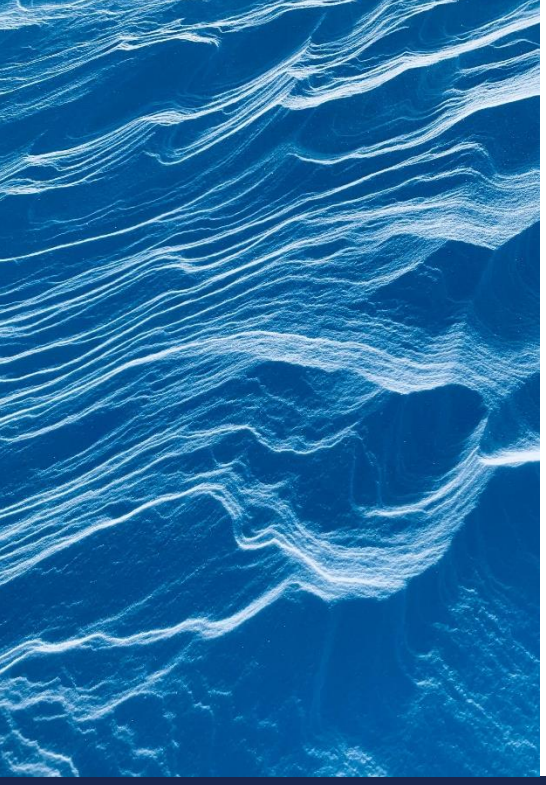

Flood Risk Assessment
AEG3072_LN10_Timberland_01

Site Address: Land at Timberland Drove
Fen Side Lodge
Timberland
Martin
LN10 6XT

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Flood risk, water and environment

UK Experts in Flood Modelling, Flood Risk Assessments, and Surface Water Drainage Strategies

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Document Issue Record

Project: Flood Risk Assessment

Prepared for: Dalcour Maclaren

Reference: AEG3072_LN10_Timberland_01

Site Location: Land at Timberland Drove, Fen Side Lodge, Timberland, Martin, LN10 6XT

Consultant		Date	Signature
Author	Daniel Cunningham	20/10/2023	
Document Check	Nick Darling-Drewett	25/10/2023	
Authorisation	Oliver Harvey	26/10/2023	
Rev A	Nick Darling-Drewett	27/11/2023	

Rev A:

Minor updates to reflect amendments in operations of the site during a flood, and subsequent mitigation measures. The applicant has stated the below with regards to the regulator building:

The nature of this building means it contains pressurised gas pipework with vents piped to 3 m above ground level. Due to this, the equipment within the building will operate under water and continue to supply gas as designed. The current equipment is located in a different building on site at ground level and we require to relocate it due to sequence of equipment on site. The other infrastructure on site which is outside our scope of modification is at ground level. These include a boiler house for pre heat and telemetry/metering room to provide data back to our control centre. If these became flooded, depending on the water height, they would cease to operate. However, gas supply would not be affected, all be it we would not have metering or visibility of the site.

As such, it is understood that the new regulator building is to relocate an existing regulator on site and thus the change in risk is considered negligible. Furthermore, the client has indicated that the equipment proposed within the building can remain operational during a flood with gas supply remaining unaffected.

Please Note:

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Flood risk, water and environment

Summary

Development Description	Existing	Proposed
Development Type	A brownfield site – gas energy infrastructure	Installation of a new gas regulator kiosk.
EA Vulnerability Classification	Essential Infrastructure	Essential Infrastructure
Ground Floor Level	The LiDAR data shows the ground elevation of the site varies between approximately 0.98m AOD and 1.52m AOD.	No change. Relocated regulator building and equipment within should be set at a level no lower than the existing regulator building.
Level of Sleeping Accommodation	None	No change
Impermeable Surface Area	N/A[2]	No change. Kiosk to be constructed atop existing gravel surface. Kiosk should be constructed on steel platform where possible rather than concrete slab.
Surface Water Drainage	N/A[1]	N/A[1]
Site Size	Approximately 4,750m^2	No change
Risk to Development	**Summary**	**Comment**
EA Flood Zone	Flood Zone 3	
Flood Source	Fluvial/Tidal	River Witham and Timberland Delph. Flood Zones are derived from fluvial and tidal models however EA have stated the below therefore risk is considered fluvial. *Whilst the site is within a tidal flood zone, ie assuming no tidal defences exist, it is not at risk of tidal flooding in either a overtopping or breaching of defences scenario, today or with an allowance for climate change.*

SFRA Available	North Kesteven Strategic Flood Risk Assessment (2008)	
Management Measures	**Summary**	**Comment**
Ground floor level above extreme flood levels	No	Relocated regulator building and equipment within should be set at a level no lower than the existing regulator building. Client has advised that the gas supply will remain operational even during flood.
Safe Access/Egress Route	N/A[2]	The gas regulator kiosk would likely remain unmanned for the majority of its use, though on receipt of a Met Office Severe Weather Warning or EA Flood Warning the site should be evacuated and any planned maintenance to site should only continue after the warning is lifted.
Flood Resilient Design	Yes	See section 5.
Site Drainage Plan	N/A[1]	Proposed development is an addition to an existing site and thus could discharge via existing system.
Flood Warning and Evacuation Plan	Yes	Recommended to sign up to the River Witham and associated Fens from Woodhall Spa to Chapel Hill Environment Agency (EA) flood warning service.
Offsite Impacts	**Summary**	**Comment**
Displacement of floodwater	Negligible	While the site is in a fluvial floodplain, the scale of the proposed kiosk relative to the wider, flat floodplain, is considered negligible.
Increase in surface run-off generation	Negligible	No change. Kiosk to be constructed atop existing gravel surface. Kiosk should be constructed on steel platform where possible rather than concrete slab.

Impact on hydraulic performance of channels	No	Nearest watercourse is approximately 781m from the site.

[1] not required for this assessment

[2] data not available.

1. Introduction

1.1. Aegaea were commissioned by Dalcour Maclaren to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.

1.2. This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

1.3. The site of the proposed development is Land at Timberland Drove, Fen Side Lodge, Timberland, Martin, LN10 6XT (Figure 1).

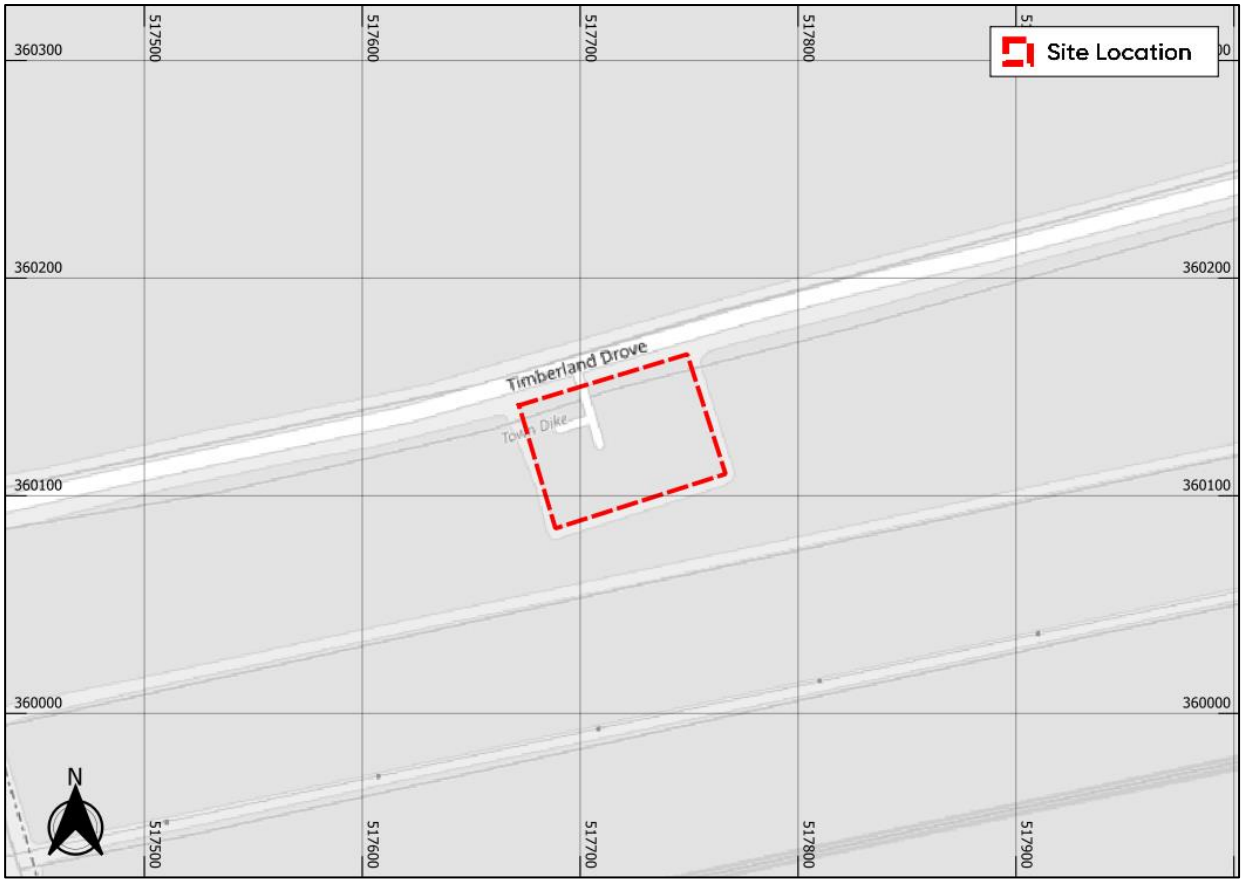


Figure 1: Site Location (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors)

1.4. The site is currently a gas infrastructure installation. The layout of the site is unknown but it is understood that there are a number of kiosks and subterranean tanks/ pipelines. It is understood that the proposed development is for the installation of replacement gas regulator kiosk. The client has advised that the current equipment is located in a different building on site at ground level and they require to relocate it due to sequence of equipment on site.

1.5. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model has been used to review the topography of the site. The LiDAR data shows the ground elevation of the site varies between approximately 0.98mAOD (metres Above Ordnance Datum) and 1.52mAOD (Figure 2).

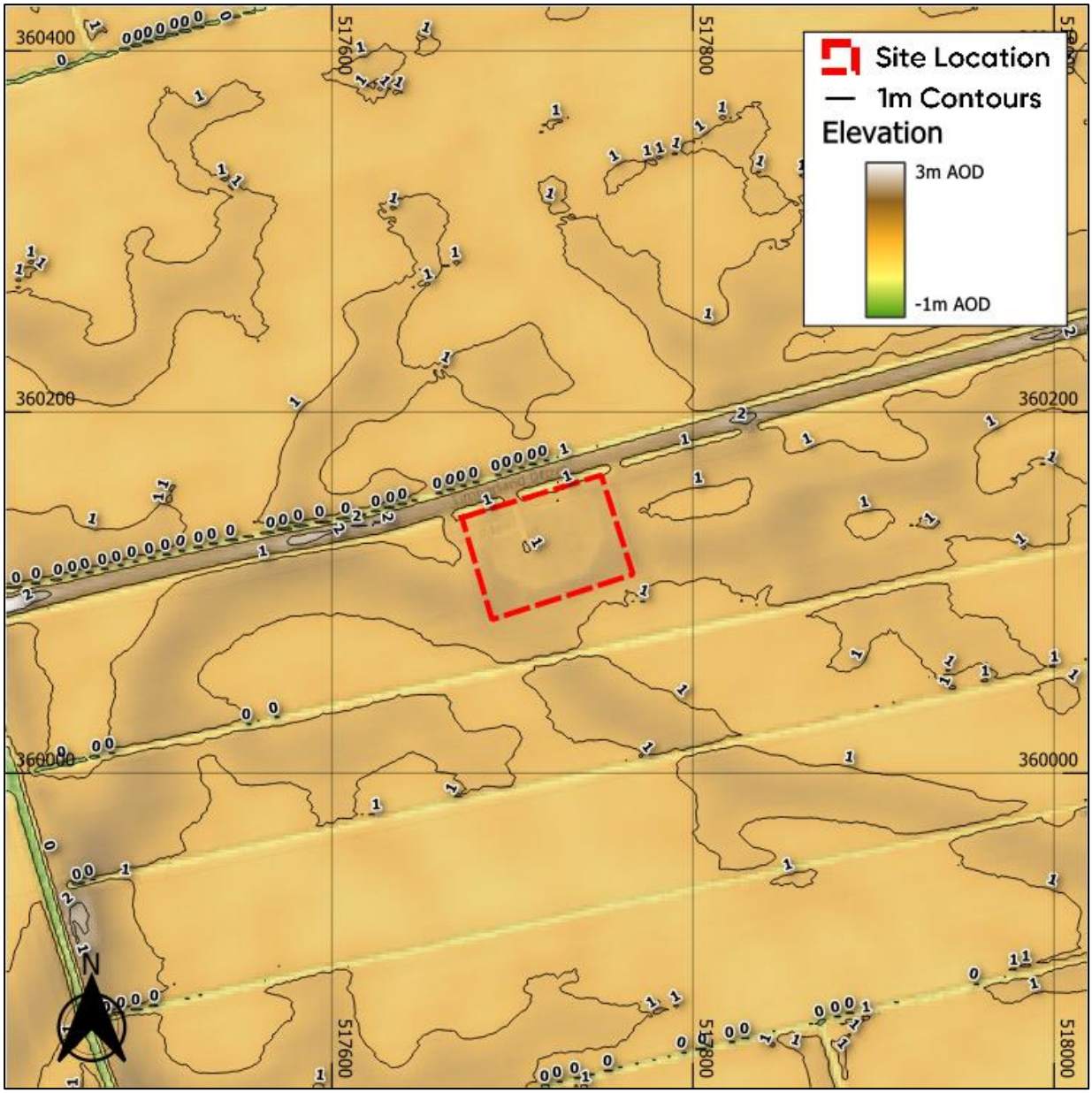


Figure 2: Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

1.6. North Kesteven District Council is the Local Planning Authority (LPA) for the site, and Lincolnshire County Council is the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Lincolnshire and Northamptonshire region.

Planning Policy and Guidance

1.7. UK government planning guidance states[1] that an FRA is required for developments which are:

- *in flood zone 2 or 3 including minor development and change of use*
- *more than 1 hectare (ha) in flood zone 1*
- *less than 1 ha in flood zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs)*
- *in an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency*

1.8. The site is in Flood Zone 3 therefore the NPPF states that an FRA is required.

1.9. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial/ tidal flood risk
- Surface water flood risk
- Risk of flooding from other sources

[1] **https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment**

2. Planning Policy

2.1. Inappropriate development in a flood risk area could pose significant risk in terms of personal safety and damage to property for the occupiers of the development or for people elsewhere. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. This section summarises the key policies and guidance relevant to the proposed development.

