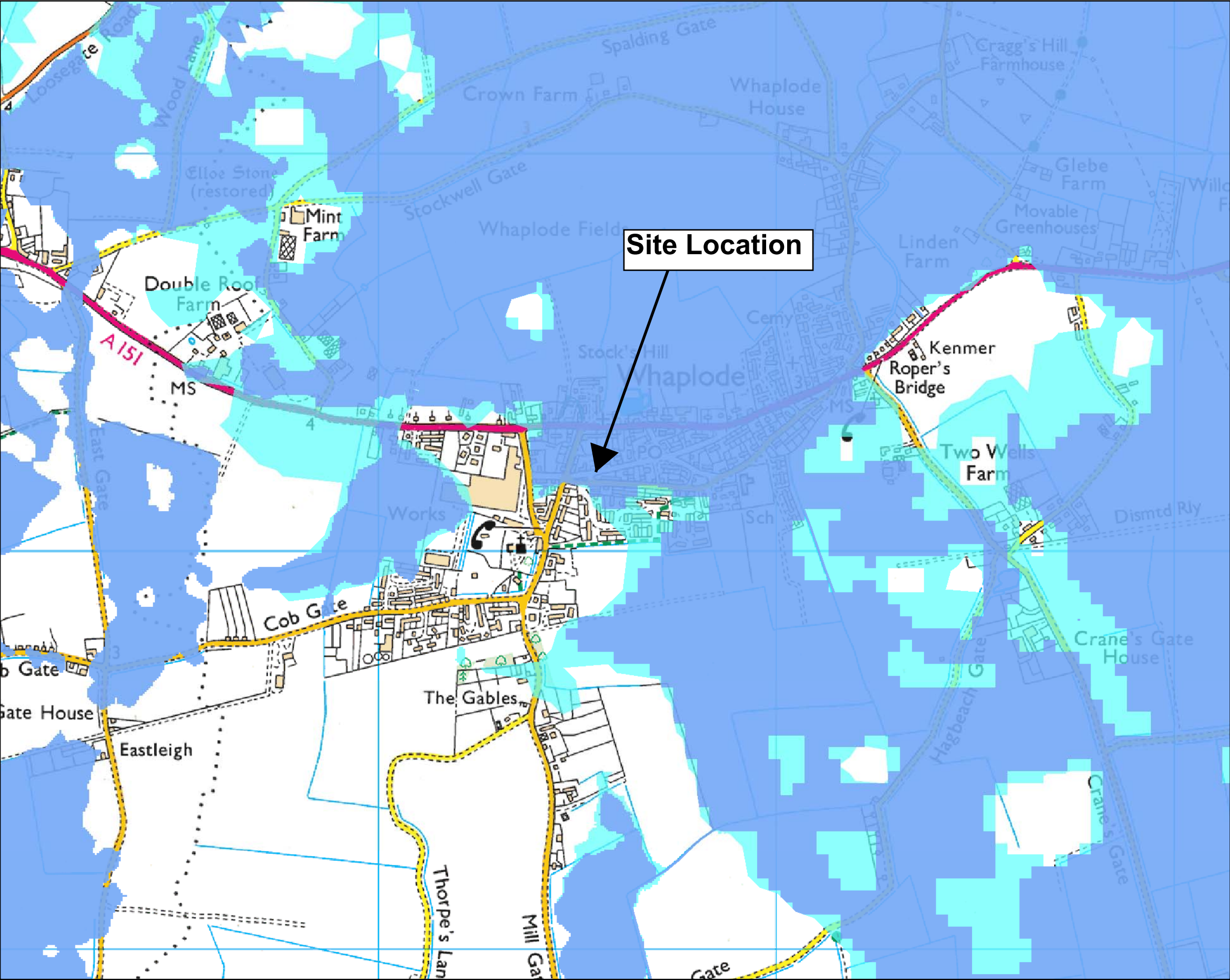
Location Map of Defences

Tidal Breaching Hazard Mapping

Breach 0.5% (1 in 200)

Breach 0.1% (1 in 1000)

Flood Map centred on TF 32597 24152 - created September 2020 [Ref: CCN-2020-184575]