National Planning Policy Framework (NPPF)

2.2. The National Planning Policy Framework[2] (NPPF) (DLUHC, 2023) which includes UK Government policy on development and flood risk states:

> *159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.*
>
> *167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*
>
> *a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
>
> *b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
>
> *c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*

[2] https://www.gov.uk/guidance/national-planning-policy-framework, **last updated Sept 2023**

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.

2.3. Paragraph 051 of the NPPG defines Minor Developments:

What is meant by "minor development" in relation to flood risk?

Minor development means:

- ***minor non-residential extensions (industrial/commercial/leisure etc): extensions with a floorspace not in excess of 250 square metres.***
- *alterations: development that does not increase the size of buildings, e.g. alterations to external appearance.*
- *householder development: for example, sheds, garages, games rooms etc. within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling (e.g. subdivision of houses into flats) or any other development with a purpose not incidental to the enjoyment of the dwelling.*

2.4. The proposal is for the installation of replacement gas regulators within a new kiosk in the existing gas infrastructure site. As such, the proposal could be considered a Minor Development in terms of flood risk, given it is for the extension of the existing gas infrastructure site use within the site curtilage.

2.5. Footnote 55 of the NPPF states:

A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that

may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

2.6. Flood Zones in England are defined as follows:

Table 1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding (all land outside Zones 2 and 3).
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

2.7. An FRA should be appropriate to the scale, nature, and location of the development. It should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.

2.8. An assessment of hydrological impacts should be undertaken, including to surface water runoff and impacts to drainage networks in order to demonstrate how flood risk to others will be managed following development and taking climate change into account.

Local Plan

2.9. The Local Plan prepared by the Local Planning Authority, Central Lincolnshire, sets out the policies for development in the local area:

2.10. Section 3 of the Local Plan states:

> *Policy S21: Flood Risk and Water Resources*
>
> *Flood Risk*
>
> *All development proposals will be considered against the NPPF, including application of the sequential and, if necessary, the exception test.*
>
> *Through appropriate consultation and option appraisal, development proposals should demonstrate:*
>
> *a) that they are informed by and take account of the best available information from all sources of flood risk and by site specific flood risk assessments where appropriate;*
>
> *b) that the development does not place itself or existing land or buildings at increased risk of flooding;*
>
> *c) that the development will be safe during its lifetime taking into account the impacts of climate change and will be resilient to flood risk from all forms of flooding such that in the event of a flood the development could be quickly brought back into use without significant refurbishment;*
>
> *d) that the development does not affect the integrity of existing flood defences and any necessary flood mitigation measures have been agreed with the relevant bodies, where adoption, ongoing maintenance and management have been considered and any necessary agreements are in place;*
>
> *e) how proposals have taken a positive approach to reducing overall flood risk and have considered the potential to contribute towards solutions for the wider area; and*

> *f) that they have incorporated Sustainable Drainage Systems (SuDS)/ Integrated Water Management into the proposals unless they can be shown to be inappropriate.*

Sequential and Exception Tests

2.11. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.

Sequential Test

2.12. The overall aim of the Sequential Test is to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk.

2.13. However, it is noted that the proposed development is categorised as Essential Infrastructure (gas kiosk) and thus there is an overriding need for the development to be located within the immediate vicinity of the site/ area it is to provide for. As such, it may not be appropriate to locate the development on another site at a lower risk of flooding.

2.14. Paragraph 027 of the NPPG also states:

> *a pragmatic approach needs to be taken where proposals involve comparatively small extensions to existing premises (relative to their existing size), where it may be impractical to accommodate the additional space in an alternative location*

2.15. Therefore, the sequential test is not considered to be applicable in this instance.

2.16. Furthermore, the proposal could be considered a Minor Development in terms of flood risk and under Paragraph 168 of the NPPF:

> *168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.*

2.17. Therefore, the proposal should not be subject to the Sequential or Exception Tests.

2.18. The Flood Risk Vulnerability Classification table[3] provided below in Table 2 shows which vulnerabilities are appropriate in each Flood Zone.

2.19. The proposed development sits wholly within Flood Zone 3 and the proposed development is considered 'Essential Infrastructure'. Table 2 shows Flood Zone 3 is only an appropriate location for 'Essential Infrastructure' uses with an Exception Test.

Table 2: Flood risk vulnerability and flood zone 'incompatibility'

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	x	Exception Test required	✓	✓
Zone 3b	Exception Test required	x	x	x	✓

2.20. For the Exception Test to be passed, the proposed development must meet the following criteria:

A. It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh the flood risk, as informed by a Strategic Flood Risk Assessment;

B. A Flood Risk Assessment demonstrates that the development will be safe, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

2.21. Part A of the Exception Test is outside the scope of this FRA. The planning application submitted by the client is required is to be accompanied by an FRA which shows that the development can meet the requirements of the Part B of the Exception Test, with an overall reduction of flood risk to the site and surrounding area.

3 https://www.gov.uk/guidance/flood-risk-and-coastal-change#table2

2.22. Furthermore, Paragraph 79 of the PPG[4] states that:

> *In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:*
>
> - *remain operational and safe for users in times of flood;*
> - *result in no net loss of floodplain storage;*
> - *not impede water flows and not increase flood risk elsewhere.*

Summary

2.23. This flood risk assessment has been prepared with due consideration to the above local and national policy.

[4] **https://www.gov.uk/guidance/flood-risk-and-coastal-change**

3. Consultation and Review

Consultation

3.1. The site is within the remit of Lincolnshire County Council as Lead Local Flood Authority (LLFA).

3.2. The Environment Agency have provided Products 4 and 6 to inform this FRA. These are discussed further in Section 4.

Documents and Online Mapping

3.3. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.

3.4. The following sources of information have been reviewed for this assessment:

- Flood Map for Planning on the Environment Agency website *https://flood-map-for-planning.service.gov.uk/*
- Long Term Flood Risk Information on the Environment Agency website *https://www.gov.uk/check-long-term-flood-risk*
- National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023)
- Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
- Geoindex Onshore (British Geological Survey, 2023)
- Central Lincolnshire Local Plan[5] (Central Lincolnshire Joint Strategic Planning Committee, 2023)

[5] https://www.n-kesteven.gov.uk/sites/default/files/2023-04/Local%20Plan%20for%20adoption%20Approved%20by%20Committee.pdf

- Lincolnshire County Council Preliminary Flood Risk Assessment[6] (2001)
- North Kesteven Strategic Flood Risk Assessment[7] (2008)
- Joint Lincolnshire Flood Riak and Water Management Strategy 2019-2050[8]

Preliminary Flood Risk Assessment (PFRA)

3.5. The PFRA is a high-level appraisal of flood risk across Lead Local Flood Authority Lincolnshire County Council. The flood risk from all sources, including fluvial, surface water, groundwater, and surcharged sewers is evaluated. It is the basis upon which the Local Flood Risk Management Strategy is produced.

3.6. The PFRA summarises historical flood incidents in Lincolnshire County Council. The site is not recorded as having been affected by any flood event.

Strategic Flood Risk Assessment (SFRA)

3.7. The SFRA provides the evidence base for the Local Planning Authority North Kesteven District Council Local Plan and guidance for consideration when determining planning applications. The SFRA seeks to place new development into areas of lower flood risk taking into account current flood risk, future flood risk, and the effect a proposed development would have on the risk of flooding.

3.8. The SFRA mapping provided by North Kesteven District Council has been used throughout production of this report as a source of information, particularly pertaining to historical flood incidents.

[6] https://www.lincolnshire.gov.uk/downloads/file/4382/preliminary-flood-risk-assessment-report

[7] https://www.n-kesteven.gov.uk/sites/default/files/2023-01/Strategic%20Flood%20Risk%20Assessment%20Report.pdf

[8] https://www.lincolnshire.gov.uk/downloads/file/2365/joint-lincolnshire-flood-risk-and-water-management-partnership-framework-draft-strategy-2019-2050-pdfa

Local Flood Risk Management Strategy (LFRMS)

3.9. The Local Flood Risk Management Strategy sets out roles and responsibilities for flood risk management, assesses the risk of flooding in the area, where funding can be found to manage flood risk, and the policies, objectives, and actions of the Lead Local Flood Authority.

3.10. The Lincolnshire County Council LFRMS is used within this report to identify any flood management infrastructure and historical incidences of flooding.

4. Sources of Flood Risk

Fluvial

4.1. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.

4.2. The whole of the site is located within Flood Zone 3 (Figure 3). Flood Zone 3 denotes a risk of flooding from fluvial sources greater than 1 in 100 (1%).

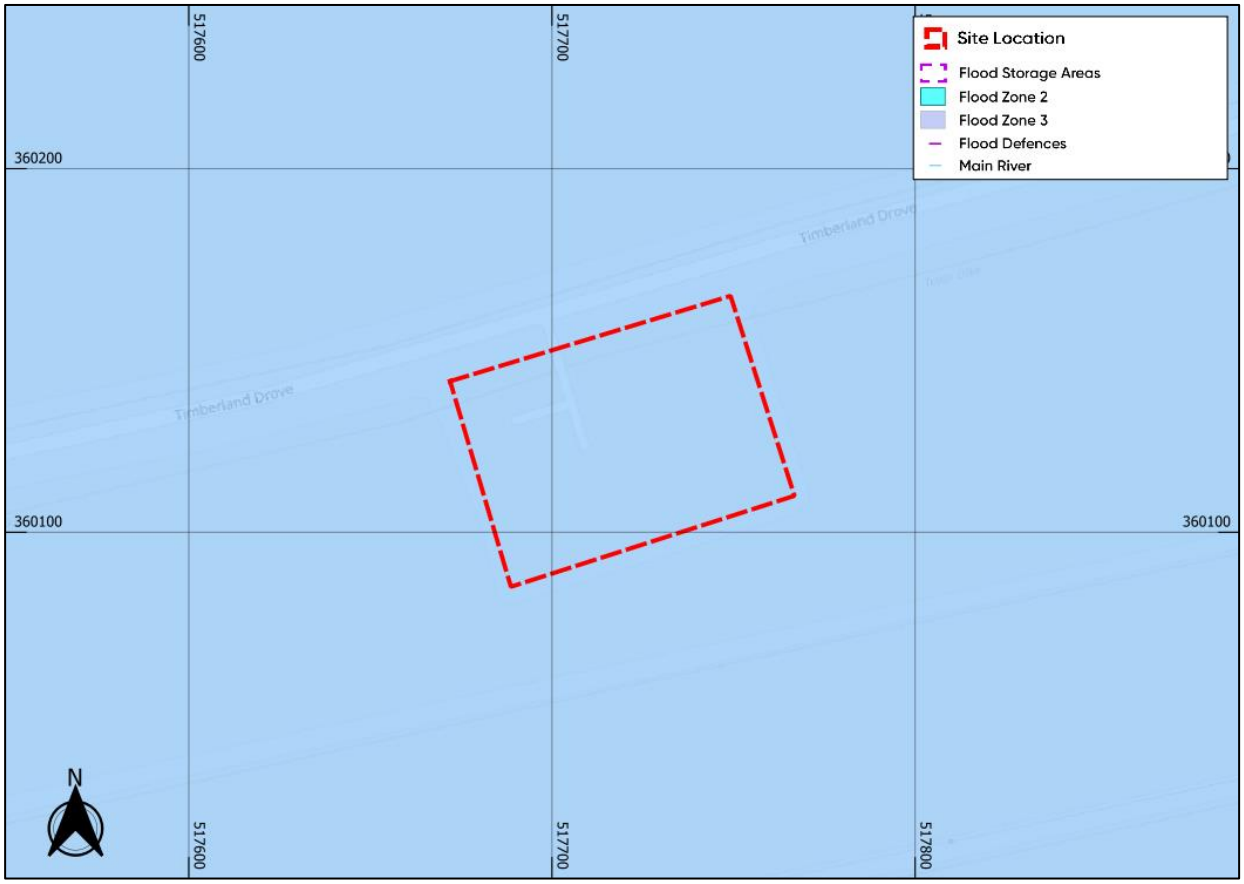


Figure 3: EA Flood Map for Planning (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

Main Rivers

4.3. The site is within proximity of 4 main rivers. The nearest main river is the River Witham which is approximately 781m northeast of the site. Timberland Delph is approximately 838m north of the

site, Billinghay Skirth is approximately 4042m south of the site and Car Dyke is approximately 4570m west of the site. This can be seen in (Figure 4).

Ordinary Watercourses / IDB Drains

4.4. An IDB drain (2103 - Dales Drain Head North) is located approximately 277m west of the site. This can be seen in (Figure 4).