Scale 1:10,000



- Legend**
- Main River
 - Raised Defences
 - Flood Storage Areas
 - Area at Risk of Flooding from Rivers or The Sea
 - Extreme Flood Outline

Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year.
- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

Light blue shows the extent of the Extreme Flood Outline, which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

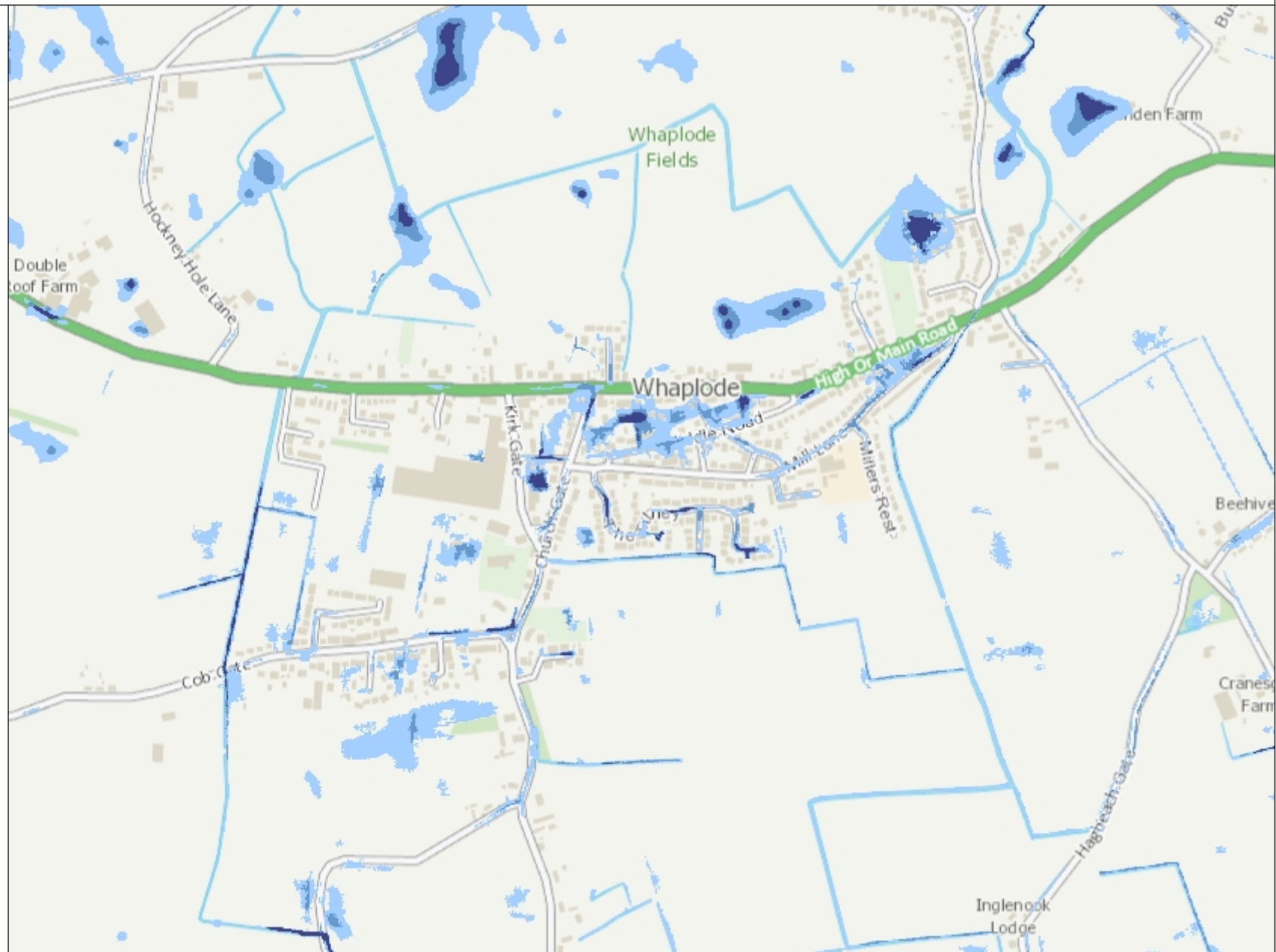
These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Sites outside the two extents, but behind raised defences, may be affected by flooding if the defences are overtopped or fail.