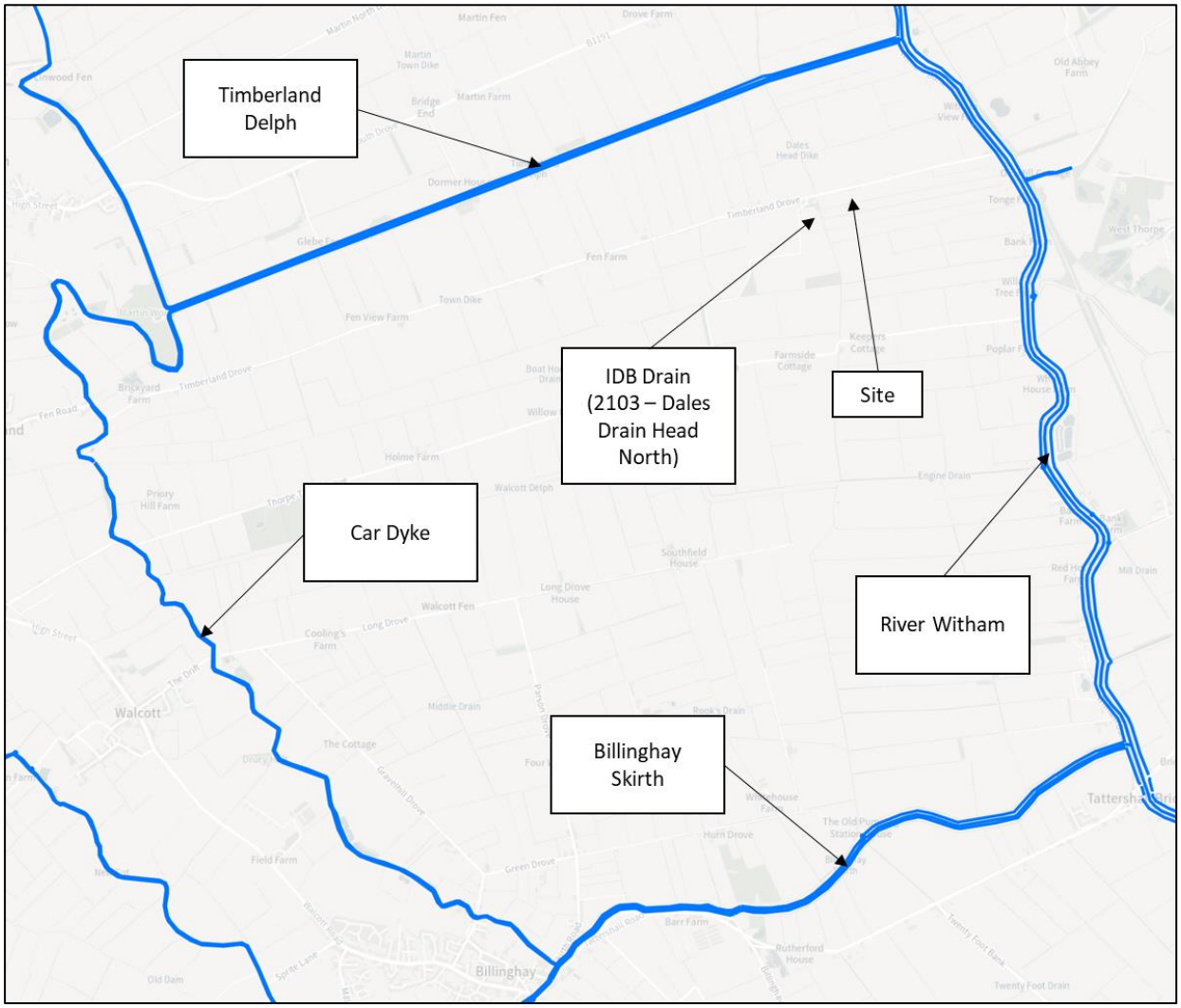


Figure 4: Location of the rivers and IDB drain in relation to the site (Base map from https://environment.data.gov.uk/asset-management/index.html)

Historical Fluvial Flooding

4.5. There is no record of historical fluvial/tidal flooding on-site based on the EA's recorded flood outline dataset (Figure 5).

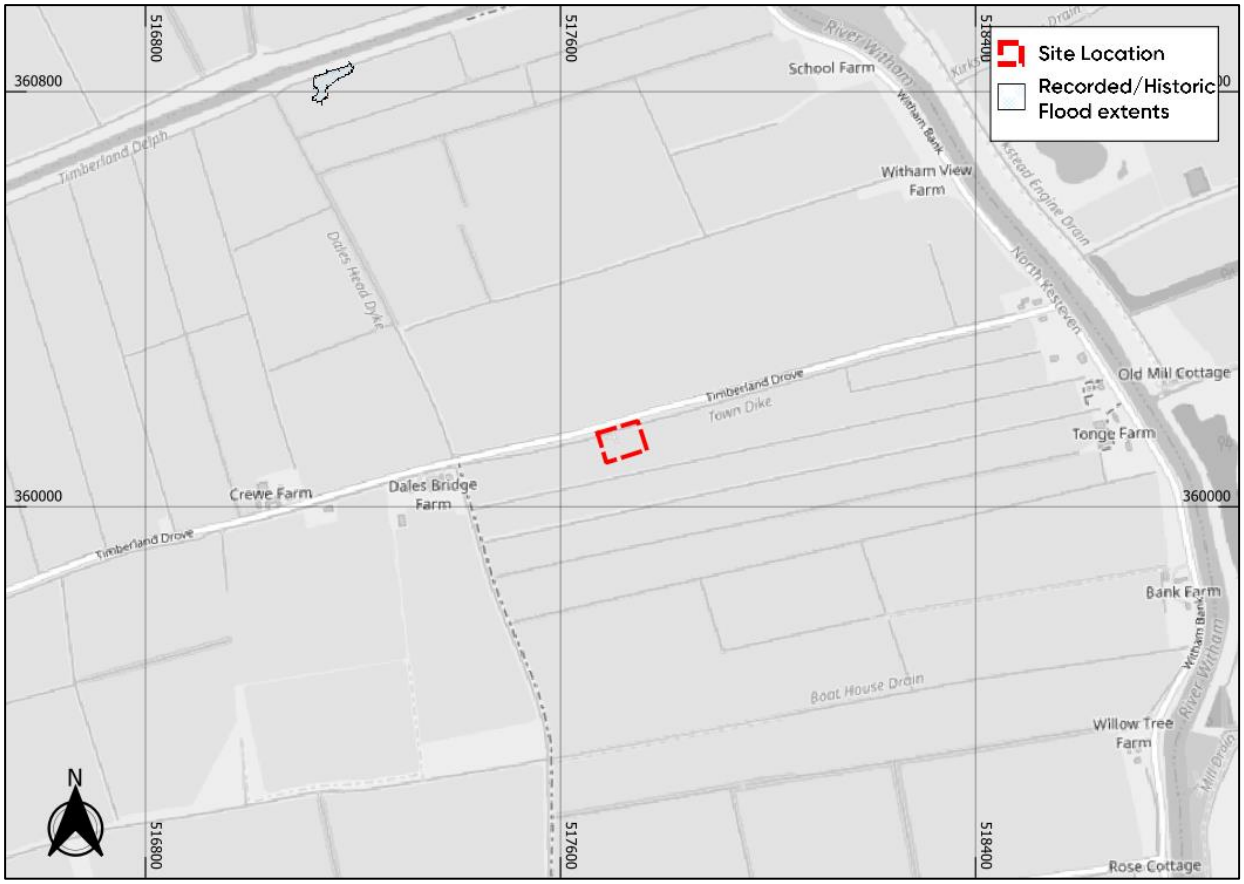


Figure 5: EA Historic Flood Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

EA Data - Flood Extents

4.6. The EA have provided a Product 4 dataset which included modelled flood levels at a number of in channel nodes. The data is only for fluvial scenarios due to the data the EA provided indicating that:

> *Whilst the site is within a tidal flood zone, ie assuming no tidal defences exist, it is not at risk of tidal flooding in either an overtopping or breaching of defences scenario, today or with an allowance for climate change.*

4.7. As such, the risk of flooding to the proposed development from tidal sources, is considered low.

4.8. The EA have provided flood extent maps for different return periods, as shown in Figure 6 and Figure 7. Using the zoomed Product 4 maps alone it is not clear which river of the four main rivers listed previously, is providing the greatest risk to the site.

4.9. Using the Product 6 data, a more zoomed out version is produced to show which rivers are being overtopped in these return periods and where the flooding at the site extends/ originates from (Figure 8 and Figure 9)

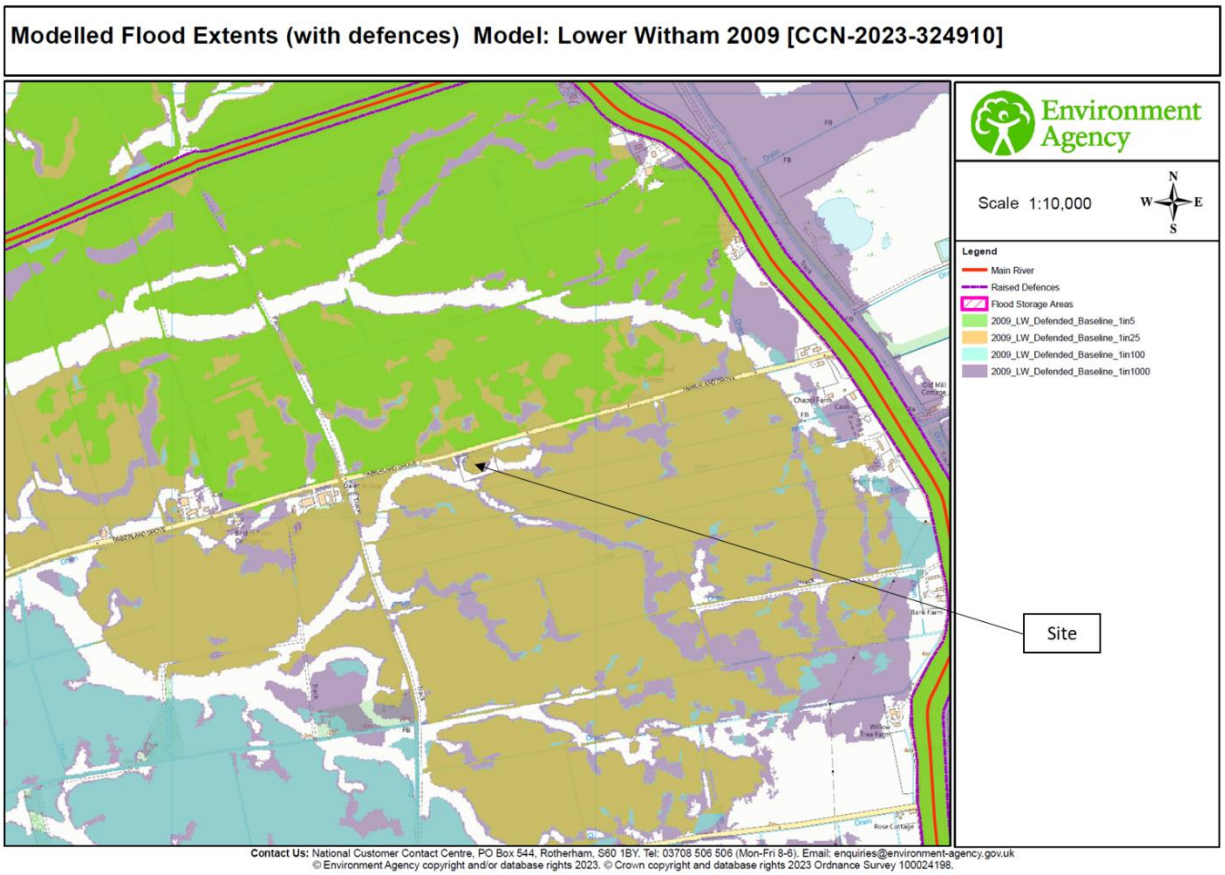


Figure 6: EA modelled Flood Extents (with defences)

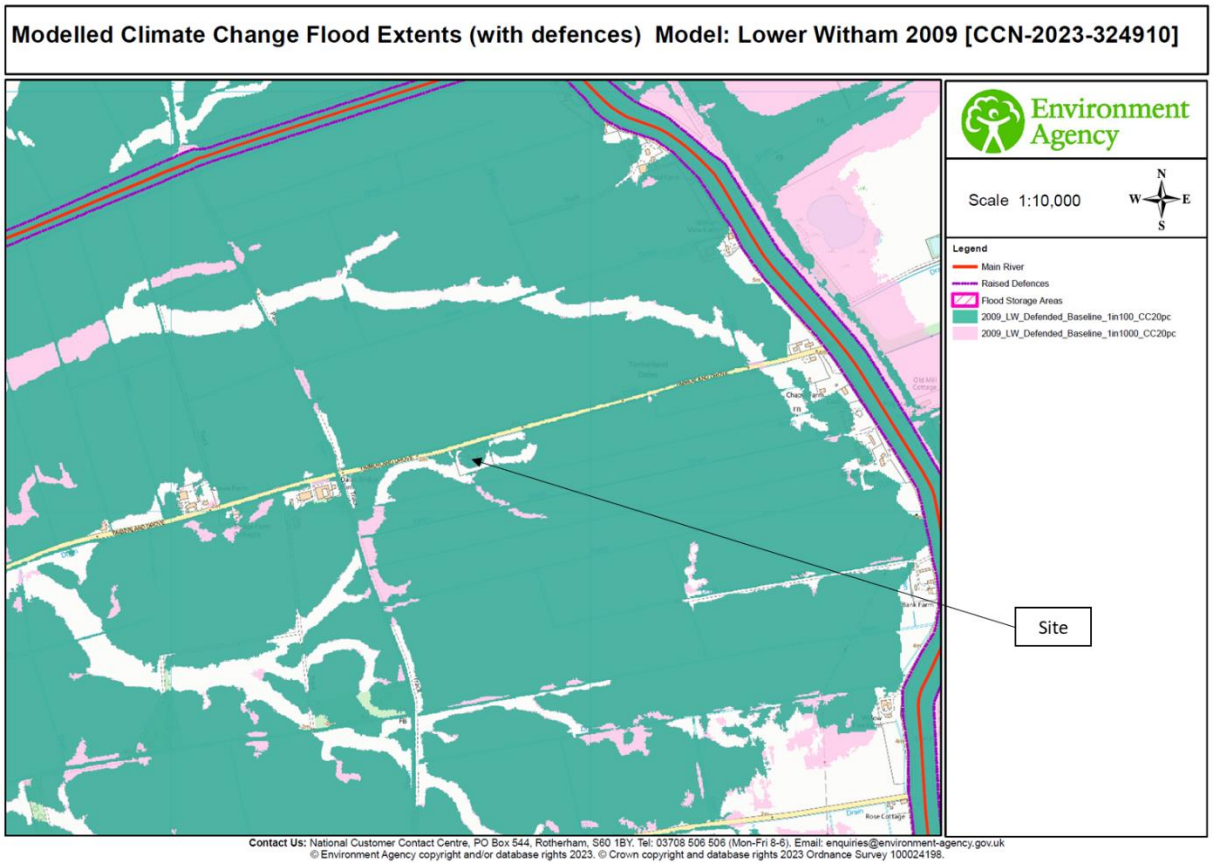


Figure 7: EA modelled Climate Change Flood Extents (with defences)

4.10. As can be seen in Figure 8, the west watercourse (Car Dyke) does experience overtopping during the flood events but does not reach the site. With regards to the southern watercourse (Billinghay Skirth) flooding is only occurring on the southern bank of the watercourse and therefore does directly not affect the site. Direct flooding to the site can be seen to only originate from the eastern (Timberland Delph) and northern (River Witham) watercourses. However, in reality all four watercourses are an interlinked system.

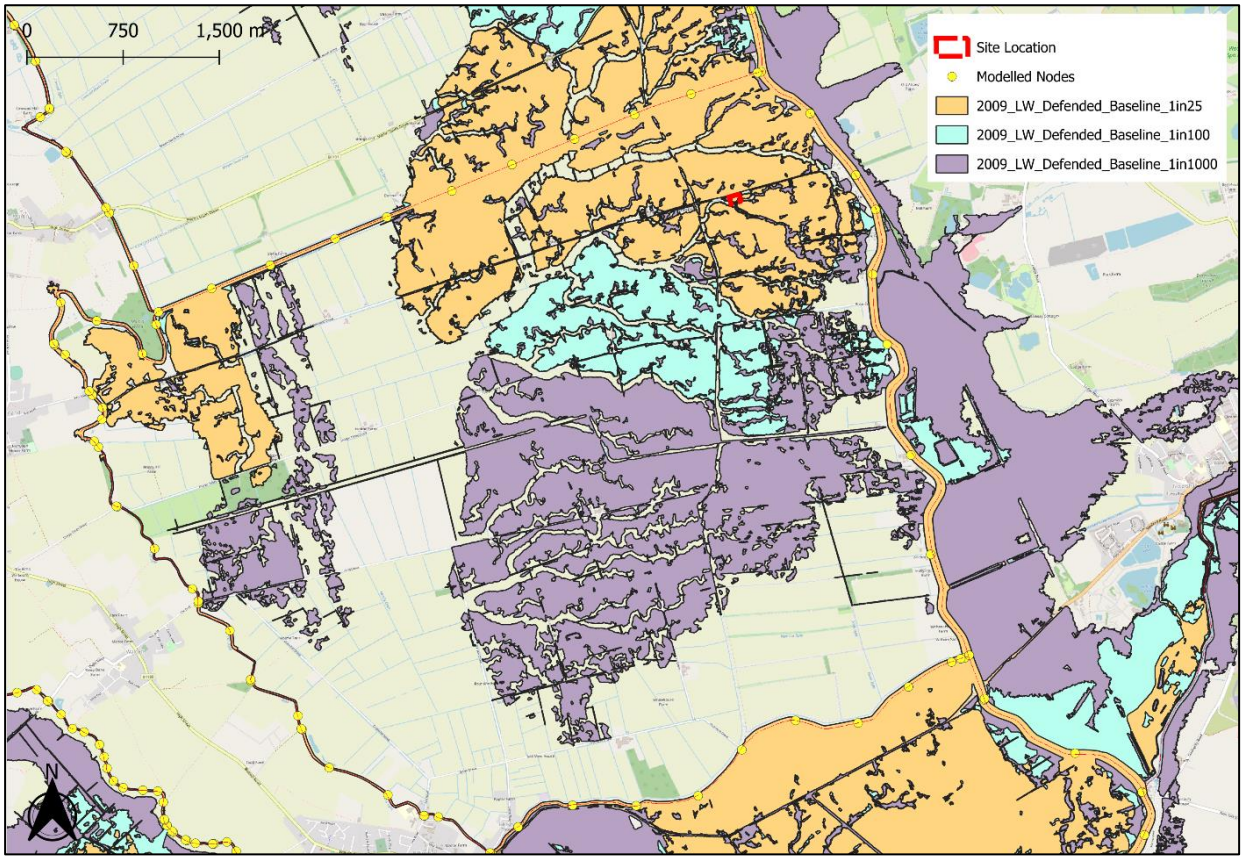


Figure 8: Modelled Flood Extents (with defences) (© Environment Agency, Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors, Contains public sector information licensed under the Open Government Licence v3.0)

4.11. As can be seen in Figure 9, the west watercourse (Car Dyke) does experience overtopping during the flood events but does not reach the site. With regards to the southern watercourse (Billinghay Skirth) flooding is only occurring on the southern bank of the watercourse and therefore does not directly affect the site. Direct flooding to the site can be seen to only originate from the eastern (Timberland Delph) and northern (River Witham) watercourses. Due to elevated land between the northern watercourse and the site such as the adjacent Timberland Drove, the majority of the flooding originates from the eastern watercourse, but it is acknowledged that they are interlinked. However, in reality all four watercourses are an interlinked system.

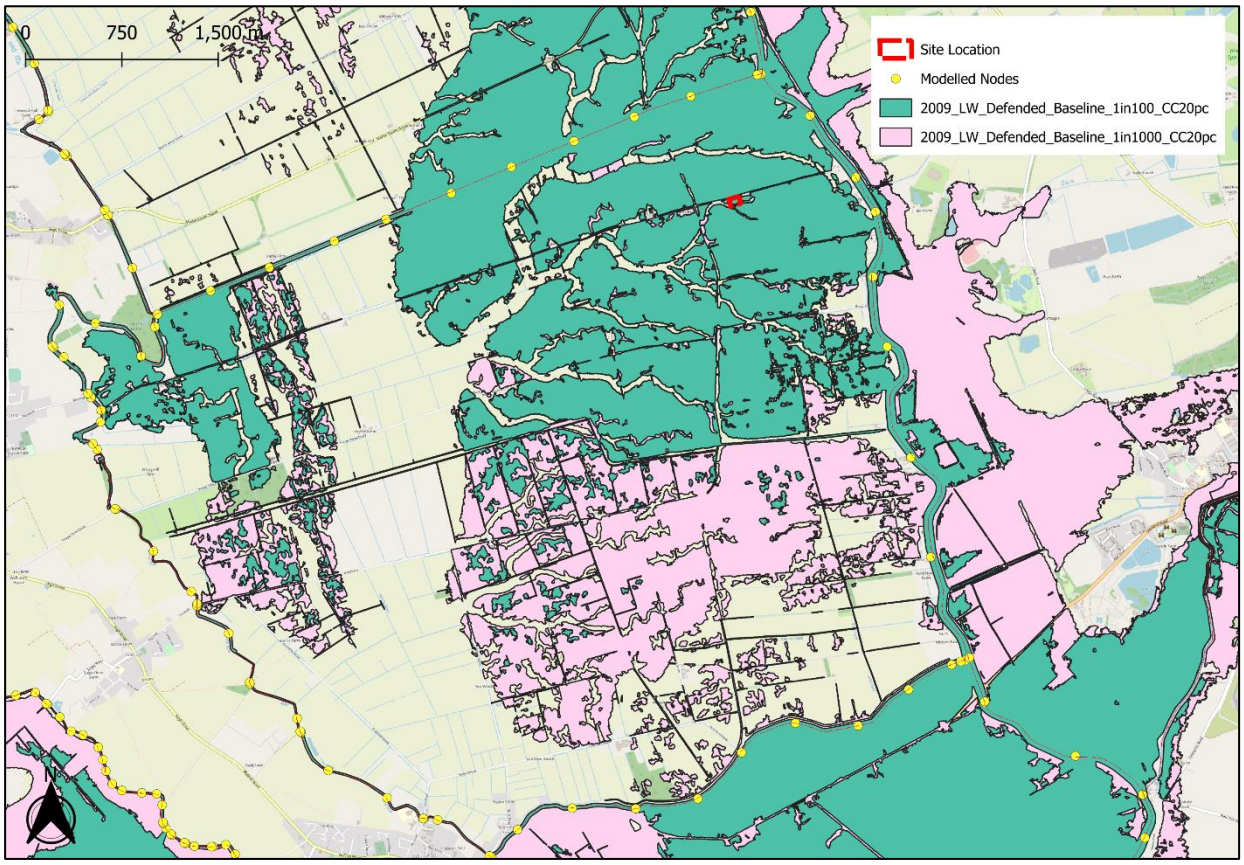


Figure 9: Modelled Climate Change Flood Extents (with defences) (© Environment Agency, Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors, Contains public sector information licensed under the Open Government Licence v3.0)

4.12. The site can be seen to be flooding in the 1 in 25 year event (Figure 6). This extent can be considered a reasonable estimation for the 1 in 30 year event in the absence of an extent for this event, meaning part of the site can be classified as being in Flood Zone 3b.

4.13. Paragraph 79 of the PPG[9] states that:

> *In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:*
>
> - *remain operational and safe for users in times of flood;*
> - *result in no net loss of floodplain storage;*
> - *not impede water flows and not increase flood risk elsewhere.*

4.14. The site can also be seen to be flooding in the 1 in 100 + CC and 1 in 1000 + CC events (Figure 9). Due to the proposed development being classed as essential infrastructure, it should consider the 1 in 1000 + CC event.

EA Data - Flood Levels

4.15. The EA provided modelled flood levels at in-channel nodes along the aforementioned four main rivers. No 2D flood levels at the site were provided.

4.16. The data for all of the nodes was initially reviewed. By observing the data provided by the EA, 4 nodes have been allocated and analysed further. One node was chosen from each of the four rivers surrounding the site. The nodes chosen had the highest levels of flooding whilst being in close proximity to the site, due to this being the point at which the flooding is most likely to occur (the nodes can be seen in Figure 10).

4.17. Given that the levels are in-channel, and there are defences along each of the main rivers, a direct comparison between in-channel flood level and site topography is not considered to be an accurate method for calculating flood levels/ depths on site.

[9] **https://www.gov.uk/guidance/flood-risk-and-coastal-change**

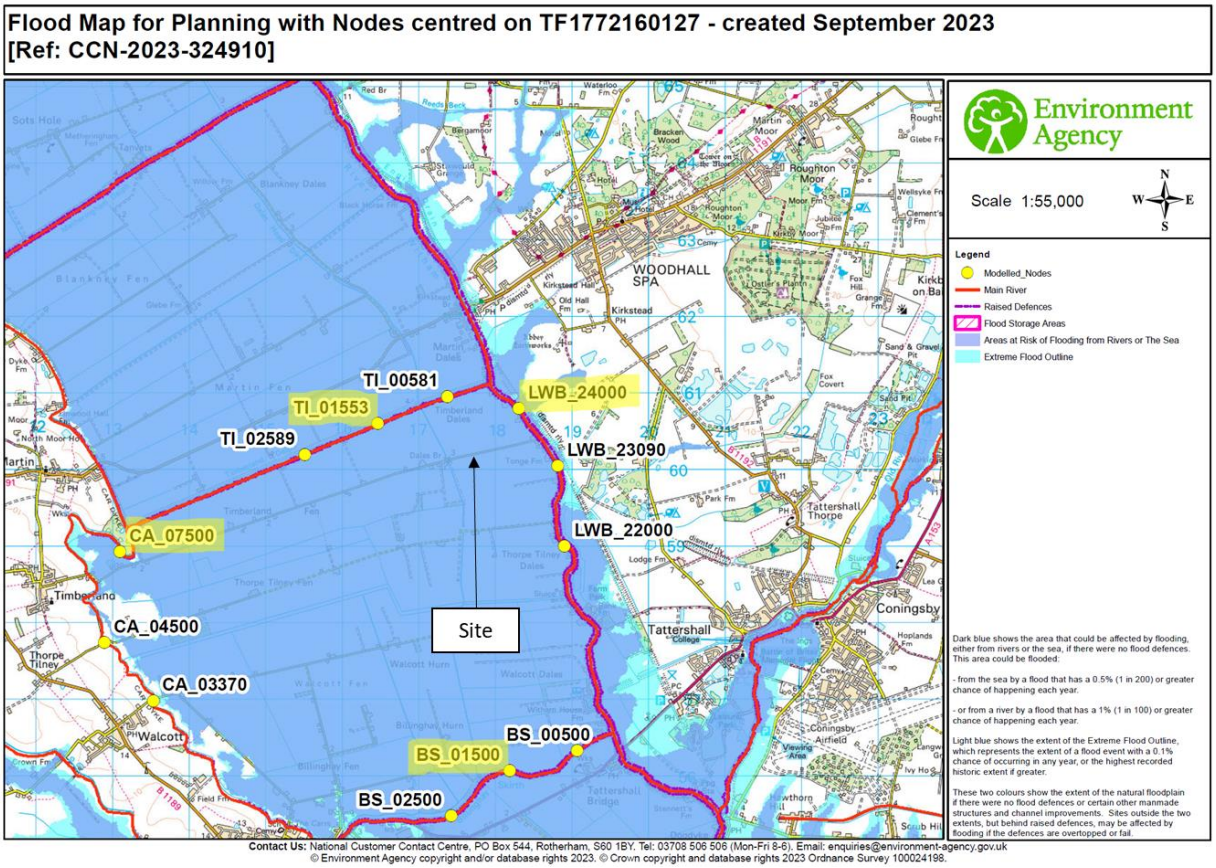


Figure 10: EA modelled 1D in-channel data nodes (Contains public sector information licensed under the Open Government Licence v3.0)

4.18. As per the Asset Information and Maintenance Programme[10], there are flood defences present at each of the rivers surrounding the site that act to mitigate the risk of flooding (Figure 11). The water levels in each event and flood defences at each node were shown and the height of overtopping was calculated (the flood level, minus the defence crest level) as seen in Table 3, Table 4, Table 5 and Table 6.

[10] **https://environment.data.gov.uk/asset-management/index.html**

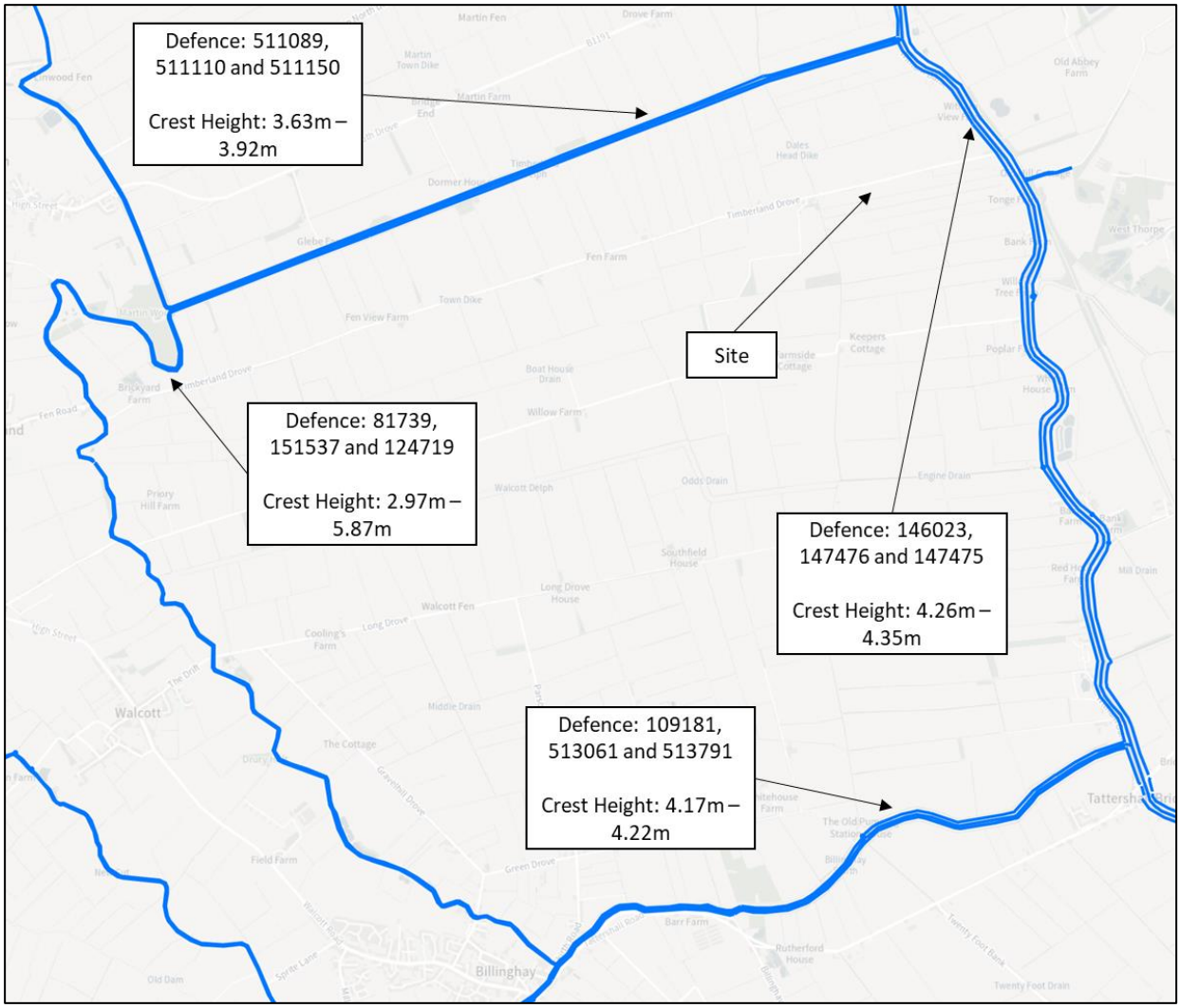


Figure 11. Heights of defences surrounding each chosen node (Asset Information and Maintenance Programme). Heights in m AOD.