Created by the Partnerships and Strategic Overview Team, Kettering

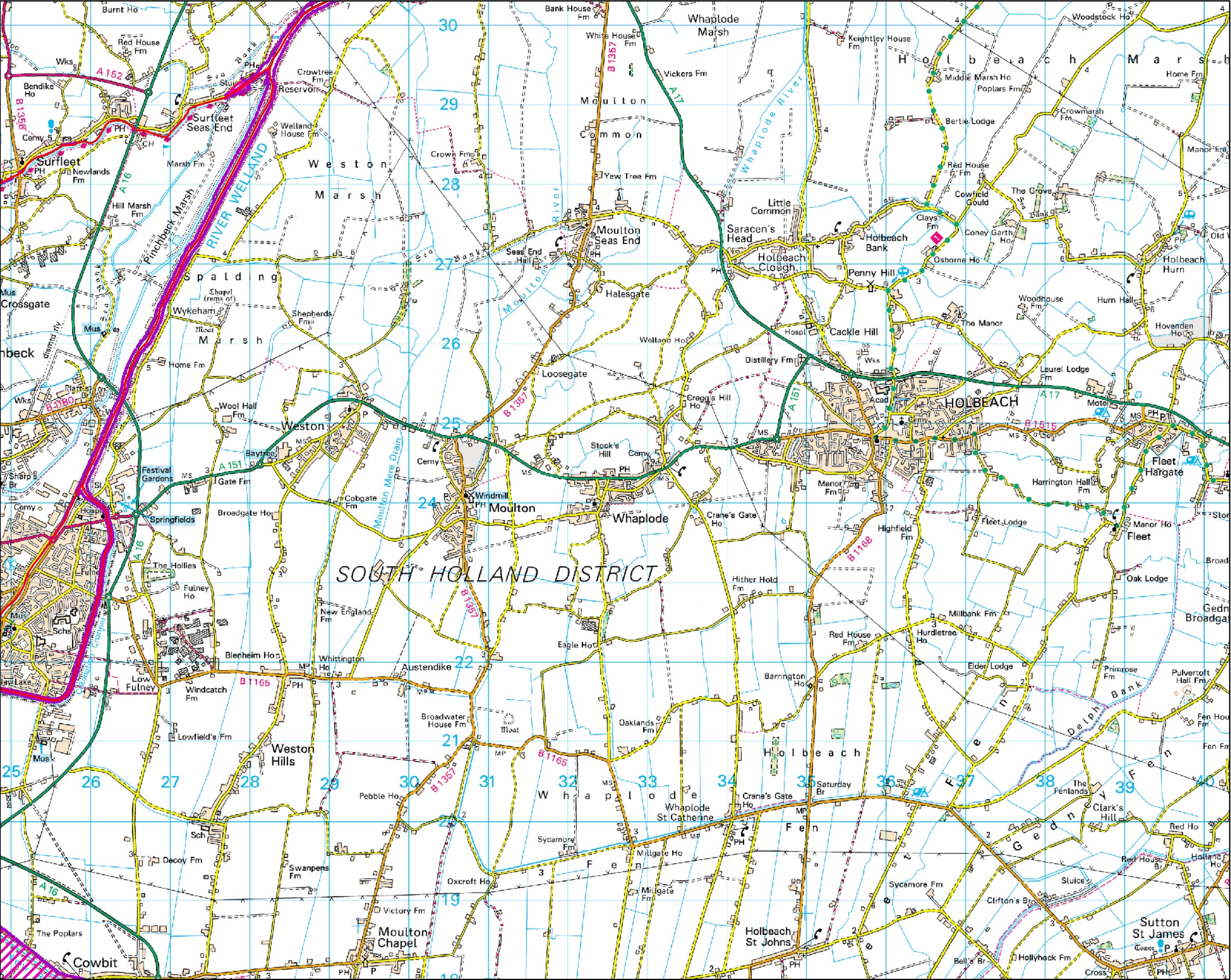
Surface Water Map - TF 32597 24152 - CCN/2020/184575

Legend

- High ($\geq 3.3\%$)
- Medium ($3.3\% - 1\%$)
- Low ($1\% - 0.1\%$)



Location map of defences centred on TF 32597 24152 - created September 2020 [Ref: CCN-2020-184575]





Scale 1:50,000

N

Legend

- Main River
- Raised Defences
- Flood Storage Areas

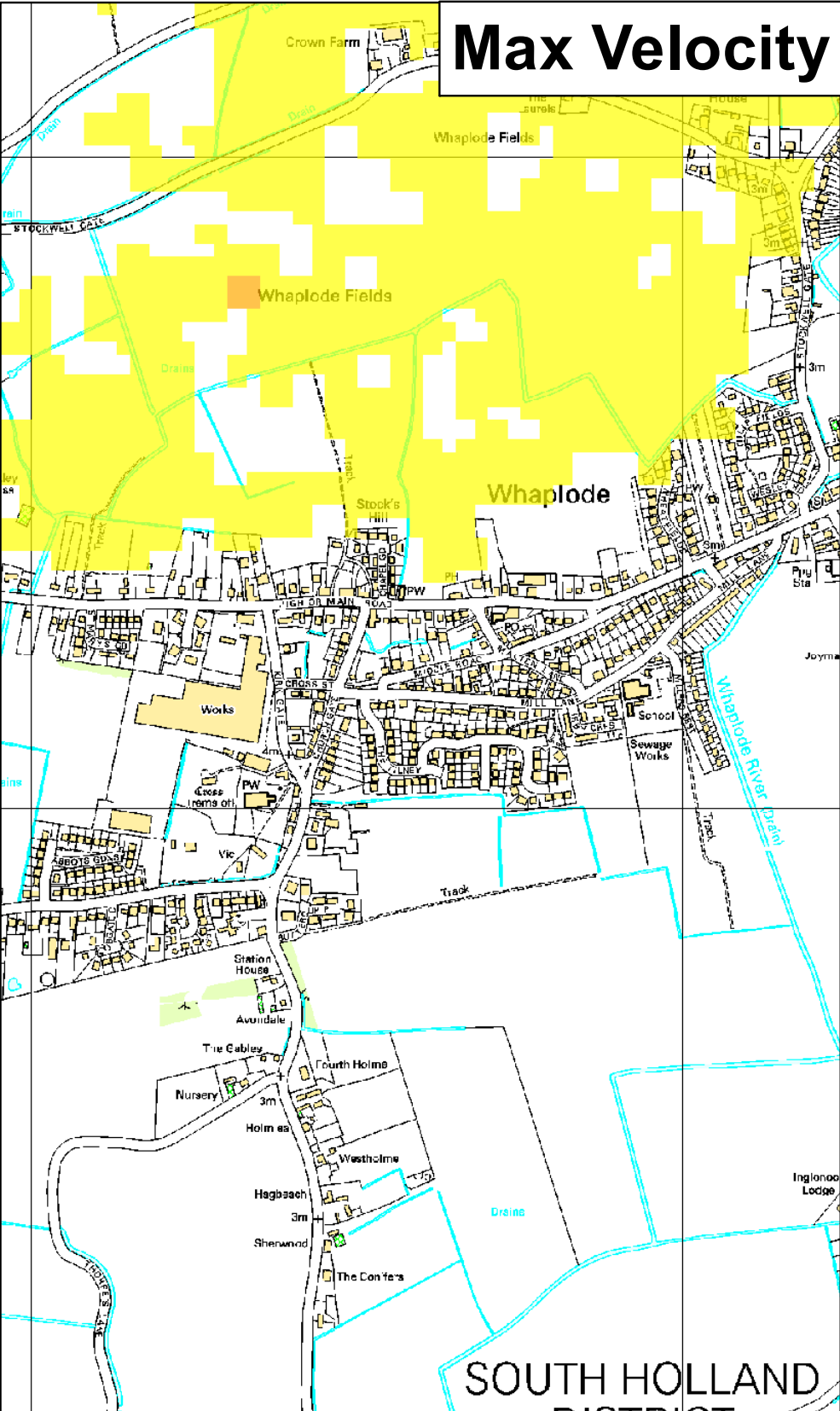
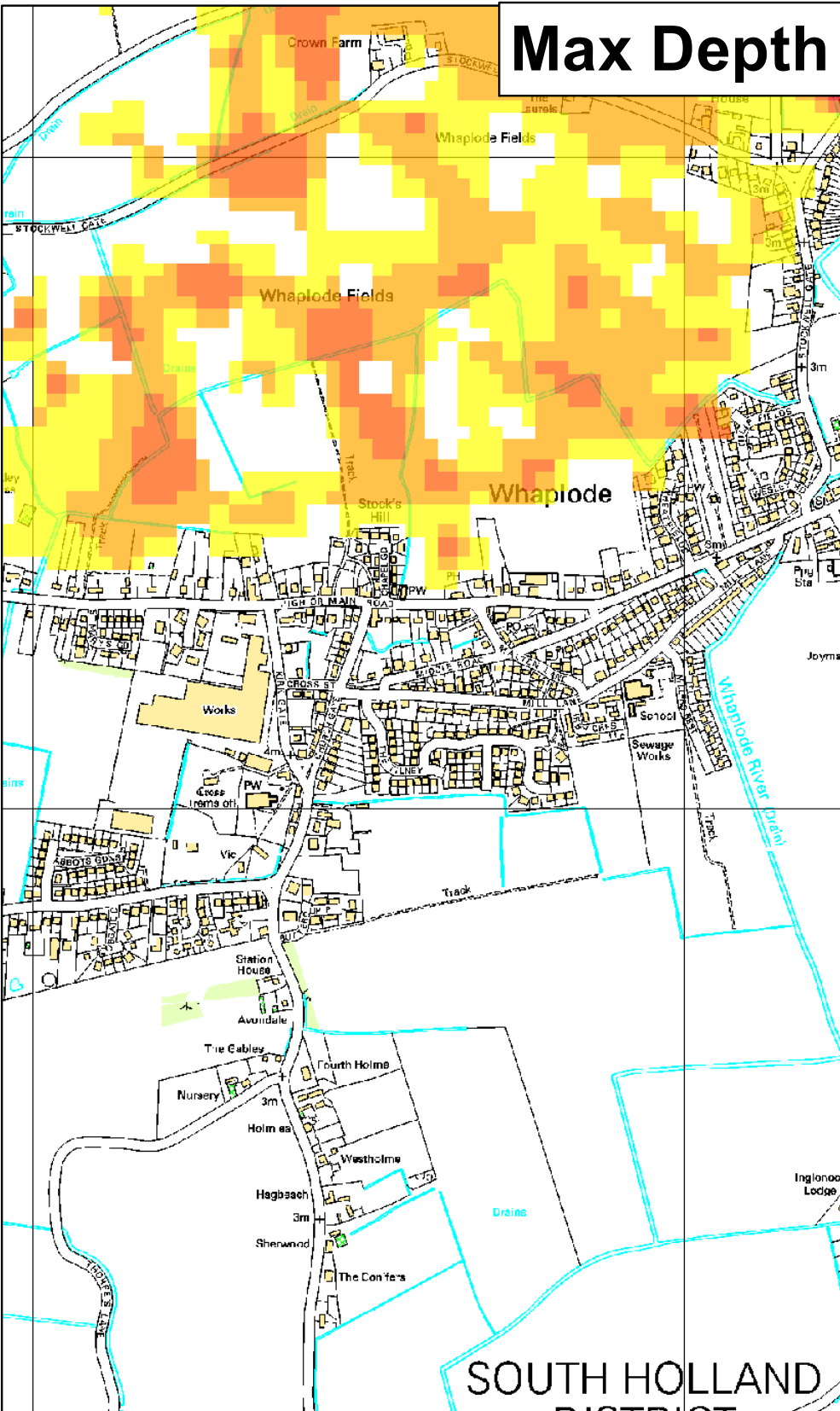
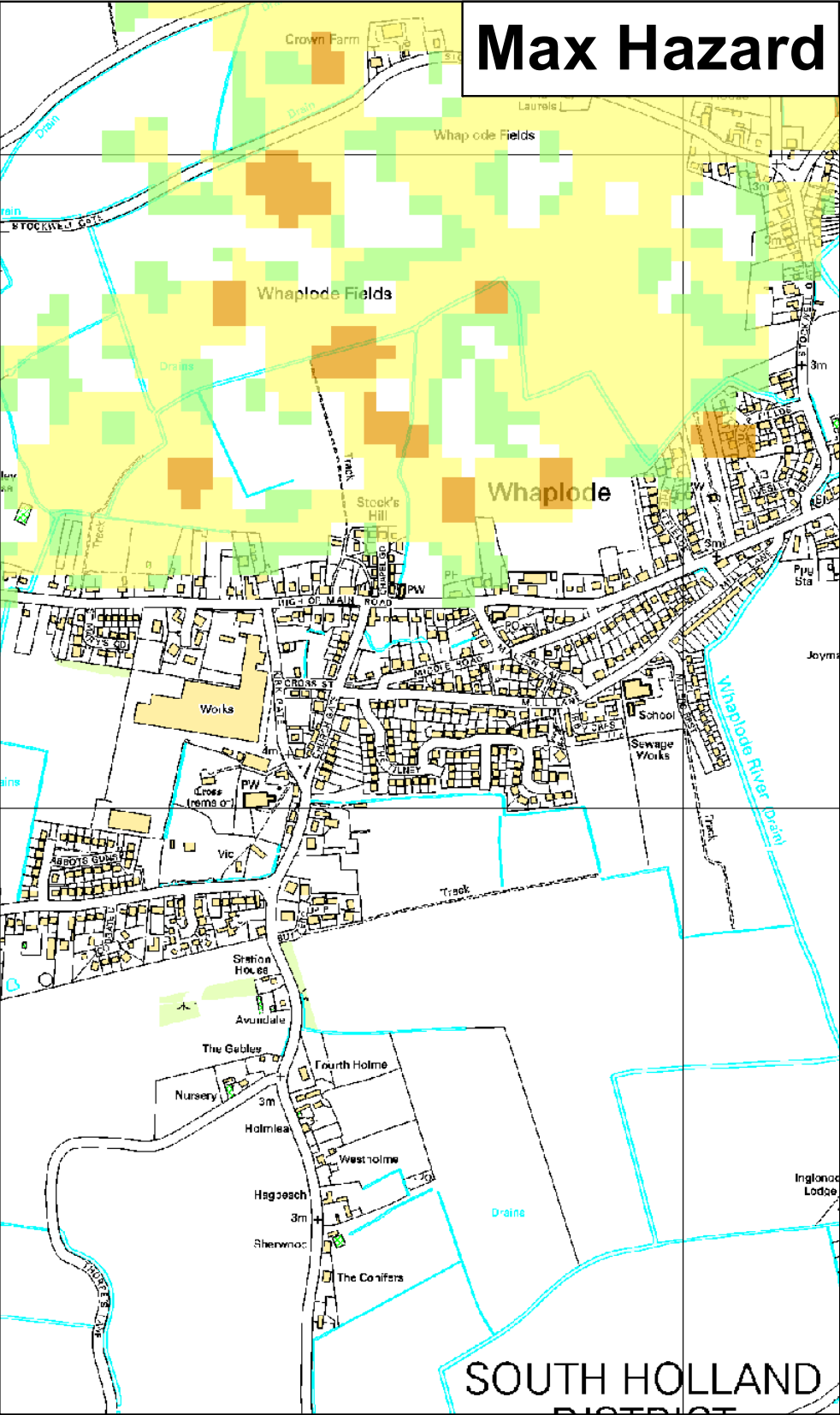
Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year.
- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

Light blue shows the extent of the Extreme Flood Outline, which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Sites outside the two extents, but behind raised defences, may be affected by flooding if the defences are overtopped or fail.

Created by the Partnerships and Strategic Overview Team, Kettering



★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard (Flood Risk to People : FD2320)	Max Depth (m)	Max Velocity (m/s)
Less than 0.75 (Low Hazard)	0 - 0.25	0 - 0.3
Between 0.75 and 1.25 (Danger for Some)	0.25 - 0.50	0.3 - 1.0
Between 1.25 and 2.0 (Danger for Most)	0.50 - 1.0	1.0 - 1.5
Greater than 2.0 (Danger for All)	1.0 - 1.6	1.5 - 2.5
	1.6 +	2.5 +

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.

Environment Agency

Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF 32597 24152

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Date Printed	September 2020	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2020-184575
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