North River (Timberland Delph):

4.19. As can be seen in Table 3, the EA model showed that Timberland Delph (represented by node TI_01553) has an overtopping height of 0.18m in the 1 in 1000 + CC flooding event. This can be seen in the EA modelled flood extents (Figure 9), which shows the floodwater overtopping the defences and flooding the site. Similar heights also occur in the other modelled return periods.

Table 3: Flood water levels and defence heights for northern river (Data from EA and Asset Information and Maintenance Programme)

TI_01553	4% (1 in25)	1% (1 in 100)	1% (1 in 100 + 20% CC)	0.1% (1 in 1000)	0.1% (1 in 1000 + 20% CC)
Maximum Water Levels (m AOD)	3.79	3.80	3.81	3.80	3.81
Defence Height (m AOD)	3.63	3.63	3.63	3.63	3.63
Overtopping?	Yes	Yes	Yes	Yes	Yes
Height of overtopping (m)	0.16	0.17	0.18	0.17	0.18

East River (River Witham):

4.20. As can be seen in Table 4, the EA model showed that the River Witham (represented by node LWB_24000) has an overtopping height of 0.18m in the 1 in 1000 + CC flooding event. This can be seen in the EA modelled flood extents (Figure 9), which shows the floodwater overtopping the defences and flooding the site.

Table 4: Flood water levels and defence heights for eastern river (Data from EA and Asset Information and Maintenance Programme)

LWB_24000	4% (1 in 25)	1% (1 in 100)	1% (1 in 100 + 20% CC)	0.1% (1 in 1000)	0.1% (1 in 1000 + 20% CC)
Maximum Water Levels (m AOD)	4.28	4.33	4.41	4.38	4.44
Defence Height (m AOD)	4.26	4.26	4.26	4.26	4.26
Overtopping?	Yes	Yes	Yes	Yes	Yes
Height of overtopping (m)	0.02	0.07	0.15	0.12	0.18

South River (Billinghay Skirth):

4.21. As can be seen in Table 5, the EA model showed that Billinghay Skirth (represented by BS_01500) did not experience any overtopping on the northern bank during the 1 in 1000 + CC flooding event. This can be seen in the EA modelled flood extents (Figure 9), where very little flooding originated from the northern bank of the southern river but instead flooded to the south, therefore not affecting the site. There was no overtopping observed in the other flood events.

Table 5: Flood water levels and defence heights for southern river (Data from EA and Asset Information and Maintenance Programme)

BS_01500	4% (1 in25)	1% (1 in 100)	1% (1 in 100 + 20% CC)	0.1% (1 in 1000)	0.1% (1 in 1000 + 20% CC)
Maximum Water Levels (m AOD)	3.96	3.97	3.99	3.97	3.98
Defence Height (m AOD)	4.26	4.26	4.26	4.26	4.26
Overtopping?	No	No	No	No	No

West River (Car Dyke):

4.22. As can be seen in Table 6, the EA model showed that Car Dyke (represented by CA_07500) has an overtopping height of 0.84m in the 1 in 1000 + CC flooding event. Flooding can be seen in the EA modelled flood extents (Figure 9), however the flooding observed does not reach the site due to the elevated land between the river and the site. Similar heights also occur in the other flooding events.

Table 6: Flood water levels and defence heights for western river (Data from EA and Asset Information and Maintenance Programme)

CA_07500	4% (1 in25)	1% (1 in 100)	1% (1 in 100 + 20% CC)	0.1% (1 in 1000)	0.1% (1 in 1000 + 20% CC)
Maximum Water Levels (m AOD)	3.79	3.80	3.80	3.81	3.81
Defence Height (m AOD)	2.97	2.97	2.97	2.97	2.97
Overtopping?	Yes	Yes	Yes	Yes	Yes
Height of overtopping (m)	0.82	0.83	0.83	0.84	0.84

4.23. **Summary:**

Taking all the above data into account, it can be seen that the East River (River Witham) is most likely to cause flooding directly to the site in a flooding event of 1 in 1000 + CC. This is due to the combination of the overtopping height and the EA maps identifying that the main source of water during the flood events was originating from the River Witham.

As stated before, it is acknowledged that all the rivers are interlinked and therefore all have a part in the predicted flooding to the site. However, the flood water reaching the site in the 1 in 1000 year +CC event appears to spill from the River Witham. Due to this, an overtopping and breach analysis of the River Witham will be conducted to assess the level of hazard that the river poses to the site in 1 in 1000 +CC event.

Overtopping Analysis

4.24. To perform the overtopping analysis the simple approach, outlined in Flood Risk Assessment Guidance for New Development[11], can be used to estimate flood hazards from overtopping and breaching at the site in the 1 in 1000 + CC event.

4.25. As shown in Table 4, the height of overtopping from the 1 in 1000 + CC event is 0.18m. To align with Figure 12 and take a conservative approach, 0.5m will be used. As discussed previously, the River Witham is located approximately 781m from the site. To align with Figure 12 and take a conservative approach, 500m will be used. With the head of the crest being 0.5m and the distance from the site being 500m, the site can be considered to have a hazard rating of Danger for some based on Figure 11. However, it must be considered that due to a very conservative approach being used it is possible that the site is actually located in the low hazard rating.

4.26. Therefore, in the 1 in 1000 + CC event, due to the low hazard rating on site, safe access/egress should be possible to the west of the site, where there is higher elevated ground away from the modelled flood levels. However, it is appreciated that due to the nature of the site it is expected that it will be unmanned for the majority of its lifetime.

[11] **https://assets.publishing.service.gov.uk/media/602d040fd3bf7f721a23a993/Flood_risk_assessment_guidance_for_new_development_-_phase_2_technical_report_Full_Documentation_and_Tools.pdf**

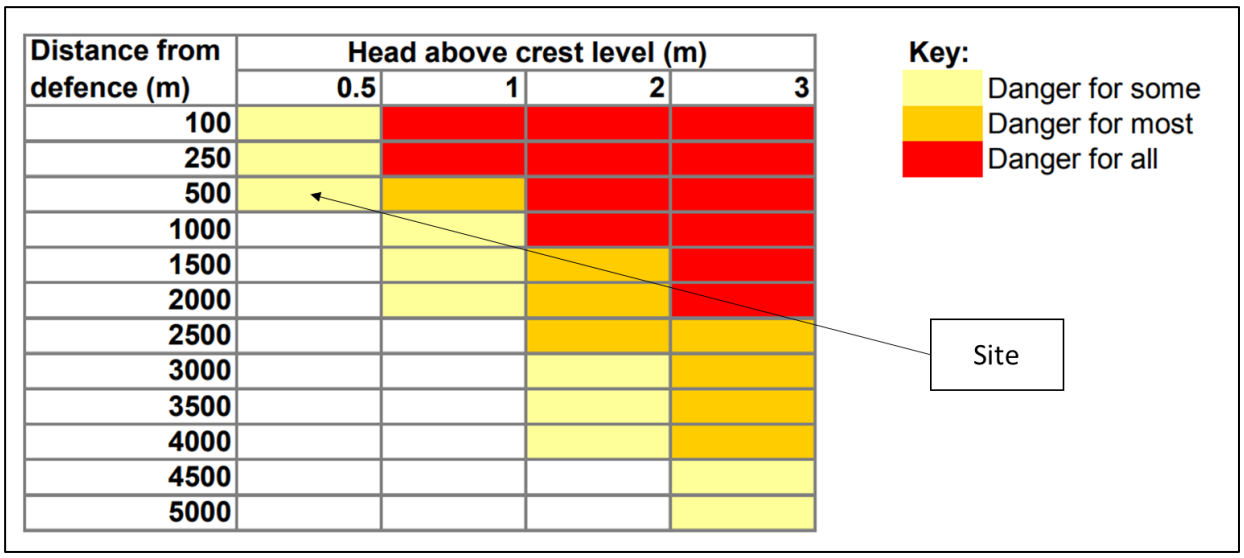


Figure 12: Danger to people from overtopping relative to distance from defence (https://assets.publishing.service.gov.uk/media/602d040fd3bf7f721a23a993/Flood_risk_assessment_guidance_for_new_development_-_phase_2_technical_report_Full_Documentation_and_Tools.pdf)

4.27. Therefore, the hazard of flooding from overtopping in a 1 in 1000 + CC can be considered as low.

4.28. However, there is a residual risk of flooding following a breach in the nearby flood defences.

Breach Analysis

4.29. The simple approach can also be applied to estimate the flood hazard on the site from a 1 in 1000 + CC breach event.

4.30. Median ground levels at the site were taken to give a more representative view of the site ground levels. The median of the ground levels at the site is 1.25m AOD. From the River Witham the 1 in 1000 + CC event level is 4.44m AOD. Therefore, the head of water above the floodplain will be 3.19m (the 1 in 1000 + CC event height, minus the median ground level at the site). However, to align with Figure 8 and take a conservative approach, 4m will be used.

4.31. As discussed previously the River Witham is located 781m from the site. To align with Figure 13 and take a conservative approach 500m will be used. With the head above the flood plain being 4m and the distance from the site being 500m the hazard is classified as Danger to all.

4.32. It should be noted that a conservative approach has been used to this could be classified as a Danger to most hazard.

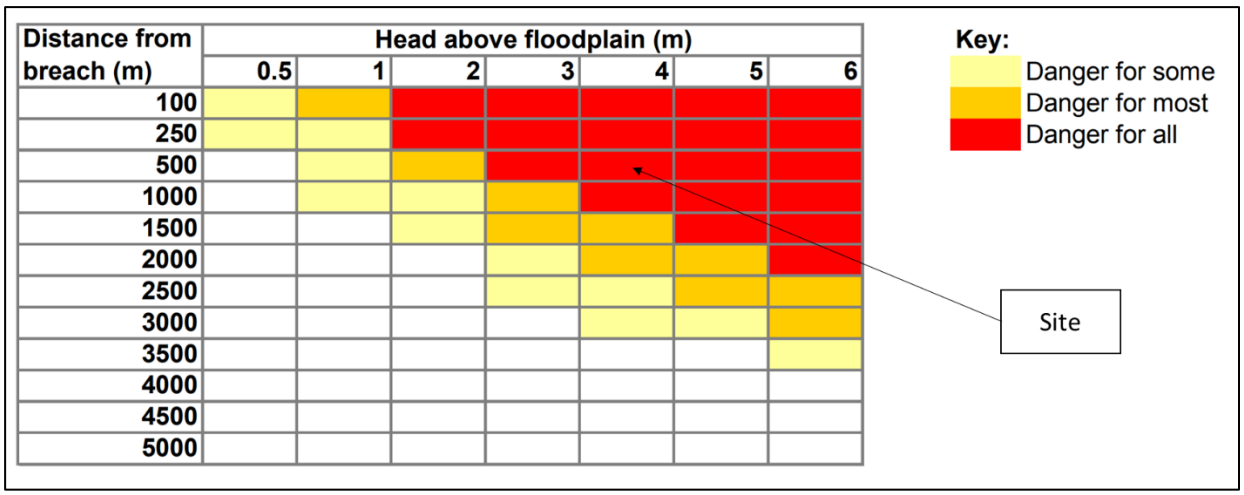


Figure 13: Danger to people from breaching relative to distance from defence (https://assets.publishing.service.gov.uk/media/602d040fd3bf7f721a23a993/Flood_risk_assessment_guidance_for_new_development_-_phase_2_technical_report_Full_Documentation_and_Tools.pdf)

4.33. As such, this analysis indicates that if the nearby River Witham defences were to breach in a 1 in 1000 year +CC event, the hazard ratings at the site / access would be classified from Danger to most to Danger to all. As with overtopping, the flood depths at the site cannot be estimated from this approach.

Summary

4.34. Analysis within this section indicates that the River Witham is considered to be the main source of flooding at the site in a flooding event.

4.35. Due to the development being classed as essential infrastructure, it is recommended that flood resistant measures are put in place to reduce the risk from flooding to the proposed development.

4.36. Modelled flood levels/ depths at the site itself were not provided by the EA. However, the simple approach indicates that the site is calculated to be at Low hazard in 1 in 1000 year +CC overtopping event.

4.37. The client has stated:

> *The nature of this building means it contains pressurised gas pipework with vents piped to 3 m above ground level. Due to this, the equipment within the building will operate under water and continue to supply gas as designed. The current equipment is located in a different building on site at ground level and we require to relocate it*

due to sequence of equipment on site. The other infrastructure on site which is outside our scope of modification is at ground level. These include a boiler house for pre heat and telemetry/metering room to provide data back to our control centre. If these became flooded, depending on the water height, they would cease to operate. However, gas supply would not be affected, all be it we would not have metering or visibility of the site.

4.38. As such, given that the gas supply regulator can remain operational during a flood, it is not proposed to raise the equipment or building. The developer should ensure that the replacement equipment is set at a level no lower than in the existing building, and that the equipment is designed to fully operate during a flood event (excluding the metering and visibility).

4.39. It should be noted that if a defence breach were to occur and the site affected, it is likely that the existing gas infrastructure would be affected/ shut down irrespective of the proposed kiosk.

Tidal

4.40. Tidal flooding occurs when a high tide and high winds combine to elevate sea levels. An area behind coastal flood defences can still flood if waves overtop the defences or break through them. Tidal flooding can also occur a long way from the coast by raising river levels. Water may overtop the river bank or river defences when tide levels are high. The site is located within Flood Zone 3. Flood Zone 3 denotes a risk of flooding from tidal sources greater than 1 in 200 (0.5%).

4.41. There is no record of historical tidal or sea flooding.

4.42. The Product 4 provided by the EA states:

Whilst the site is within a tidal flood zone, ie assuming no tidal defences exist, it is not at risk of tidal flooding in either an overtopping or breaching of defences scenario, today or with an allowance for climate change.

4.43. As such, the risk of flooding to the proposed development from tidal sources, is considered low.

Canals

4.44. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders, and boreholes and manages water levels by transferring it within the canal system.

4.45. The site is approximately 781 metres from the River Witham which is also defined as a canal.

4.46. Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. Control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.

4.47. Flooding can occur where a canal is impounded above surrounding ground levels and the retaining structure fails.

4.48. Water levels within the canal will be maintained as described above.

4.49. The flood risk from the River Witham was described in the Fluvial section above and mitigation was outlined.

Pluvial

4.50. Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.

4.51. Annual surface water flood risk is labelled by the EA as:

- 'High Risk'; >3.3% AEP (annual probability greater than 1 in 30).
- 'Medium Risk'; 1.1% to 3.3% AEP (annual probability between 1 in 100 and 1 in 30).
- 'Low Risk'; 0.1% to 1% AEP (annual probability between 1 in 1000 and 1 in 100).
- 'Very Low Risk'; <0.1% AEP (annual probability less than 1 in 1000).

4.52. Examination of the EA's Flood Risk from Surface Water mapping for High Risk, Medium Risk, and Low Risk AEP flood events shows the ditch on the northern boundary of the site is at risk of flooding in 'Low' surface water flood events (Figure 14).

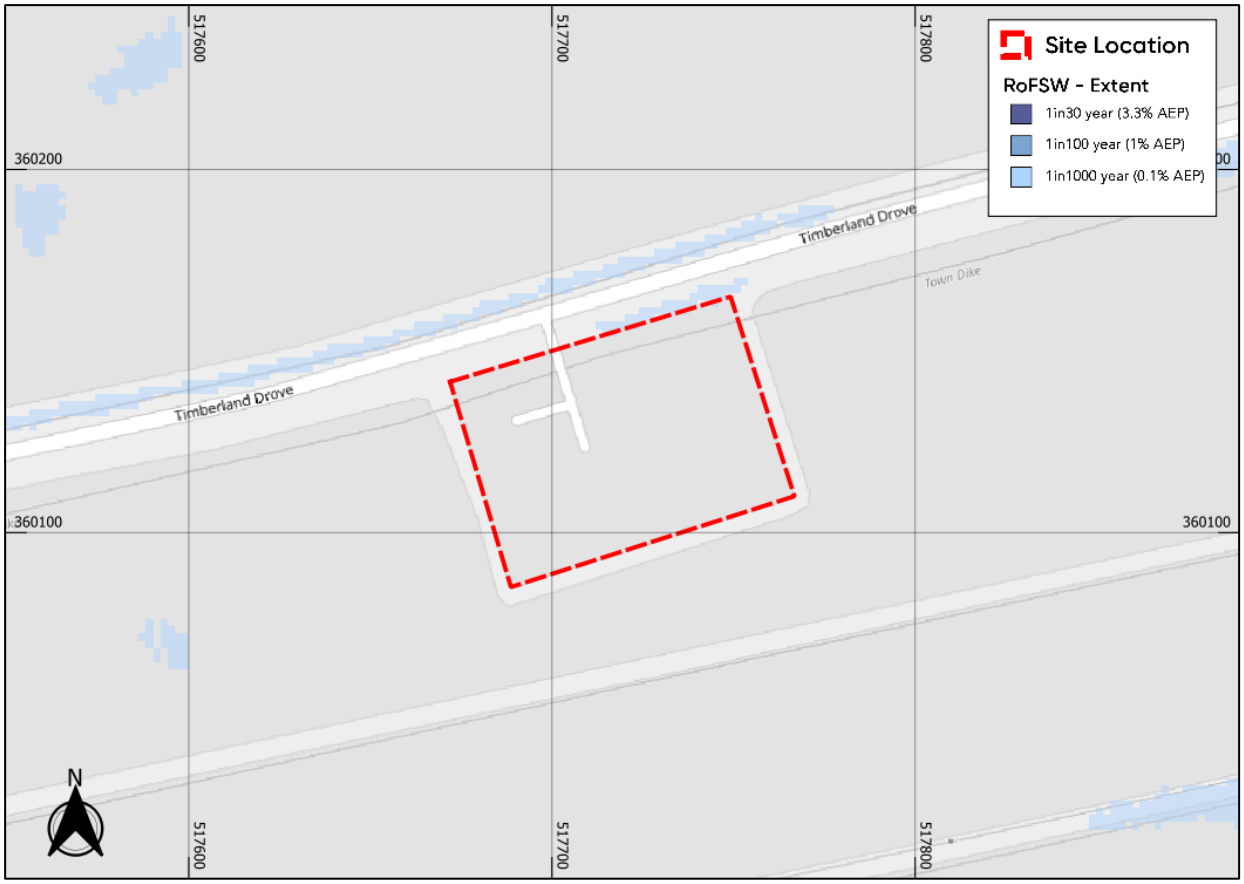


Figure 14: EA Surface Water Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.53. As can be seen in Figure 15, during the modelled 1 in 30 year probability event, surface water flooding does not reach the site or the surrounding area.

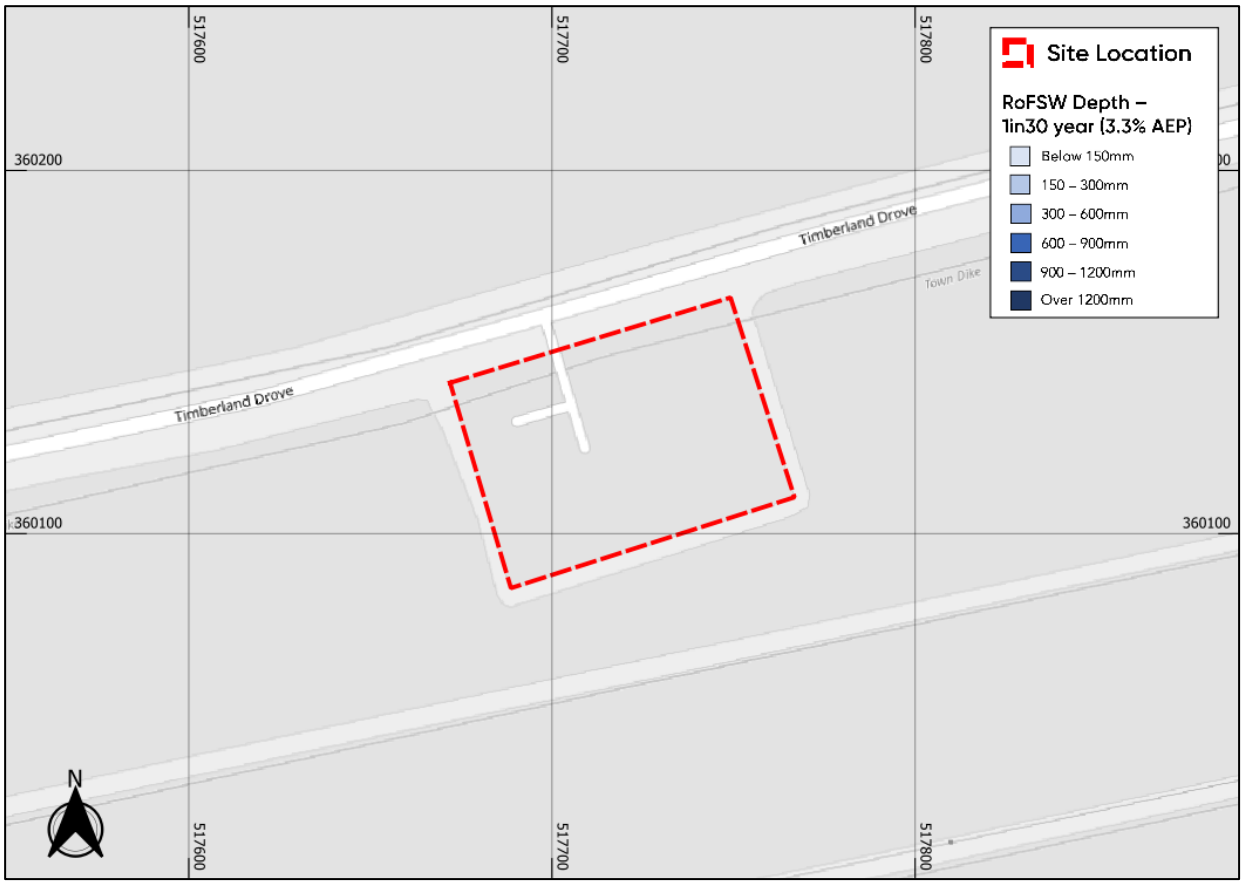


Figure 15. EA Surface Water Flood Risk Mapping 1 in 30 year depth (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.54. As can be seen in Figure 16, during the modelled 1 in 100 year probability event, surface water flooding does not reach the site or the surrounding area.

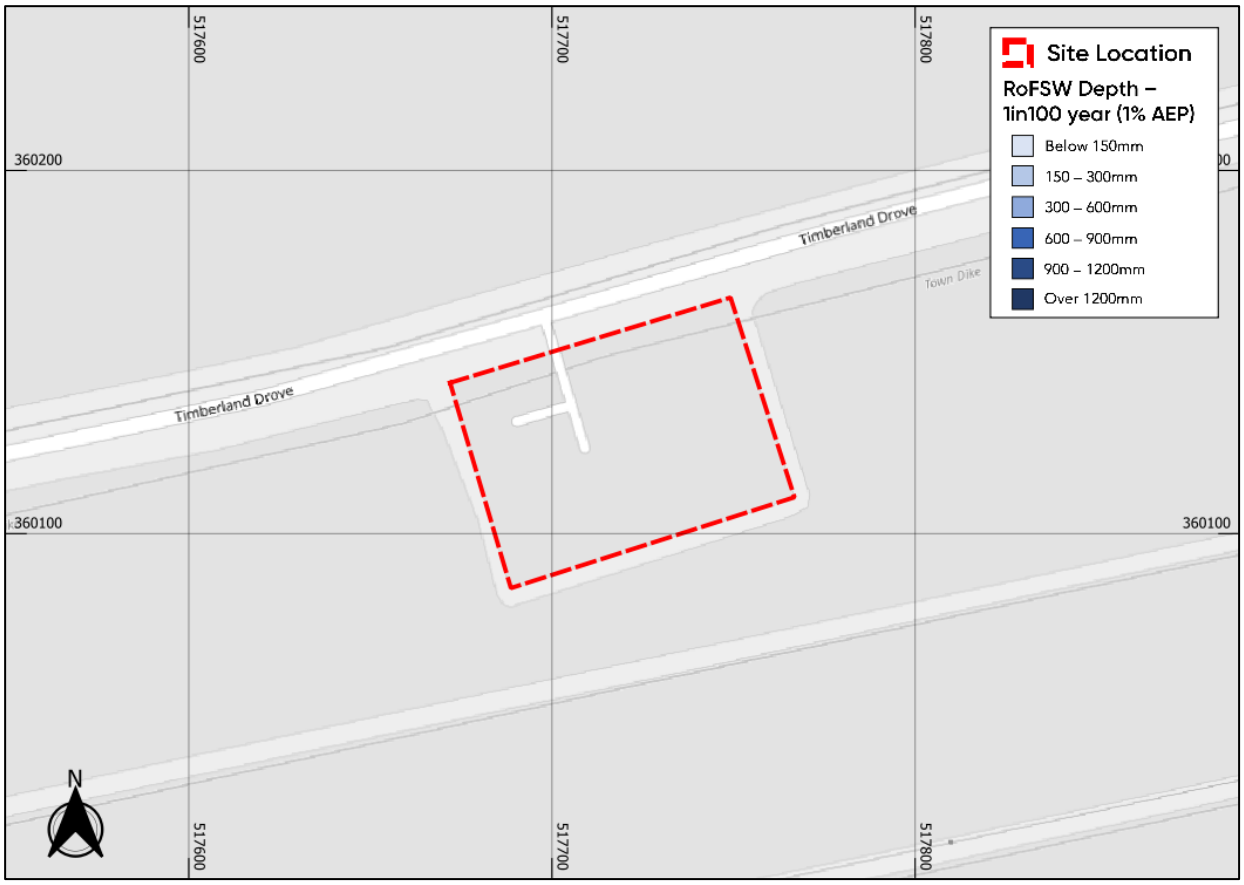


Figure 16: EA Surface Water Flood Risk Mapping 1 in 100 year depth (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government)

4.55. As can be seen in Figure 17, during the modelled 1 in 1000 year probability event, surface water flooding depths could reach over 150mm - 300mm in the ditch to the northwest and north of the site. Flooding may spill from the ditch into the site boundary, but based on the pixilation of the dataset the northern boundary of the site may be affected in these events, but this may remain within the ditch rather than affecting the site.

Figure 17: EA Surface Water Flood Risk Mapping 1 in 1000 year depth (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government)

4.56. The risk to the site can be considered as low due to the surface water flooding likely remaining in the ditch rather than affecting the site. Based on the model, safe access / egress will not be affected as the roadway remains clears in all events.

4.57. The SFRA provides mapping of historical surface water flood incident records kept by the local authority. No historical surface water incidents have been recorded in the vicinity of the site.

Reservoirs

4.58. Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain floodwater. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.

4.59. According to the EA's Flood Risk from Reservoirs mapping (Figure 18) the site is at risk of flooding in the event of a breach at the Abbey Farm Irrigation reservoir. The reservoir failure model is a 'wet day' scenario meaning that it would have to happen at the same time as other flooding for there to be enough water to reach the site.

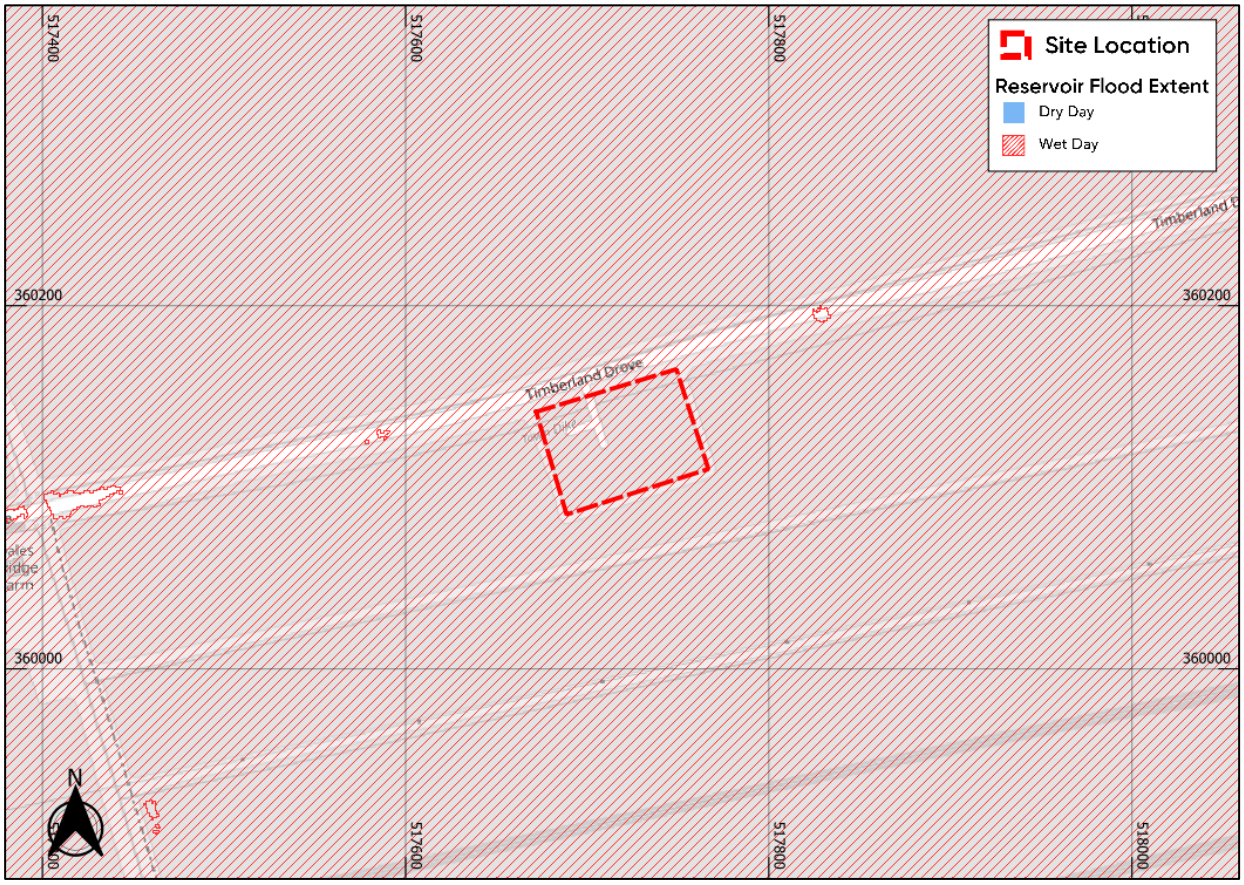


Figure 18: EA Reservoir Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). ©https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.60. All large reservoirs must be inspected and supervised by reservoir panel engineers as detailed by the Reservoirs Act 1975 in England and Wales. The EA are responsible to ensure that reservoirs are inspected regularly, and essential safety work carried out. As reservoirs are highly

managed the maximum flood extent provided in the EA Risk of Flooding from Reservoirs mapping is considered a worst-case scenario.

4.61. As reservoir flooding is unlikely and the modelled flood depths are based on the worst-case scenario, flooding from this source may be considered as a relatively low risk.

Groundwater

4.62. Groundwater flooding occurs in areas where underlying geology is permeable, and water can rise within the strata sufficiently to breach the surface.

4.63. The British Geological Survey's (BGS) mapping shows superficial deposits of Tidal Flat Deposits comprising clay and silt underlying the site. The bedrock underlying the site is Ampthill Clay Formation comprising Mudstone.

4.64. There are no records of Historical BGS boreholes within 500m of the site.

4.65. The SFRA states:

> *The flooding archive only contains one groundwater flooding incident, the February 1997 flood in Sleaford when 200 acres and one property were flooded. However, the flood archive tends to focus on fluvial events and is not considered to be comprehensive, so this figure should be used with caution since there could be many more instances of groundwater flooding that have gone unrecorded. Groundwater flooding in Heighington has been identified. Unfortunately no detailed information is available for these incidents. The number of incidents however, suggests that groundwater flooding is not a significant issue in the District.*

4.66. As a result, the risk of groundwater flooding can be considered low.

Sewers

4.67. Foul or surface water sewers can be a cause of flooding if the drainage network becomes overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.

4.68. The SFRA contains historical incidents of sewer flooding detailed by Anglian Water in their DG5 register. The DG5 register indicates a total of 55 recorded flood incidents in the North Kesteven area. However, the postcode area of the site (LN10 6) is not listed as an area that has recorded incidents of sewer flooding.

4.69. Local policy documentation does not identify the site as being in a Critical Drainage Area.

4.70. The development is therefore considered to be at low risk of flooding from sewers.

5. Flood Risk Mitigation

Fluvial

5.1. Analysis within this section indicates that the River Witham is considered to be the main source of flooding at the site in a flooding event.

5.2. Due to the development being classed as essential infrastructure, it is recommended that flood resistant measures are put in place to reduce the risk from flooding to the proposed development.

5.3. Modelled flood levels/ depths at the site itself were not provided by the EA. However, the simple approach indicates that the site is calculated to be at Low hazard in 1 in 1000 year +CC overtopping event.

5.4. The client has stated:

> *The nature of this building means it contains pressurised gas pipework with vents piped to 3 m above ground level. Due to this, the equipment within the building will operate under water and continue to supply gas as designed. The current equipment is located in a different building on site at ground level and we require to relocate it due to sequence of equipment on site. The other infrastructure on site which is outside our scope of modification is at ground level. These include a boiler house for pre heat and telemetry/metering room to provide data back to our control centre. If these became flooded, depending on the water height, they would cease to operate. However, gas supply would not be affected, all be it we would not have metering or visibility of the site.*

5.5. As such, given that the gas supply regulator can remain operational during a flood, it is not proposed to raise the equipment or building. The developer should ensure that the replacement equipment is set at a level no lower than in the existing building, and that the equipment is designed to fully operate during a flood event (excluding the metering and visibility).

5.6. It should be noted that if a defence breach were to occur and the site affected, it is likely that the existing gas infrastructure would be affected/ shut down irrespective of the proposed kiosk.

5.7. The site management staff should sign up to the EA's Flood Warning Service - River Witham and associated Fens from Woodhall Spa to Chapel Hill. Upon receipt of a Flood Warning,

management and staff should be prepared to carry out their flood protocol, which presumably involves shutdown of flood sensitive equipment. The prosed regular kiosk should be incorporated into their current flood protocol. If a flood protocol/ Flood Emergency Plan (FEP) is not currently in place then one should be formalised.

Pluvial, Reservoirs, Groundwater and Sewers

5.8. Flood risk from these sources is considered to be low, therefore mitigation is not required.

Increase to Flood Risk Elsewhere

5.9. While the site is in a fluvial floodplain, the scale of the proposed kiosk relative to the wider, flat floodplain, is considered negligible.

5.10. As such, the proposed development can be considered to have a negligible effect on the flood risk to the surrounding area.

Flood Warnings

5.11. The site is in an area benefiting from the Environment Agency (EA) flood warning service - River Witham and associated Fens from Woodhall Spa to Chapel Hill. This service allows site owners to register an address, which is at risk of flooding, along with contact details so that in the event of a flood being forecast, the site owner will be sent an alert directly to their chosen method of contact. As a further precaution and risk reduction, the owner of the site should sign up.

5.12. Flood warnings/alerts can be enforced at any time of the day or night. Signing up for this service provides site owners some notice before a flood event. The amount of time afforded before a flood occurs depends on the site-specific location (e.g. proximity to the source of flooding, topography of the surrounding area) and the flood mechanism (e.g. bank over topping versus a breach event). Flood alerts and warnings provide site managers with time to take necessary action, e.g. communication of the risk of flooding to occupants/employees etc, evacuation of occupants offsite or to a safe level and the mounting of site-specific flood defences.

5.13. Due to the nature of the site, it is expected that it will be unmanned for the majority of its lifetime. However, if upon receipt of a Flood Warning, or during a breach event the site is manned then immediate evacuation should be taken until the flood warnings are lifted.

6. Conclusions

6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at Land at Timberland Drove, Fen Side Lodge, Timberland, Martin, LN10 6XT. It has been written to support a planning application >and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.

6.2. An assessment of the risk of flooding from all sources has been undertaken and is summarised in the table below:

Source of Flooding	Flood Risk Summary
Fluvial	The whole site is located in Flood Zone 3 and is within proximity of 4 main rivers. Analysis within this section indicates that the River Witham is considered to be the main source of flooding at the site in a flooding event. Due to the development being classed as essential infrastructure, it is recommended that flood resistant measures are put in place to reduce the risk from flooding to the proposed development. Given that the gas supply regulator can remain operational during a flood, it is not proposed to raise the equipment or building. The developer should ensure that the replacement equipment is set at a level no lower than in the existing building, and that the equipment is designed to fully operate during a flood event (excluding the metering and visibility). It should be noted that if a defence breach were to occur and the site affected, it is likely that the existing gas infrastructure would be affected/ shut down irrespective of the proposed kiosk.
Tidal Canals Pluvial Reservoirs Groundwater Sewers	The site is considered to be at low risk from these sources.

6.3. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does should not increase flood risk off site or to the wider area.

6.4. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

Appendix A - Development Proposals

Appendix B - EA Data

Lisa Slater
lisa@aegaea.com

Our ref: CCN-2023-324910

Date: 06/09/2023

Dear Lisa

Provision of Flood Risk Information for Timberland Drove, Martin.

Thank you for your request for our flood risk information for the above site. The information is set out below and attached. It is important you read any contextual notes on the maps provided.

If you are preparing a Flood Risk Assessment (FRA) for this site, please note this information may not be sufficient by itself to produce an adequate FRA to demonstrate the development is safe over its lifetime. Additional information may be required to carry out an appropriate assessment of all risk, such as consequence of a breach in defences.

We aim to review our information on a regular basis, so if you are using this data more than twelve months from the date of this letter, please contact us again to check it is still valid.

Please read the letter in full as the information covered has been updated in **June 2023.**

1. Flood Map for Planning

The attached map includes the current Flood Map for Planning for your area. The map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

In some locations, such as around the fens and the large coastal floodplains, showing the area at risk of flooding assuming no defences may give a slightly misleading picture in that if there were no flood defences, water would spread out across these large floodplains. This flooding could cover large areas of land but to relatively shallow depths and could leave pockets of locally slightly higher land as isolated dry islands. It is important to understand the actual risk of the flooding to these dry islands, particularly in the event of defence failure.

The Flood Map for Planning also shows the location of formal raised flood defences and flood storage reservoirs. It represents areas at risk of flooding for present day only and does not take account of climate change.

The Flood Map for Planning only indicates the extent and likelihood of flooding from rivers or the sea. It should also be remembered flooding may occur from other sources such as surface water sewers, road drainage, etc.

The Flood Map has been supplied at a 1:10,000 scale and also at a 1:55,000 scale in order to show the main river channel and node points.

2. Recorded Flood Outlines

With regards to the history of flooding I can advise we do not have any records of flooding in this area. It is possible recent flooding may have occurred which we are currently investigating, therefore this information may be subject to change. It is possible other flooding may have occurred which other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist) have responsibility.

3. Schemes in the area

There are no ongoing capital projects to reduce or sustain the current flood risk to this site.

4. Fluvial Flood Risk Information

This site is considered to be at risk of flooding from main rivers.

The site may also be at risk from local ordinary watercourses for which other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist) have responsibility.

4.1 Fluvial Defence Information

The existing fluvial defences reducing the risk of flooding from River Witham to this site consist of earth embankments and concrete floodwalls in conjunction with upstream flood storage reservoirs. They are in fair condition and reduce the risk of flooding (at the defence) to a 10% (1 in 10) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

The existing fluvial defences reducing the risk of flooding from Timberland Delph to this site consist of earth embankments. They are in fair condition and reduce the risk of flooding (at the defence) to a 50% (1 in 2) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

The existing fluvial defences reducing the risk of flooding from Billinghay Skirth to this site consist of earth embankments. They are in fair condition and reduce the risk of flooding (at the defence) to a 50% (1 in 2) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

The existing fluvial defences reducing the risk of flooding from Carr Dyke to this site consist of earth embankments and concrete floodwalls. They are in fair condition and reduce the risk of flooding (at the defence) to a 1% (1 in 100) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

Refer to paragraph 3 for details of any ongoing capital projects to reduce the flood risk to this site.

4.2 Fluvial Modelled Levels and Flows

Available modelled fluvial flood levels and flows for the model nodes shown on the attached map are set out in the data table attached. This data is taken from the model named on the data table, which is the most up-to-date model currently available.

Please note these levels are “in-channel” levels and therefore may not represent the flood level on the floodplain, particularly where the channel is embanked or has raised defences.

Our models may not have the most up to date climate change allowances. In time we will update our models for the latest allowances. You should refer to 'Flood risk assessments: climate change allowances' to check if the allowances modelled are appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

4.3 Fluvial Modelled Flood Extents

Please find attached a map showing available modelled flood extents, taking into account flood defences, for your area. This data is taken from the model named on the map, which is the most up-to-date model currently available.

In some cases the flood extents shown may not be from main river, but may be from other sources such as IDB lowland drainage networks.

4.4 Fluvial Hazard Mapping

For certain locations we have carried out modelling to map the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from overtopping and / or breaching of defences at specific locations for a number of scenarios.

At present this information is available for fluvial flood risk in Northampton, Lincoln, Wainfleet and some isolated rural locations.

The number of locations we have this information for is expected to increase in time.

At present this site is not covered by any fluvial hazard mapping.

5. Tidal Flood Risk Information

Whilst the site is within a tidal flood zone, ie assuming no tidal defences exist, it is not at risk of tidal flooding in either a overtopping or breaching of defences scenario, today or with an allowance for climate change.

6. Development Planning

If you would like local guidance on preparing a flood risk assessment for a planning application, please contact our Sustainable Places team at LNplanning@environment-agency.gov.uk. It will help if you mention this data request and attach your site location plan.

We provide free preliminary advice; additional/detailed advice, review of draft FRAs and meetings are chargeable at a rate set to cover our costs, currently £100 (plus VAT) per hour of staff time. Further details are available on our website at https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals.

General advice on flood risk assessment for planning applications can be found on GOV.UK at https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications

Climate change will increase flood risk due to overtopping of defences. Please note, unless specified otherwise, the climate change data included has an allowance for 20% increase in flow. Updated guidance on how climate change could affect flood risk to new development - 'Flood risk assessments: climate change allowances' was published on GOV.UK in **July 2021**. The appropriate updated climate change allowance should be applied in a Flood Risk Assessment.

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

7. Data Licence and Other Supporting Information

We respond to requests for recorded information we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

This information is provided in accordance with the Open Government Licence which can be found here: http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

Further information on flood risk can be found on the GOV.UK website at:
https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

8. Other Flood Risk Management Authorities

The information provided with this letter relates to flood risk from main river or the sea. The Flood Map for Surface Water can be viewed at https://www.gov.uk/check-long-term-flood-risk

Additional information may be available from other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist).

I hope we have correctly interpreted your request. If you have any queries or would like to discuss the content of this letter further please contact Jacob Lowe using the email address below and quoting our CCN reference number above.

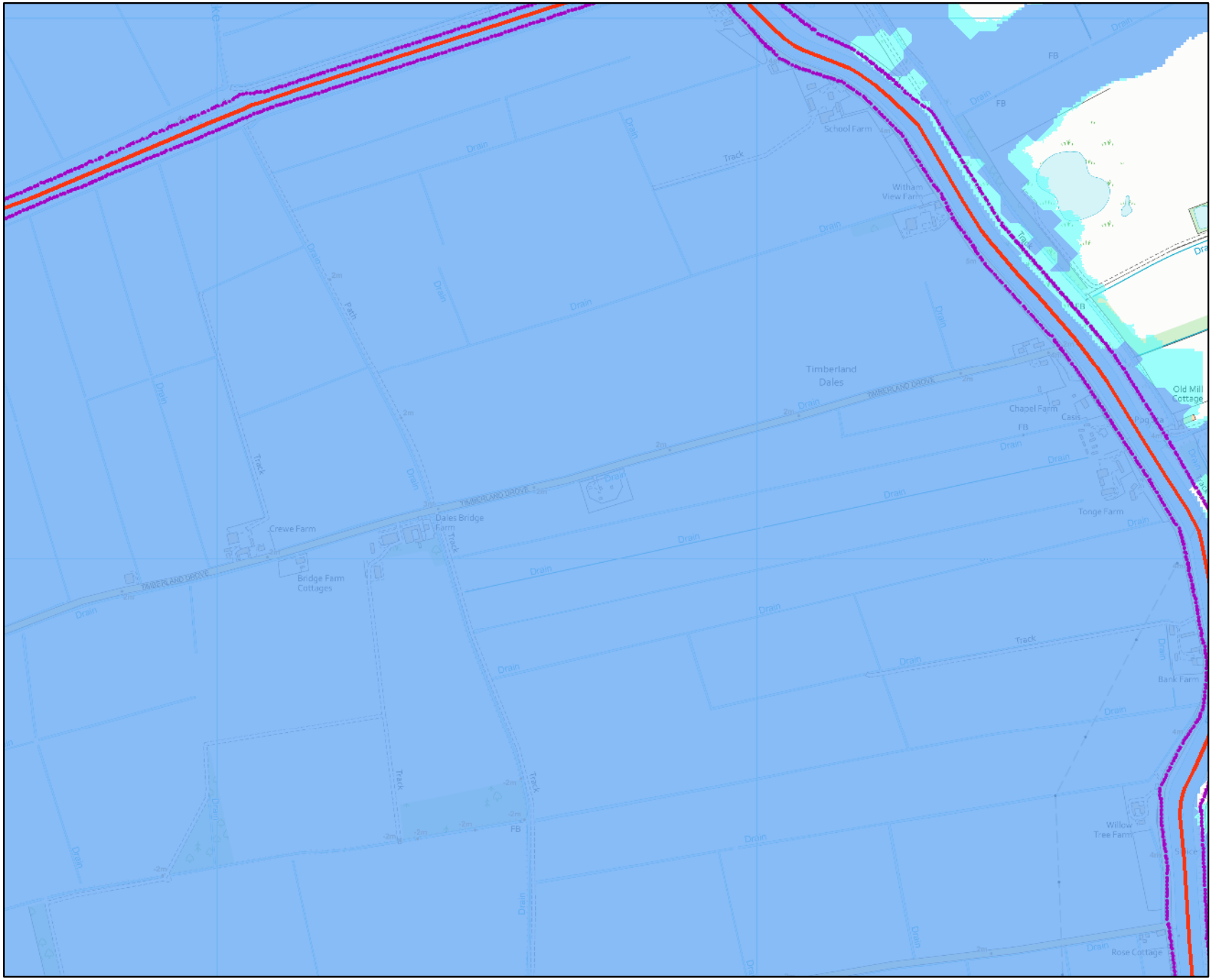
Yours sincerely,

Jacob Lowe
Tel: 07788 596786

for Ian Cappitt
Witham Partnerships and Strategic Overview Team Leader
e-mail PSOLINCS@environment-agency.gov.uk

Enc.
Flood Map for Planning
Modelled Node Points Map
Modelled Fluvial Levels and Flows Data Sheet
Modelled Flood Extent Maps

Flood Map for Planning centred on TF1772160127 - created September 2023 [Ref: CCN-2023-324910]



Environment Agency

Scale 1:10,000

N
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Legend

- Main River
- Raised Defences
- Flood Storage Areas
- Areas 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.

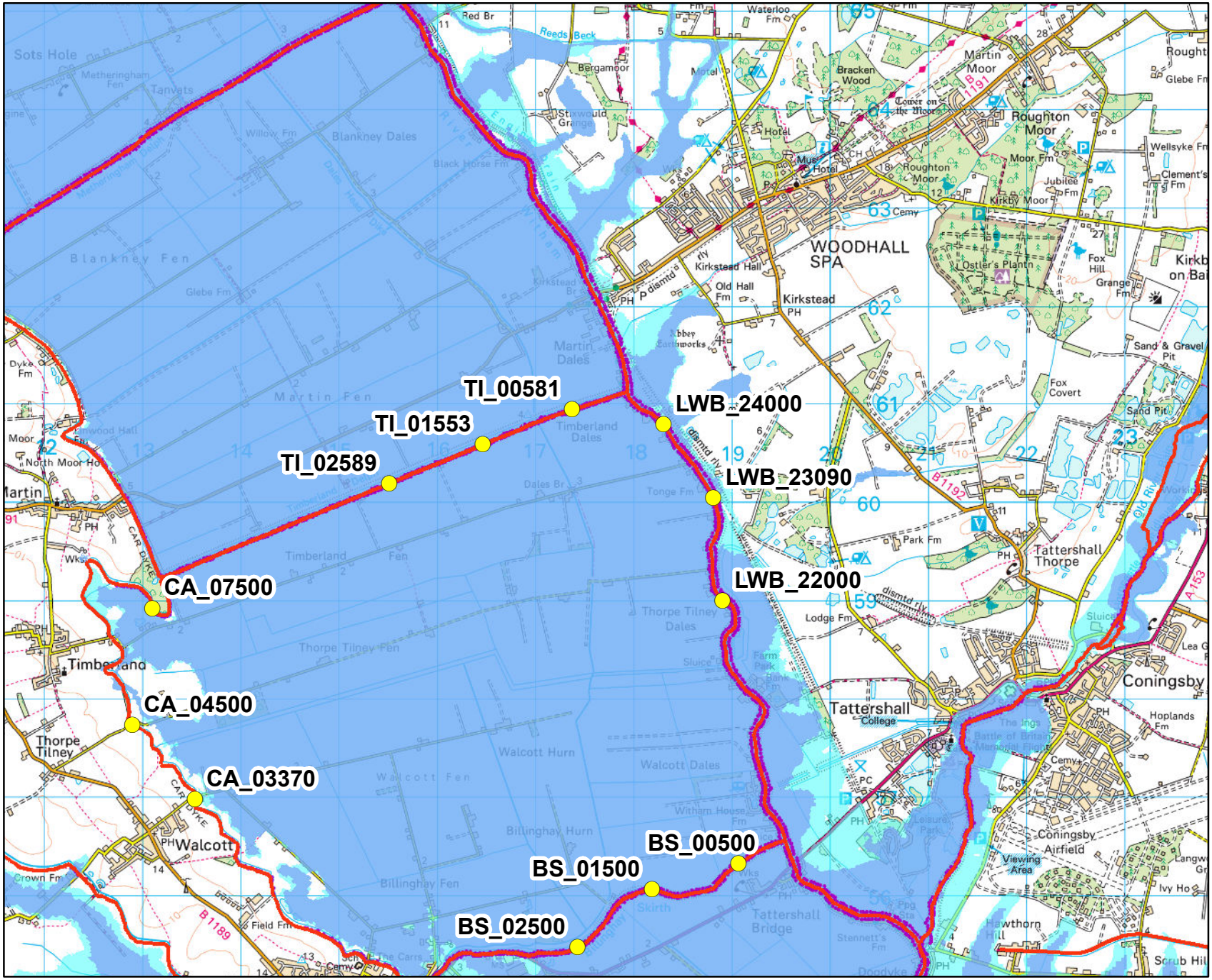
- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

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.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Flood Map for Planning with Nodes centred on TF1772160127 - created September 2023 [Ref: CCN-2023-324910]



Environment Agency

Scale 1:55,000

N W E S

Legend

- Modelled_Nodes
- Main River
- Raised Defences
- Flood Storage Areas
- Areas 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.

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Fluvial Flood Levels (mODN)

The fluvial flood levels for the model nodes shown on the attached map are set out in the table below. They are measured in metres above Ordnance Datum Newlyn (mODN).

			Annual Exceedance Probability - Maximum Water Levels (mODN)											
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**4% (1 in 25)**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
LWB_22000	518906	358995	3.73	4.02	4.21	4.26	4.26	4.28	4.30	4.30	4.40	4.32	4.36	4.43
LWB_23090	518815	360044	3.74	4.03	4.22	4.27	4.27	4.29	4.31	4.32	4.41	4.33	4.37	4.44
LWB_24000	518304	360793	3.75	4.04	4.22	4.26	4.28	4.31	4.33	4.33	4.41	4.35	4.38	4.44
TI_00581	517376	360945	3.67	3.77	3.79	3.80	3.79	3.80	3.80	3.80	3.81	3.81	3.80	3.80
TI_01553	516467	360594	3.68	3.77	3.78	3.79	3.79	3.79	3.79	3.80	3.81	3.80	3.80	3.81
TI_02589	515510	360190	3.67	3.76	3.77	3.77	3.78	3.78	3.78	3.79	3.79	3.80	3.78	3.78
BS_00500	519071	356322	3.66	3.90	3.95	3.96	3.96	3.96	3.96	3.96	3.97	3.97	3.97	3.98
BS_01500	518190	356060	3.66	3.90	3.95	3.96	3.96	3.97	3.96	3.97	3.99	3.97	3.97	3.98
BS_02500	517431	355473	3.67	3.90	3.94	3.94	3.95	3.96	3.97	3.96	3.97	3.98	3.96	3.97
CA_03370	513532	356974	2.94	3.18	3.30	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.44	3.48
CA_04500	512893	357731	2.94	3.18	3.30	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.49	3.82
CA_07500	513097	358920	3.68	3.77	3.79	3.79	3.79	3.79	3.80	3.80	3.80	3.80	3.81	3.81

Fluvial Flood Flows (m^3/s)

The fluvial flood flows for the model nodes shown on the attached map are set out in the table below. They are measured in metres cubed per second (m^3/s).

			Annual Exceedance Probability - Maximum Flows (m^3/s)											
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**4% (1 in 25)**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
LWB_22000	518906	358995	85.84	92.18	97.03	100.89	101.54	104.19	103.26	104.77	106.84	105.81	112.80	137.14
LWB_23090	518815	360044	84.88	90.64	97.26	99.66	100.26	102.05	102.03	102.75	105.91	103.26	112.25	131.42
LWB_24000	518304	360793	84.97	91.27	97.28	99.56	100.00	101.44	101.09	101.33	104.74	101.52	111.19	131.92
TI_00581	517376	360945	4.58	5.48	6.14	5.27	5.35	5.56	6.03	6.35	7.76	6.53	6.28	6.00
TI_01553	516467	360594	4.06	4.99	5.61	6.87	4.93	5.09	5.56	5.83	7.08	5.97	5.81	5.38
TI_02589	515510	360190	3.55	4.44	5.01	4.41	4.85	4.64	4.99	5.28	6.27	5.79	5.33	4.73
BS_00500	519071	356322	8.33	8.97	9.05	10.20	10.40	10.61	10.97	11.26	12.24	11.61	14.33	14.73
BS_01500	518190	356060	7.83	8.60	8.97	10.13	10.29	10.65	10.85	11.20	11.82	11.56	14.22	14.44
BS_02500	517431	355473	7.47	8.19	8.41	9.08	9.32	9.55	9.96	10.04	10.78	10.47	13.28	13.33
CA_03370	513532	356974	0.14	0.22	0.26	0.31	0.33	0.38	0.40	0.42	0.50	0.47	0.79	1.19
CA_04500	512893	357731	0.14	0.23	0.28	0.34	0.35	0.41	0.43	0.46	0.56	0.52	0.96	1.19
CA_07500	513097	358920	1.60	2.28	2.84	3.42	2.38	3.32	3.00	3.55	2.87	3.34	2.80	2.03

Modelled Flood Extents (with defences) Model: Lower Witham 2009 [CCN-2023-324910]

Environment Agency

Scale 1:10,000

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Legend

- Main River
- Raised Defences
- Flood Storage Areas
- 2009_LW_Defended_Baseline_1in5
- 2009_LW_Defended_Baseline_1in25
- 2009_LW_Defended_Baseline_1in100
- 2009_LW_Defended_Baseline_1in1000

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Modelled Climate Change Flood Extents (with defences) Model: Lower Witham 2009 [CCN-2023-324910]

Environment Agency

Scale 1:10,000

N W E S

Legend

- Main River
- Raised Defences
- Flood Storage Areas
- 2009_LW_Defended_Baseline_1in100_CC20pc
- 2009_LW_Defended_Baseline_1in1000_CC20pc

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk