

Level 2 Strategic Flood Risk Assessment

Selby District Council

Project number: 60631417

Quality information

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1. Introduction

1.1 Terms of reference

- 1.1.1 AECOM has been commissioned by Selby District Council (SDC) to update their Level 1 and Level 2 Strategic Flood Risk Assessments (SFRA). The update is required as SDC are currently preparing PLAN Selby (the Sites and Policies Local Plan) that will guide and set the vision for future development across the district. As part of this process, baseline evidence must be collated to inform key planning issues. Since the previous Selby District Strategic Flood Risk Assessment (SFRA) was published in 2015, a number of changing in planning policy have occurred. In addition to this there have been updates to flood datasets, including improvements to river models and flood mapping.
- 1.1.2 The Level 1 SFRA Update was completed on 23rd October 2020 and this document presents the Level 2 SFRA Update.

1.2 Project Background

- 1.2.1 The [National Planning Policy Framework](#)¹ (NPPF) and associated [Planning Practice Guidance](#) for Flood Risk and Coastal Change (PPG)² set out the active role Local Planning Authorities (LPAs) should take to ensure that flood risk is understood and managed effectively and sustainably throughout all stages of the planning process. The NPPF outlines that Local Plans should be supported by a SFRA and LPAs should use the findings to inform strategic land use planning. The overall approach of the NPPF to flood risk is broadly summarised Paragraph 103:

“When determining planning applications, LPAs should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific FRA following the Sequential Test, and if required the Exception Test, it can be demonstrated that:

- 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, and*
- development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.”*

1.3 Level 1 SFRA

- 1.3.1 A Level 1 SFRA Update report was prepared for Selby District Council in October 2020, and it will be available online³ (it was not available at time of writing this document, but all historic versions are available). The purpose of the Level 1 SFRA was to collate and analyse the most up to date readily available flood risk information for all sources of flooding and provide an overview of flood risk issues across Selby District.
- 1.3.2 The Level 1 SFRA provides guidance on:
- The application of the Sequential Test by Selby District Council when allocating future development sites to inform their Local Plan, as well as by developers promoting development on windfall sites;
 - Managing and mitigating flood risk, the application of sustainable drainage systems (SuDS), and the preparation of site-specific Flood Risk Assessments (FRAs); and
 - Potential flood risk management objectives and policy considerations which may be developed and adopted by Selby District Council as formal policies when developing their Local Plan.

¹ Department for Communities and Local Government. 2019. *National Planning Policy Framework*. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

² Department for Communities and Local Government. 2014. *Planning Practice Guidance: Flood Risk and Coastal Change*. Available at: <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

³ Selby District Council. 2020. *Strategic Flood Risk Assessment*. Available at: <https://www.selby.gov.uk/strategic-flood-risk-assessment>

- 1.3.3 Using the strategic flood risk information presented within the Level 1 SFRA, Selby District Council have undertaken the Sequential Test to document the process whereby future development is steered towards areas of lowest flood risk. Applying guidance outlined in the Level 1 SFRA, SDC has identified the need for a Level 2 SFRA covering some of the proposed development areas.

1.4 Exception Test

- 1.4.1 Where it is not possible to accommodate potential development sites outside of those areas identified to be at risk of flooding, the Exception Test may be required, as set out in Table 1-1. The purpose of the Exception Test is to ensure that where it may be necessary to locate development in areas at risk of flooding, new development is only permitted in Flood Zone 2 and Flood Zone 3 when the flood risk is clearly outweighed by other sustainability factors and where the development will remain safe during its lifetime, taking climate change into account.

- 1.4.2 The NPPF states that for the Exception Test to be passed:

- Part 1 - "It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by the SFRA where one has been prepared; and
- Part 2 - A site-specific Flood Risk Assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall."

- 1.4.3 Both elements of the test will have to be passed for development to be allocated or permitted.

- 1.4.4 In order to determine Part 1 of the Exception Test, applicants should assess their scheme against the objectives set out in the LPA's Sustainability Appraisal⁴ and information presented in Level 1 and Level 2 SFRA's. In order to demonstrate satisfaction of Part 2 of the Exception Test, relevant flood risk management and mitigation measures should be applied and demonstrated within a site-specific flood risk assessment (FRA). Appendix D 'Managing and Mitigating Flood Risk' and Appendix E 'Site Specific Flood Risk Assessments' within the Level 1 SFRA should be referred to in order to support Part 2 of the Exception Test.

Table 1-1 Flood risk vulnerability and Flood Zone 'compatibility' (PPG, 2014)

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test Required	✓	✓
	3a	Exception Test Required	✓	✗	Exception Test Required	✓
	3b	Exception Test Required	✓	✗	✗	✗

✓ - Development is appropriate ✗ - Development should not be permitted

⁴ Waterman, December 2010, Sustainability Appraisal Report.
https://www.selby.gov.uk/sites/default/files/Documents/CSCD17_Final_SA_Report_1310.pdf

2. Level 2 SFRA

2.1 Datasets

- 2.1.1 This report comprises the Level 2 SFRA for Selby District Council. Where land outside Flood Zone 2 and 3 cannot appropriately accommodate all development, the NPPF's Exception Test must be applied.
- 2.1.2 The scope of the Level 2 SFRA is to consider flood risk from all sources and the detailed nature of the flood characteristics and mechanisms within a flood zone including, where appropriate and the data is available:
- flood probability;
 - flood depth;
 - flood velocity;
 - rate of onset of flooding; and
 - duration of flood.
- 2.1.3 Three separate hydraulic models have been used to cover the wider Selby District Council area. The following sections outline sources of information that have been obtained to inform this Level 2 SFRA.

Lower Ouse and Wharfe Modelling Outputs

- 2.1.4 In July 2018, the Environment Agency updated the hydraulic model for the River Ouse and River Wharfe Washlands to account for the latest climate change allowances. The outputs from this model have been provided for use in the Level 2 SFRA for sites within the Ouse and Wharfe Washlands floodplain.
- 2.1.5 Outputs showing the maximum flood depth and hazard rating associated with flooding from the River Ouse and River Wharfe Washlands are presented within this Level 2 SFRA. It is noted that information on the rate of onset of flooding and the duration of flooding has not been made available for use in this study.

Lower Aire Modelling Outputs

- 2.1.6 In July 2017 the Environment Agency updated the hydraulic model for the Lower River Aire to account for the latest climate change allowances. The outputs from this model have been provided for use in the Level 2 SFRA for sites located within the Lower Aire floodplain.
- 2.1.7 Outputs showing the maximum flood depth and hazard rating associated with flooding from the Lower River Aire are presented within this Level 2 SFRA. It is noted that information on the rate of onset of flooding and the duration of flooding has not been made available for use in this study.

Upper Humber Modelling Outputs

- 2.1.8 In July 2018 the Environment Agency, updated the hydraulic model for the River Humber to account for the latest climate change allowances as part of a Flood Risk Mapping Study. The outputs from this model have been provided for use in the Level 2 SFRA for sites located within the Humber floodplain.
- 2.1.9 Outputs showing the maximum flood depth and hazard rating associated with flooding from the River Humber are presented within this Level 2 SFRA. It is noted that information on the rate of onset of flooding and the duration of flooding has not been made available for use in this study.

Upper Humber Breach Assessments

- 2.1.10 In May 2017, AECOM, on behalf of Selby District Council, published the Olympia Park Flood Risk Assessment⁸. This study simulated a breach in one location (referred to as Breach 2) which was carried out as part of the Upper Humber Flood Risk Mapping study with the latest climate change allowances.
- 2.1.11 Outputs showing the maximum flood depth and hazard rating experienced for the 1% Annual Exceedance Probability (AEP) upper end allowance for the 2080s have been presented within the Level 2 SFRA site assessments, where relevant. Reference has been made to the maximum flood depths for each site within the site assessments.

Flood Hazard Mapping

- 2.1.12 Flood hazard mapping categorises the danger to people for different combinations of flood water depth and velocity. The derivation of these categories is based on the methodology set out by Defra in Flood Risk Assessment Guidance for New Development FD2320/TR2⁹ using the following equation:

*Flood Hazard Rating = ((v+0.5)*D) + DF*

Where v = velocity (m/s), D = depth (m), DF = debris factor

Flood Hazard		Description
Low	HR < 0.75	Caution – Flood zone with shallow flowing water or deep standing water
Moderate	0.75 ≥ HR ≤ 1.25	Dangerous for some (i.e. children) – Danger: flood zone with deep or fast flowing water
Significant	1.25 > HR ≤ 2.0	Dangerous for most people – Danger: flood zone with deep fast flowing water
Extreme	HR > 2.0	Dangerous for all – Extreme danger: flood zone with deep fast flowing water

Table 2-1: Flood Hazard Calculation (top); and Classifications (bottom)

Risk of Flooding from Surface Water

Flood Extents

- 2.1.13 The outputs of the Environment Agency’s Risk of Flooding from Surface Water (RoFSW) mapping include GIS layers showing the extent of flooding from surface water that could result from a flood with a 3.33%, 1% and 0.1% chance of happening in any given year.
- 2.1.14 It is noted that the RoFSW mapping is not to be used at property level. Due to the way they have been produced and the fact that they are indicative, the maps are not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies or evidence. However, the mapping provides a useful source of information to identify the risk of surface water flooding to the wider area in which a site is located, and the general patterns of surface water flow and ponding.

⁸ Selby District Council (2019) Olympia Park Development Flood Risk Assessment

⁹ Defra and Environment Agency (2005) FD2320/TR2 Flood Risk Assessment Guidance for New Development

British Geological Society (BGS) Susceptibility to Groundwater Flooding

- 2.1.15 The BGS Susceptibility to Groundwater Flooding dataset has been used to undertake a high-level screening of the sites in the Selby District Council area.
- 2.1.16 It is noted that this dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.

Sites for Assessment

- The Level 2 SFRA provides a detailed assessment of the following development sites which have been identified by Selby District Council as requiring the application of the Exception Test.

Site Name	Location
BURN-G	Burn Airfield;
CFAB-A	RAF Church Fenton, Church Fenton (Ulleskelf Parish)
SELB-AG	Rigid Group Ltd, Denison Road, Selby
SELB-B	Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby
SELB-BO	Land off Canal Road
SELB-BX	Land to West of Selby Business Park, Selby (Brayton Parish)
SELB-BZ	Land at Cross Hills Lane, Selby
SELB-CC	Olympia Park, Barlby Road, Barlby
SELB-CG	Land off Friars Meadow, Selby Town
SELB-CH	Land at Cockret Farm, Selby
SELB-CL	Land adjacent to St. James's Church, Selby
SELB-CM	Land at Benedict Avenue, Selby
SELB-CN	Land at Richard Street, Selby
SELB-E	Holmes Field, South of Lordship Lane, Selby
TADC-I	Land at Mill Lane.
SELB-CA	Olympia Park, Barlby Road, Barlby
SELB-CB	Land between A19 and A63 bypass
SELB-CO	Land at Former Police Station Site, Selby
TADC-AI	Land East of Britannia Car Park

2.2 Site Proformas

- 2.2.1 A proforma has been prepared for each of the fifteen sites to assess the risk of flooding from all sources and provide recommendations for how development could be delivered on the site that would satisfy the requirements of the Exception Test.
- 2.2.2 Table 2-2 provides an overview of the datasets that have been used to populate the proformas. The majority of the datasets used in the Level 2 SFRA are described in full in the Level 1 SFRA.

Table 2-2 Datasets and information used for Level 2 Site Proformas

Proforma Field	Dataset / information used
Site Description	
Site ID	As provided by Selby District Council
Area (ha)	The area of the site (hectares).
Proposed use	As provided by Selby District Council. Where this was not specified, mixed-use including residential has been assumed.
Vulnerability classification	Defined in accordance with PPG Flood Risk and Coastal Change Table 1.
Flood Zone and Historic Flooding	
Proportion within each Flood Zone and Areas Benefitting from Defences	Flood Map for Planning (Rivers and Sea) Flood Zone 2; Flood Map for Planning (Rivers and Sea) Flood Zone 3; Flood Map for Planning (Rivers and Sea) Areas Benefitting from Defences; Flood Zone 3b Functional Floodplain outline, as defined in the Level 1 SFRA.
Flood Warning Area	Environment Agency Flood Warning Areas.
River Flooding	
Maximum Flood Depth Map for the River Ouse, Aire, Humber and Wharfe for the 1% AEP event including climate change	River Ouse And River Wharfe Washlands Climate Change Modelling, July 2018, Mott MacDonald on behalf of the Environment Agency. Defended flood event information for the 1% AEP event including 30% and 50% increase in flow for climate change. Lower River Aire Climate Change Modelling, July 2017, JBA Consulting on behalf of the Environment Agency. Defended flood event information for the 1% AEP event including 30% and 50% increase in flow for climate change. River Humber Climate Change Modelling, May 2017, JBA Consulting, on behalf of the Environment Agency. Flood event information for the defended 1% AEP event including 30% and 50% increase in flow for climate change.
Maximum Flood Hazard Map for the River Ouse, Aire, Humber and Wharfe for the 1% AEP event including climate change	River Ouse And River Wharfe Washlands Climate Change Modelling, July 2018, Mott MacDonald, on behalf of the Environment Agency. Flood event information for the defended 1% AEP event including 30% increase in flow for climate change. Lower River Aire Climate Change Modelling, July 2017, JBA Consulting on behalf of the Environment Agency. Defended flood event information for the 1% AEP event including 30% increase in flow for climate change. River Humber Climate Change Modelling, May 2017, JBA Consulting on behalf of the Environment Agency. Flood event information for the defended 1% AEP event including 30% increase in flow for climate change.
Surface Water Flooding	
Risk of Flooding from Surface Water Map	Environment Agency dataset.
Groundwater Flooding	
Geology	Bedrock and superficial geology underlying the site, based on BGS mapping.
Susceptibility to Groundwater Flooding	The BGS dataset 'Susceptibility to Groundwater Flooding' is divided into four different risk bands ranging from <25%; 25% - <50%, 50% - 75% and >75%.
Other sources	
Risk of flooding from reservoirs	As identified on the Environment Agency Long Term Flood Risk Map ¹⁰ .
Summary	

¹⁰ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

A written overview of the risk of flooding to the site from all sources based on the information within the proforma.

Site Specific Recommendations

Recommendations for how development could be delivered on the site to meet the requirements of Part 2 of the Exception Test i.e. that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall. Recommendations are made in line with the development management measures presented within the Level 1 SFRA and typically address the following:

- Applying sequential approach within development site;
- Setting back development from the edge of watercourses;
- Finished floor levels;
- Floodplain compensation storage;
- Access and egress arrangements;
- Flood Warning and Evacuation procedures;
- Surface water management;
- Further investigation of groundwater levels.

2.3 Future Updates to the SFRA

2.3.1 SFRAs are intended to be living documents that are kept up to date as information on flood risk management changes. The Environment Agency [SFRA guidance](#) available online¹¹ states that in order to remain up to date, it is necessary to update a SFRA to incorporate any changes to:

- the predicted impacts of climate change on flood risk;
- detailed flood modelling - from the Environment Agency or Lead Local Flood Authority;
- the local plan, spatial development strategy or relevant local development documents;
- local flood management schemes;
- flood risk management plans;
- shoreline management plans;
- local flood risk management strategies;
- national planning policy or guidance.

¹¹ <https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment>

Appendix A Site Proformas

Site Name	Location
BURN-G	Burn Airfield;
CFAB-A	RAF Church Fenton, Church Fenton (Ulleskelf Parish)
SELB-AG	Rigid Group Ltd, Denison Road, Selby
SELB-B	Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby
SELB-BO	Land off Canal Road
SELB-BX	Land to West of Selby Business Park, Selby (Brayton Parish)
SELB-BZ	Land at Cross Hills Lane, Selby
SELB-CC	Olympia Park, Barlby Road, Barlby
SELB-CG	Land off Friars Meadow, Selby Town
SELB-CH	Land at Cockret Farm, Selby
SELB-CL	Land adjacent to St. James's Church, Selby
SELB-CM	Land at Benedict Avenue, Selby
SELB-CN	Land at Richard Street, Selby
SELB-E	Holmes Field, South of Lordship Lane, Selby
TADC-I	Land at Mill Lane.
SELB-CA	Olympia Park, Barlby Road, Barlby
SELB-CB	Land between A19 and A63 bypass
SELB-CO	Land at Former Police Station Site, Selby
TADC-AI	Land East of Britannia Car Park

Site Name: BURN-G – Burn Airfield, Burn			
Site ID:	BURN-G	Area (ha):	228.8
Proposed Use:	Mixed Use – Residential and Employment	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Aire		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
1%	1%	98%	0%	99%

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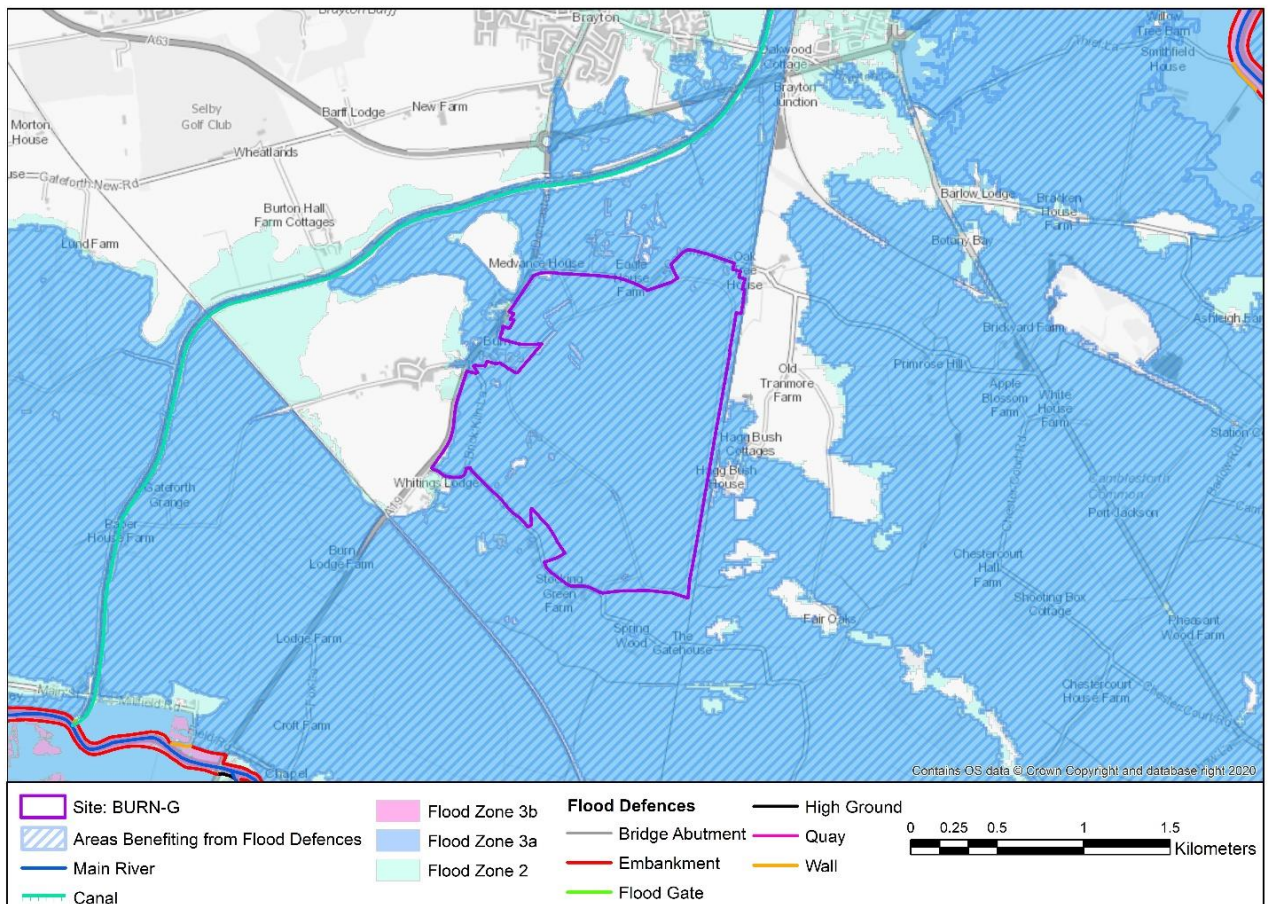


Figure A - Flood Zones

Flood Warning Area	N/A
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Site Name: BURN-G – Burn Airfield, Burn

River Flooding

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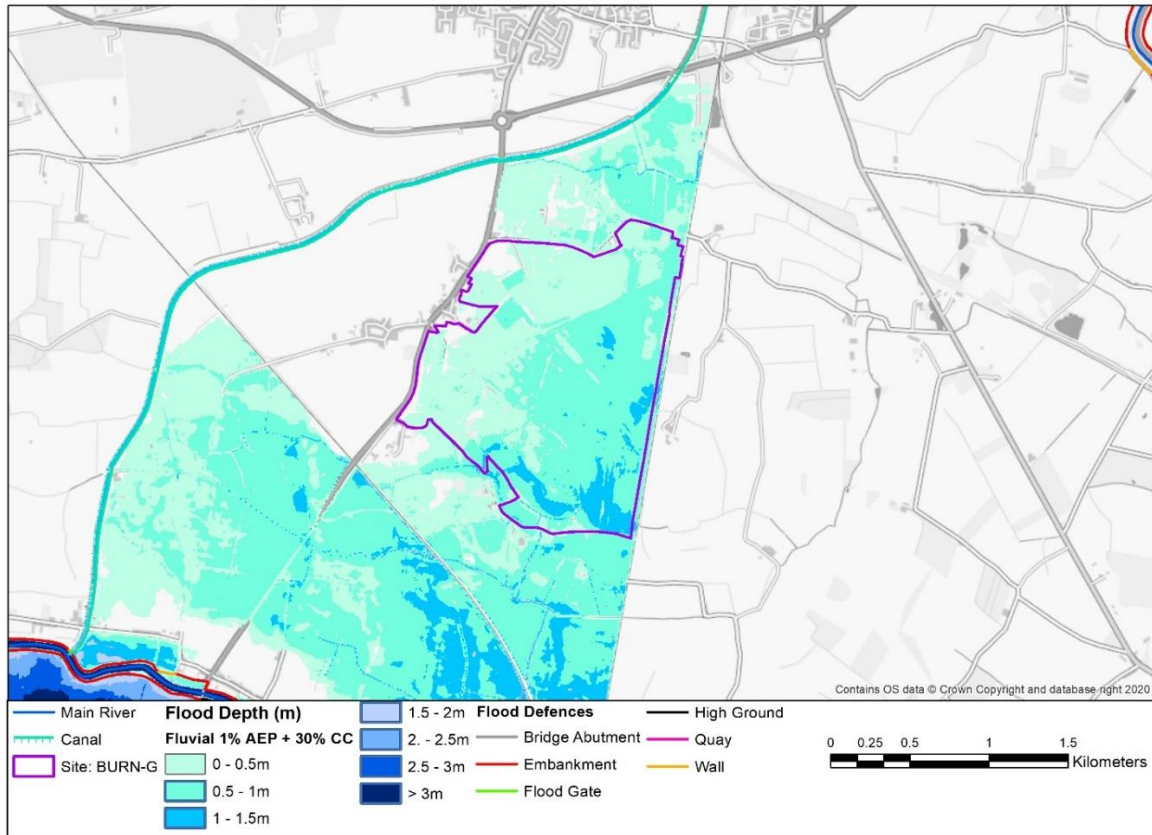


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: BURN-G – Burn Airfield, Burn

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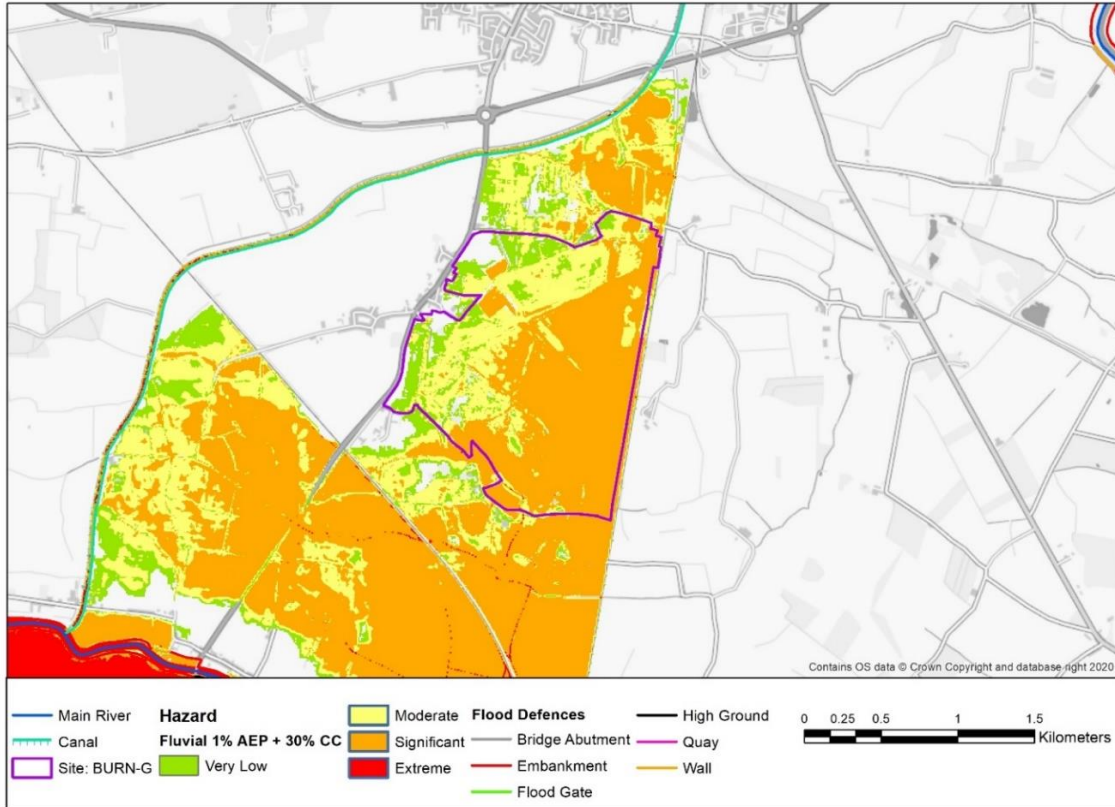


Figure C - Maximum Hazard 1% AEP including climate change (+30%), including flood defences

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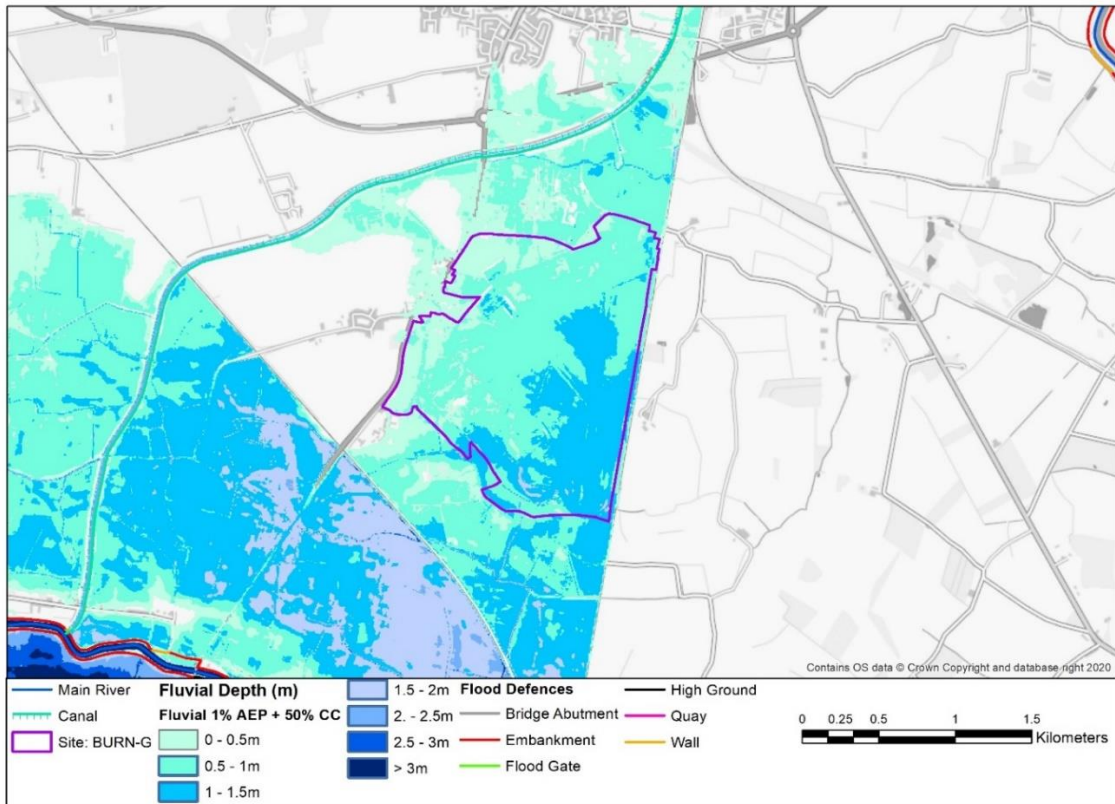


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: BURN-G – Burn Airfield, Burn

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

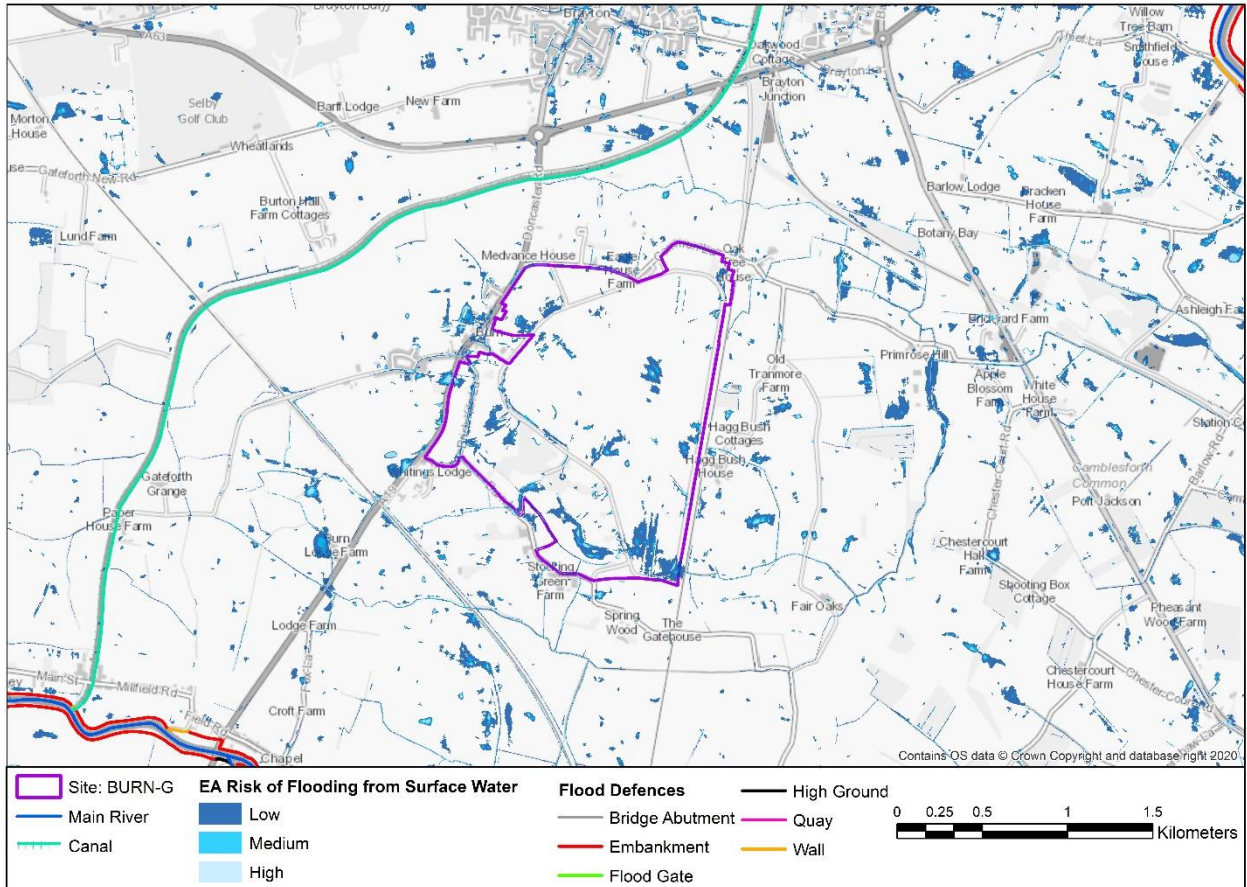


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Silt and Sand
Susceptibility to Groundwater Flooding (BGS)	There is mixed potential for groundwater flooding to occur across the site ranging from 0% to <25%		
Other Sources			
Risk of flooding from reservoirs	The Long-Term Flood Risk Map shows that the site could be at risk of flooding in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir).		

Site Name: BURN-G – Burn Airfield, Burn

Summary

The site is at risk of flooding from the River Aire which is approximately 2km from the southern end of the site. The majority of the site (98%) is defined as Flood Zone 3a - High probability of flooding from rivers or the sea, with the remaining area divided between Flood Zone 2 - Medium probability of flooding from rivers or the sea (1%) and Flood Zone 1 - Low probability of flooding from rivers or sea (1%).

The flood defences along the River Aire that provide a degree of protection to the site are classified as being in Fair- Good condition within closest proximity of the site. The site is at residual risk of flooding despite the presence of defences. The defences consist of a series of flood storage areas and embankments. There are no defences within the site but the defences along the River Aire as discussed help to provide protection from flooding of the site.

Modelling shows the site to be at increased risk of flooding when considering the impact of climate change, the risk is more significant for the 50% uplift on the 1% AEP event compared to 30%. During the modelled 1% AEP event including 30% climate change, flood levels across the site vary from 0.0 – 1.5m with the greatest depths located to the south east corner of the site. During the modelled 1% AEP event including 50% climate change, maximum flood depths vary from 0 - 2m across the site.

The site is split mainly between Moderate and Significant Hazard for the 1% AEP plus 30% climate change uplift to flows.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to pond within the site. Mapping identifies the potential for surface water to flow and pond within the site, and also on the roads adjacent to the site including Burn Lane, Brick Kiln Lane, A19 and Common Lane.

There is mixed potential for groundwater flooding to occur across the site ranging from 0% to <25%.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test can be satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding / areas of the site with a Very Low – Moderate Flood Hazard rating. Areas of the site to the North and West are suitable for sleeping accommodation and the South and East of the site are more suitable for Employment due to associated flood depths with the 1% AEP plus 30% and 50% climate change.
- Finished floor levels or raised development platforms should be set 300mm above the 1% AEP flood level including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation is not recommended to be on the ground floor. The ground floor should be set 300mm above the flood level for the 1% AEP event including appropriate allowance for climate change.
- The proposed development must not reduce the ability of the floodplain to store water. This should be considered in relation to the 1% AEP modelled flood event including 30% allowance for climate change. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis, or informed by hydraulic modelling for a range of return period events. Given that 98% of the site is classed as Flood Zone 3a, it will be challenging to achieve compensatory storage within the red line boundary of the site and off-site compensatory storage may be required. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- The Selby Canal could cause flooding of the site as the land surrounding the site is very flat. This risk will need to be investigated in more detail as part of a Flood Risk Assessment to develop the site.
- Breach modelling of the River Aire/ Selby Canal is recommended to be undertaken as part of a site specific FRA.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the extreme water level (0.1% AEP) including an allowance for climate change.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. There are a number of small drains to the North and South of the site which could be potential discharge points. If these drains are not to be modelled a 20m buffer strip for development will be required. This should be discussed with the Internal Drainage Board (IDB) and Lead Local Flood Authority (LLFA) upon appointment.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the IDB and the LLFA upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: CFAB-A– RAF Church Fenton, Church Fenton (Ulleskelf Parish), Church Fenton Airbase

Site ID:	CFAB-A	Area (ha):	181.79
Proposed Use:	Mixed Use – Residential and Employment	Vulnerability Classification:	More Vulnerable
Watercourses near the site	Carr Dyke (ordinary watercourse) , River Wharfe		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
8%	92%	0%	0%	0%

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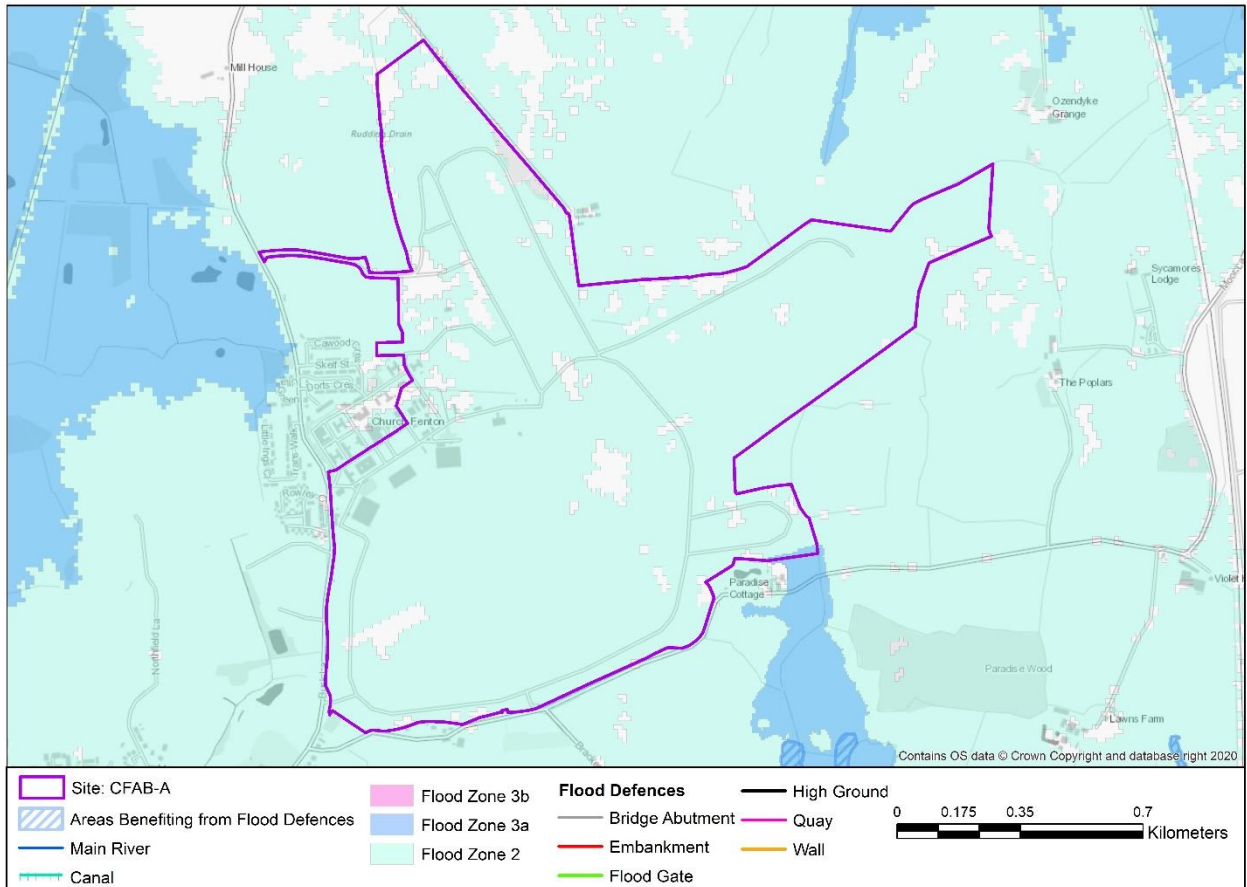


Figure A - Flood Zones

Flood Warning Area	N/A
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Site Name: CFAB-A– RAF Church Fenton, Church Fenton (Ulleskelf Parish), Church Fenton Airbase

River Flooding

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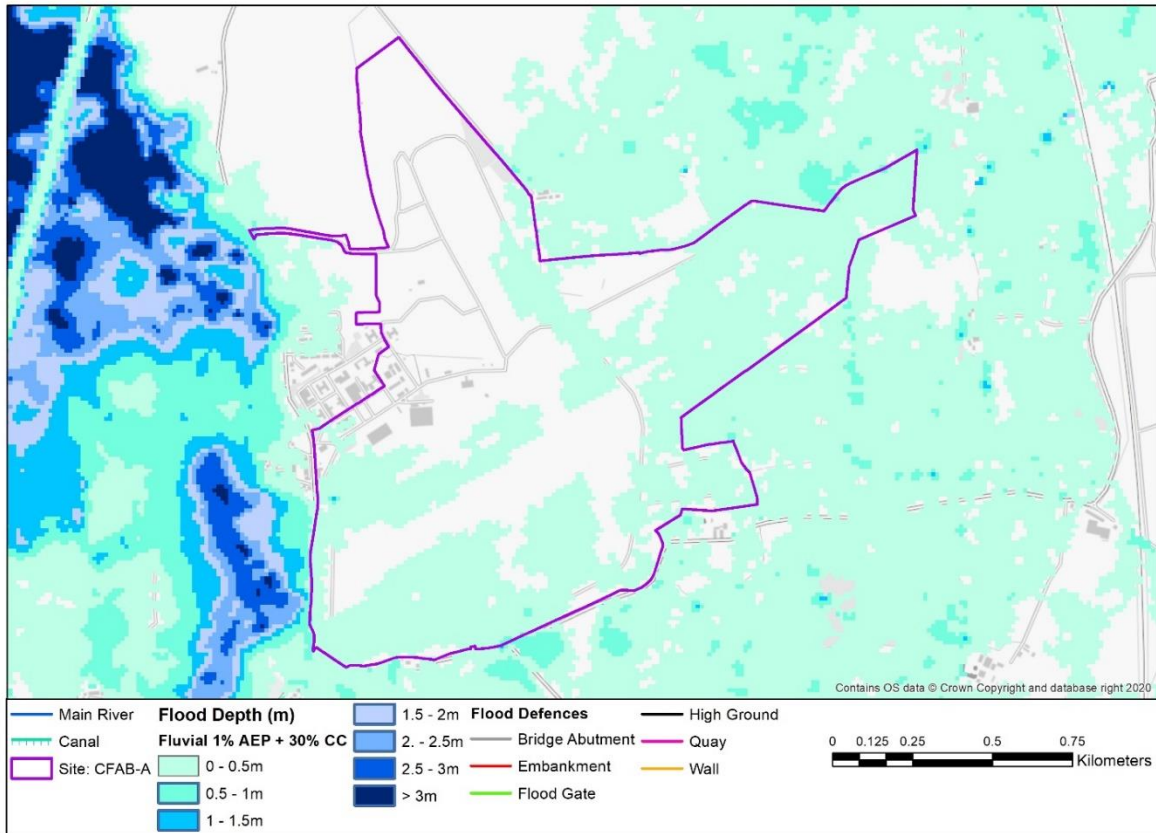


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%)

Site Name: CFAB-A- RAF Church Fenton, Church Fenton (Ulleskelf Parish), Church Fenton Airbase

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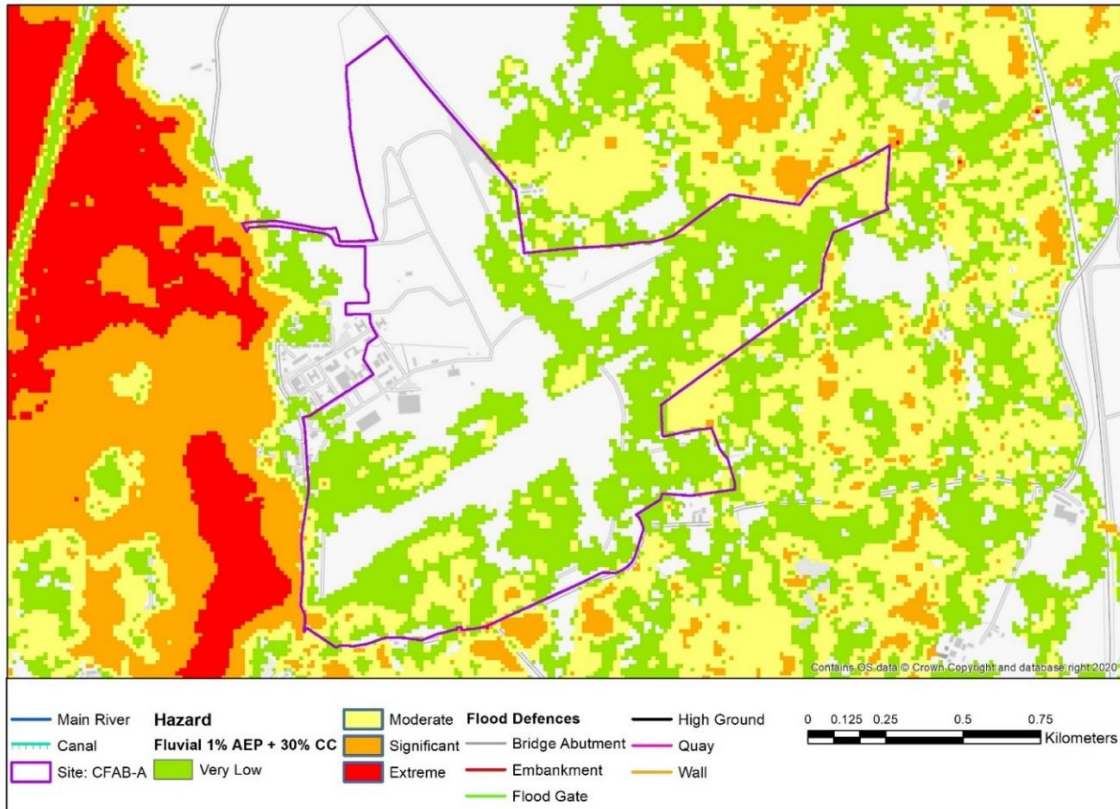


Figure C - Maximum Hazard 1% AEP including climate change (+30%)

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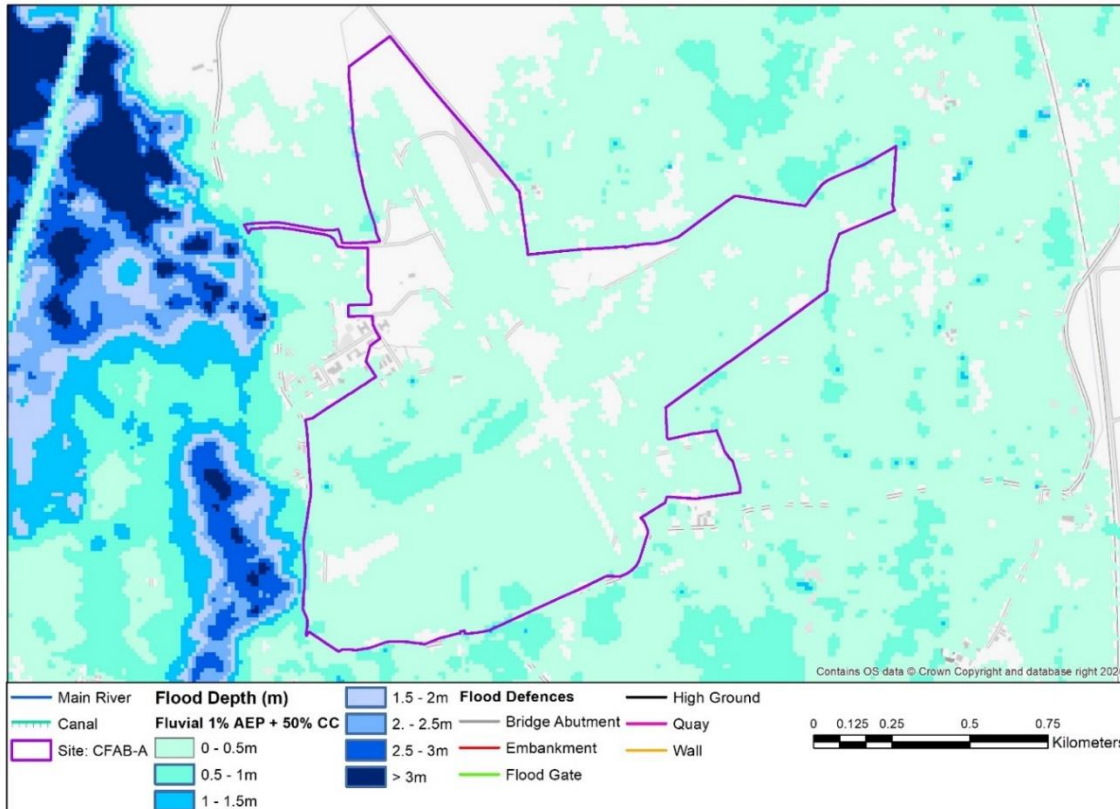


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%)

Site Name: CFAB-A– RAF Church Fenton, Church Fenton (Ulleskelf Parish), Church Fenton Airbase

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

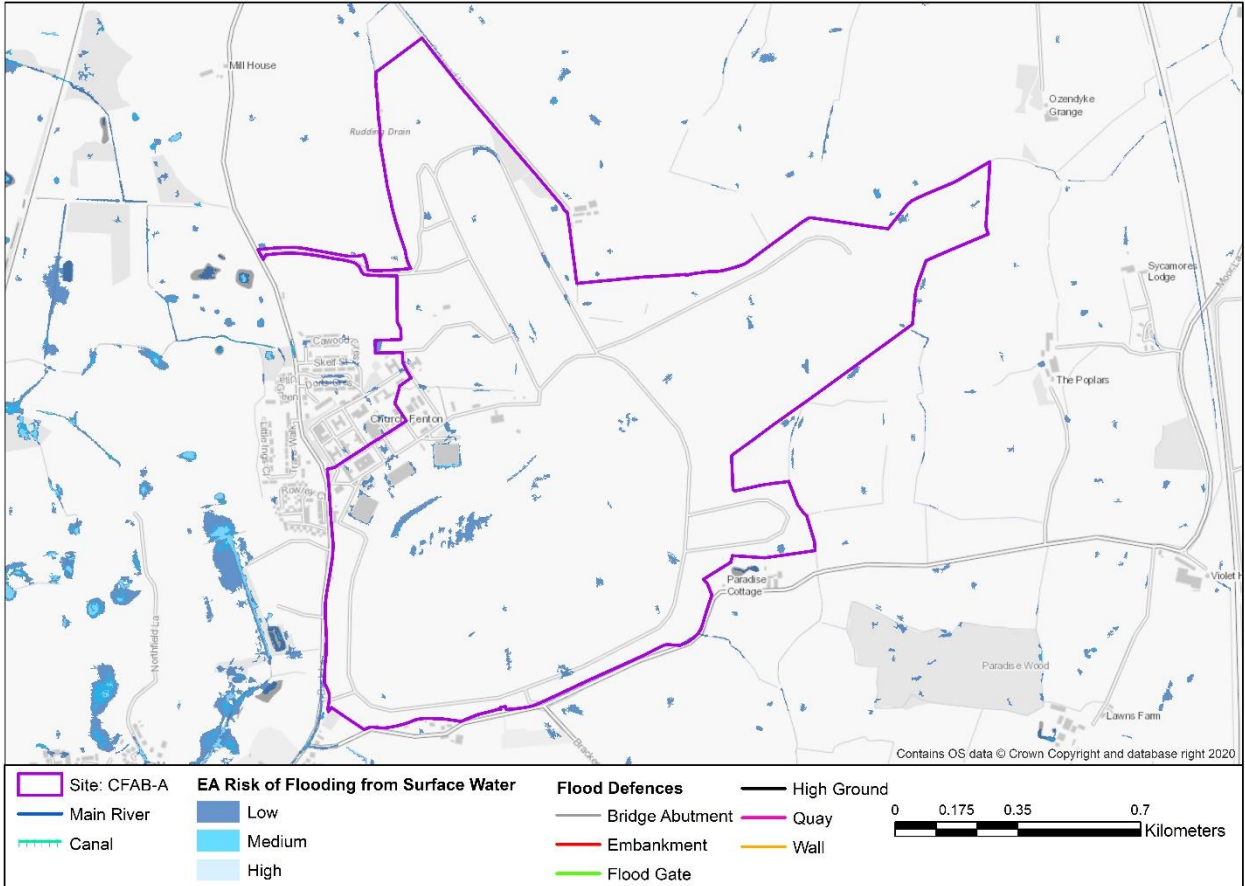


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Sand
Susceptibility to Groundwater Flooding (BGS)		There is mixed potential for groundwater flooding to occur across the site ranging from 25% to >75%	
Other Sources			
Risk of flooding from reservoirs	The Long-Term Flood Risk Map shows that a small part of the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir).		

Site Name: CFAB-A– RAF Church Fenton, Church Fenton (Ulleskelf Parish), Church Fenton Airbase

Summary

The site is at risk of flooding from the Carr Dyke (an Ordinary Watercourse) and the River Wharfe which is approximately 1km from the site. The majority of the site (92%) is defined as Flood Zone 2 - Medium probability of flooding from rivers or the sea, with the remaining area (8%) located within Flood Zone - 1 Low probability of flooding from rivers or the sea.

The flood defences along the River Wharfe that help to protect the site are classified as being in Fair- Good condition within closest proximity of the site. The defences consist of a series of flood storage areas, walls and high ground. The site is at residual risk of flooding despite the presence of defences. There are no defences alongside or on the site.

Modelling shows the site to be at risk of flooding when considering the impact of climate change, the risk is more significant for the 50% uplift on the 1% AEP event compared to 30%. During the modelled 1% AEP event including 30% climate change, the site is at risk of flooding and flood depths vary from 0.0 – 0.5m across the site. During the modelled 1% AEP event including 50% climate change, flood depths vary from 0 - 1m across the site.

Hazard ranges across the site from No Risk and Moderate hazard for the 1% AEP plus 30% uplift to flows.

The existing flood defences protect the wider areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to pond within the site.

There is mixed potential for groundwater flooding to occur across the site ranging from 25% to >75%

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test is satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding / areas of the site with a Very Low – Moderate Flood Hazard rating. Areas of the site to the North West are most suitable for residential accommodation due to lower flood depths being associated with those areas. Employment facilities can be situated in those other parts of the site.
- There are some small drains in close proximity of the site that may not have been explicitly included in existing modelling used to inform this site assessment and their associated risk should be considered when developing this site. No development can be within 20 metres of small drains unless modelling has been carried out to assess the risk. This should be agreed with the Internal Drainage Board (IDB) and the Lead Local Flood Authority (LLFA) upon appointment.
- Finished floor levels or raised development platforms should be set 300mm above the 1% AEP flood level including an allowance for climate change (to be discussed with the Environment Agency to ensure that the current guidance is applied). Sleeping accommodation should be set 300mm above the flood level for the 1% AEP event including appropriate allowance for climate change. It is likely that ground floor sleeping accommodation will be appropriate in areas of the site classed as no Hazard - Very Low Hazard.
- The proposed development must not reduce the ability of the floodplain to store water. This should be considered in relation to the 1% AEP modelled flood event including 30% allowance for climate change. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. There is a small drain to the North of the site which could be a potential discharge point. In addition, the site's current use is a small airport, so there may also be existing drainage that could be tapped into on site, subject to appropriate attenuation.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the IDB and the LLFA upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: SELB-AG– Rigid Group Ltd, Denison Road, Selby

Site ID:	SELB-AG	Area (ha):	8.19
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Ouse, Selby Canal		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	0%	95%	5%	95%

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Figure A - Flood Zones

Flood Warning Area	River Ouse at Selby and Barlby
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Site Name: SELB-AG– Rigid Group Ltd, Denison Road, Selby

River Flooding

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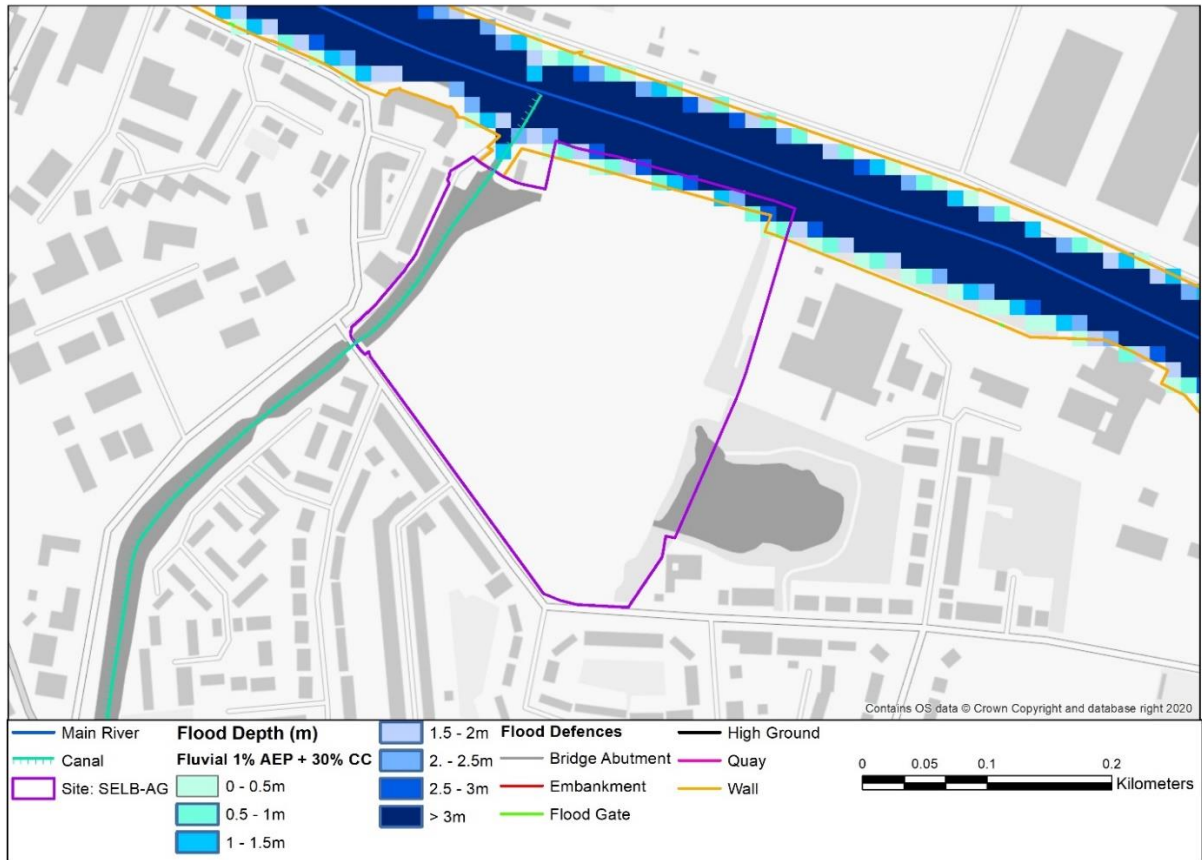


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), taking account of flood defences

Site Name: SELB-AG– Rigid Group Ltd, Denison Road, Selby

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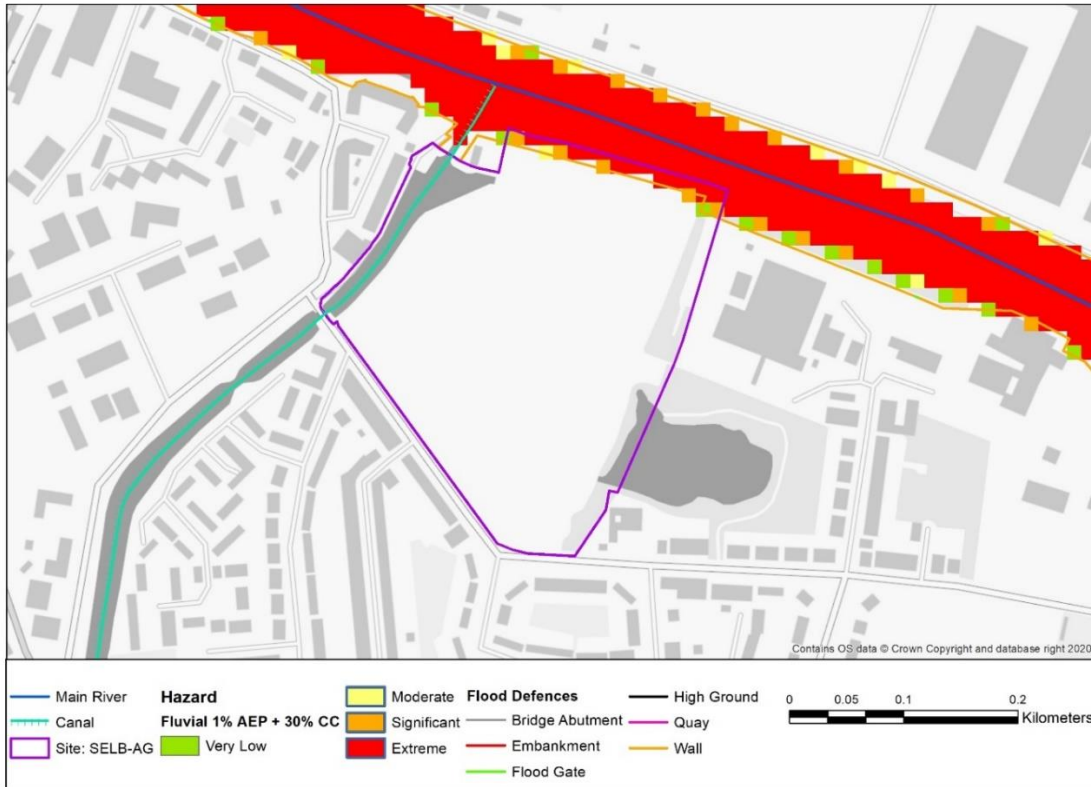


Figure C - Maximum Hazard 1% AEP including climate change (+30%), taking account of flood defences

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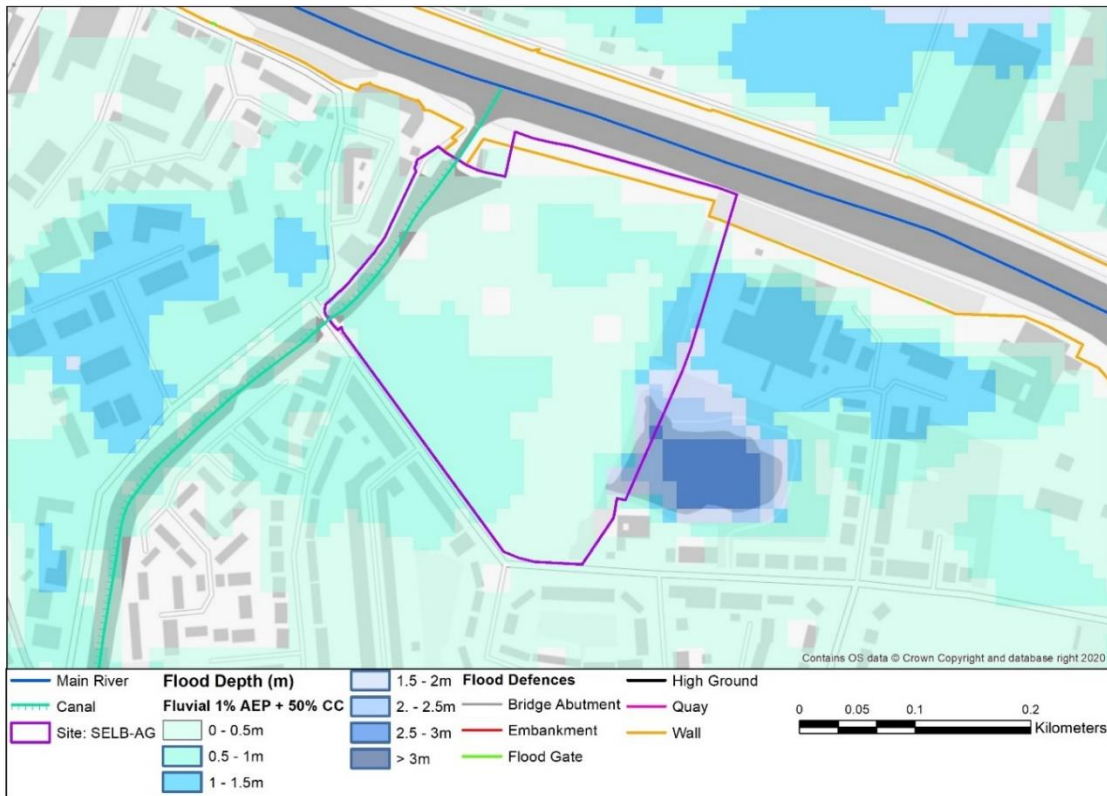


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), taking account of flood defences

Site Name: SELB-AG– Rigid Group Ltd, Denison Road, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

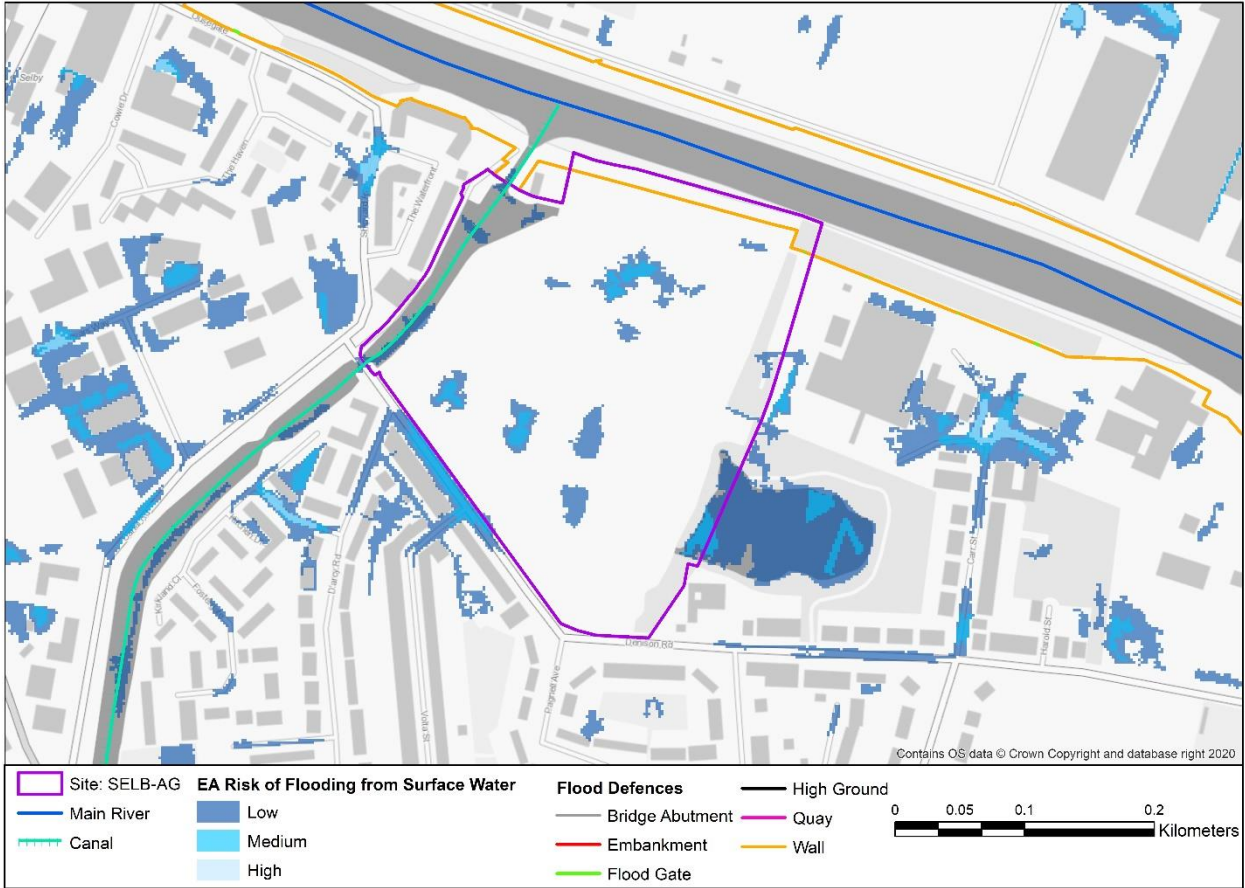


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology

Sherwood Sandstone Group - Sandstone

Superficial Geology

Sand, Clay, Peat and Silt

Susceptibility to Groundwater Flooding (BGS)

There is mixed potential for groundwater flooding to occur across the site ranging from 25% to >75%

Other Sources

Risk of flooding from reservoirs

The Long-Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir).

Site Name: SELB-AG– Rigid Group Ltd, Denison Road, Selby

Summary

The River Ouse flows east to west across the north of the site and Selby Canal flows to the west along the western perimeter of the site. The majority of the site (95%) is defined as Flood Zone 3a - High probability of flooding from rivers or the sea, with a small area (5%) of Flood Zone 3b - Functional Floodplain. The site is located in an area shown as benefitting from flood defences and a stretch of the River Ouse defences are located along the northern boundary of the site.

The flood defences along the River Ouse that border the site are classified as being in Fair- Good condition. The defences consist of a series of flood storage areas and embankments. There is a floodgate which opens on to Selby Canal and there is residual risk of flooding from the Canal itself. The defences protect the site from flooding, but there is still a residual risk of the site flooding if the defences were to be breached or there is a large enough event.

Modelling shows the site to be at limited risk of flooding from the River Ouse due to the presence of flood defences. The site is only flooded during the 1% AEP plus 50% climate change uplift and flood depths vary from 0 – 1m across the site.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is advised.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site, and also on Denison Road adjacent to the site.

There is mixed potential for groundwater flooding to occur across the site ranging from 25% to >75%.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test is satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding / areas of the site with a Very Low – Moderate Flood Hazard rating. Residential accommodation should not be placed directly behind the defences on the River Ouse or directly next to the Selby Canal due to residual risk associated if either were breached.
- Breach modelling should be undertaken as part of a site specific FRA.
- There is no flooding in the 1% AEP plus 30% climate change due to the presence of defences, therefore site levels should be based upon those from a breach. Finished floor levels or raised development platforms should be set 300mm above the River Ouse 1% AEP flood level resulting from a breach of defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the 1% AEP breach level including an allowance for climate change. Ground floor sleeping accommodation is unlikely to be appropriate on the site due to the proximity flood defences and the risk of rapid inundation in the event of a breach.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 50% climate change uplift but none for the 1% AEP plus 30% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level (1% AEP) including an allowance for climate change.
- As part of a site specific FRA, the Canal and River Trust must be consulted to understand the risk of flooding from the canal and any potential impacts of the operation philosophy for the lock / flood gate where the canal meets the River Ouse.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The River Ouse and the Selby canal border the site and these could be potential discharge points.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Canal and Rivers Trust upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.
- Developments are not appropriate within the functional floodplain 3b unless it is water compatible.

Site Name: SELB-B– Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

Site ID:	SELB-B	Area (ha):	15.02
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Ouse, Selby Canal		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
2%	15%	83%	0%	88%

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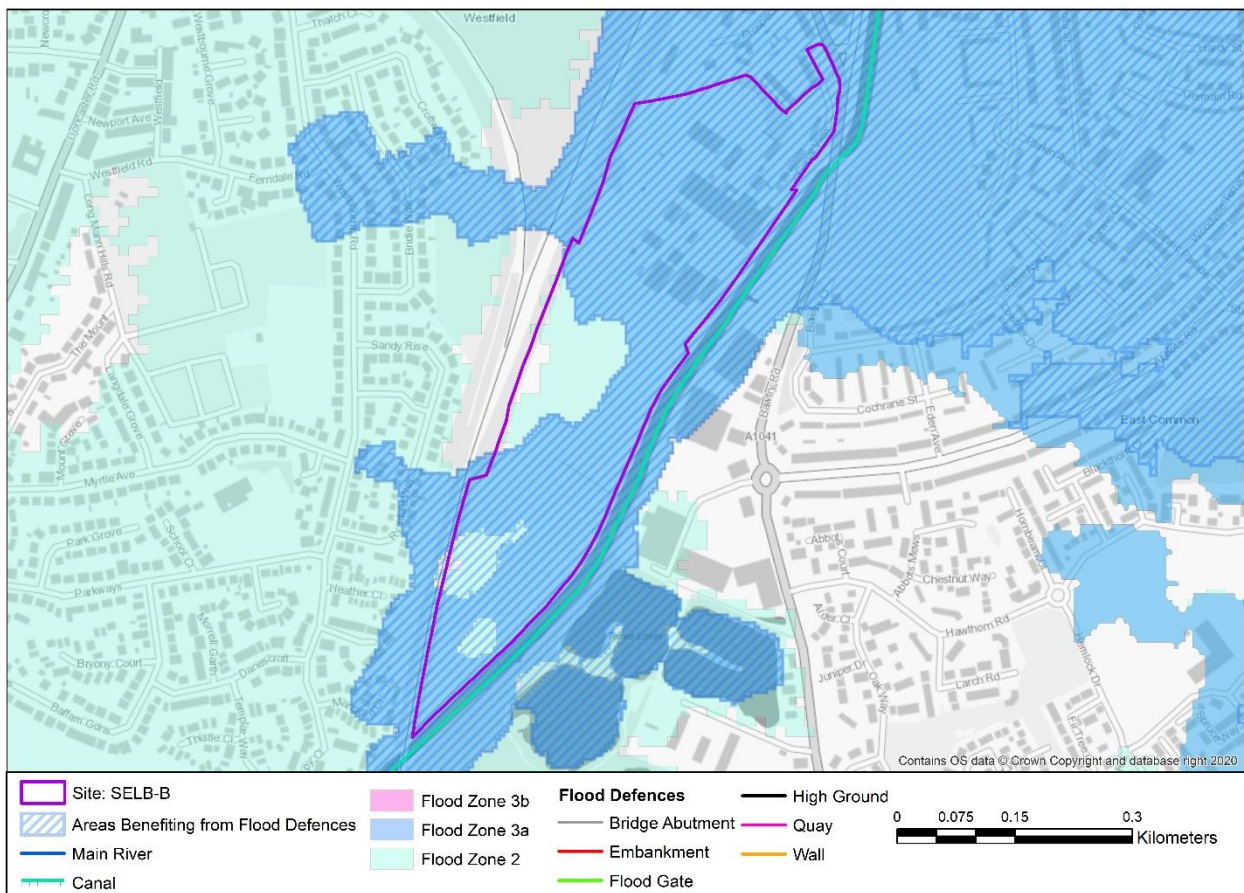


Figure A - Flood Zones

Flood Warning Area	River Ouse at Selby and Barlby
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Site Name: SELB-B- Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

River Flooding

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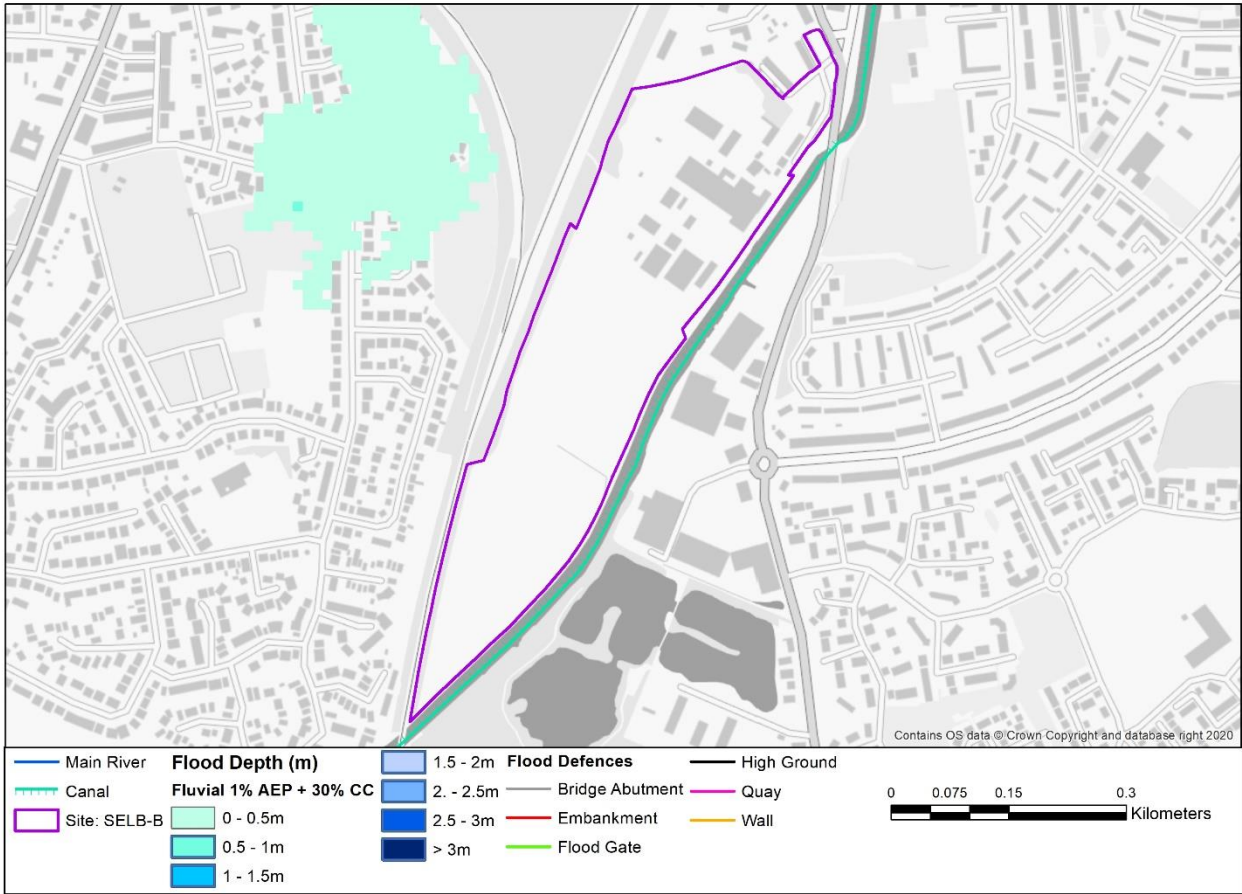


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), taking account of flood defences

Site Name: SELB-B– Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

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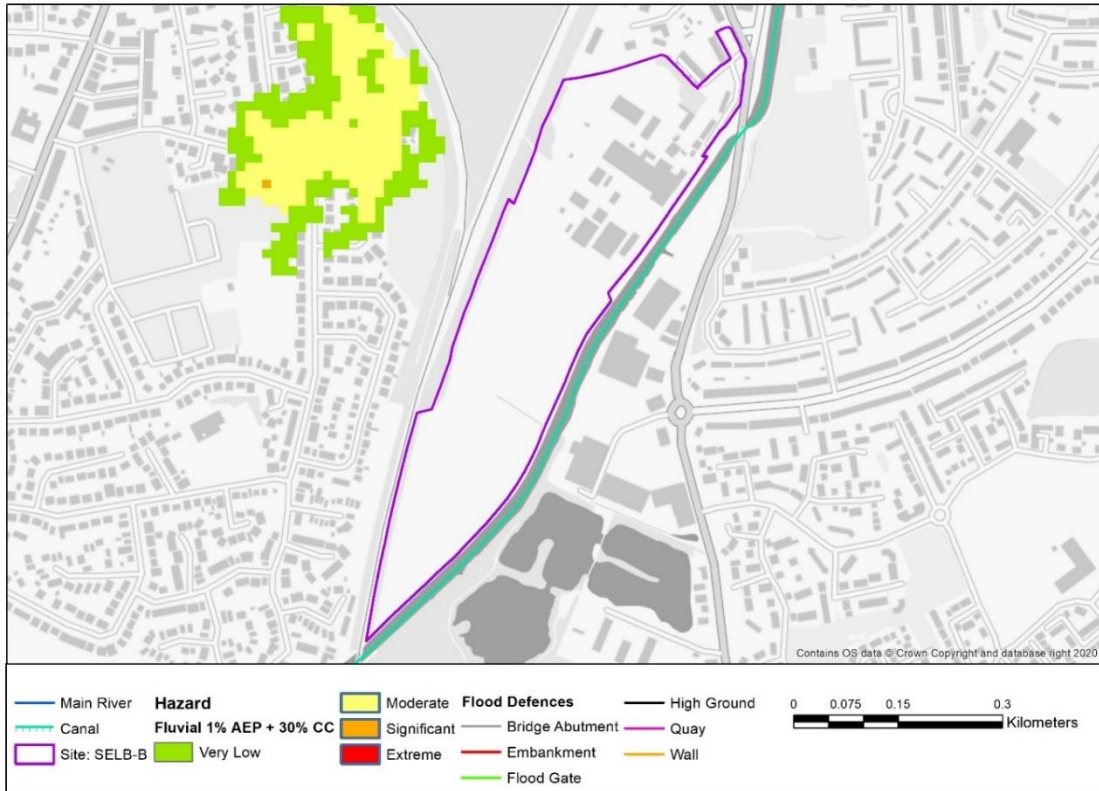


Figure C - Maximum Hazard 1% AEP including climate change (+30%), taking account of flood defences

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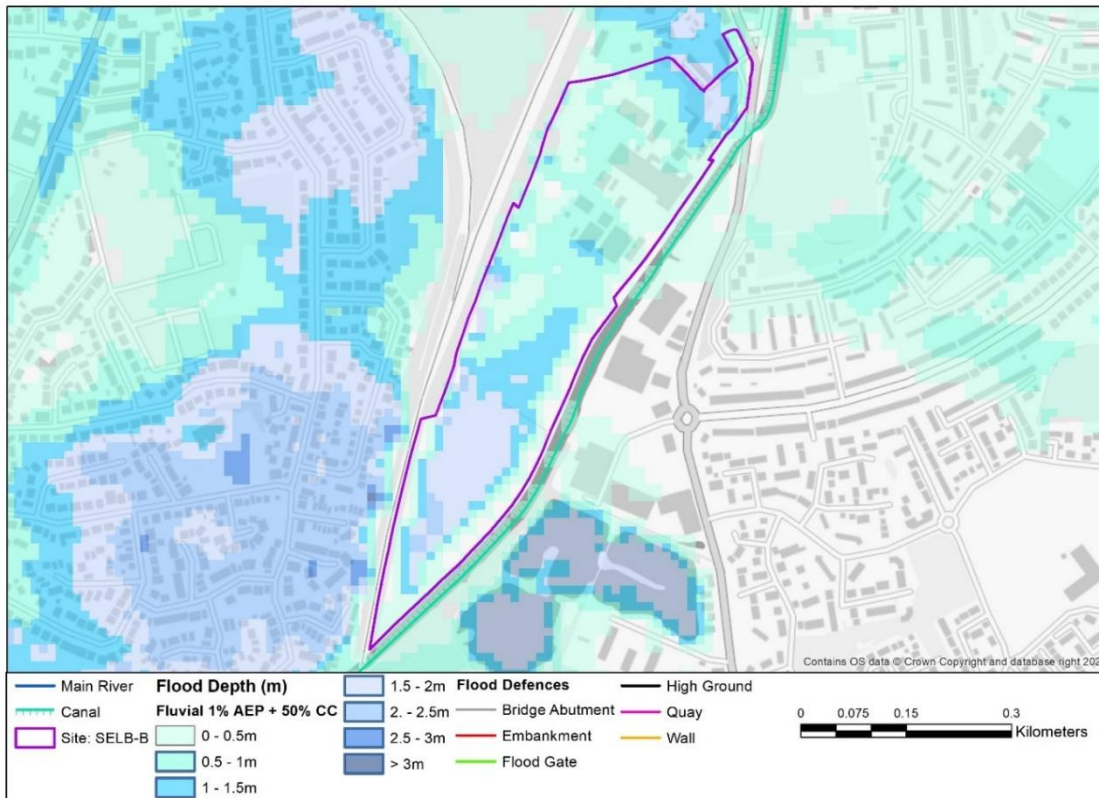


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), taking account of flood defences

Site Name: SELB-B– Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High



Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Sand, Clay, and Silt
Susceptibility to Groundwater Flooding (BGS)	<25%		
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir).		

Site Name: SELB-B– Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

Summary

The Selby Canal flows southwards along the eastern perimeter of the site. The majority of the site (83%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, the rest of the site is divided between (15%) Flood Zone 2 Medium probability of flooding from rivers or sea and (2%) Flood Zone 1 Low probability of flooding from rivers or sea. The site is located in an area shown as benefitting from flood defences due to the presence of defences along the River Ouse and the presence of the flood gate on Selby Canal that protect the site.

The flood defences along the River Ouse are classified as being in Fair- Good condition within closest proximity of the site. The defences consist of a series of flood storage areas and embankments. There is a floodgate which opens on to Selby Canal and there is residual risk of flooding from the Canal itself. The defences protect the site from flooding, but there is still a residual risk of the site flooding if the defences were to be breached or there is a large enough event.

Modelling shows the site to be at limited risk of flooding from the River Ouse via the Selby Canal due to the presence of flood defences on the River Ouse. The site is only flooded during the 1% AEP plus 50% climate change uplift and flood levels vary from 0 – 2m across the site.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is advised.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site.

Broadscale mapping identifies that there is <25% susceptibility for groundwater flooding to occur across the site

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test is satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard rating. Residential accommodation should not be placed directly behind the defences on the River Ouse or directly next to the Selby Canal due to residual risk associated if either were breached. Residential Properties should be sequentially placed in areas of lower flood water depth, and should be preferably placed in the North West portion of the site.
- Breach modelling should be undertaken as part of a site specific FRA
- There is no flooding in the 1% AEP plus 30% climate change due to the presence of defences, therefore site levels should be based upon those from a breach. Finished floor levels or raised development platforms should be set 300mm above the River Ouse/ Selby Canal 1% AEP flood level resulting from a breach of defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the 1% AEP breach level including an allowance for climate change. Ground floor sleeping accommodation is unlikely to be appropriate on the site due to the proximity flood defences and the risk of rapid inundation in the event of a breach.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 50% climate change uplift but none for the 1% AEP plus 30% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- The Canal and River Trust should be consulted to understand the operation and maintenance of the canal and associated assets, and the potential impact on flood risk to the site.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level (1% AEP) including an allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The Selby Canal skirts the perimeter the site which could be potential discharge point, subject to agreement with the Canal and River Trust.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Canal and Rivers Trust upon appointment .
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: SELB-BO – Land off Canal Road				
Site ID:	SELB-BO	Area (ha):	0.23	
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable	
Watercourses near the site	River Ouse, Selby Canal			
Area of site within each Flood Zones and associated mapping				
Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	0%	100%	0%	100%

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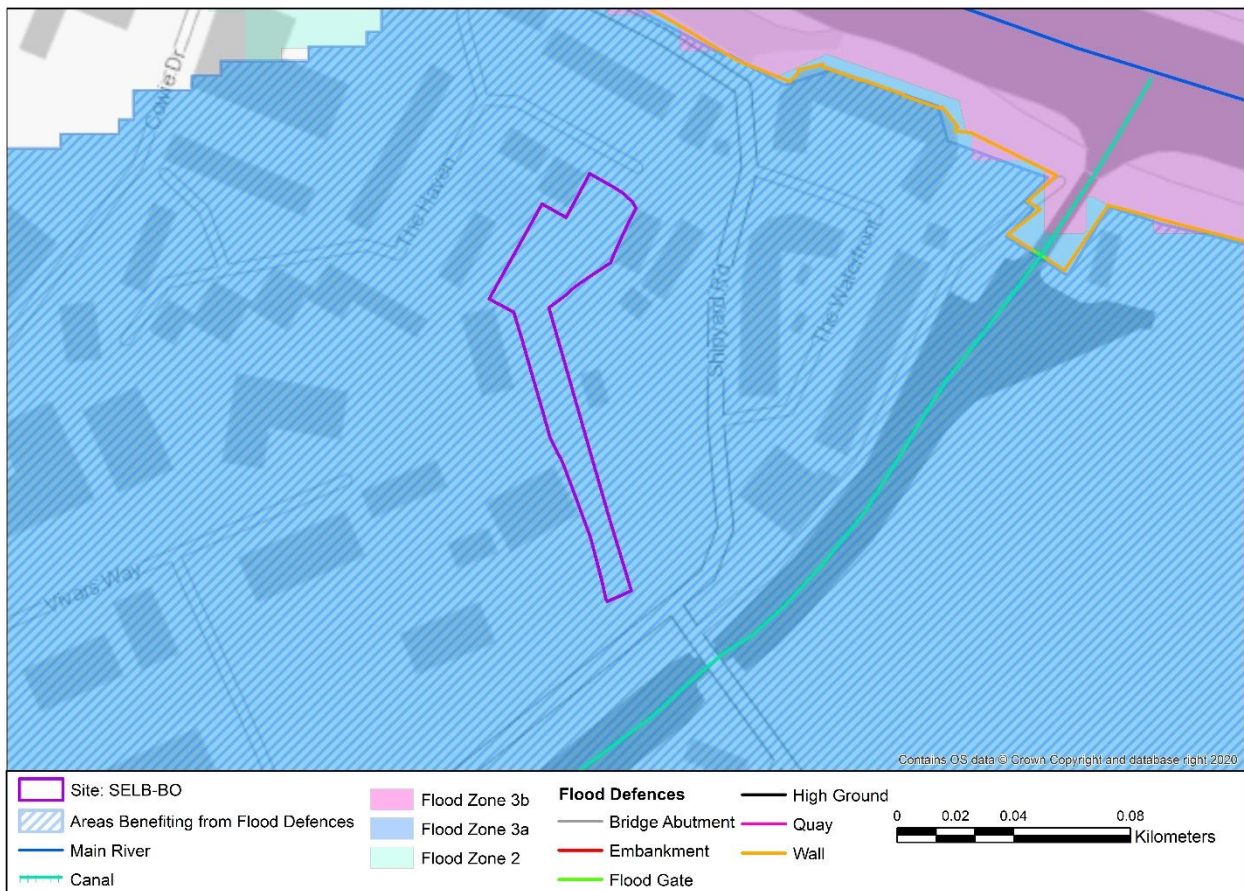


Figure A - Flood Zones

Flood Warning Area	River Ouse at Selby and Barlby
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Site Name: SELB-BO – Land off Canal Road

River Flooding

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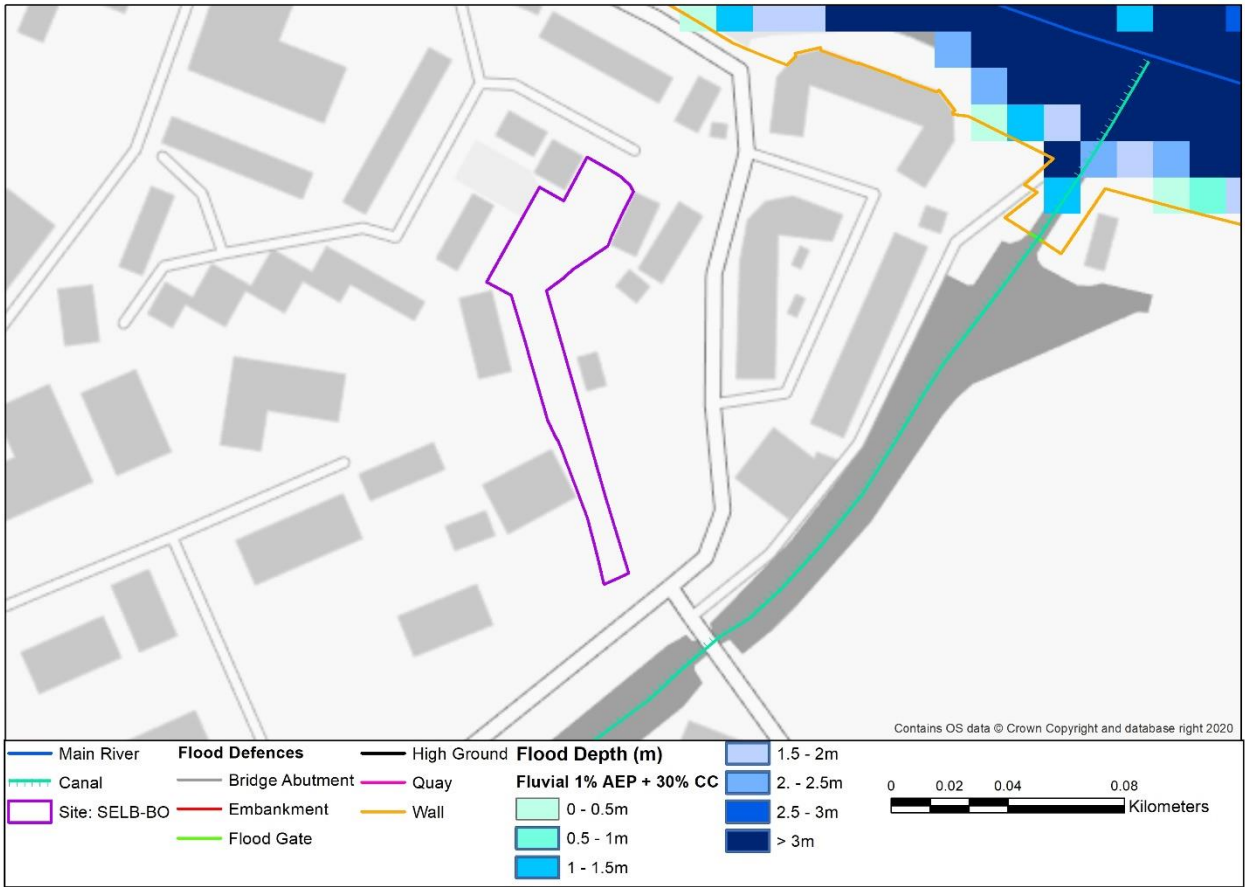


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-BO – Land off Canal Road

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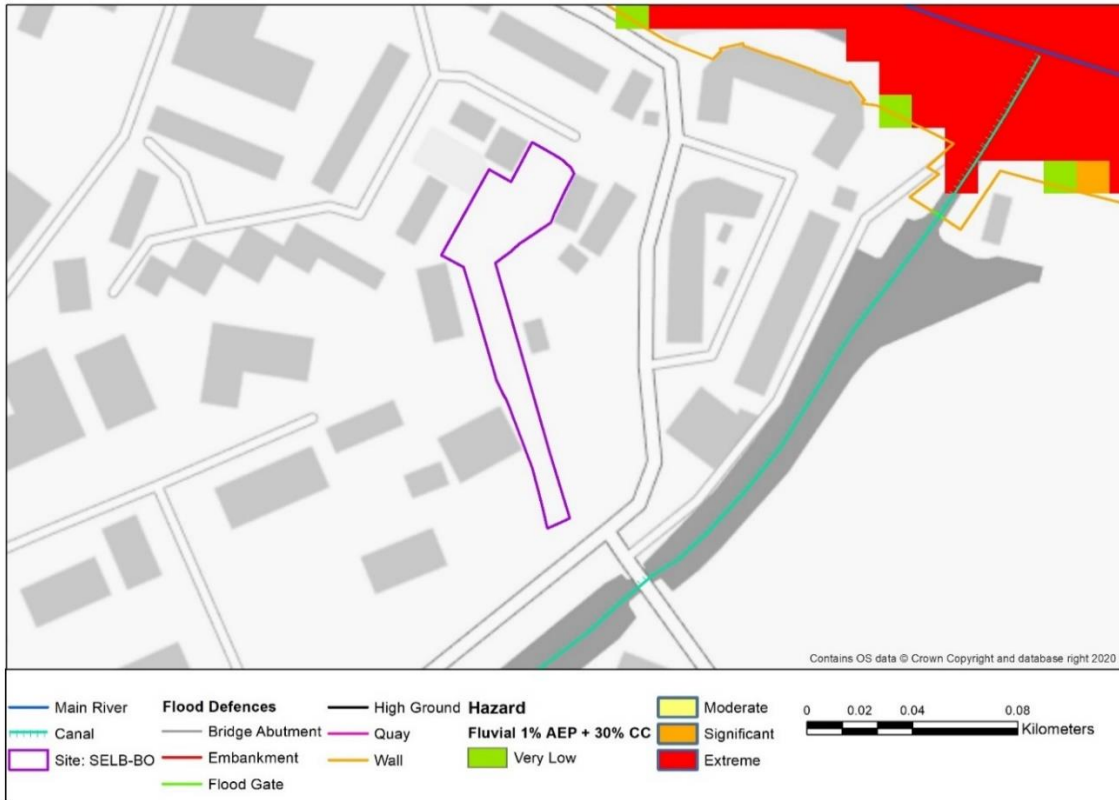


Figure C - Maximum Hazard 1% AEP including climate change (+30%), including flood defences

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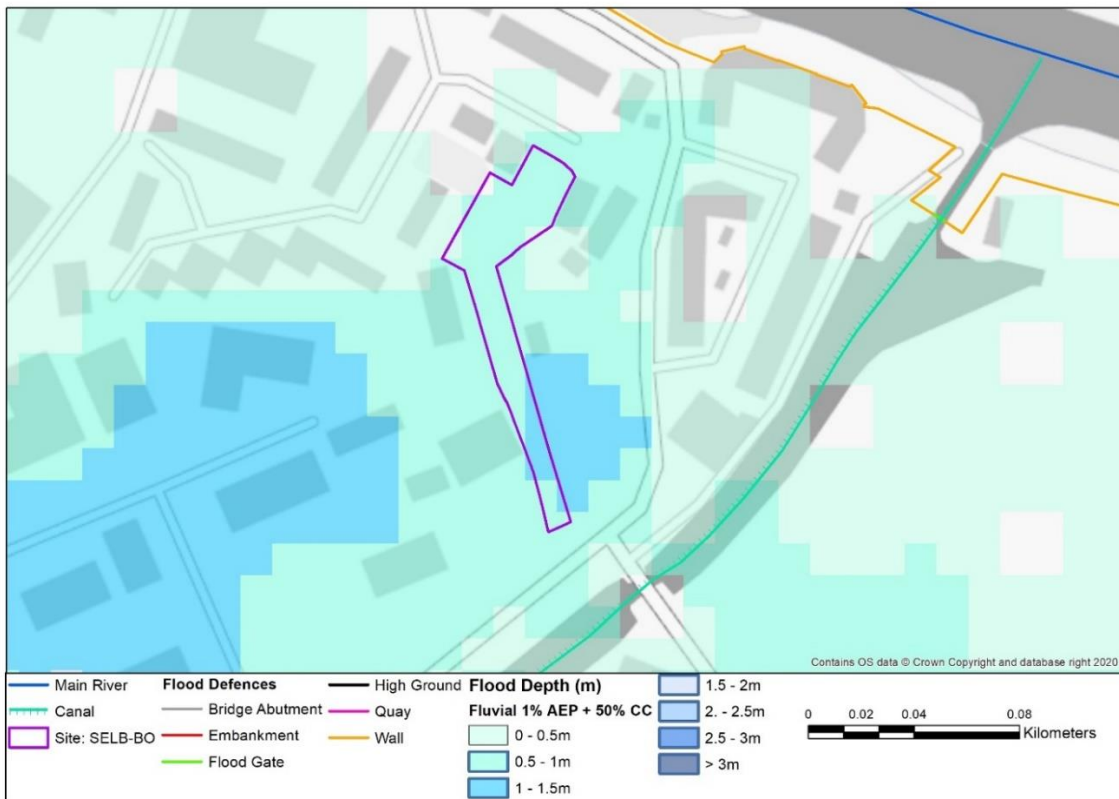


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: SELB-BO – Land off Canal Road

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

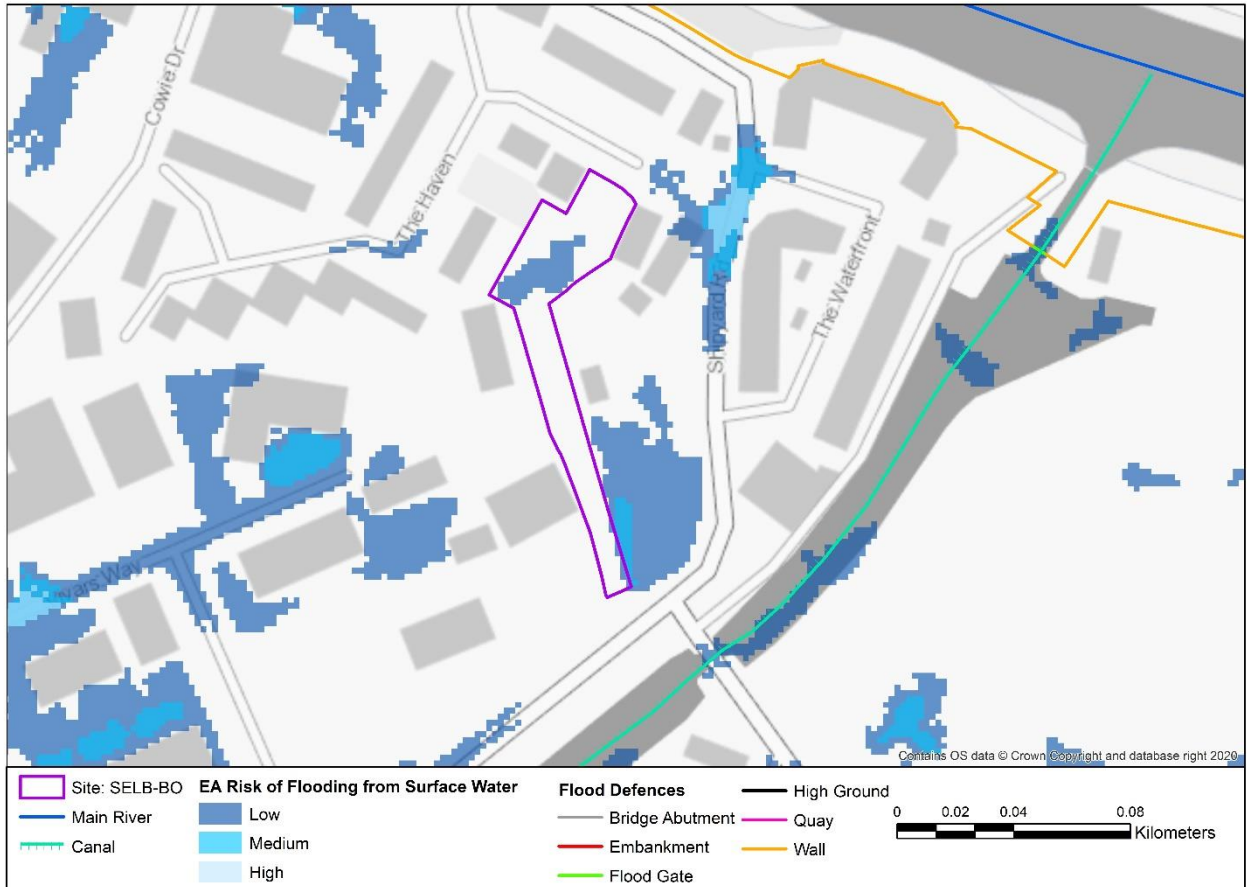


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Silt and Peat
Susceptibility to Groundwater Flooding (BGS)	<75%		
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir).		

Site Name: SELB-BO – Land off Canal Road

Summary

The entire site (100%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, but located wholly within an Area Benefiting from Flood Defences. This is due to the presence of flood defences along the River Ouse which are near the site (<100m).

The flood defences along the River Ouse that protect the site are classified as being in Fair- Good condition. The defences consist of a series of flood storage areas and embankments. There is a floodgate which opens on to Selby Canal and there is residual risk of flooding from the Canal itself. The defences protect the site from flooding, but there is still a residual risk of the site flooding if the defences were to be breached or there is a large enough event.

Modelling shows the site to be at limited risk of flooding due to the presence of flood defences. The site is only flooded during the 1% AEP plus 50% climate change uplift and flood levels vary from 0 – 1.5m across the site.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is advised.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to pond within the site, and also on Shipyard Road adjacent to the site. The ponding of surface water towards the southern end of the site is occurring on an area of abandoned grass land that is likely to be undrained. The ponding on Shipyard Road is occurring mainly along the road but there is a car park outside the front of a tool store which is where surface water is seen to be accumulating.

Broadscale mapping identifies that there is >75% susceptibility for groundwater flooding to occur across the site

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating. Housing should be positioned preferentially to the North of the site where flood depths are lower.
- Breach modelling should be undertaken as part of a site specific FRA
- There is no flooding in the 1% AEP plus 30% climate change due to the presence of defences, therefore site levels should be based upon those from a breach. Finished floor levels or raised development platforms should be set 300mm above the River Ouse/ Selby Canal 1% AEP flood level resulting from a breach of defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the 1% AEP breach level including an allowance for climate change. Ground floor sleeping accommodation is unlikely to be appropriate on the site due to the proximity flood defences and the risk of rapid inundation in the event of a breach.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 50% climate change uplift but none for the 1% AEP plus 30% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level (1% AEP) including an appropriate allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- As part of a site specific FRA, the Canal and River Trust must be consulted to understand the risk of flooding from the canal and any potential impacts of the operation philosophy for the lock / flood gate where the canal meets the River Ouse.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The Selby Canal is within close proximity of the southern end of the site and it could be potential discharge point subject to agreement by the Canal and River Trust.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Canal and Rivers Trust upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: SELB-BX– Land to West of Selby Business Park, Selby (Brayton Parish)

Site ID:	SELB-BX	Area (ha):	1.99
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	Selby Canal		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
30%	70%	0%	0%	0%

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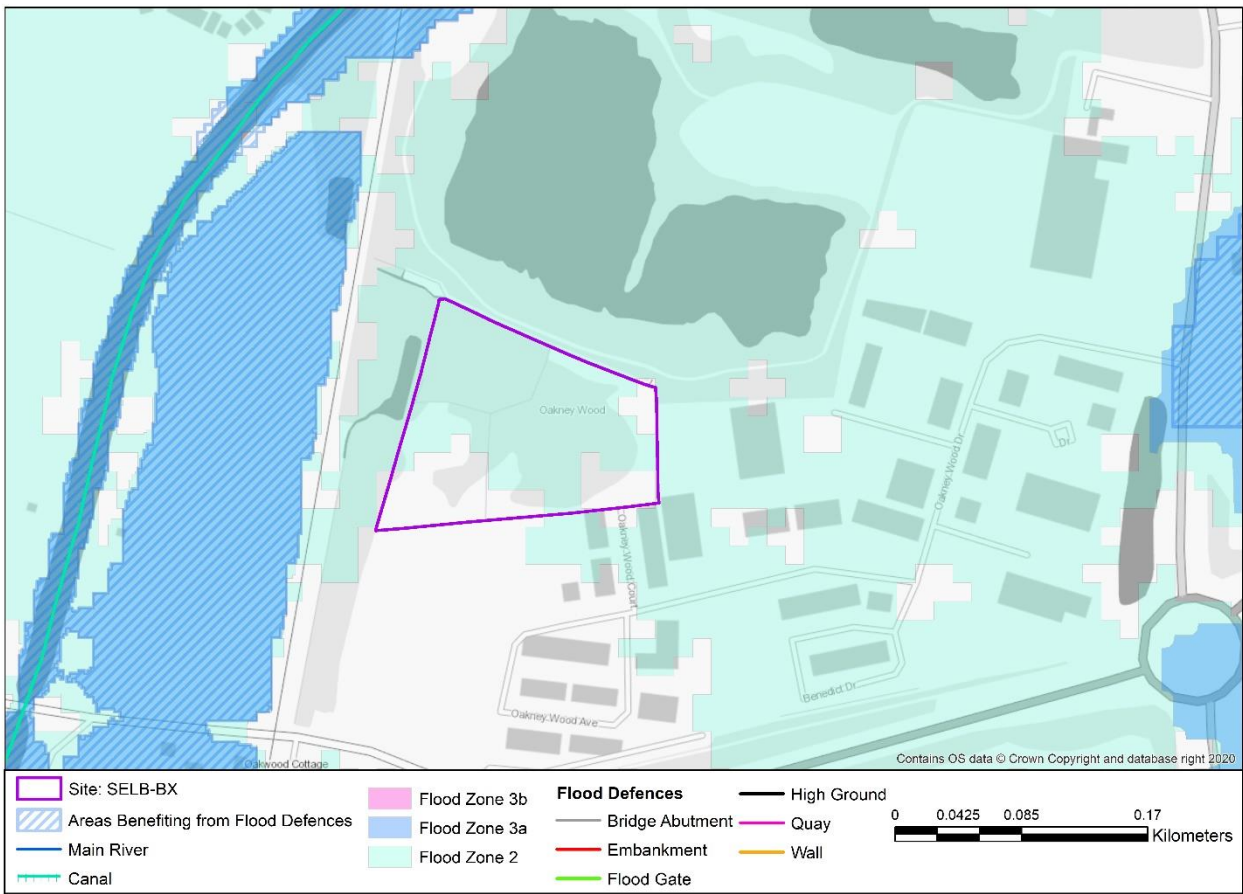


Figure A - Flood Zones

Flood Warning Area	The site is not within a Flood Warning area but the closest Flood Warning area approximately 250m away is the River Ouse at Selby and Barlby
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Site Name: SELB-BX– Land to West of Selby Business Park, Selby (Brayton Parish)

River Flooding

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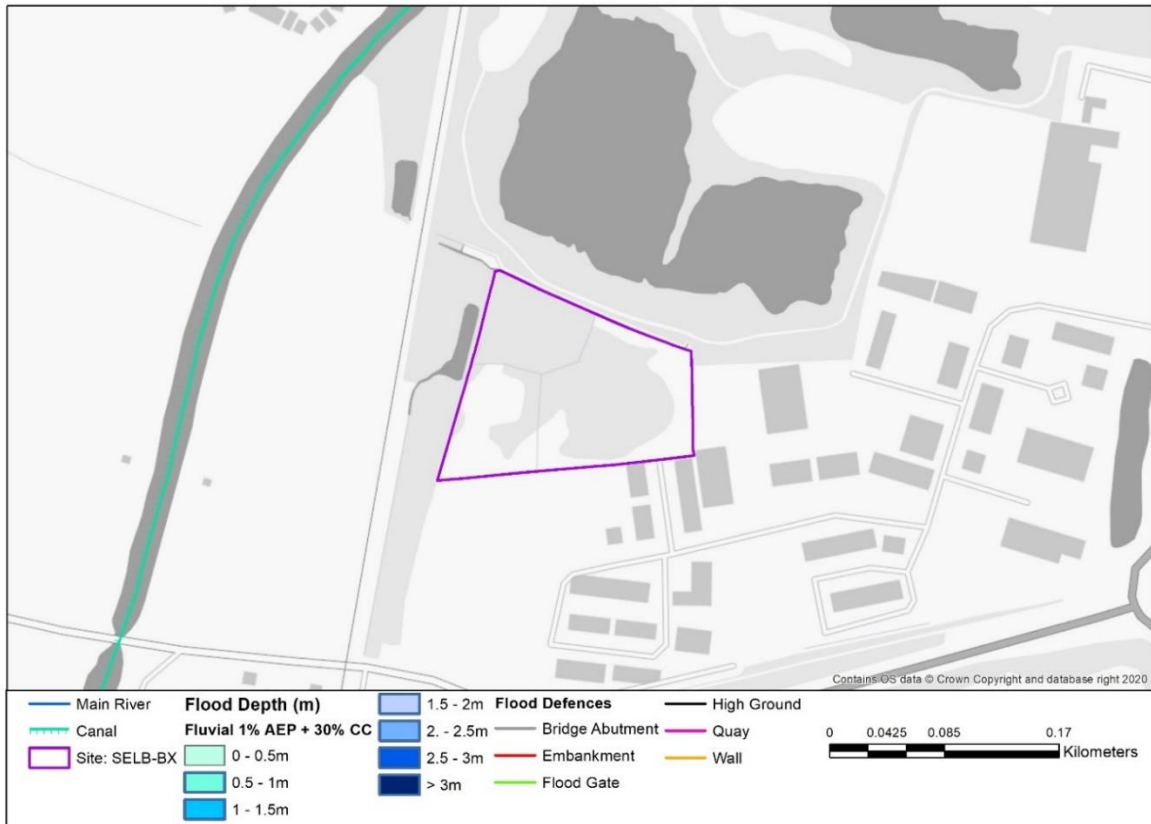


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-BX– Land to West of Selby Business Park, Selby (Brayton Parish)

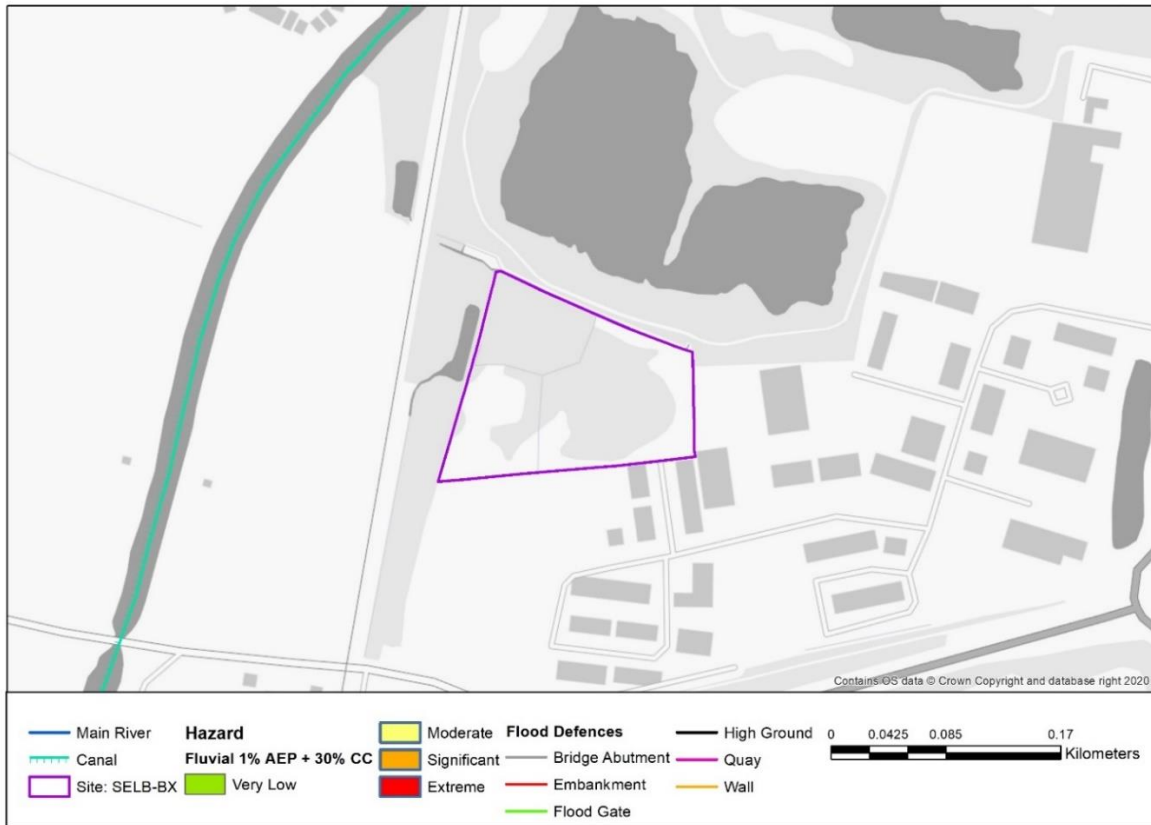


Figure C – Hazard Mapping 1% AEP including climate change (+30%), including flood defences

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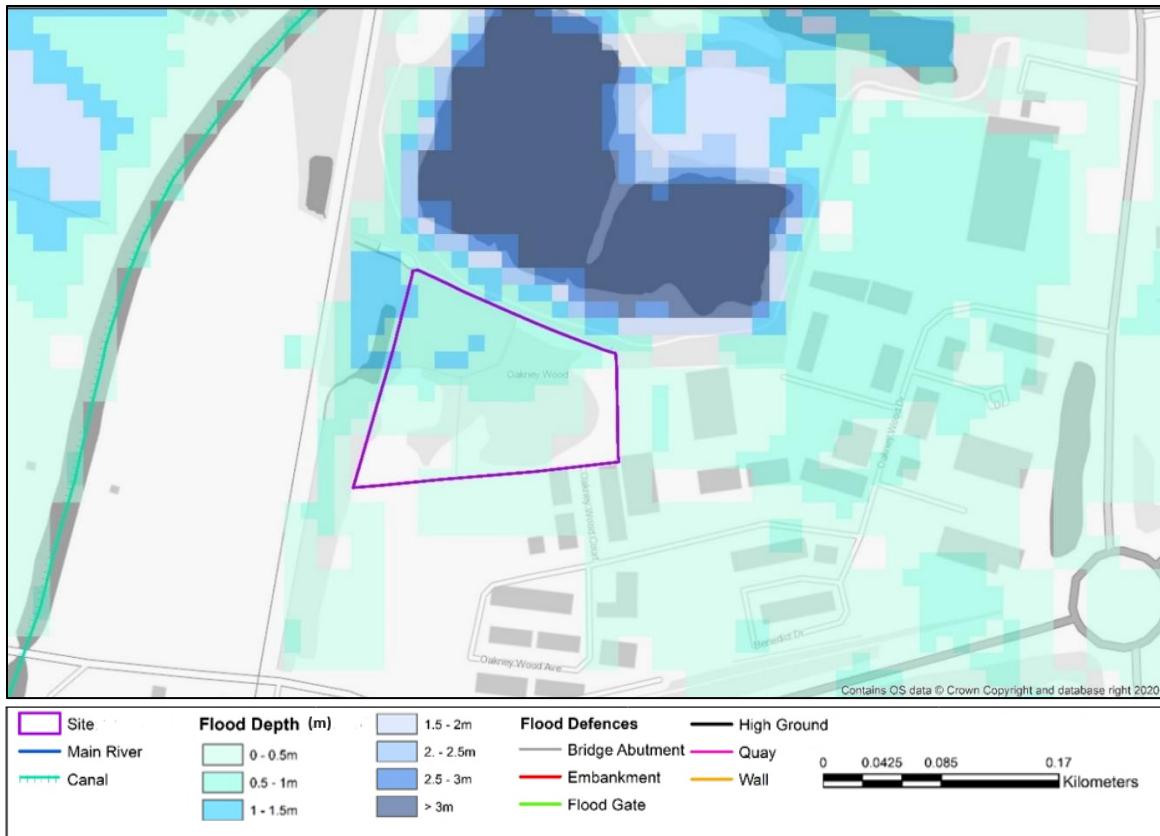


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: SELB-BX– Land to West of Selby Business Park, Selby (Brayton Parish)

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

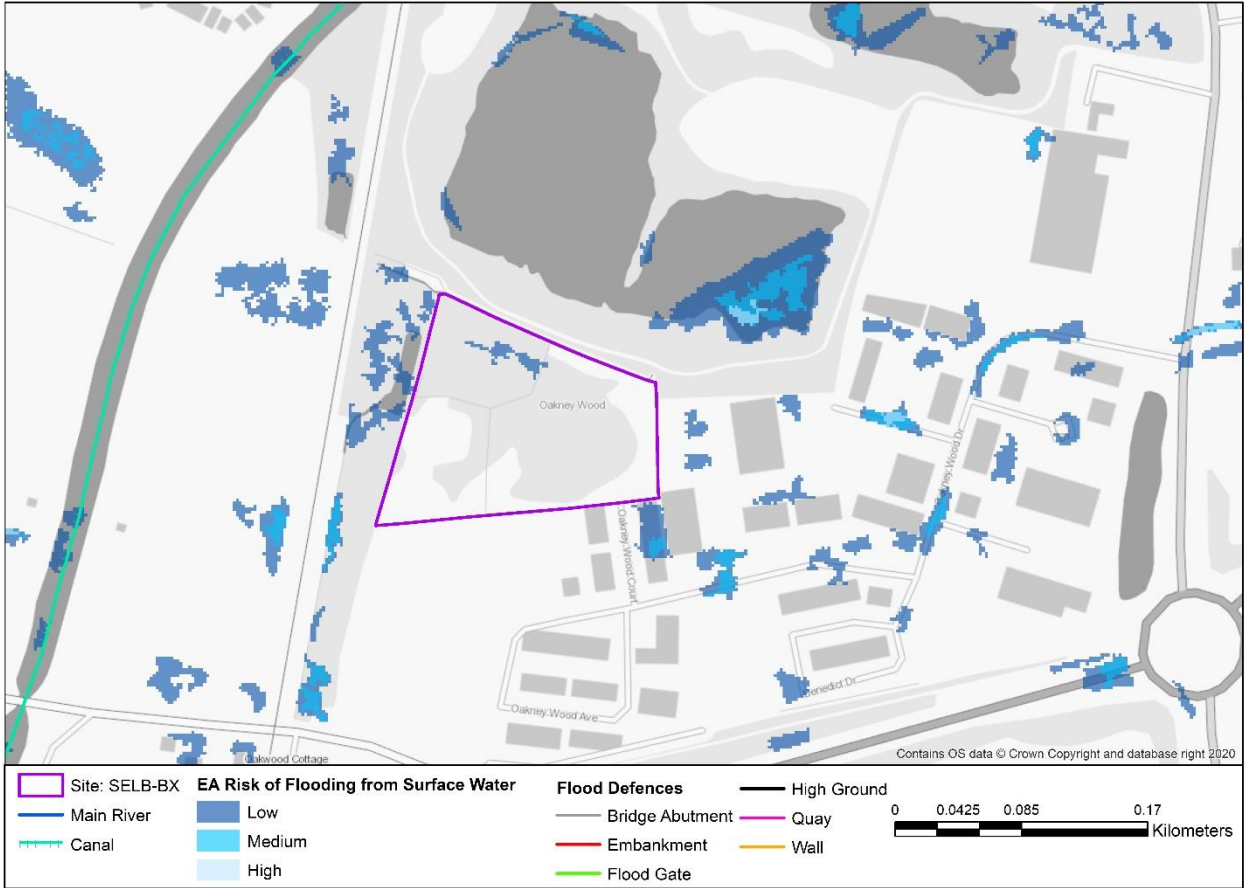


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, and Silt
Susceptibility to Groundwater Flooding (BGS)	<25%		
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that part of the site could be at risk of flooding, in the event of a breach or failure of a reservoir. (It is not possible to determine which reservoir).		

Site Name: SELB-BX– Land to West of Selby Business Park, Selby (Brayton Parish)

Summary

The Selby Canal is approximately 160m to the west of the site. The majority of the site (70%) is defined as Flood Zone 2 Medium probability of flooding from rivers or the sea, with a small area (30%) of Flood Zone 1 Low probability of flooding from rivers or the sea.

Whilst the site is not classified as being within an area benefitting from defences it is thought that the site is influenced by the presence of defences on the River Ouse in the centre of Selby. This may be due to the presence of the floodgate joining the River Ouse and Selby Canal influencing water levels within the Canal itself near to the site. Therefore, it is recommended that a breach run on the River Ouse (at the floodgate) is considered as part of a site specific FRA. There are no known defences on the Selby Canal that could be breached (other than the floodgate connecting the River Ouse and Selby Canal), and the closest defences to the site along the River Ouse are classified as being in Fair- Good condition.

Modelling shows the site is not at risk from the 1% AEP event including 30% climate change, but it is at risk of flooding from the Selby Canal when considering the 50% uplift of the 1% AEP event. Most of the site is considered to be at risk from the 1% AEP including 50% uplift and flood depths vary from 0 – 1.5m on the site.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is recommended to be considered.

The Risk of Flooding from Surface Water mapping identifies there is potential for surface water to flow and pond within the site There are some lakes to the north and south of the site but surface water flood risk does not identify that these lakes are at risk of overtopping during storm events. Mapping also shows there may be some minor watercourses/ drains on the site that have not necessarily been included in existing modelling.

Broadscale mapping identifies that there is <25% susceptibility for groundwater flooding to occur across the site.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard rating. Housing should be positioned preferentially to the South of the site where flood water depths are lowest.
- There are some small drains/ ponds in close proximity of the site that may not have been explicitly included in existing modelling used to inform this site assessment and there associated risk should be considered when developing this site. No development can be within 20 metres of small drains unless modelling has been carried out to assess the risk. This should be agreed with the Internal Drainage Board (IDB) upon appointment .
- Breach modelling is recommended to be considered as part of a site specific FRA due to the likely influence of the presence of defences on the River Ouse and the water levels in Selby Canal
- Finished floor levels should be set 300mm above the River Ouse/ Selby Canal 1% AEP flood level resulting from the 1% AEP event which may include a breach of defences if considered to be required including an allowance for climate change(to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the flood level for the 1% AEP event including appropriate allowance for climate change (and potentially a breach of defences). It is likely that ground floor sleeping accommodation will be appropriate.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 50% climate change uplift but none for the 1% AEP plus 30% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- Minor watercourses/ drains/ ponds have been identified within or very close to the site and they may not have been represented in existing modelling. These features should be investigated further during the completion of a site specific FRA through additional hydraulic modelling or no development is permitted within 20m of these water features.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The Selby Canal is within close proximity to the site and it could be used as a potential discharge point, subject to agreement with the Canal and River Trust.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Canal and Rivers Trust and IDB upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: SELB-BZ– Land at Cross Hills Lane, Selby			
Site ID:	SELB-BZ	Area (ha):	80.1
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	Selby Dam, Cockret Dike		

Area of site within each Flood Zones and associated mapping				
Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	18%	82%	0%	82%

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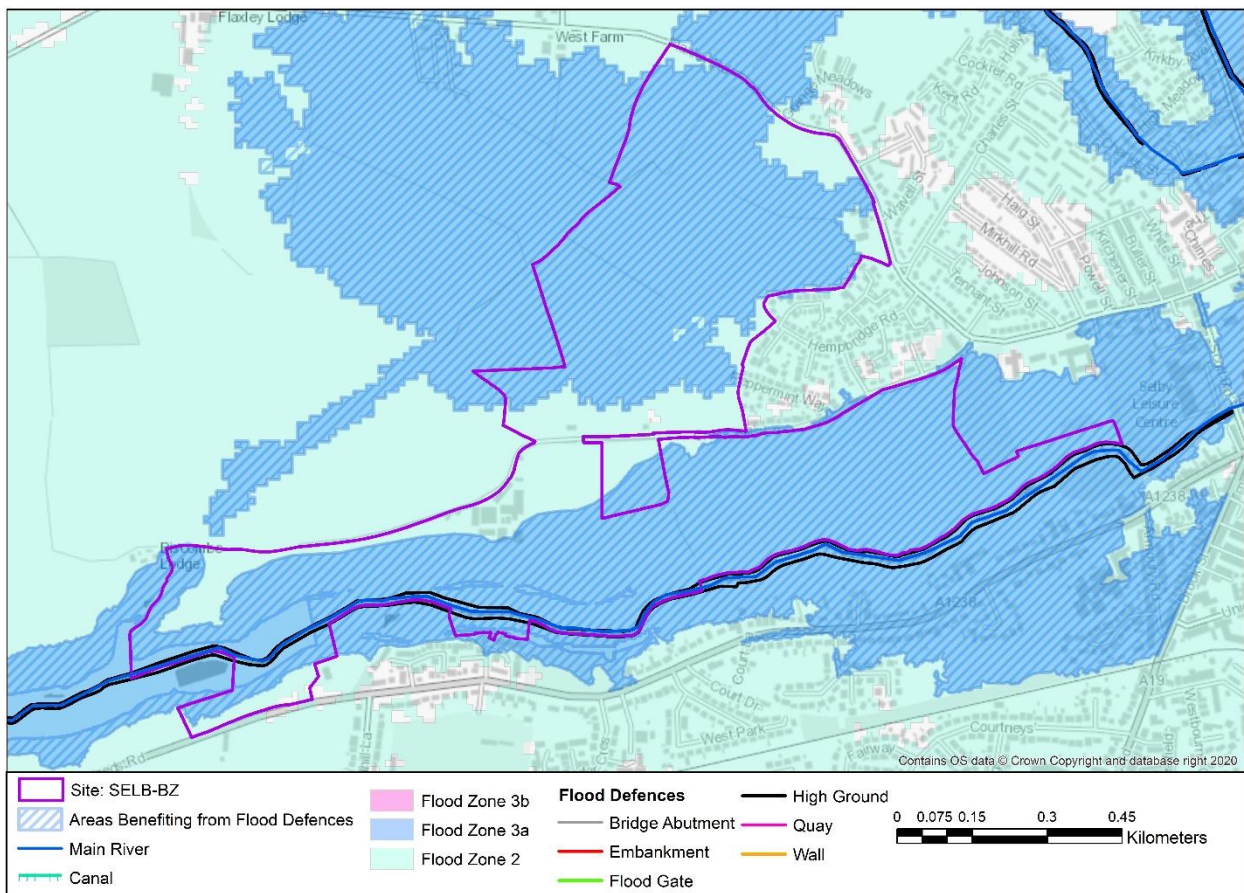


Figure A - Flood Zones

Flood Warning Area	A small portion of the site is within the River Ouse at Selby Dam Flood Warning Area
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Site Name: SELB-BZ– Land at Cross Hills Lane, Selby

River Flooding

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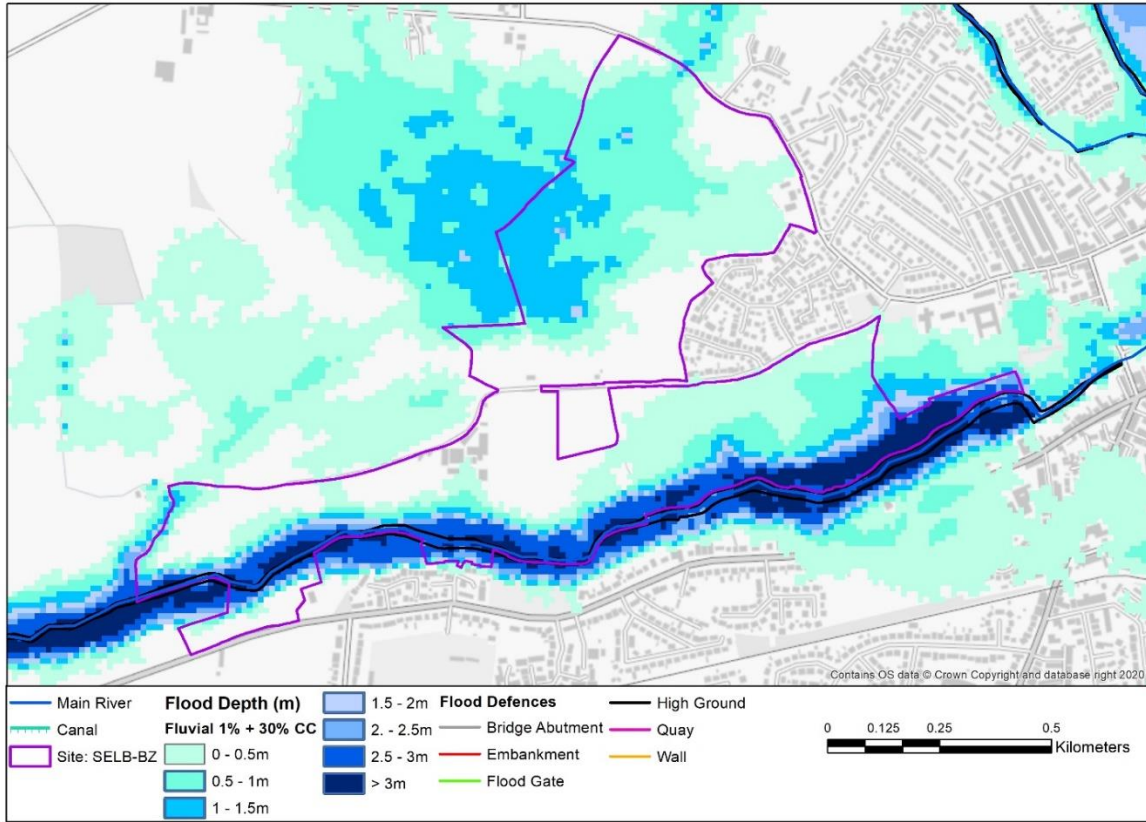
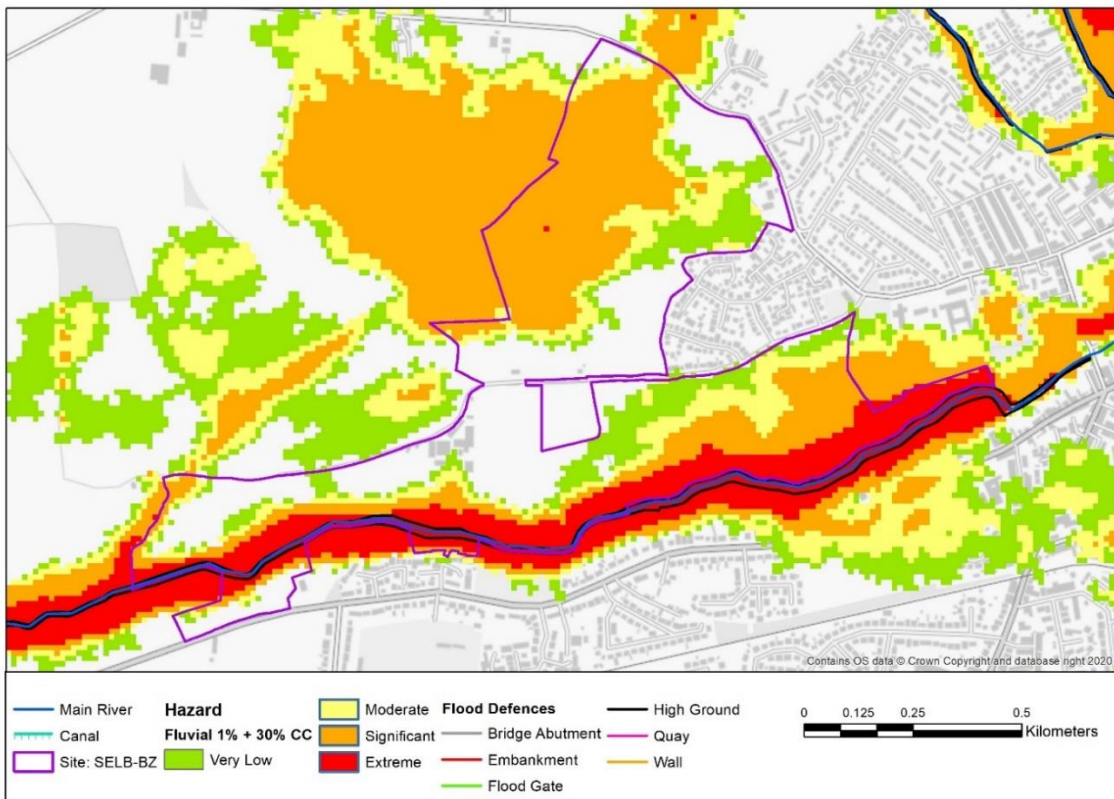


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

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Site Name: SELB-BZ– Land at Cross Hills Lane, Selby

Figure C - Hazard 1% AEP including climate change (+30%) , including flood defences

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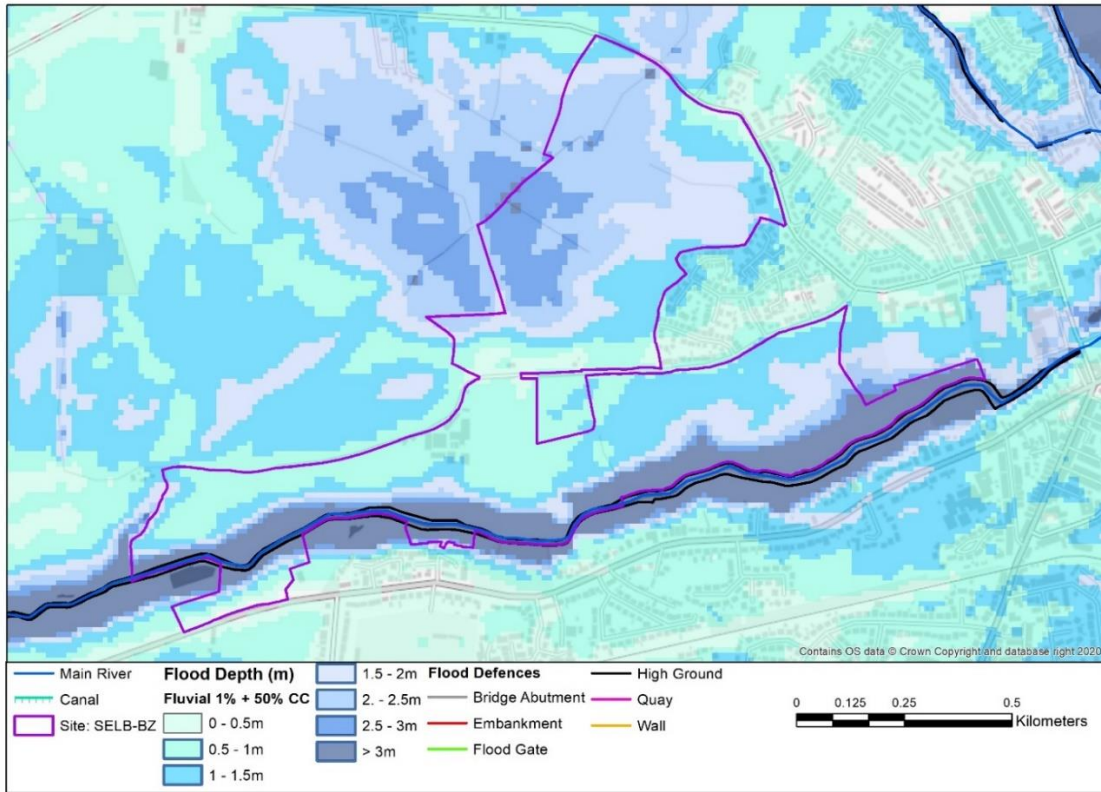


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%) , including flood defences

Site Name: SELB-BZ– Land at Cross Hills Lane, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

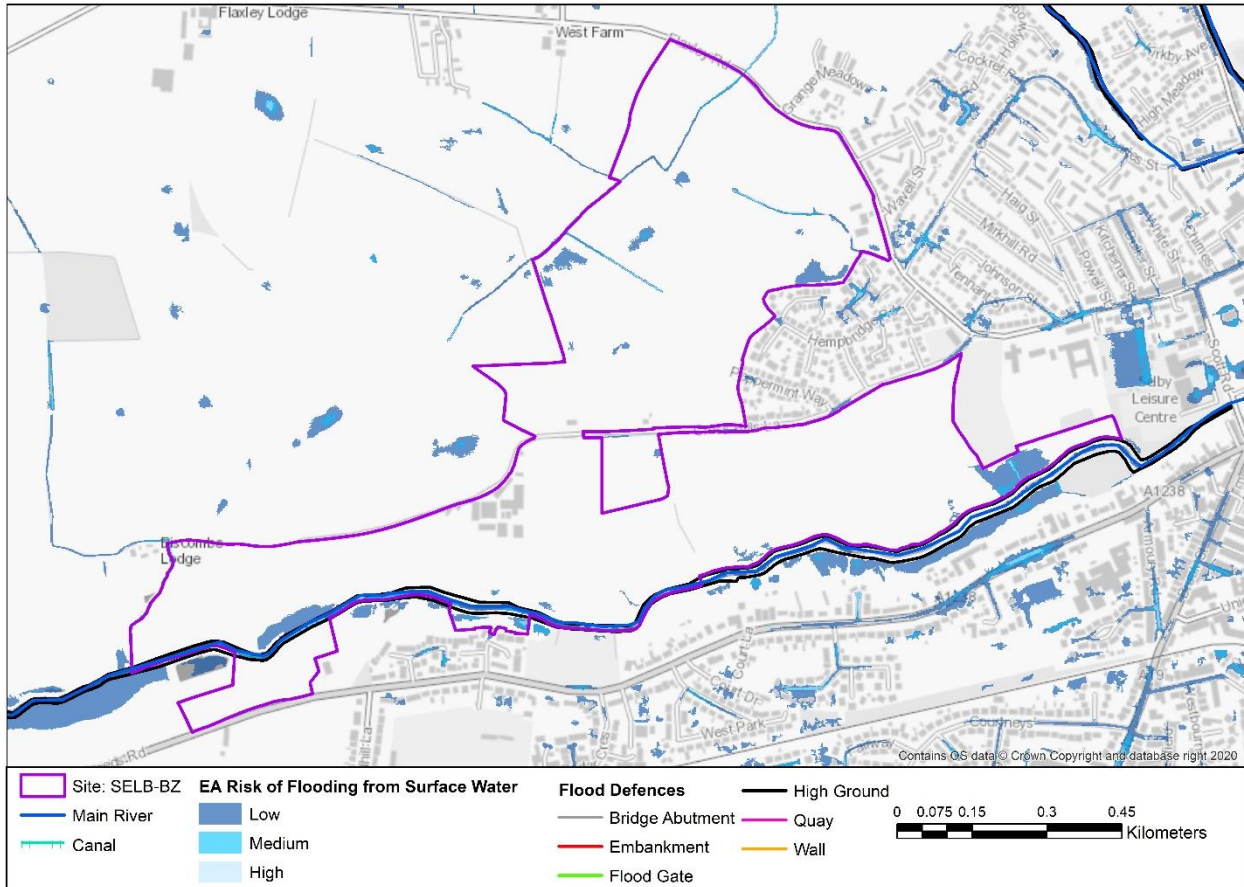


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Sand, Clay, Peat and Silt
Susceptibility to Groundwater Flooding (BGS)	There is mixed potential for groundwater flooding to occur across the site. The site has predominantly <25% susceptibility but a small portion is classified as 25% - <50%.		
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir).		

Site Name: SELB-BZ– Land at Cross Hills Lane, Selby

Summary

The Selby Dam watercourse flows east along the southern edge of the site. The majority of the site (81%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, with a small area (18%) of Flood Zone 2 Medium probability of flooding from rivers or the sea and no Flood Zone 1 Low probability of flooding from rivers or the sea. The majority of the site benefits from the presence of defences. It is not possible to assess precisely which defences the site is benefitting from based on, this should be investigated further when the site specific FRA is completed.

There is high ground along parts of Selby Dam and Cockret Dike (EA Main River) which act as informal flood defences. The high ground is not continuous and does not cover the full length of the watercourses upstream (where they are not classified as EA Main Rivers). Selby Dam flows into the River Ouse via a pumping station which is utilised when the level on the River Ouse is high, the impact of this should be investigated further during the time of writing an FRA for the site. Cockret Dike flows through the Cawood/ Wistow Reservoir before discharging into the River Ouse. Any site specific FRA should consider the multiple flood sources for this site.

Modelling shows that at least part of the site is at risk of flooding from the Selby Dam watercourse when considering the impact of climate change (30% and 50%). Part of the site is not at risk of flooding in the 1% AEP event including 30% climate change. During the modelled 1% AEP event including 50% climate change, most of the site is at risk of flooding. Flood levels vary mostly from 0 - >1.5m on the site for the 1% AEP plus 30% climate change. The areas corresponding to water depths of 1 – 1.5 m deep are classified as Significant Hazard risk and are a 'Danger to Most' people. The highest water depths are closer to Selby Dam watercourse.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is recommended to be considered.

Broadscale mapping identifies that there is mixed potential for groundwater flooding to occur across the site. The site has predominantly <25% susceptibility but a small portion is classified as 25% - <50%.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard rating. Residential accommodation should not be placed directly next to the Selby Canal due to residual risk associated if the high ground surrounding the watercourse was breached. Residential Properties should be sequentially placed in areas of lower flood water depth, and should be preferably placed in the middle portion of the site.
- Breach modelling should be undertaken as part of a site specific FRA after investigating how the site is classed as benefitting from defences and the complex interactions of different flood sources. The impact of Selby Dam Pumping Station failing should be investigated.
- Finished floor levels should be set 300mm above the Selby Dam/Cockret Dike 1% AEP flood level resulting from a breach of defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the flood level for the 1% AEP breach event including appropriate allowance for climate change. It is unlikely that ground floor sleeping accommodation will be appropriate, even in the sections of the site where there is no risk of flooding for the 1% AEP event including appropriate allowance for climate change.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 30% climate change uplift and 1% AEP plus 50% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an appropriate allowance for climate change.
- Part of the site is located within the Flood Warning Area for River Ouse at Selby Dam. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. Selby Dam flows through the site and this is a potential discharge point for SuDs.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Internal Drainage Board (IDB) upon appointment ..
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: SELB-CC– Olympia Park, Barlby Road, Barlby, Selby				
Site ID:	SELB-CC	Area (ha):	42.71	
Proposed Use:	Residential/ Employment. Open Space/ Community Space/ Leisure	Vulnerability Classification:	More Vulnerable	
Watercourses near the site	River Ouse			
Area of site within each Flood Zones and associated mapping				
Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	0%	99%	1%	99%

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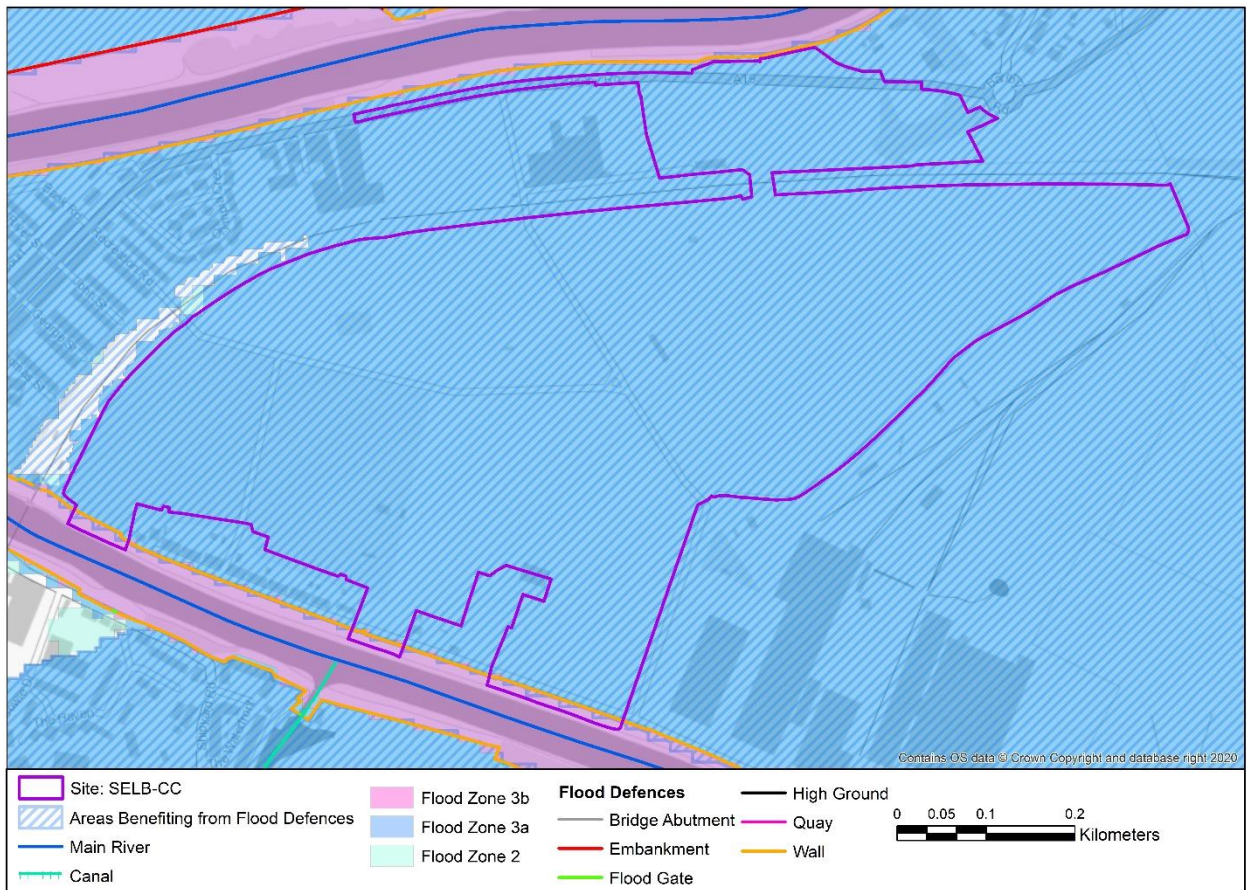


Figure A - Flood Zones

Flood Warning Area	River Ouse at Selby and Barlby
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Site Name: SELB-CC– Olympia Park, Barlby Road, Barlby, Selby

River Flooding

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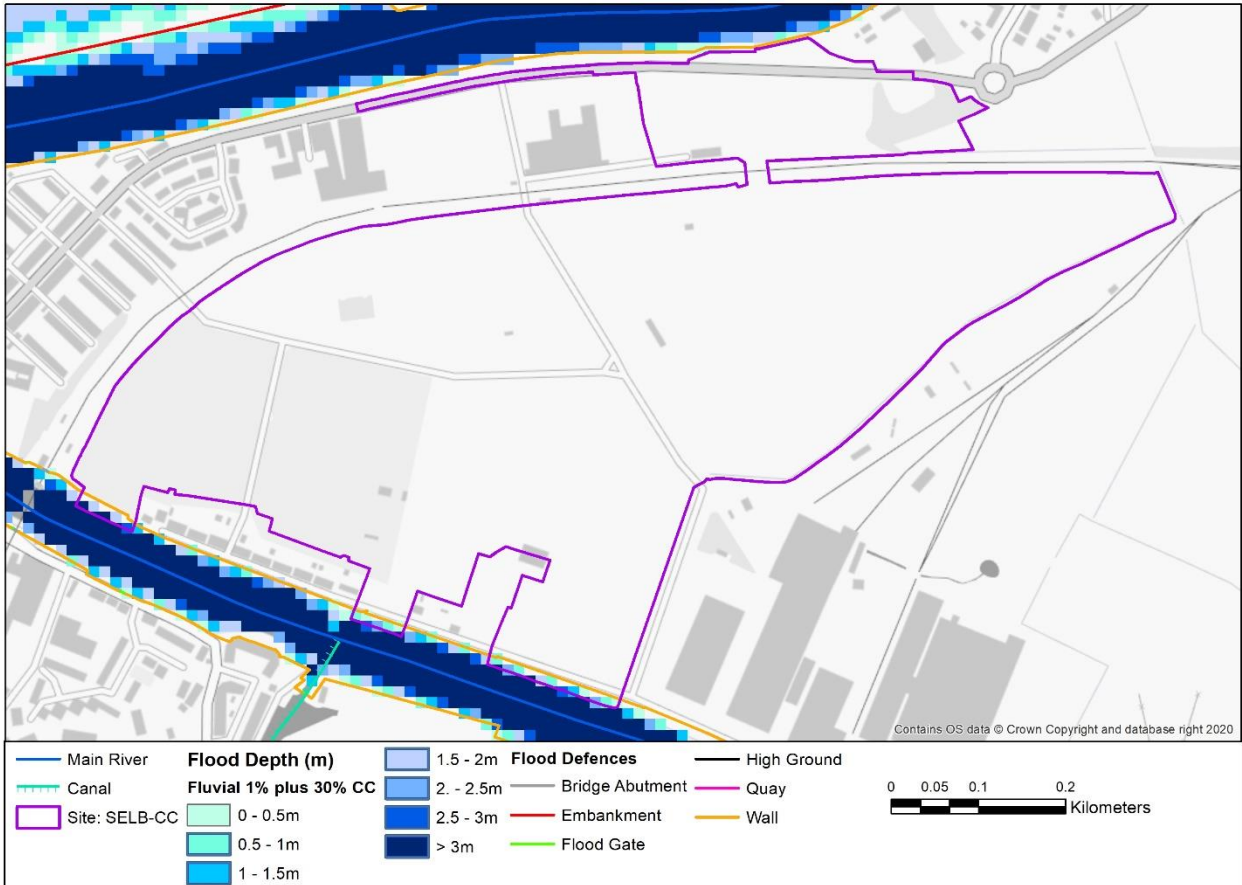


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-CC– Olympia Park, Barlby Road, Barlby, Selby

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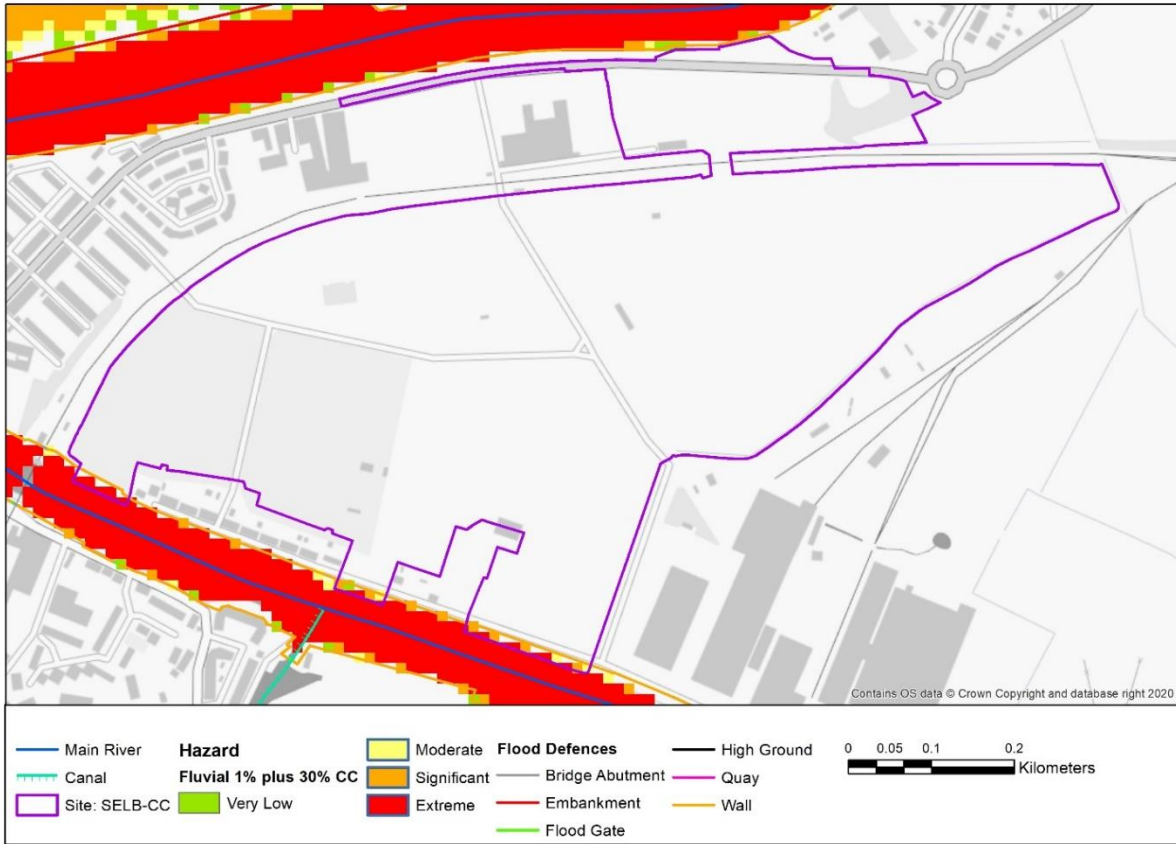


Figure C - Hazard 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-CC– Olympia Park, Barlby Road, Barlby, Selby

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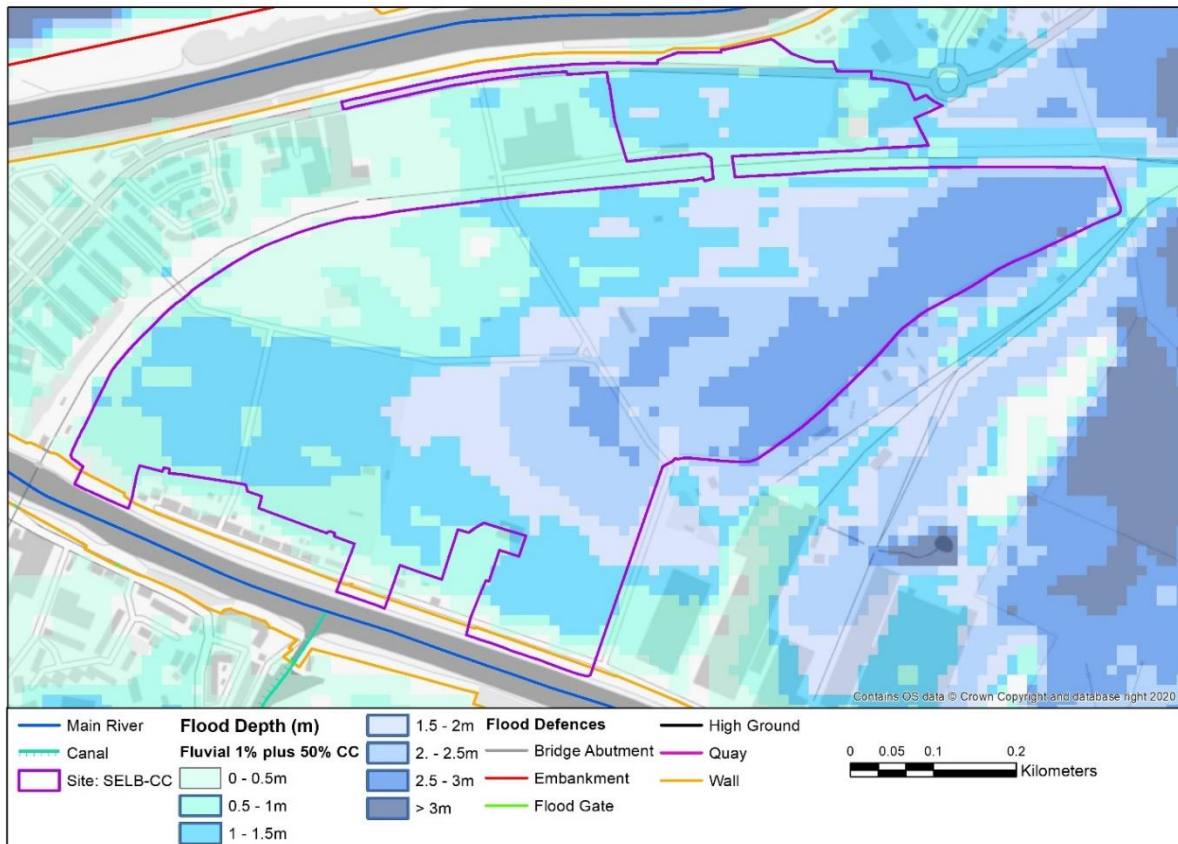


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: SELB-CC– Olympia Park, Barlby Road, Barlby, Selby

Breach Flooding

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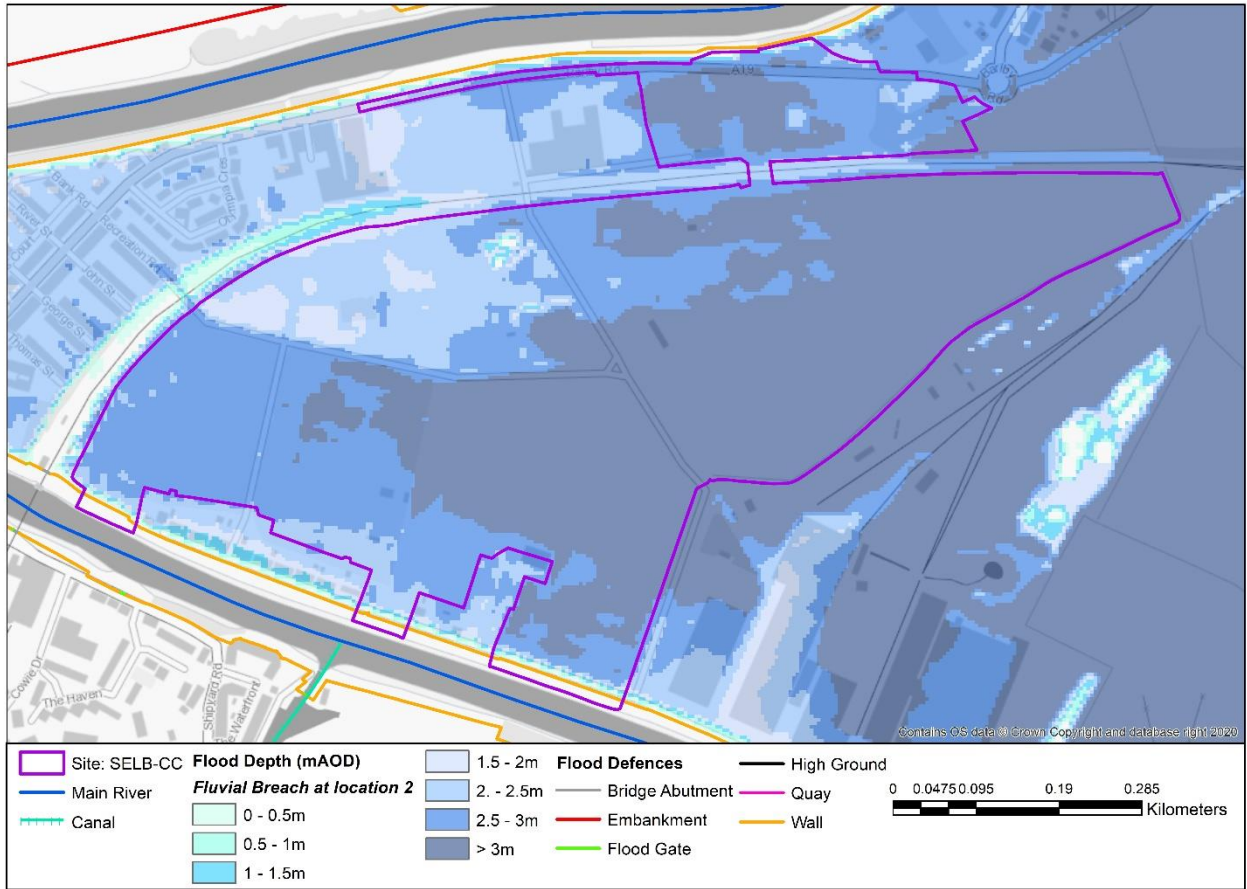


Figure E - Breach Assessment 1 % AEP + 50 % CC Fluvial: Maximum Flood Depth Upper End (2080s)

Site Name: SELB-CC– Olympia Park, Barlby Road, Barlby, Selby

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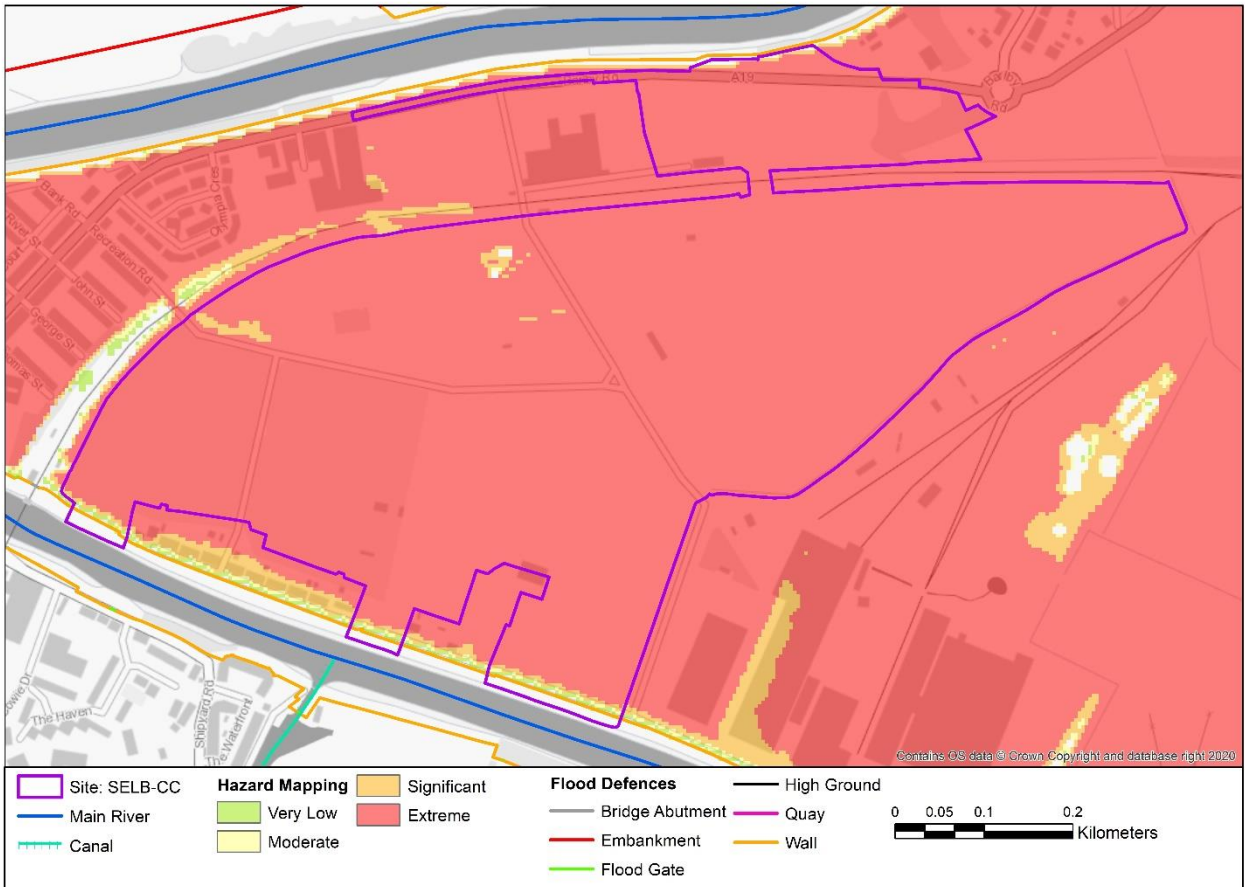


Figure F - Breach Assessment 1 % AEP + 50 % CC Fluvial: Maximum Flood Hazard Upper End (2080s)

Site Name: SELB-CC– Olympia Park, Barlby Road, Barlby, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

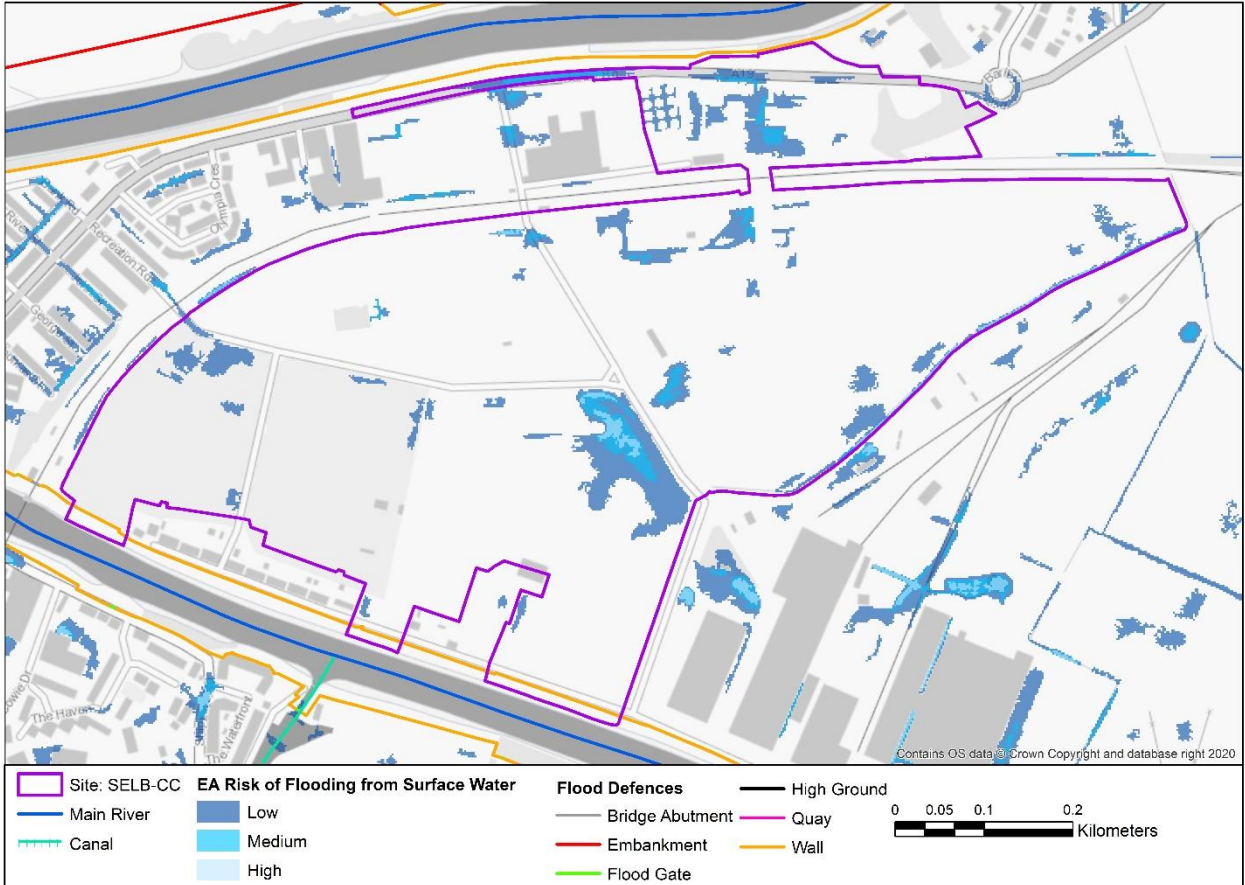


Figure G - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology

Sherwood Sandstone Group - Sandstone

Superficial Geology

Clay, Peat and Silt

Susceptibility to Groundwater Flooding (BGS)

There is mixed potential for groundwater flooding to occur across the site. The site has predominantly <75% susceptibility but a small portion is classified as 25% - <50%.

Other Sources

Risk of flooding from reservoirs

The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir).

Site Name: SELB-CC– Olympia Park, Barlby Road, Barlby, Selby

Summary

The site is located within a meander of the River Ouse, which borders the southern part of the site. The majority of the site (99%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, and the rest of the site (1%) is defined as Flood Zone 3b Functional Floodplain. The site is shown wholly to be within an Area Benefiting from Defences.

Flood defences (walls) border the site to the South which protect the site from flooding from the River Ouse. There is still a residual risk of the site flooding, if the walls are overtopped or breached. The walls are classified as being in Fair condition.

Modelling shows the site is not at risk of flooding when considering the 1% AEP plus 30% climate change uplift, but it is a risk when a 50% uplift is applied to the 1% AEP event. Flood depths vary from 0 - >3m on the site for the 1% AEP plus 50% climate uplift.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still risk of flooding even without a breach of defences and therefore the risk of flooding to Selby is a residual risk, only if the defences fail (breach). Breach modelling for 18 locations was carried out as part of the update to the Environment Agency Upper Humber model. Breach number 2 was located on the left bank of the River Ouse between the A19 and the railway swing bridge in the vicinity of Barlby Bridge Community Primary School. This breach was modelled with Climate change at the 1% AEP event as part of an FRA (for Olympia Park) carried out in the area and therefore could be analysed for the purposes of this assessment. The results from the Olympia Park Breach Assessment show that the site is at residual risk of fluvial flooding during a breach in the Ouse defences. Flood water would inundate the majority of the site to a depth of >3.0m, with a corresponding hazard rating of Extreme ('danger for all') on the site, Recreation Road and the A19, for the year 2100. Flood levels on the site vary from 0 - >3m for the year 2100.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site, and also on Recreation Road adjacent to the site.

Broadscale mapping identifies that there is mixed potential for groundwater flooding to occur across the site. The site has predominantly <75% susceptibility but a small portion is classified as 25% - <50%.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test is satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating. Residential accommodation should not be placed directly behind the defences on the River Ouse due to the residual risk if the defences were breached. Infrastructure of higher vulnerability should be sequentially placed in areas of lower flood water depth, and should be preferably placed in the North East portion of the site, furthest from the River Ouse.
- Finished floor levels should be set 300mm above the River Ouse 1% AEP flood level resulting from a breach of including an appropriate allowance for climate change (to be discussed with the Environment Agency upon appointment to confirm if the Climate Change uplifts used in this report are appropriate). Sleeping accommodation should be set 300mm above the flood level for the 1% AEP event including appropriate allowance for climate change. Ground floor sleeping accommodation is unlikely to be appropriate on the site due to the proximity flood defences and the risk of rapid inundation in the event of a breach. There is no flooding in the 1% AEP plus 30% climate change due to the presence of defences, therefore site levels should be based upon those from a breach assessment (as discussed above).
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 50% climate change uplift but none for the 1% AEP plus 30% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The River Ouse is within close proximity to the site and it could be used as a potential discharge point.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.
- Developments are not appropriate within the functional floodplain 3b unless it is water compatible.

Site Name: SELB-CG– Land off Friars Meadow, Selby Town

Site ID:	SELB-CG	Area (ha):	1.12
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Ouse, Holme Dike		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	0%	100%	0%	100%

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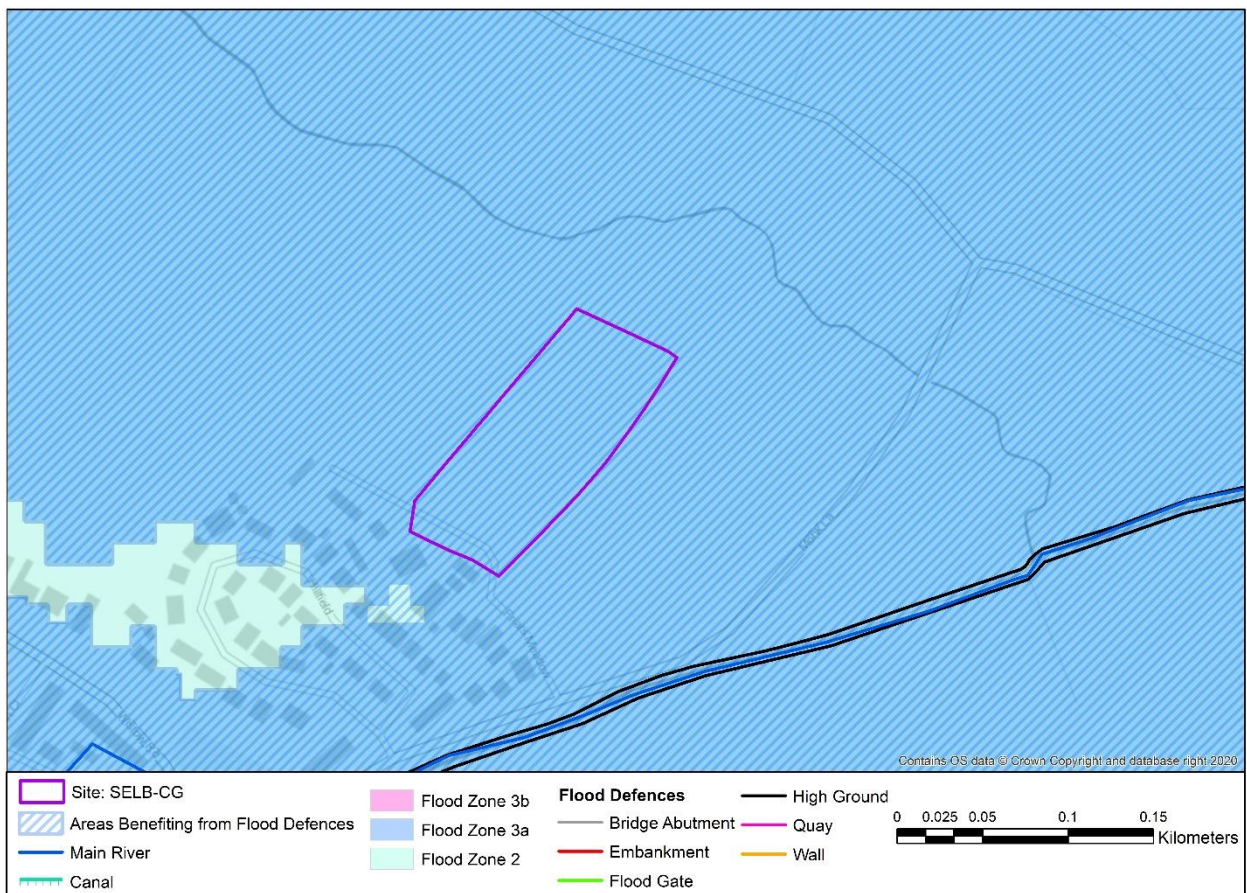


Figure A - Flood Zones

Flood Warning Area	A small portion of the site is within the River Ouse at Selby and Barlby Flood Warning Area
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Site Name: SELB-CG– Land off Friars Meadow, Selby Town

River Flooding

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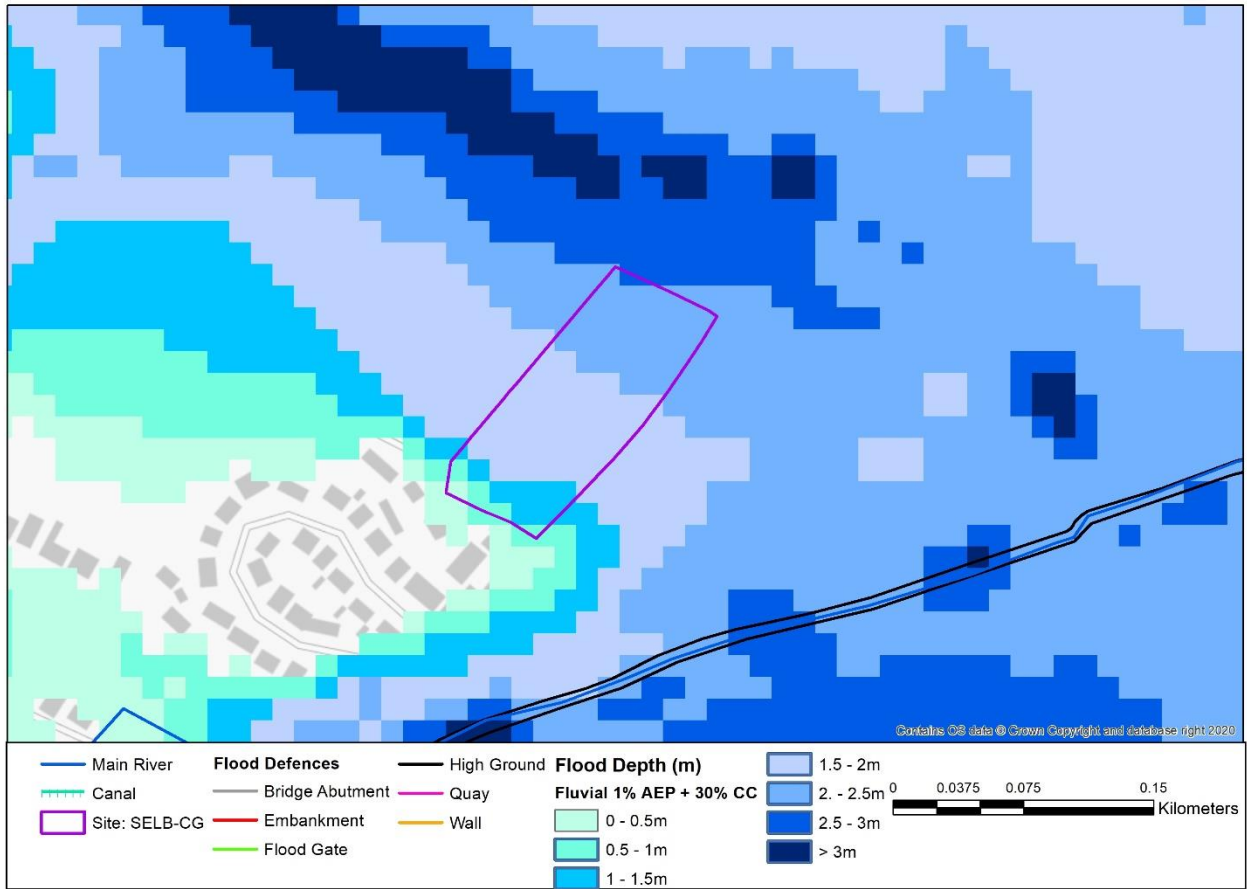


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%) , including flood defences

Site Name: SELB-CG– Land off Friars Meadow, Selby Town

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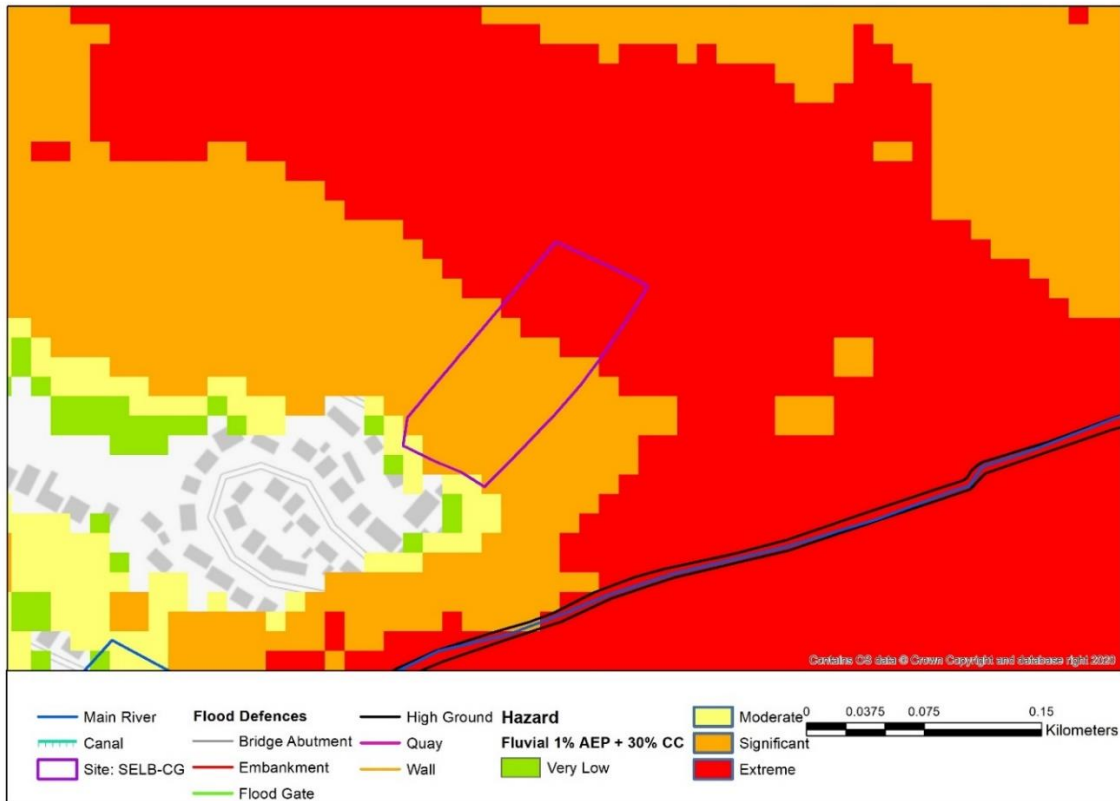


Figure C - Hazard 1% AEP including climate change (+30%), including flood defences

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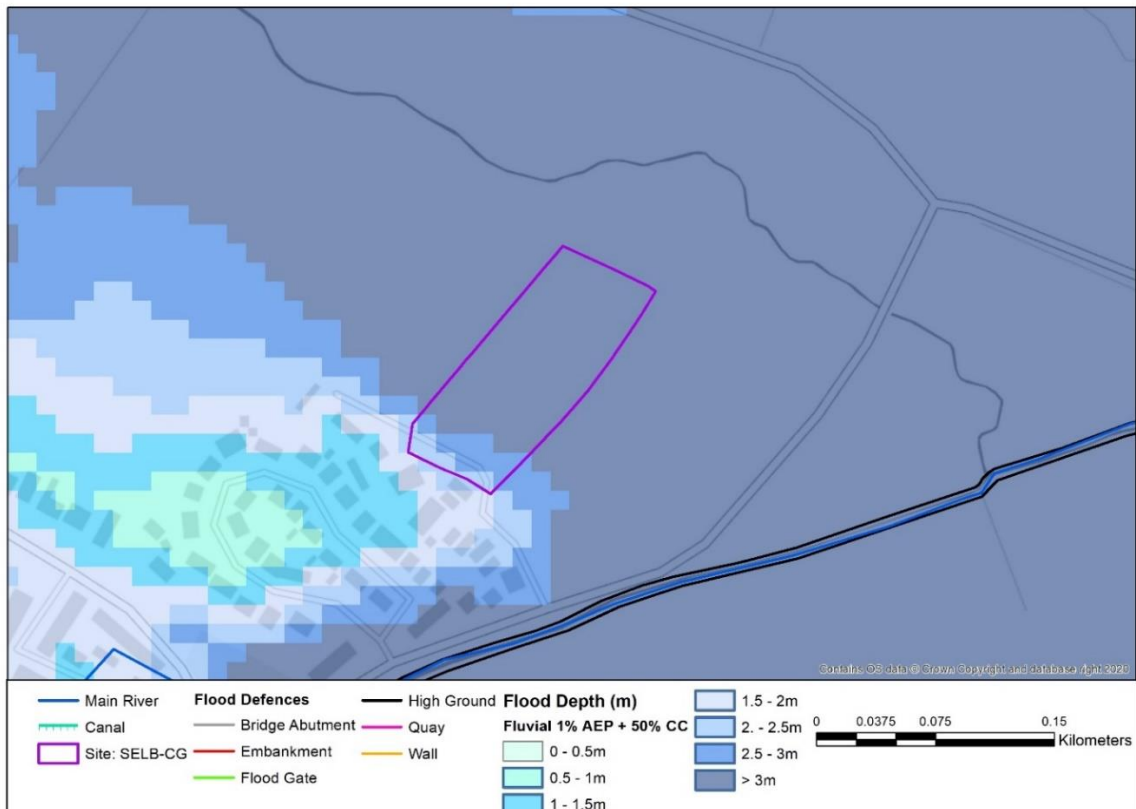


Figure B - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: SELB-CG– Land off Friars Meadow, Selby Town

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

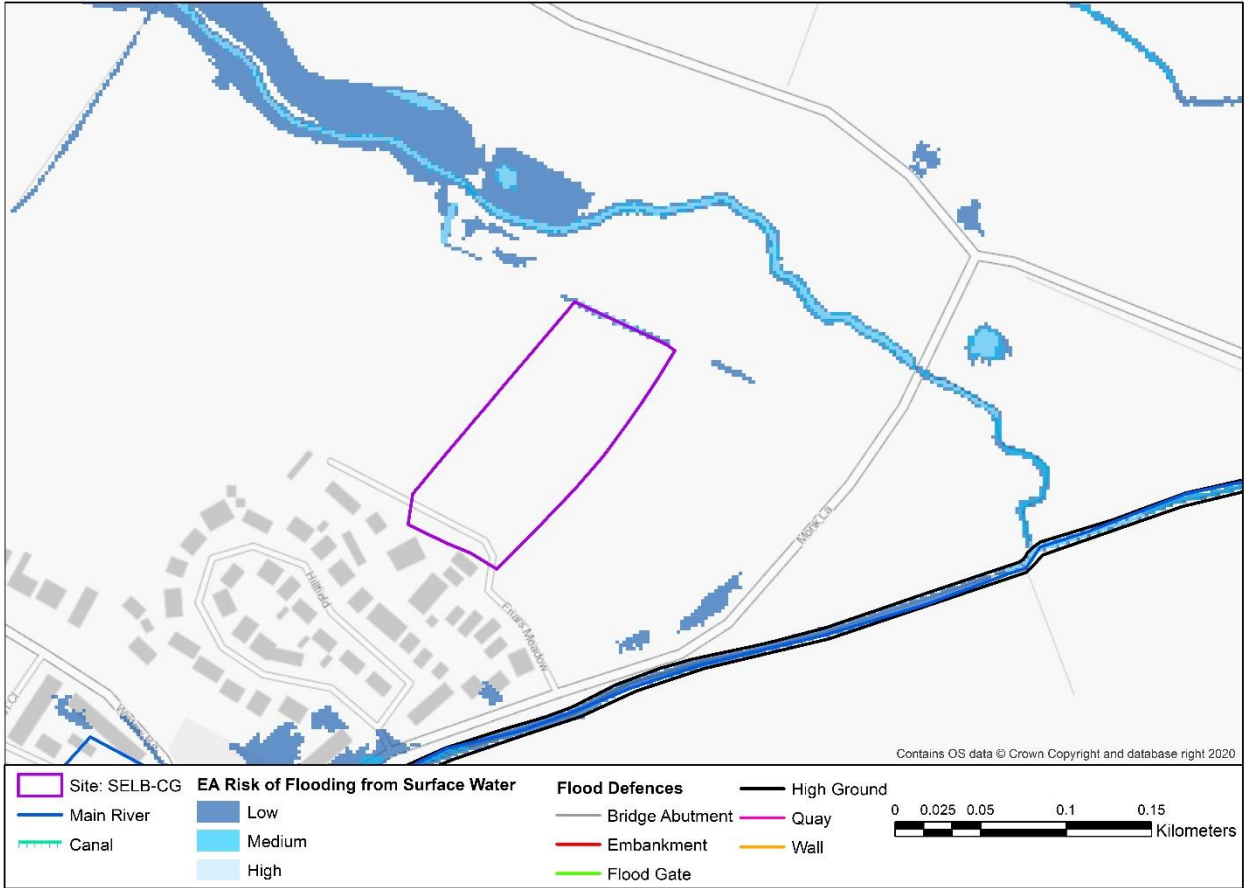


Figure C - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Sand
Susceptibility to Groundwater Flooding (BGS)	<25%		
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir. (It is not possible to determine which reservoir).		

Site Name: SELB-CG– Land off Friars Meadow, Selby Town

Summary

A small drain (ordinary watercourse) flows along the northern perimeter of the site, this drain flows into Holme Dike which is a main watercourse approximately 200m from the site. The entire site (100%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea.

No defences are present on the site. Holme Dike (approximately 200m from the site) is protected by the presence of high ground. There is therefore a residual risk associated with potential breaching of Holme Dike or if channel capacity was reached. Holme Dike discharges into the River Ouse via the Cawood/ Wistow Reservoir which may have a backwater effect upon the levels within Holme Dike, it is recommended that this is investigated as part of the site specific FRA. The small drain to the northern perimeter of the site must be modelled as part of the FRA or there must be an easement of 20m of development within a buffer from the drain.

Modelling shows the site to be at risk of flooding from Holme Dike when considering the impact of climate change, the risk is more significant for the 50% uplift on the 1% AEP compared to 30%. During the modelled 1% AEP event including 30%, climate change, most of the site is at risk of flooding. Flood levels vary from 0.5 – 2.5m on the site (for 1% AEP plus 30% uplift). The site is split between an Extreme and Significant risk for the 1% AEP plus 30% uplift to flows

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is recommended to be considered.

The Risk of Flooding from Surface Water mapping identifies there is no potential for surface water to flow and pond within the site. There is some surface water flood risk associated with the drain adjacent to the site.

Broadscale mapping shows that there is a <25% risk of the site flooding due to groundwater flood risk.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating.
- There may need to be an easement of development 20m of the site should the small drain to the North of the site not be modelled as part of the FRA. It is recommended Residential properties are sequentially placed in areas of lower flood water depth and preferably placed to the South West of the site. This should be agreed with the Internal Drainage Board (IDB) and the Lead Local Flood Authority (LLFA) upon appointment .
- Breach modelling should be considered to be undertaken as part of a site specific FRA after investigating how the site is classed as benefitting from defences. It is suggested that the impact of the Cawood/Wistow Reservoir being breached is investigated.
- Finished floor levels should be set 300mm above the Selby Dam/Cockret Dike 1% AEP flood level resulting from a breach of defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the flood level for the 1% AEP breach event including appropriate allowance for climate change. Ground floor sleeping accommodation is unlikely to be appropriate on this site due to the flood depths across the site and the potential risk of rapid inundation related to Cawood/ Wistow Reservoir.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 30% climate change uplift and 1% AEP plus 50% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an appropriate allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. A small drain flows in close proximity to the site to the North and this is a potential discharge point for SuDs.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Internal Drainage Board (IDB) upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation

Site Name: SELB-CH– Land at Cockret Farm, Selby				
Site ID:	SELB-CH	Area (ha):	11.51	
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable	
Watercourses near the site	River Ouse, Cockret Dike			
Area of site within each Flood Zones and associated mapping				
Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	31%	69%	0%	69%

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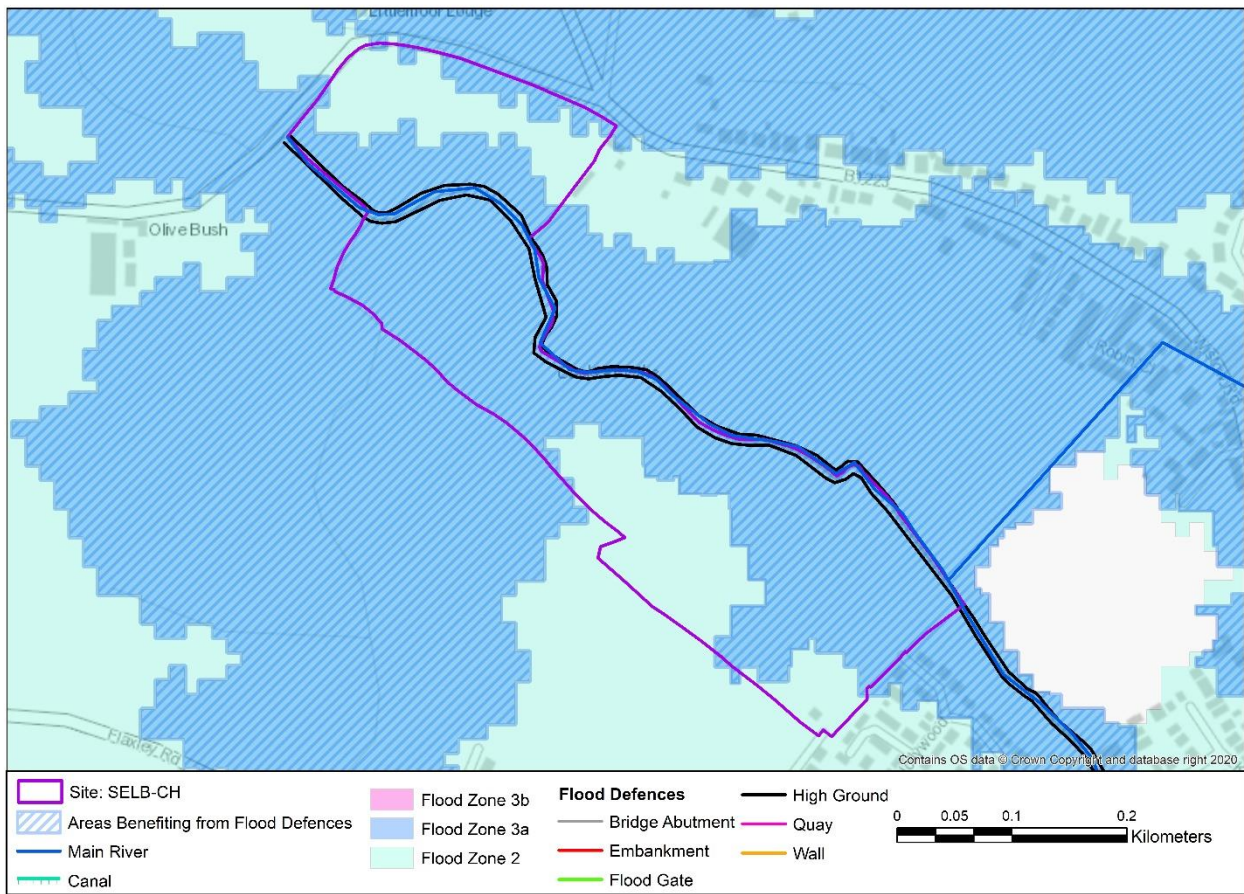


Figure A - Flood Zones

Flood Warning Area	The site borders the River Ouse at Selby and Barby Flood Warning Area
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River Flooding

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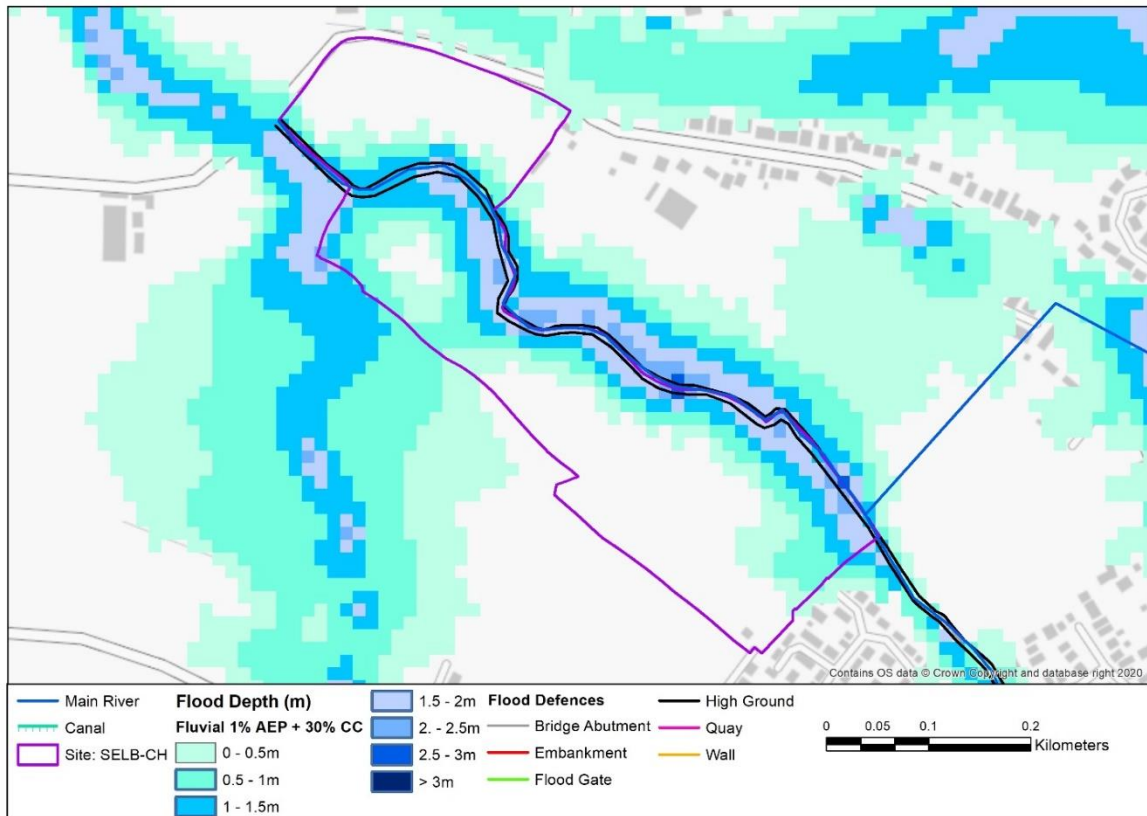


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences.

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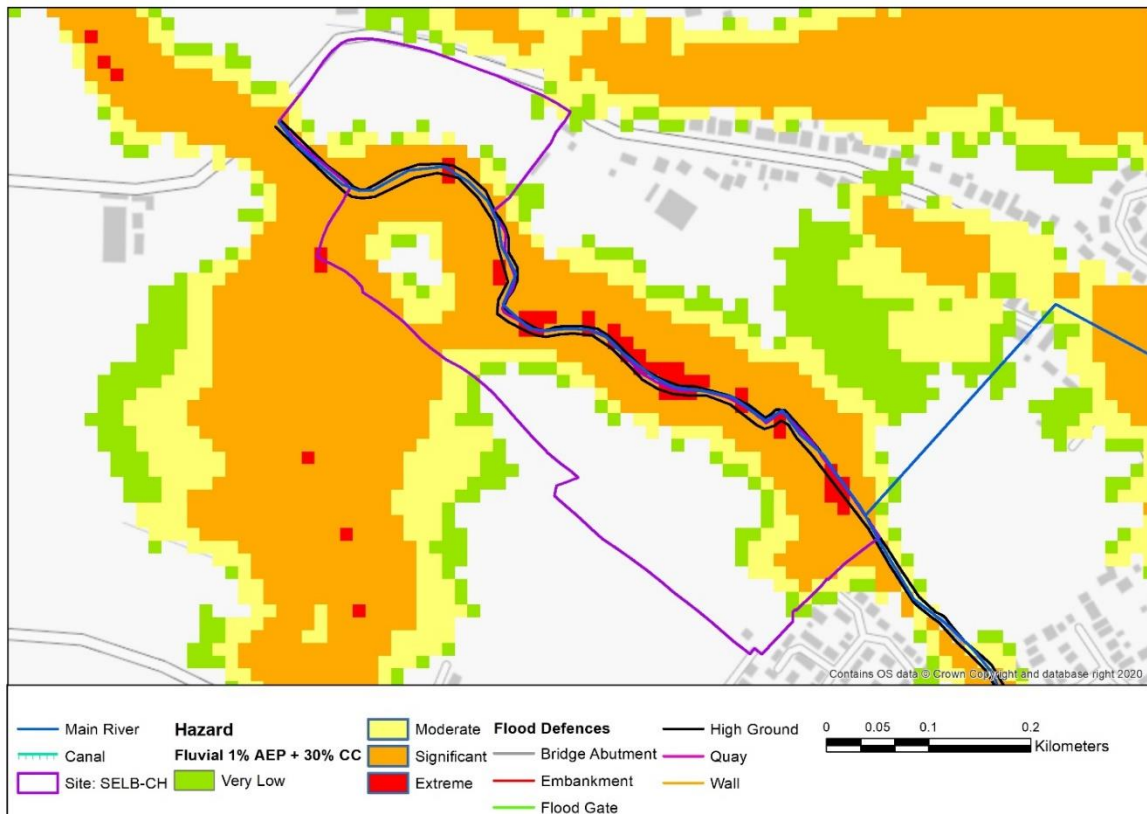


Figure C - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences.

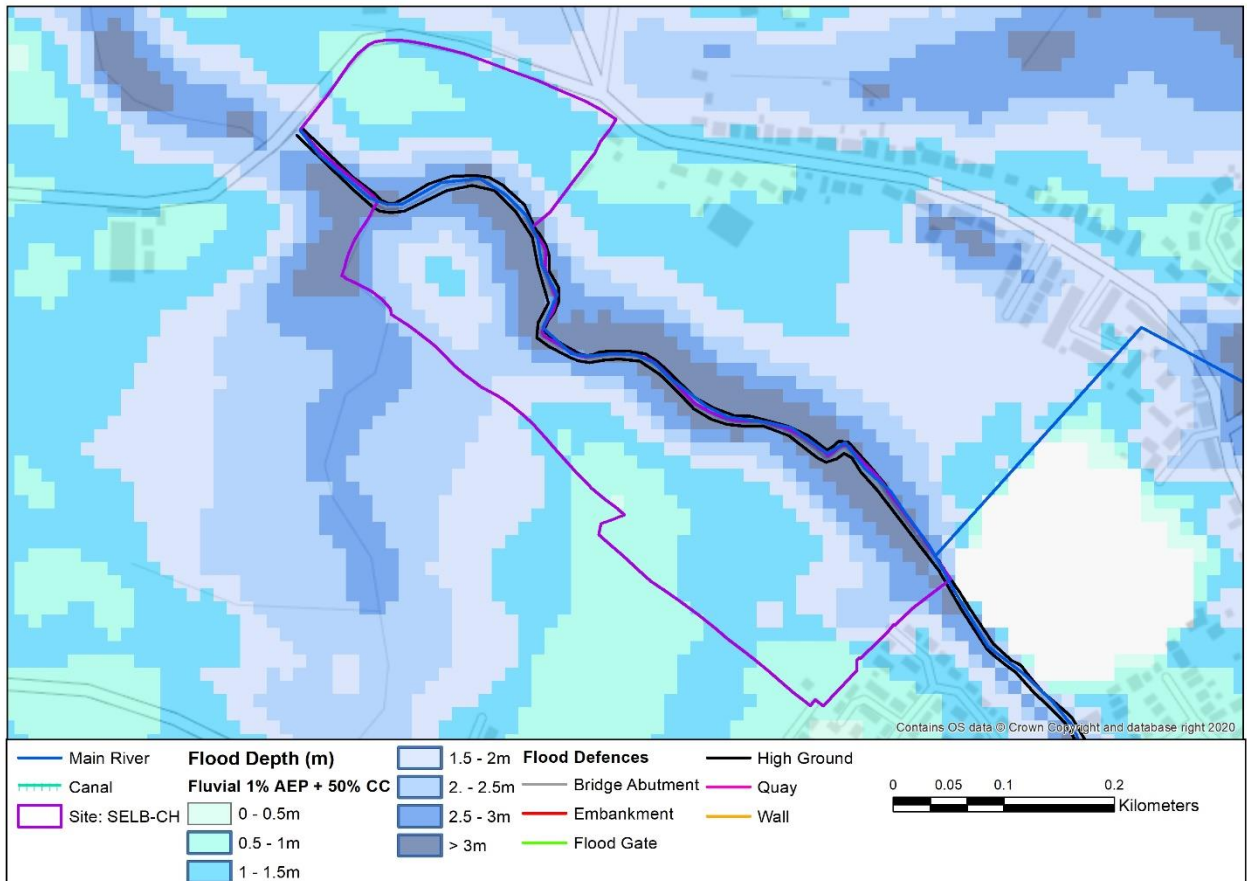


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences.

Site Name: SELB-CH– Land at Cockret Farm, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

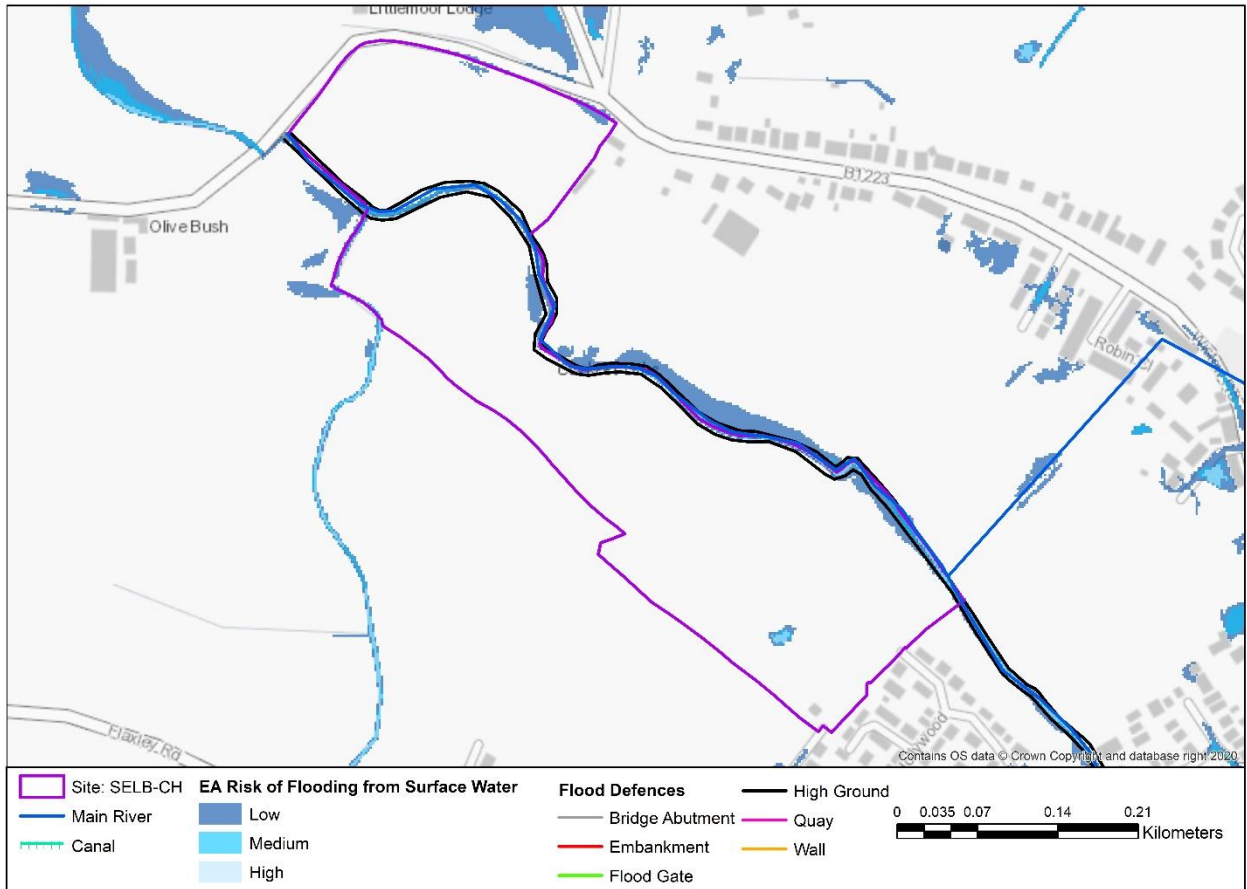


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Silt, and Sand
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Susceptibility to Groundwater Flooding (BGS)	<25%
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Other Sources

Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir. (It is not possible to determine which reservoir).
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Site Name: SELB-CH– Land at Cockret Farm, Selby

Summary

Cockret Dike, which is an EA Main River, flows south east through the site. The majority of the site (69%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, with the remaining area (31%) of Flood Zone 2 Medium probability of flooding from rivers or the sea. The majority of the site is influenced by the presence of defences that protect the site as it is classed as area benefitting from defences. It is not possible to assess precisely which defences the site is benefitting from, this should be investigated further when the site specific FRA is completed.

There is high ground along parts of Cockret Dike (EA Main River) which behaves like defences but are not classified as defences within the EA Flood Map for Planning. The high ground is patchy and does not cover the full length of the watercourse upstream (where they are not classified as EA Main Rivers). Cockret Dike discharges into the River Ouse via the Cawood/ Wistow Reservoir which may have a backwater effect upon the levels within Cockret Dike, it is recommended that this is investigated as part of the site specific FRA.

Modelling shows the site to be at risk of flooding from Cockret Dike when considering the impact of climate change, the risk is more significant for the 50% uplift on the 1% AEP compared to 30%. During the modelled 1% AEP event including 30%, climate change, approximately half of the site is at risk of flooding. Flood levels vary from 0. – 1.5m on the site (for 1% AEP plus 30% uplift). The site is split between Low and Significant risk for the 1% AEP plus 30% uplift to flows. During the modelled 1% AEP event including 50%, climate change, most of the site is at risk of flooding. Flood levels vary from 0.5 - >3m on the site.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is recommended to be considered.

Broadscale mapping identifies that there is <25% susceptibility for groundwater flooding to occur across the site.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating. Residential accommodation should not be placed directly next to Cockret Dike due to residual risk associated if the high ground surrounding the watercourse was breached. Residential Properties should be sequentially placed in areas of lower flood water depth, and should be preferably placed in the far North and South portion of the site furthest away from Cockret Dike.
- Breach modelling should be considered to be undertaken as part of a site specific FRA after investigating how the site is classed as benefitting from defences. It is suggested that the impact of the Cawood/Wistow Reservoir being breached is investigated.
- Finished floor levels should be set 300mm above the Cockret Dike 1% AEP flood level resulting from a breach in defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the flood level for the 1% AEP event including appropriate allowance for climate change. It is unlikely that ground floor sleeping accommodation will be appropriate, even in the sections of the site where there is no risk of flooding for the 1% AEP event including appropriate allowance for climate change.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 30% climate change uplift and 1% AEP plus 50% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
 - In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. Cockret Dike flows through the site and this is a potential discharge point for SuDs.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation

Site Name: SELB-CL– Land adjacent to St. James’s Church, Selby

Site ID:	SELB-CL	Area (ha):	0.07
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Ouse, Selby Dam		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	100%	0%	0%	0%

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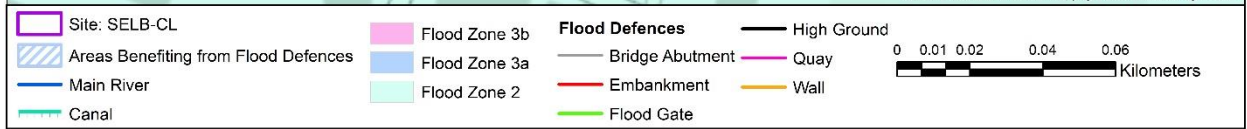
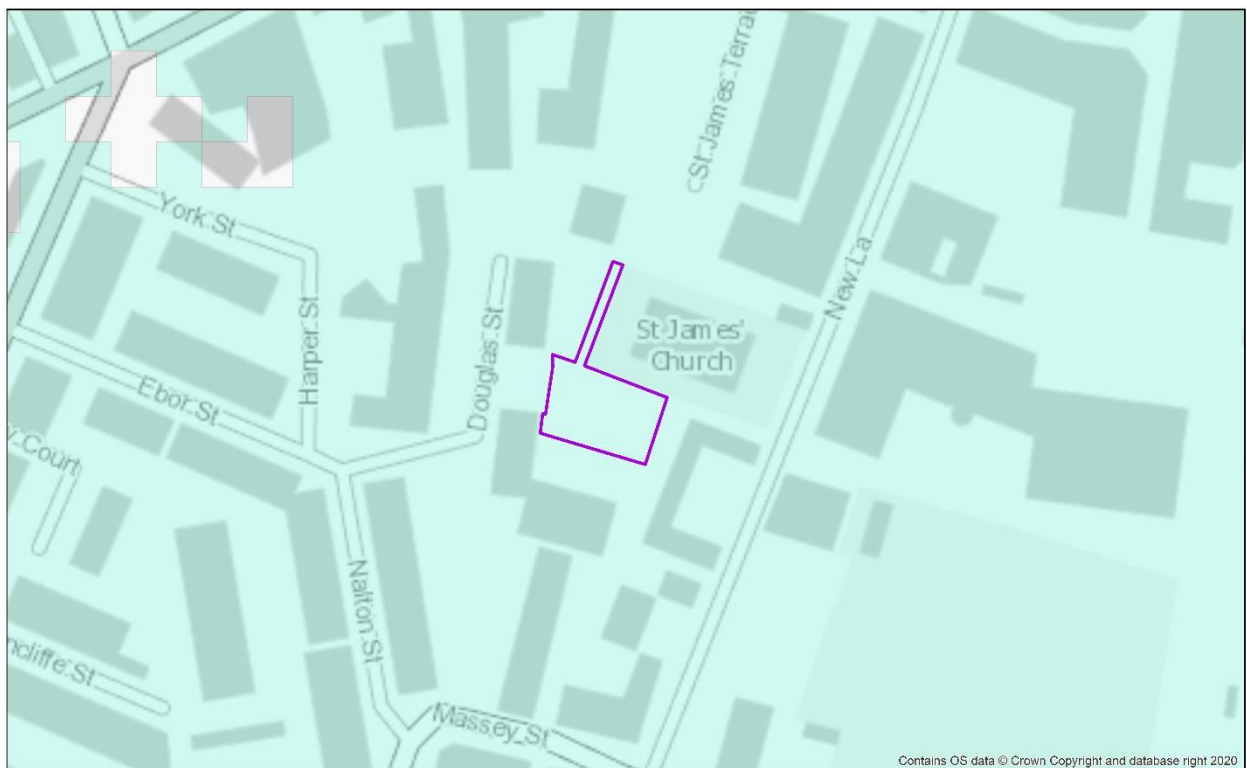


Figure A - Flood Zones

Flood Warning Area	N/A
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Site Name: SELB-CL– Land adjacent to St. James’s Church, Selby

River Flooding

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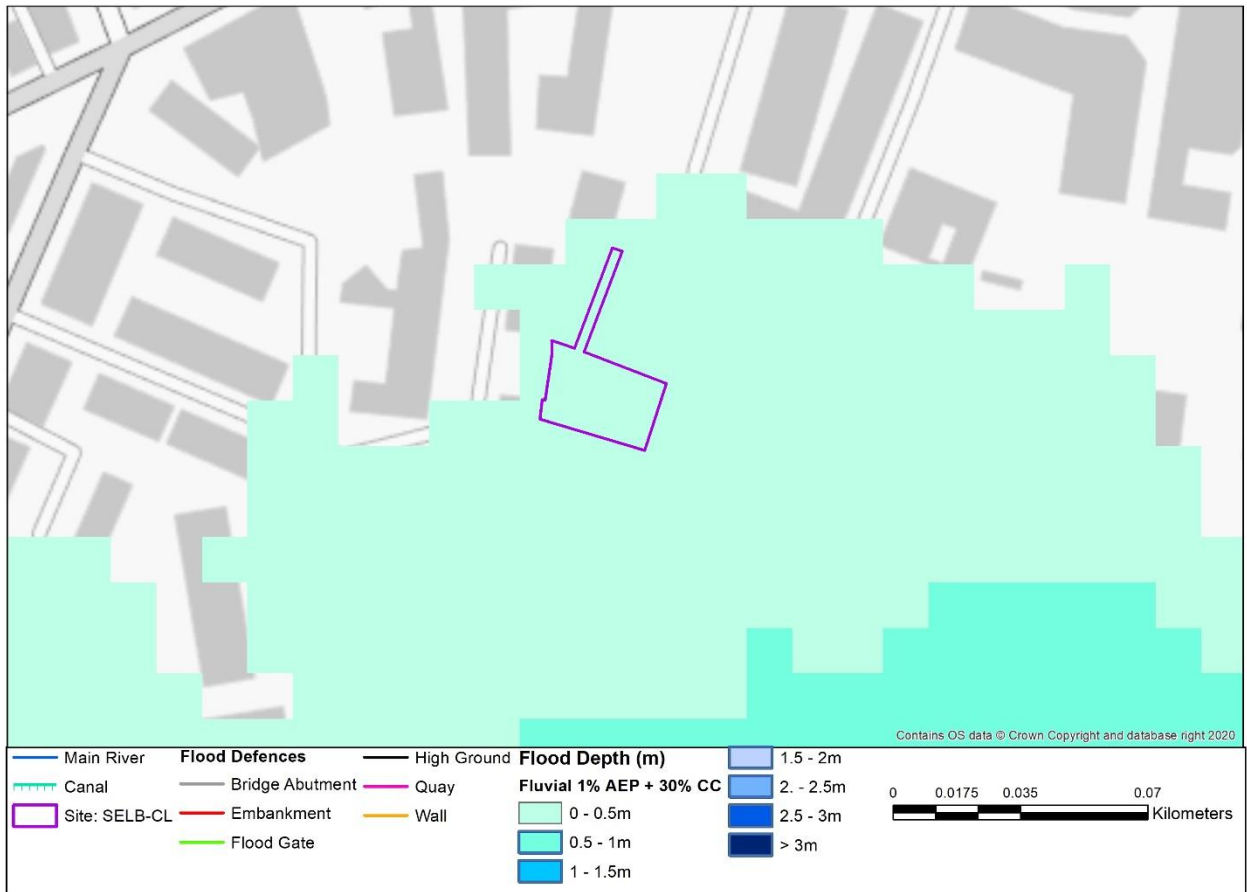


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-CL– Land adjacent to St. James’s Church, Selby

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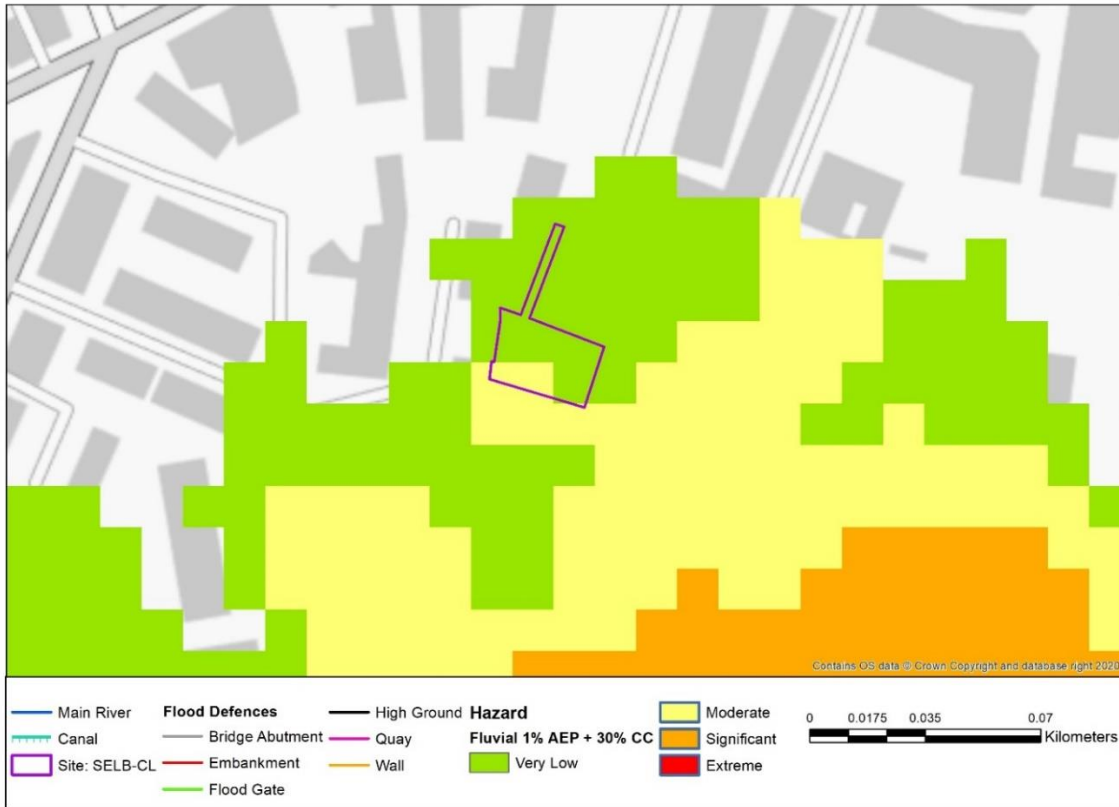


Figure C - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

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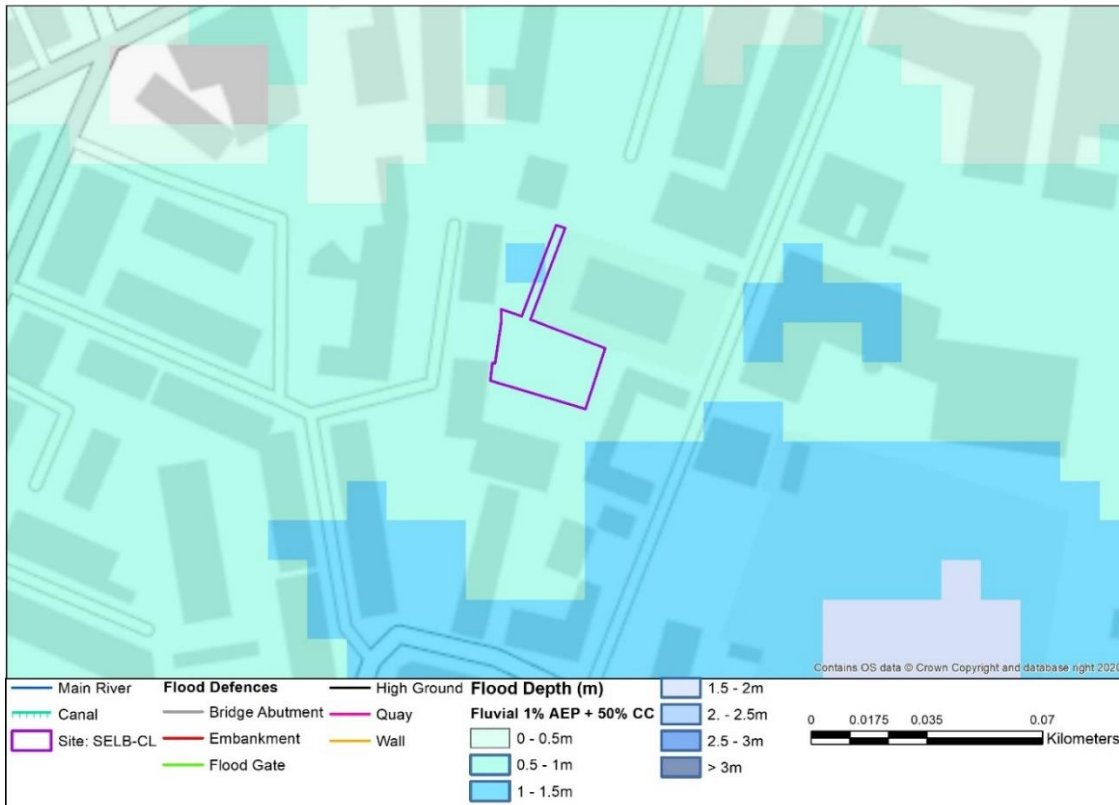


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: SELB-CL– Land adjacent to St. James’s Church, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

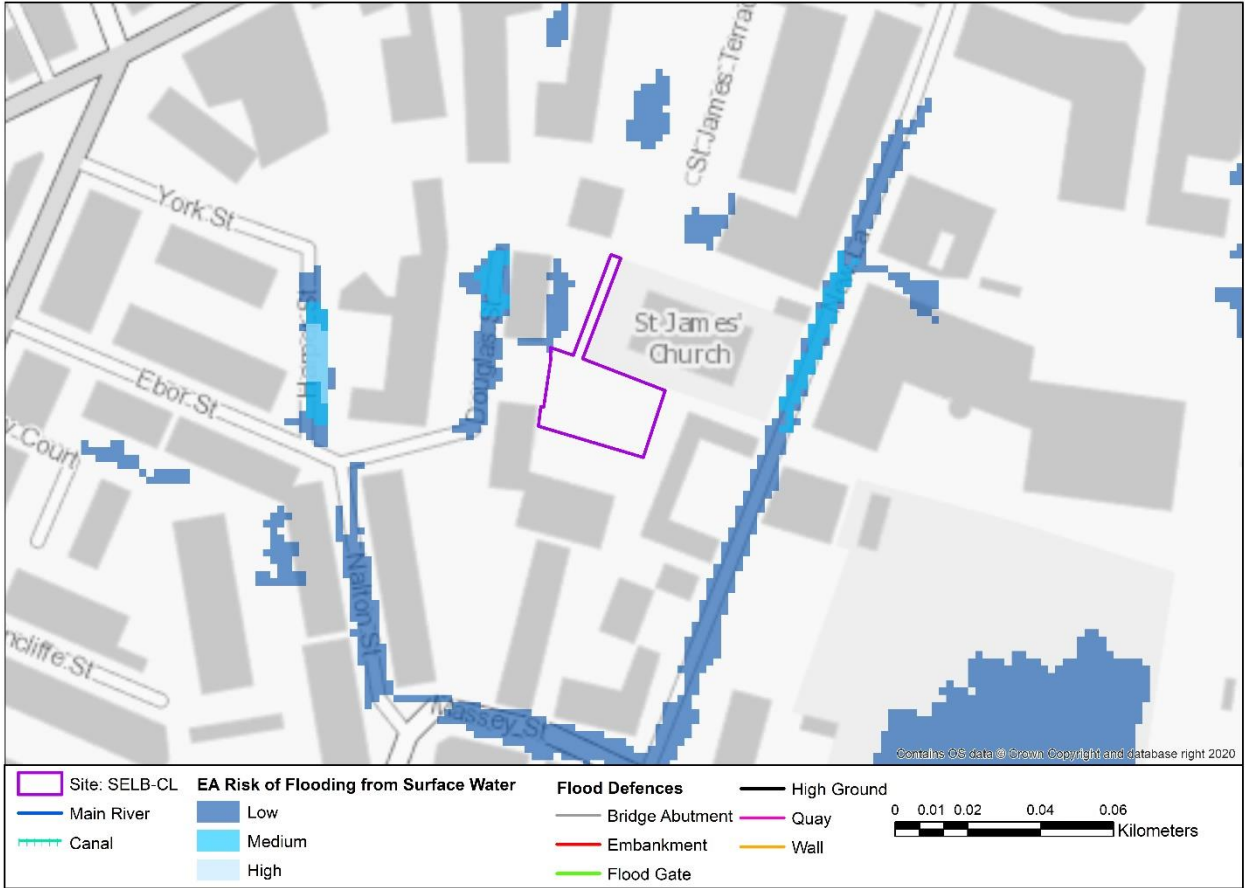


Figure F - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Sand
Susceptibility to Groundwater Flooding (BGS)	25% - <50%		
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir. (It is not possible to determine which reservoir).		

Site Name: SELB-CL– Land adjacent to St. James’s Church, Selby

Summary

The site (100%) is defined as Flood Zone 2 Medium probability of flooding from rivers or the sea. The site is approximately 200m from Selby Dam watercourse and 500m from the River Ouse.

Selby Dam has high ground, which forms a ‘defence’ along most of its length nearest to the site. There is a pumping station which controls the flow of water from Selby Dam to the River Ouse during times of high flow on the River Ouse. The River Ouse has walls that protect it closest to the site and these are classified as being within Fair to Good Condition.

Modelling shows the site to be at risk of flooding from when considering the impact of climate change, the risk is more significant for the 50% uplift on the 1% AEP compared to 30%. During the modelled 1% AEP event including 30% climate change, the site floods to a depth of 0-0.5m and has a predominantly ‘Very Low’ hazard associated with the site flooding. During the modelled 1% AEP event including 50%, climate change, the site floods to a depth of 0.5-1m.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is a minor residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date it may not be required.

The Risk of Flooding from Surface Water mapping identifies there is potential for surface water to flow and pond within the site, and also on New Lane adjacent to the site.

Broadscale mapping identifies that there is 25% - <50% susceptibility for groundwater flooding to occur across the site.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating.
- Finished floor levels should be set 300mm above the River Ouse/Selby Dam 1% AEP flood level including an allowance for climate change (to be discussed with the Environment Agency upon appointment to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the flood level for the 1% AEP event including appropriate allowance for climate change. It is likely that ground floor sleeping accommodation will be appropriate in the sections of the site where there is no risk of flooding for the 1% AEP event including appropriate allowance for climate change
- The proposed development must not reduce the ability of the floodplain to store water. This should be considered in relation to the 1% AEP modelled flood event including 30% allowance for climate change. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. There are no obvious discharge points for SuDs on the site and further investigation should be carried out by the developer.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Internal Drainage Board (IDB) upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation

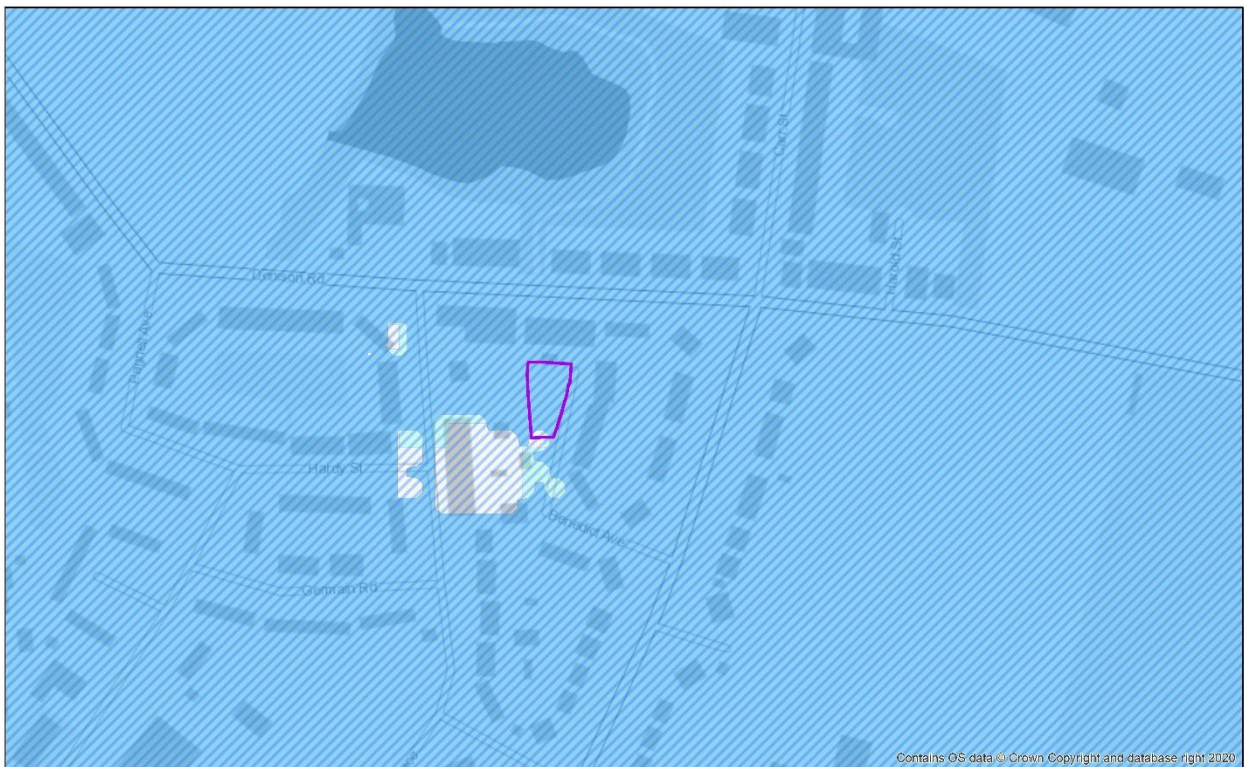
Site Name: SELB-CM– Land at Benedict Avenue, Selby

Site ID:	SELB-CM	Area (ha):	0.07
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Ouse		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
3%	1%	96%	0%	100%

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Site: SELB-CM	Flood Zone 3b	Flood Defences	High Ground
Areas Benefiting from Flood Defences	Flood Zone 3a	Bridge Abutment	Quay
Main River	Flood Zone 2	Embankment	Wall
Canal		Flood Gate	

Figure A - Flood Zones

Flood Warning Area	River Ouse at Selby and Barlby
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Site Name: SELB-CM– Land at Benedict Avenue, Selby

River Flooding

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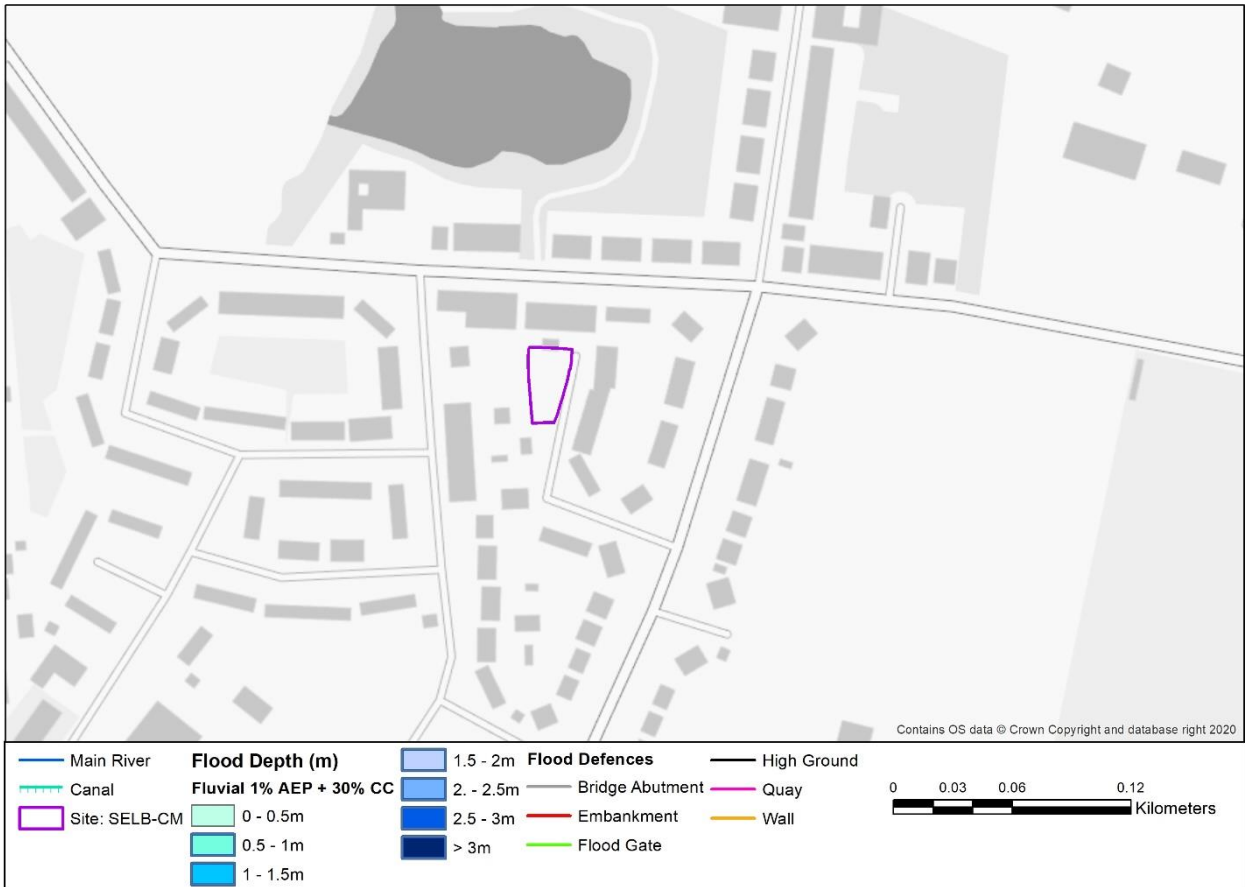


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including defences

Site Name: SELB-CM– Land at Benedict Avenue, Selby

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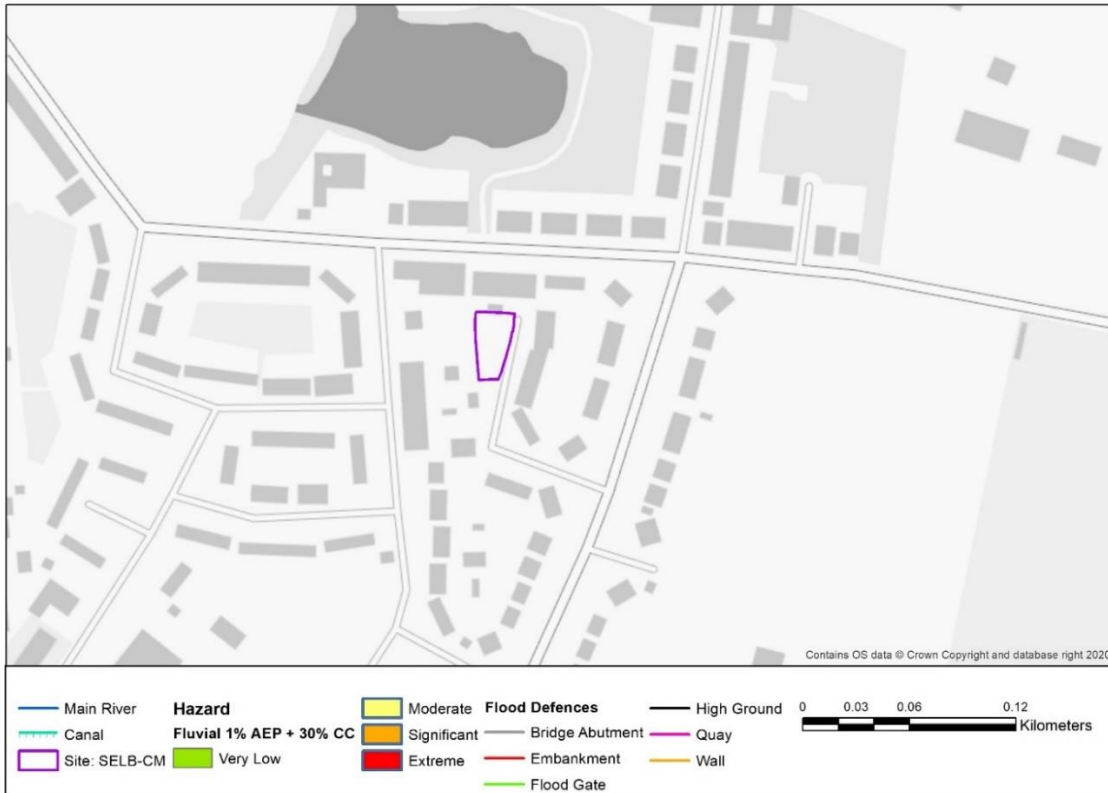


Figure C - Maximum Flood Depth 1% AEP including climate change (+30%), including defences

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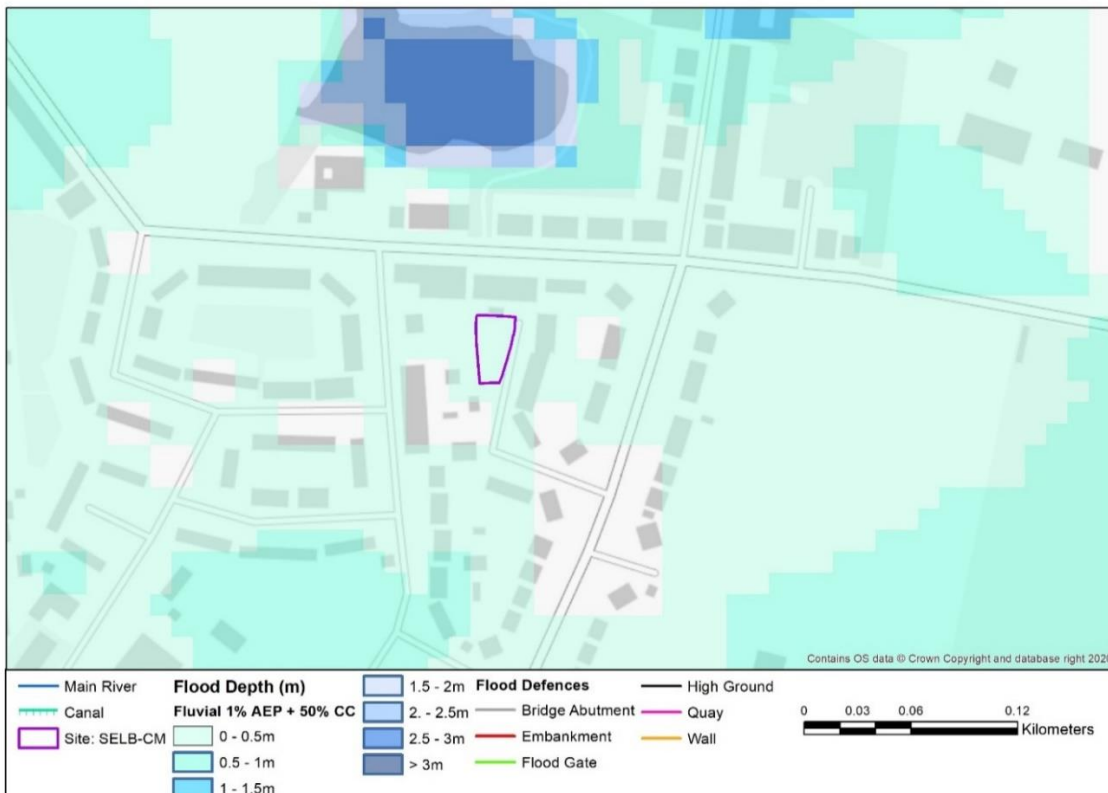


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including defences

Site Name: SELB-CM– Land at Benedict Avenue, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

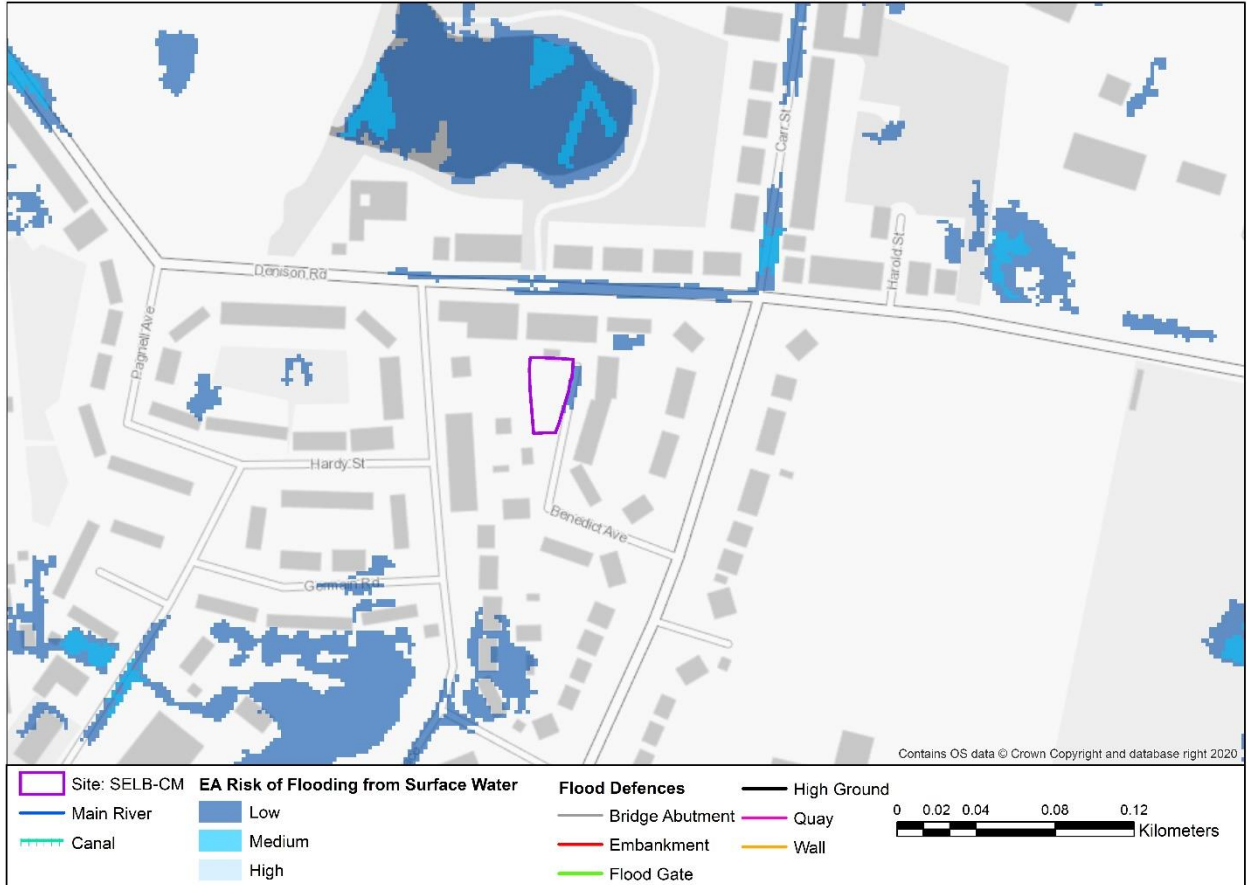


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology

Sherwood Sandstone Group - Sandstone

Superficial Geology

Sand

Susceptibility to Groundwater Flooding (BGS)

25% - <50%

Other Sources

Risk of flooding from reservoirs

The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir. (It is not possible to determine which reservoir).

Site Name: SELB-CM– Land at Benedict Avenue, Selby

Summary

The majority of the site (96%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, with a small area (1%) of Flood Zone 2 Medium probability of flooding from rivers or the sea and (3%) within Flood Zone 1 Low probability of flooding from rivers or the sea.

The flood defences along the River Ouse that protect the site are classified as being in Fair- Good condition. The defences consist of a series of flood walls and a floodgate. It is not clear which watercourse is connected via the floodgate and this must be investigated upon appointment. The defences protect the site from flooding, but there is still a residual risk of the site flooding if the defences were to be breached or there is a large enough event.

Modelling shows the site to be at limited risk of flooding. There is no risk of flooding to the site for the 1% AEP plus 30% climate change. For the 1% AEP plus 50% climate change uplift the entire site is at risk of flooding to a depth between 0 and 0.5m deep.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is advised.

The Risk of Flooding from Surface Water mapping identifies there is no potential for surface water to flow and pond within the site. There is potential some surface water to pond along Denison Road.

Broadscale mapping identifies that there is 25% - <50% susceptibility for groundwater flooding to occur across the site.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test is satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating. Housing should be sequentially located to areas of lower potential flood depths.
- There is no flooding in the 1% AEP plus 30% climate change due to the presence of defences, therefore site levels should be based upon those from a breach. Finished floor levels or raised development platforms should be set 300mm above the River Ouse 1% AEP flood level resulting from a breach of defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the 1% AEP breach level including an allowance for climate change. Ground floor sleeping accommodation is unlikely to be appropriate on the site due to the proximity flood defences and the risk of rapid inundation in the event of a breach.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 50% climate change uplift but none for the 1% AEP plus 30% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624. In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level (1% AEP) including an appropriate allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. There is no obvious drainage outfall location on the site.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Internal Drainage Board (IDB) upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: SELB-CN– Land at Richard Street, Selby

Site ID:	SELB-CN	Area (ha):	0.1
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	Selby Dam		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	0%	100%	0%	100%

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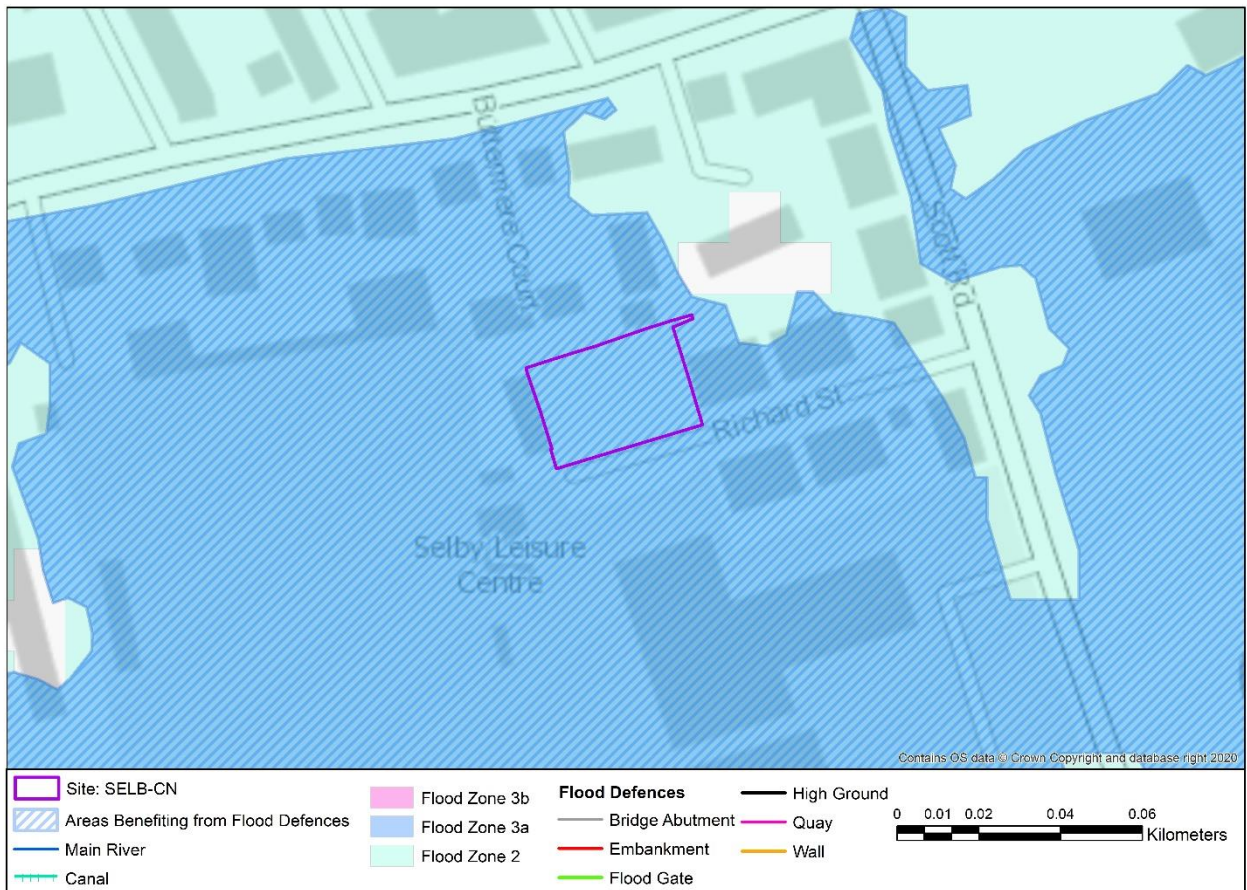


Figure A - Flood Zones

Flood Warning Area	N/A
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Site Name: SELB-CN– Land at Richard Street, Selby

River Flooding

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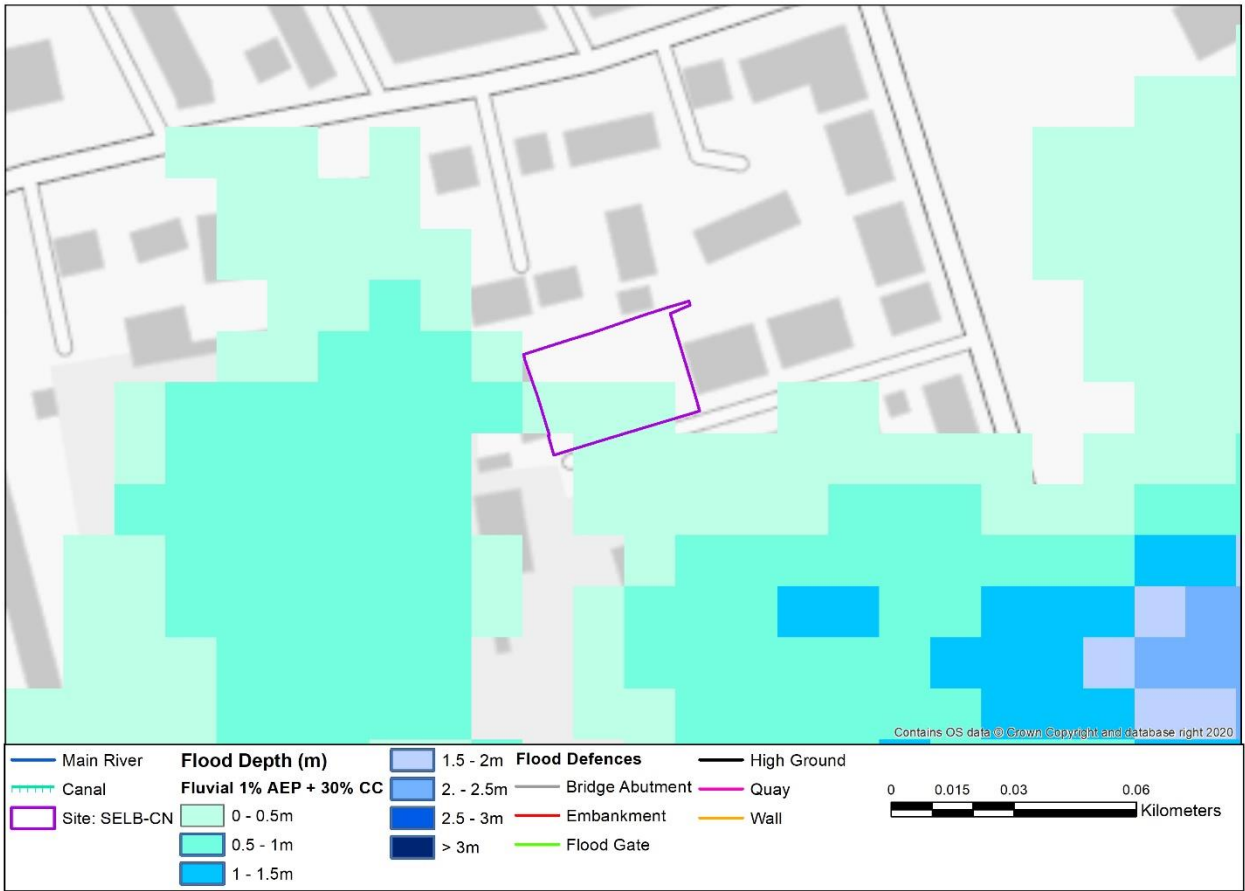


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-CN– Land at Richard Street, Selby

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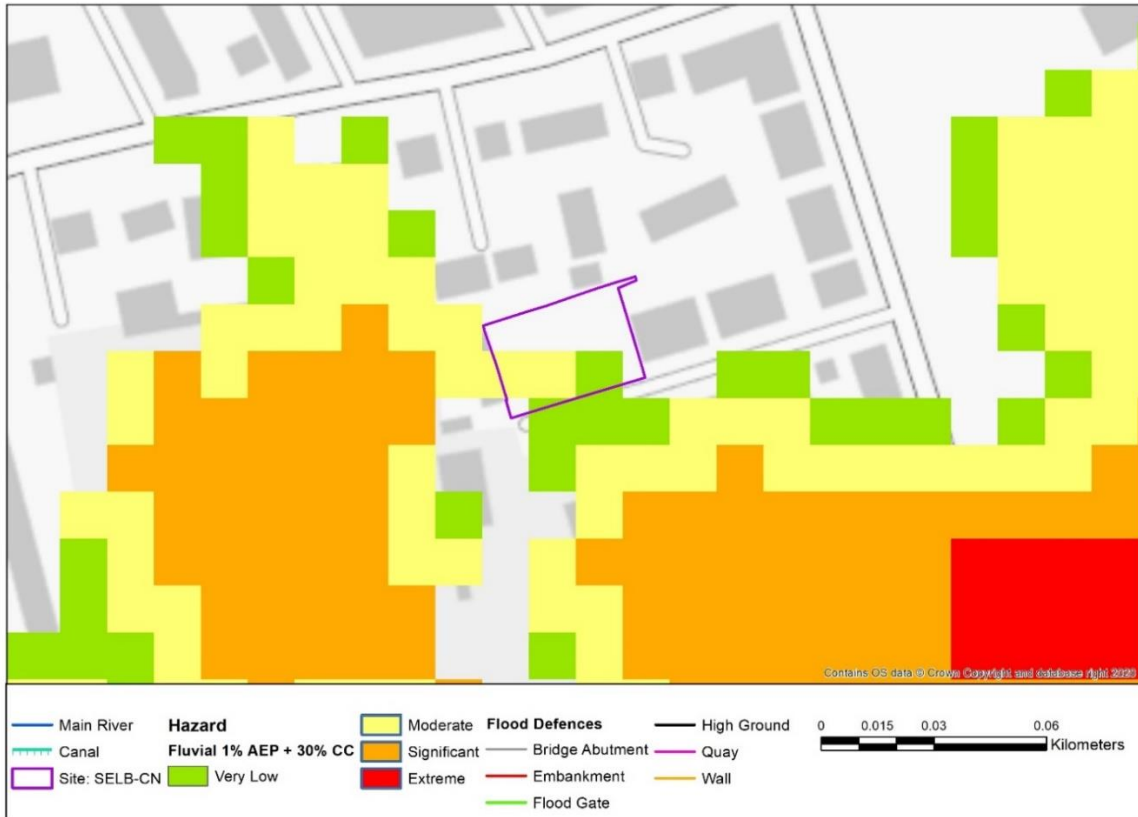


Figure C - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

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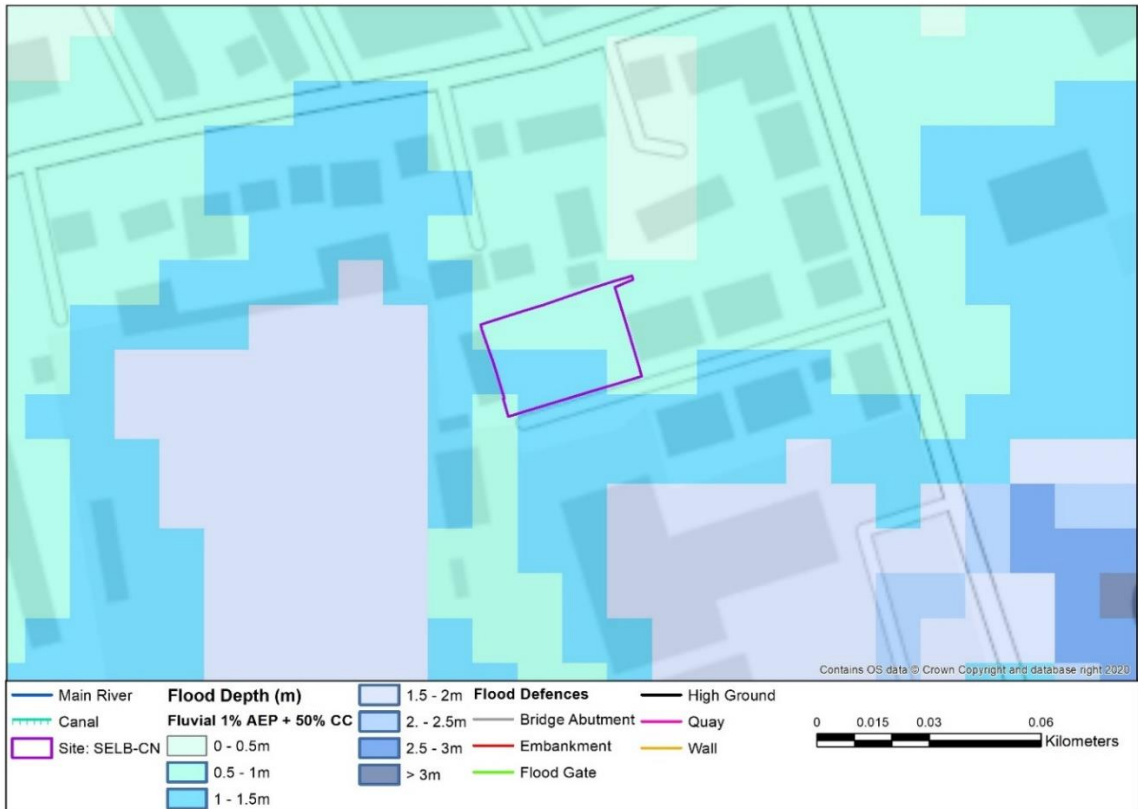


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: SELB-CN– Land at Richard Street, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

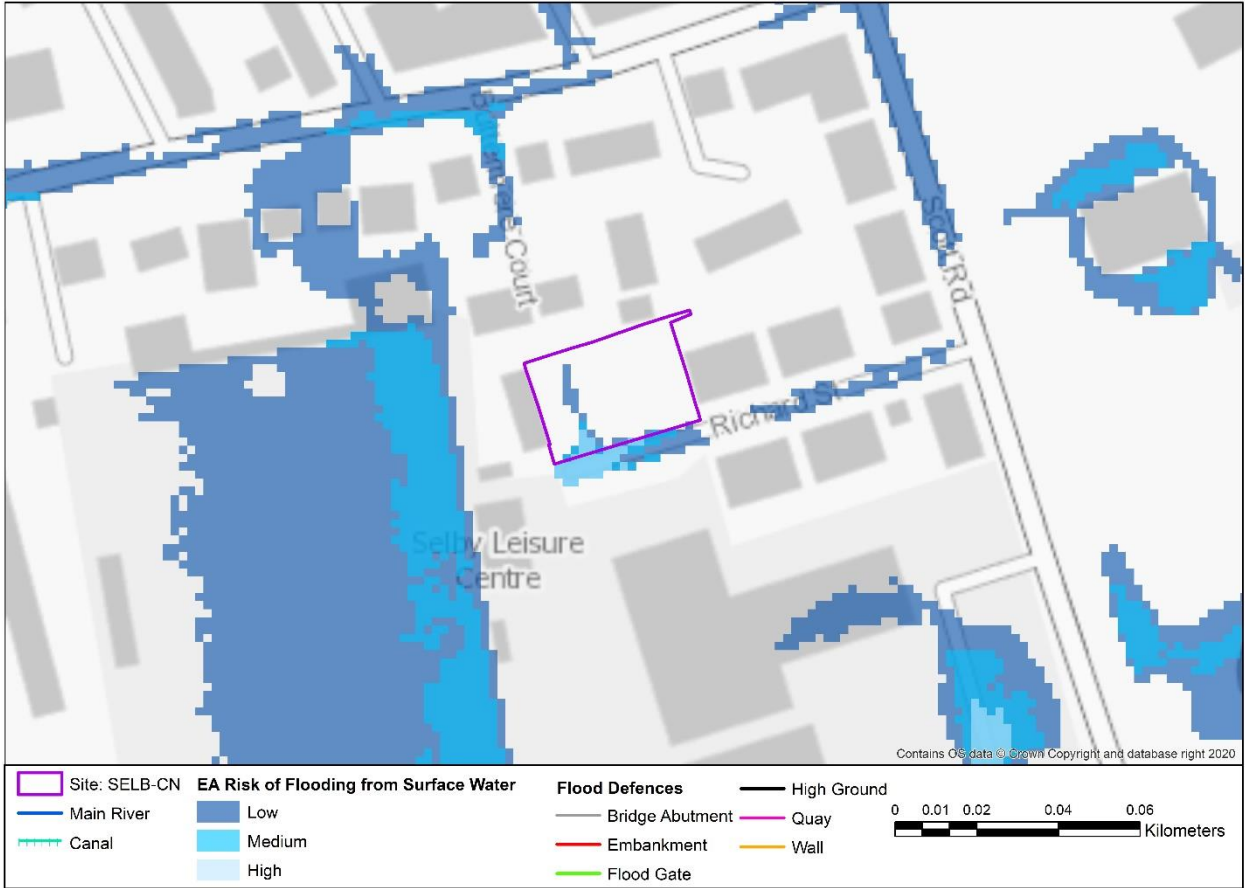


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Peat and Silt
Susceptibility to Groundwater Flooding (BGS)	25% - <50%		
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir. (It is not possible to determine which reservoir).		

Site Name: SELB-CN– Land at Richard Street, Selby

Summary

The site (100%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea. The site is located approximately 200m North of Selby Dam watercourse. The whole site is influenced by the presence of defences, that protect the site as it is classed as an area benefitting from defences. It is not possible to assess precisely which defences the site is benefitting from, this should be investigated further when the site specific FRA is completed. It is thought that the presence of Selby Dam pumping station would have a notable impact upon the potential risk of flooding. There is a residual risk of flooding if the Pumping Station or defences along the River Ouse were to be outflanked or breached.

Modelling shows that approximately half of the site is at risk of flooding for the 1% AEP plus 30% climate change uplift and that portion of the site floods to a depth of between 0 and 0.5m deep. The corresponding flood hazard associated with the site is mostly 'Very Low' risk.. For the 1% AEP plus 50% climate change uplift the entire site is at risk of flooding to a depth between 0.5 and 1.5m deep.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is recommended to be considered.

The Risk of Flooding from Surface Water mapping identifies there is no potential for surface water to flow and pond within the site. There is potential for surface water to pond on Richard Street and the Football Ground adjacent to the site.

Broadscale mapping identifies that there is 25% - <50% susceptibility for groundwater flooding to occur across the site.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating. Residential accommodation should be placed preferably towards the North of the site where flood depths are lower.
- Breach modelling should be undertaken as part of a site specific FRA after investigating how the site is classed as benefitting from defences and the complex interactions of different flood sources. The impact of Selby Dam Pumping Station failing should be investigated.
- Finished floor levels should be set 300mm above the Selby Dam 1% AEP flood level resulting from a breach/failure of defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the flood level for the 1% AEP breach/failure event including appropriate allowance for climate change. It is unlikely that ground floor sleeping accommodation will be appropriate, even in the sections of the site where there is no risk of flooding for the 1% AEP event including appropriate allowance for climate change.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 30% climate change uplift and 1% AEP plus 50% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- In the event of a breach/failure in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an appropriate allowance for climate change.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. There are no obvious discharge points for SuDs on the site and further investigation should be carried out by the developer.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Internal Drainage Board (IDB) upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation

Site Name: SELB-E– Holmes Field, South of Lordship Lane, Selby				
Site ID:	SELB-E	Area (ha):	32.57	
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable	
Watercourses near the site	Selby Dam, Holme Dike, River Ouse			
Flood Zones and Historic Flooding				
Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	0%	100%	0%	100%

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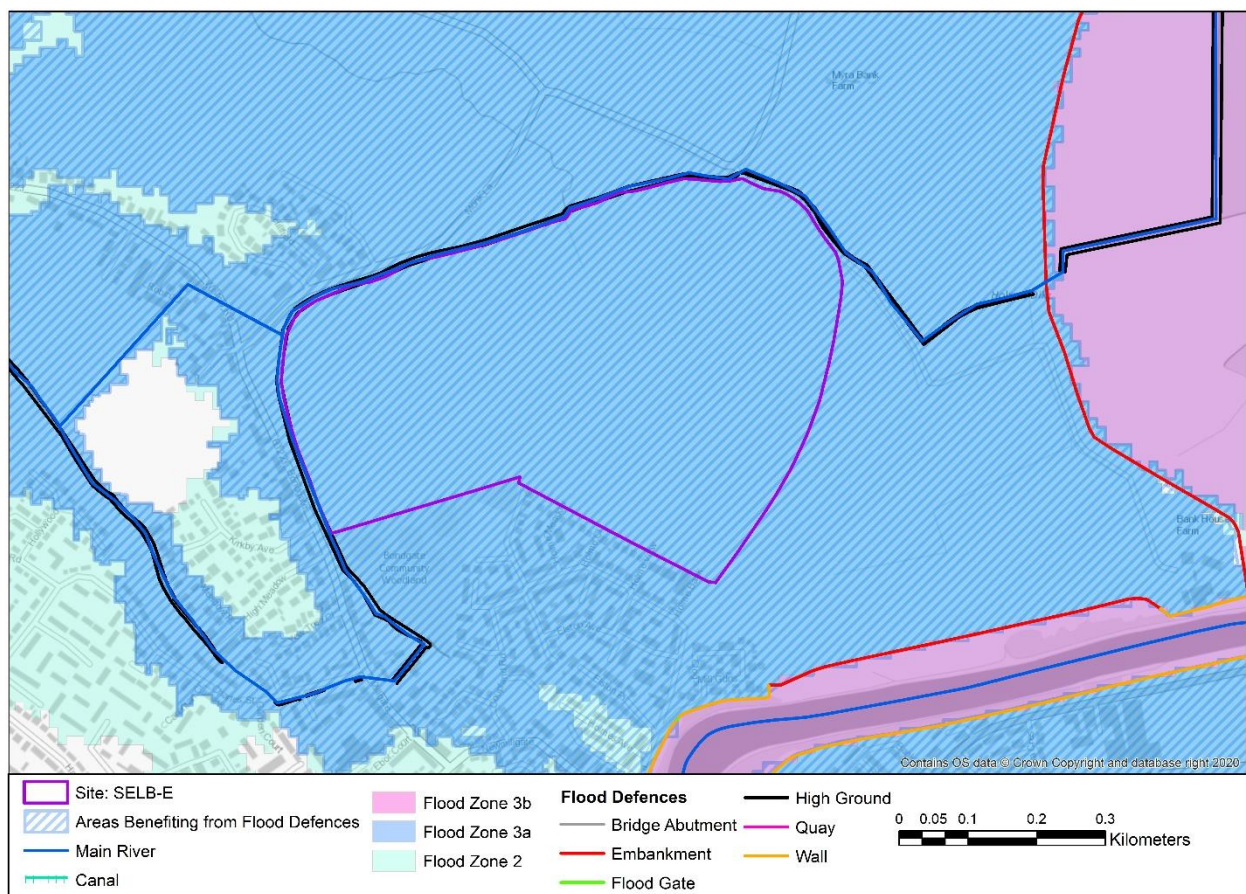


Figure A - Flood Zones

Flood Warning Area	The site is not within a Flood Warning area but it is close to the River Ouse at Selby and Barlby Flood Warning Zone
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Site Name: SELB-E– Holmes Field, South of Lordship Lane, Selby

River Flooding

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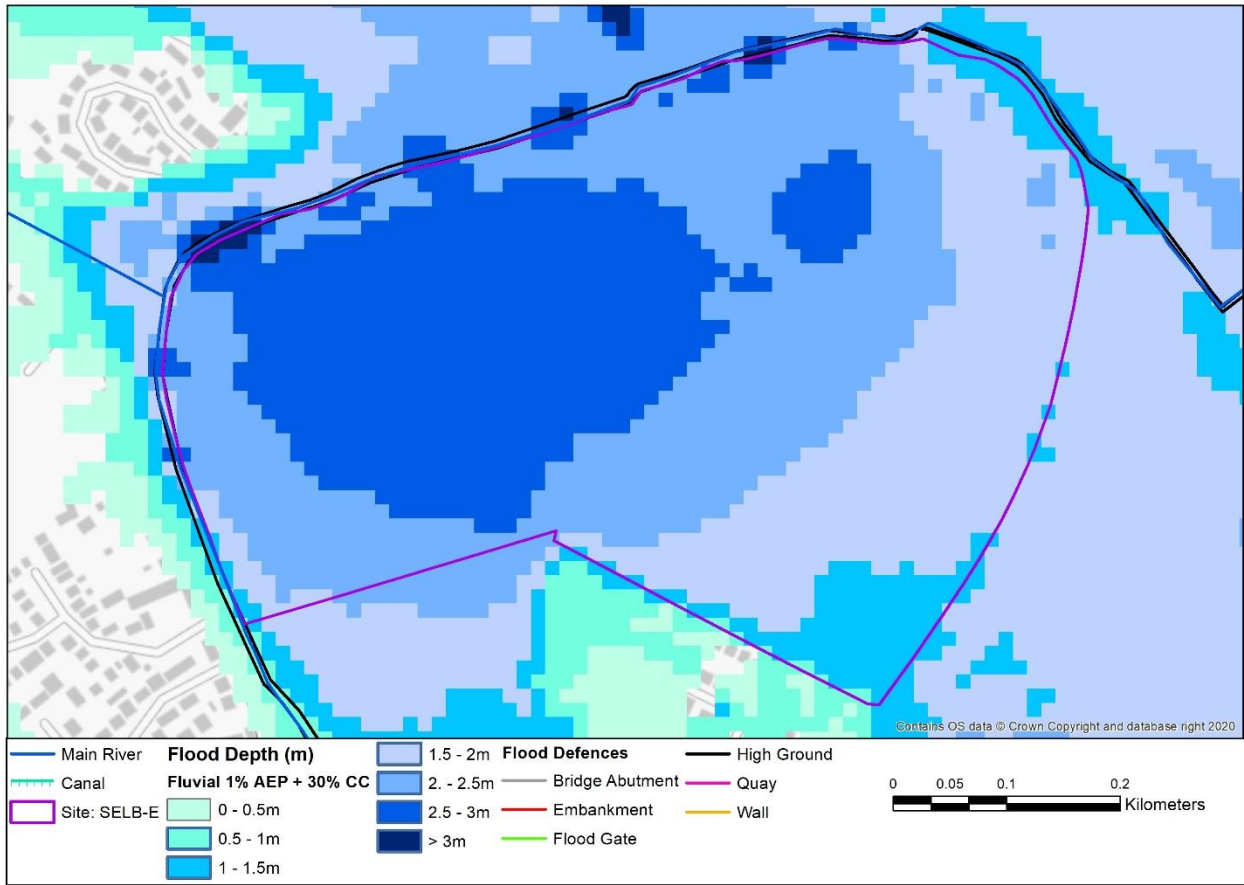


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-E– Holmes Field, South of Lordship Lane, Selby

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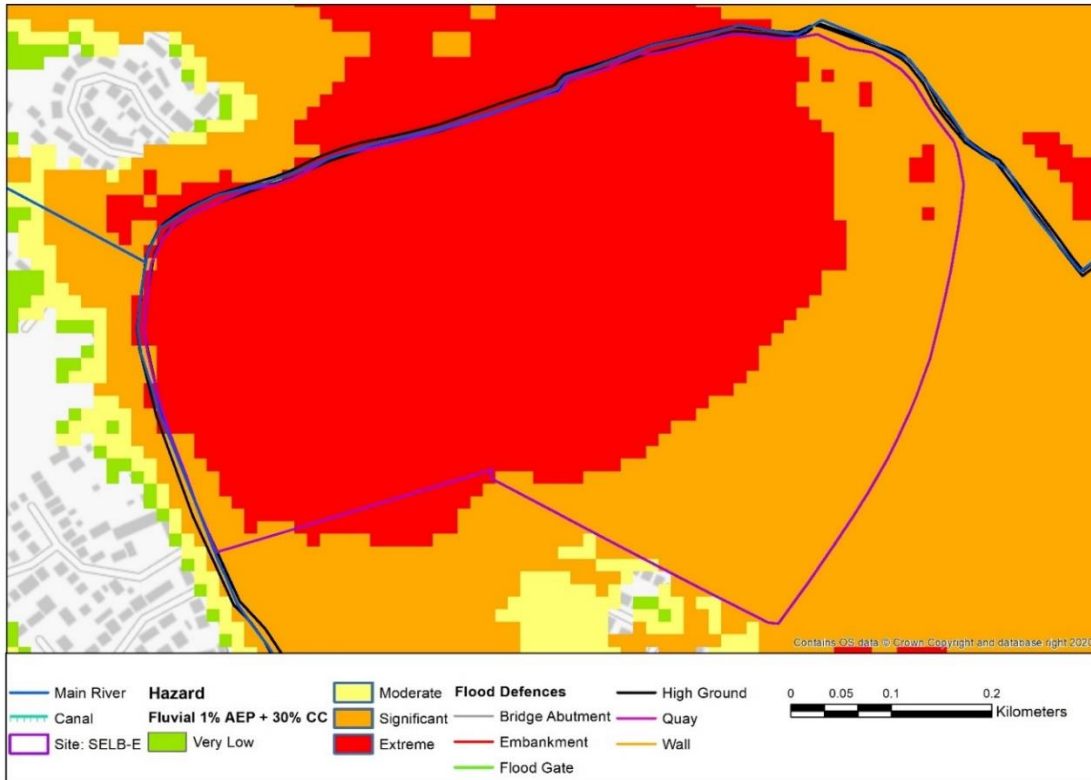


Figure C - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

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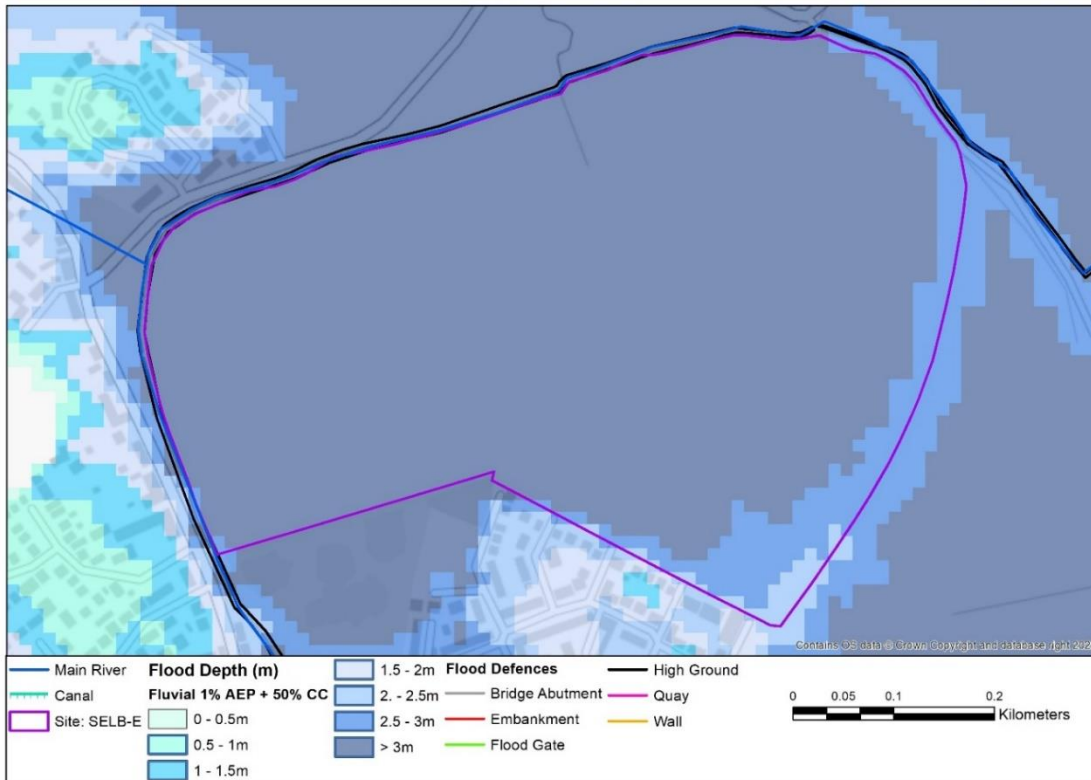


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: SELB-E– Holmes Field, South of Lordship Lane, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

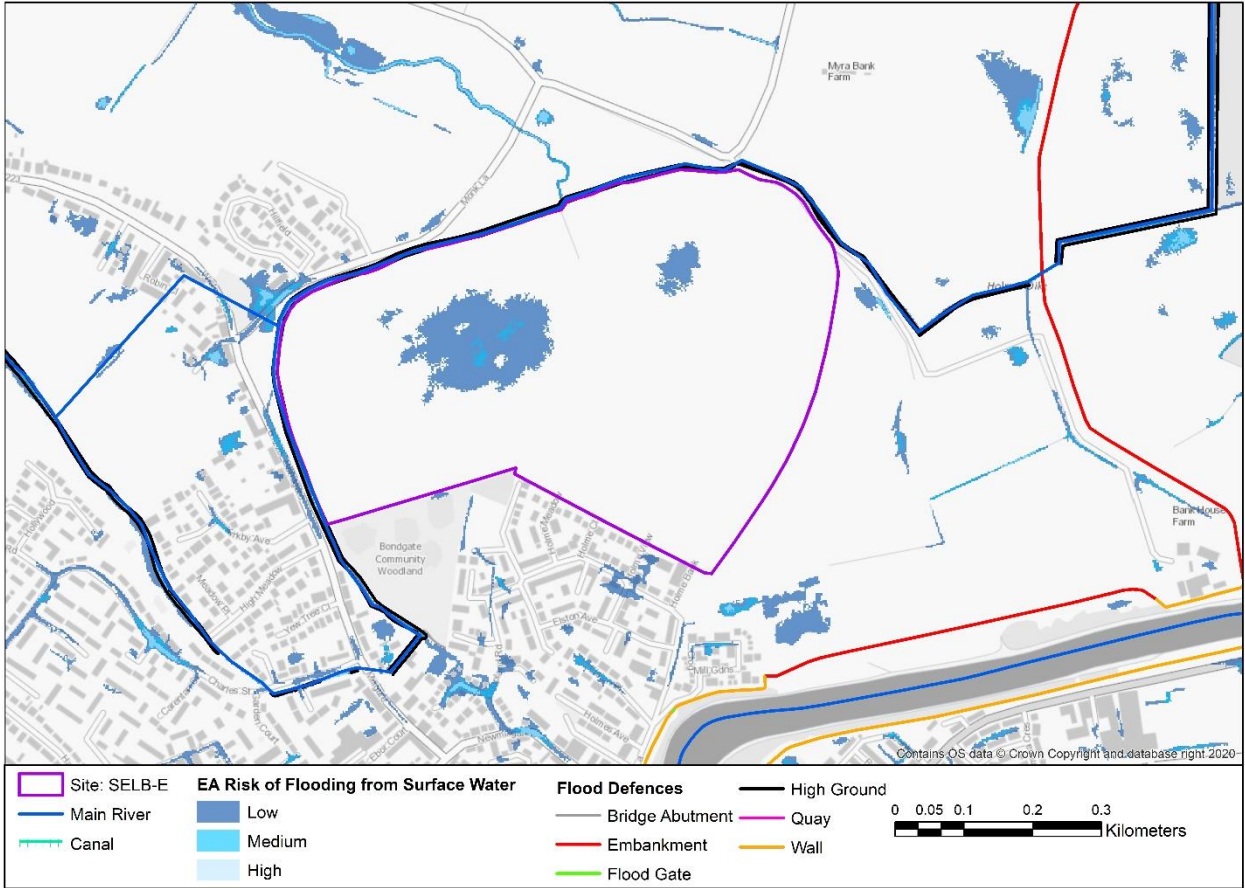


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Peat and Silt
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Susceptibility to Groundwater Flooding (BGS)	<25%
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Other Sources

Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir).
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Site Name: SELB-E– Holmes Field, South of Lordship Lane, Selby

Summary

Holme Dike (Main River) encircles the site from all directions except to the south. Holme Dike drains into Cawood/ Wistow Reservoir approximately 300m to the East of the site. The River Ouse is approximately 200m to the south of the site. The site is entirely within Flood Zone 3a High probability of flooding from rivers or the sea.

The site is encircled from all sides except the South by Holme Dike. Holme Dike does not have any formal defences, just high ground which provides a degree of protection from flooding, there is still residual risk of flooding if capacity is exceeded in the channel. There is a residual risk from the Cawood/ Reservoir which is used as washlands when the level on the River Ouse is high, the potential impacts if a breach were to occur should be investigated at the time of writing an FRA for the site. The River Ouse which is to the south of the site is lined by embankments, and flood walls that vary in condition from Fair- Good. There is a residual risk of the site flooding if these are breached or overtopped.

Modelling shows the site to be at risk of flooding when considering the impact of climate change, the risk is more significant for the 50% uplift on the 1% AEP compared to 30%. During the modelled 1% AEP event including 30%, climate change, the site is at risk of flooding and flood levels vary from 1.5 – 3m on the site. The site is split between Extreme and Significant risk for the 1% AEP plus 30% uplift to flows. During the modelled 1% AEP event including 50%, climate change, flood levels vary from 2.5 - >3m on the site.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is recommended to be considered.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to pond within the site, and also on Monk Lane and Bondgate adjacent to the site.

Broadscale mapping identifies that there is <25% susceptibility for groundwater flooding to occur across the site

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard rating. Residential accommodation should not be placed directly alongside Holme Dike due to risk of rapid inundation. Residential accommodation should be placed preferentially where there are lower flood depth closer to the South East portion of the site.
- Breach modelling should be undertaken as part of a site specific FRA after investigating how the site is classed as benefitting from defences and the complex interactions of different flood sources. It is suggested that the impact of the Cawood/Wistow Reservoir being breached is investigated. A breach in the defences along the River Ouse should also be considered.
- Finished floor levels should be set 300mm above the Holme Dike/River Ouse 1% AEP flood level resulting from a breach of defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). Sleeping accommodation should be set 300mm above the flood level for the 1% AEP breach event including appropriate allowance for climate change. It is unlikely that ground floor sleeping accommodation will be appropriate, even in the sections of the site where there is no risk of flooding for the 1% AEP event including appropriate allowance for climate change.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 30% climate change uplift and 1% AEP plus 50% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an appropriate allowance for climate change.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. Home Dike, which flows around the site and this is a potential discharge point for SuDs.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Internal Drainage Board (IDB) upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: TADC-I- Land at Mill Lane, Tadcaster				
Site ID:	TADC-I	Area (ha):	3.05	
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable	
Watercourses near the site	River Wharfe			
Flood Zones and Historic Flooding				
Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
42%	6%	44%	8%	0%

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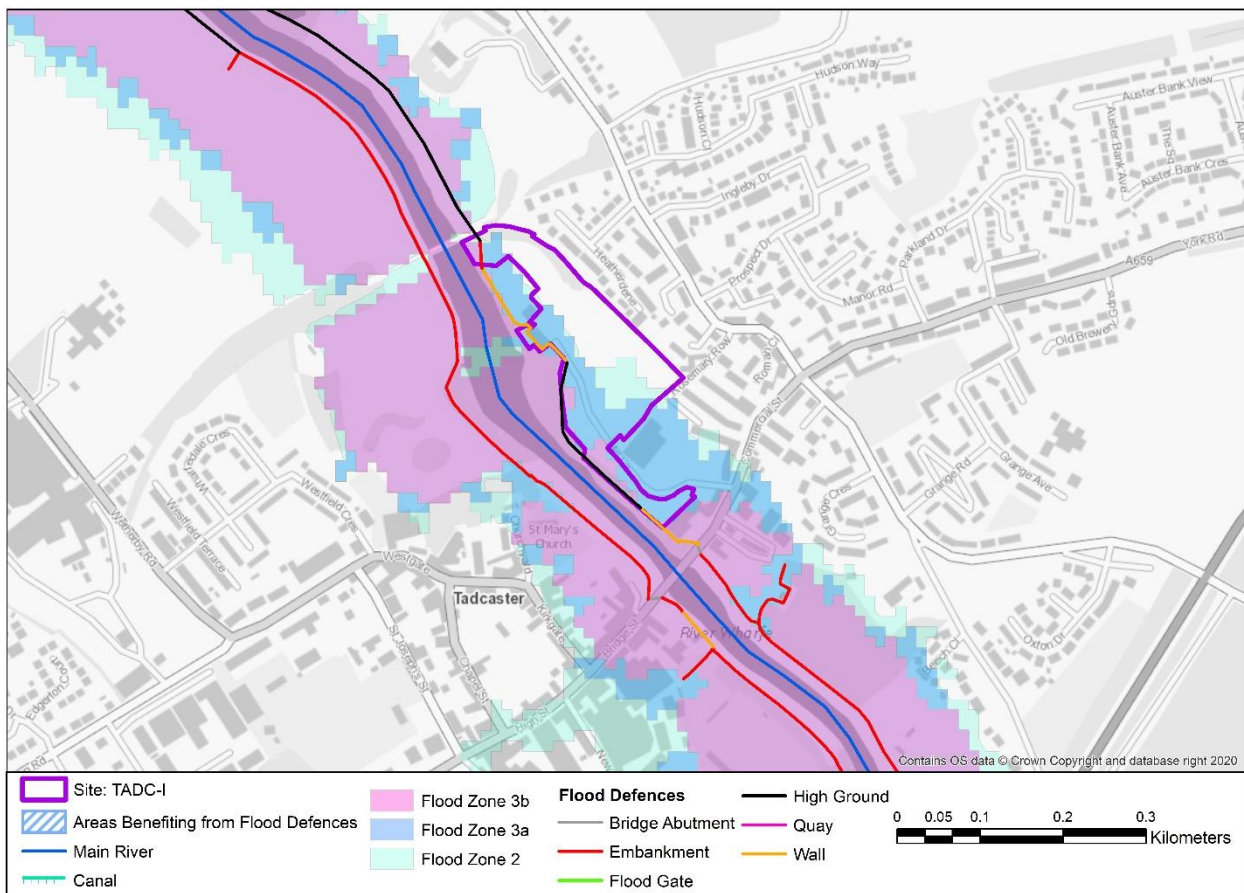


Figure A - Flood Zones

Flood Warning Area	River Wharfe at Tadcaster
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Site Name: TADC-I- Land at Mill Lane, Tadcaster

River Flooding

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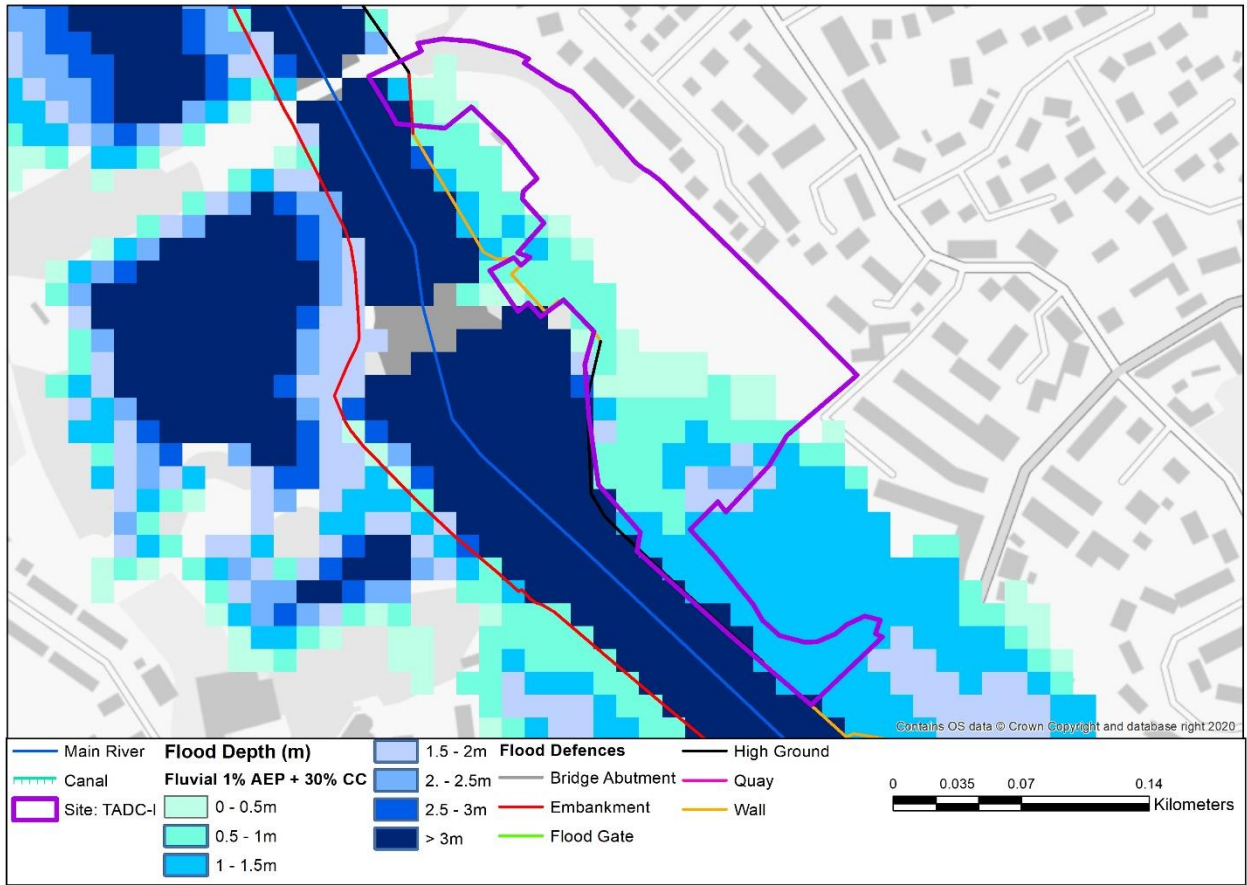


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: TADC-I- Land at Mill Lane, Tadcaster

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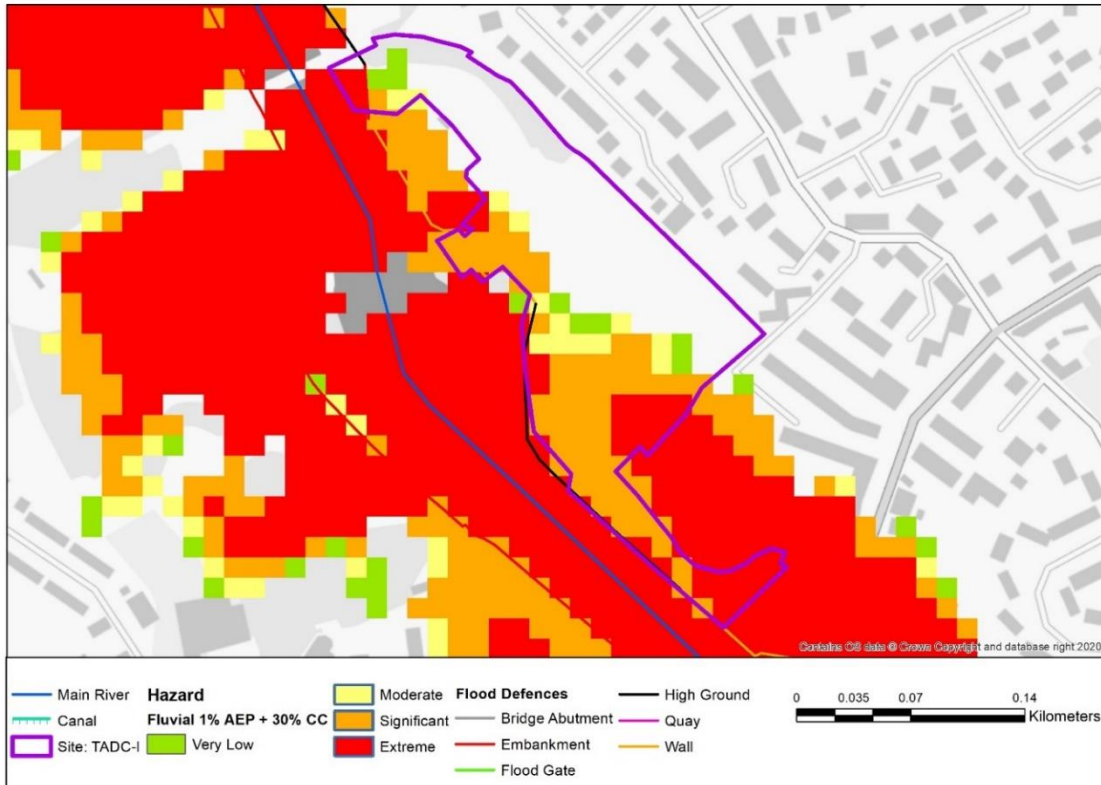


Figure C - Maximum Hazard 1% AEP including climate change (+30%), including flood defences

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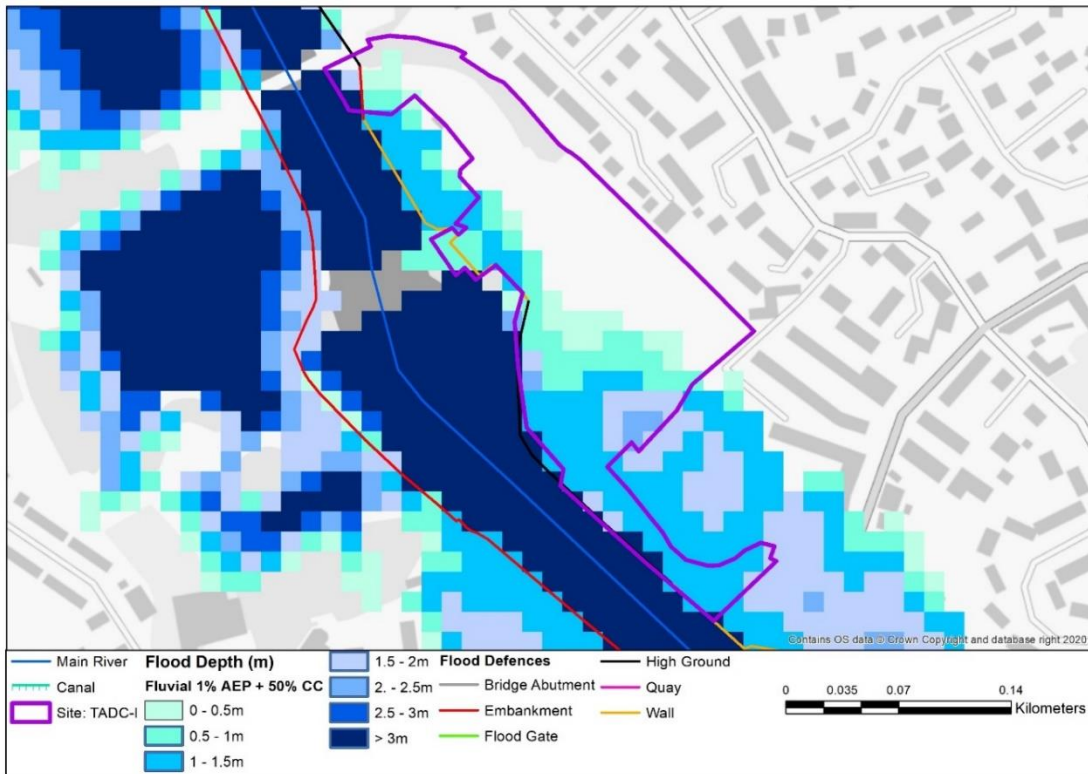


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: TADC-I- Land at Mill Lane, Tadcaster

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

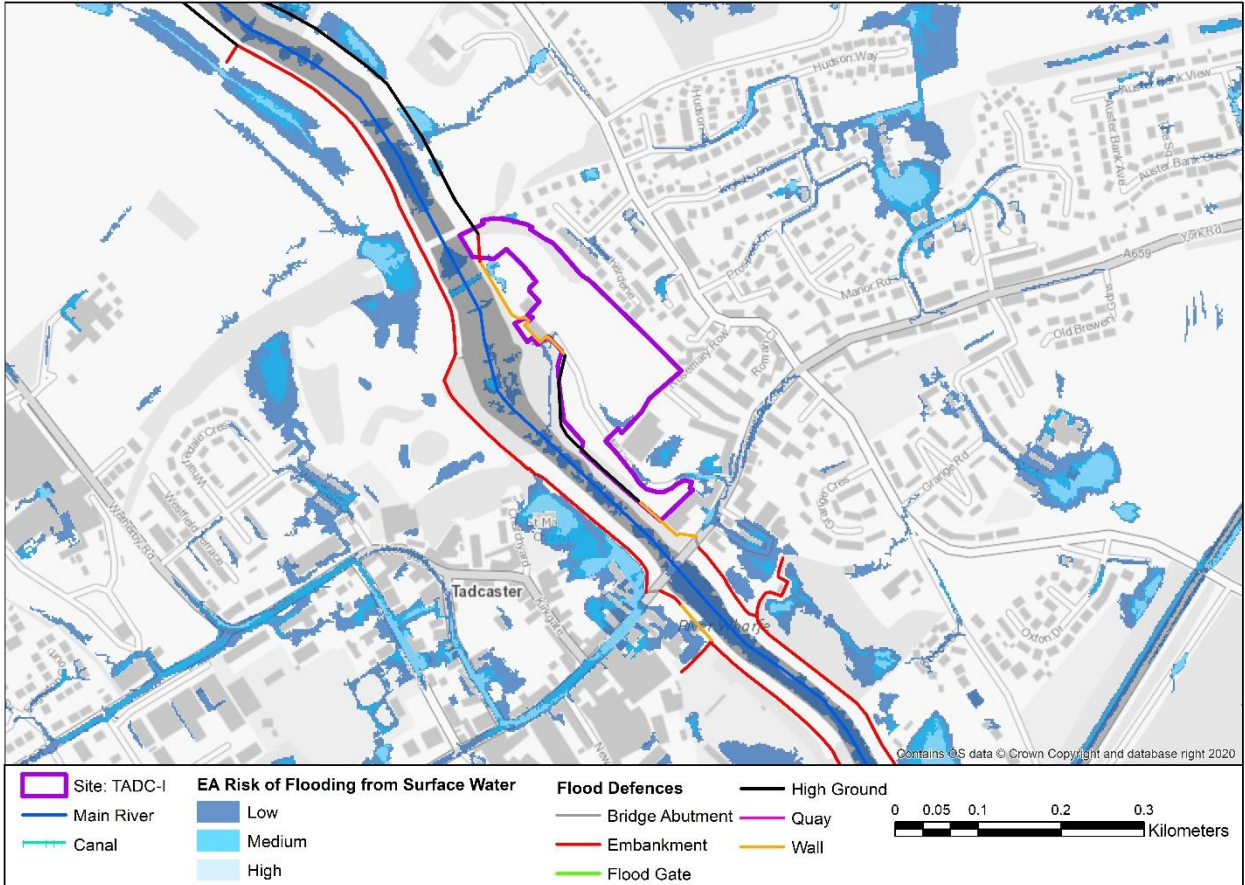


Figure F - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology

Brotherton Formation - Limestone, Dolomitic

Superficial Geology

Clay, Sand and Gravel

Susceptibility to Groundwater Flooding (BGS)

25 - <50%

Other Sources

Risk of flooding from reservoirs

The Long Term Flood Risk Map shows that part of the site could be at risk of flooding, in the event of a breach or failure of a reservoir. (It is not possible to determine which reservoir).

Site Name: TADC-I– Land at Mill Lane, Tadcaster

Summary

The River Wharfe flows south alongside the site to the west. The site is divided between Flood Zone 3a High probability of flooding from Rivers or sea (44 %), (8 %) Flood Zone 3b Functional Floodplain, (6 %) Flood Zone 2 Medium probability of flooding from Rivers or sea and (42 %) Flood Zone 1 Low probability of flooding from Rivers or sea. The current SoP of defences which line the site is a 1 in 25 year Standard of Protection (SoP) or 4% AEP which means that Flood Zone 3b is not relevant and is classified as Flood Zone 3a.

Defences are present along the western perimeter of the site. They vary from embankments and flood walls which vary in condition from an unknown condition to Good. There is also some high ground that partially protects the site, but this is not classified as a formal defence, despite providing a degree of protection to the site.

Modelling shows the site to be at risk of flooding from the River Wharfe when considering the impact of climate change, the risk is marginally more extensive for the 50% uplift on the 1% AEP compared to 30%. During the modelled 1% AEP event including 30%, climate change, approximately half of the site is at risk of flooding. Flood levels vary from 0 – 2.5m on the site (for 1% AEP plus 30% uplift and plus 50%). The deeper areas of flooding across the site are more extensive for the 1% AEP plus 50% climate change than when the 30% uplift is applied but the overall footprint of flooded sections of the site is similar.

The northern portion of the site is raised much higher than the watercourse and therefore is not liable to flood. Provided development is steered away from the southern portion of the site, there is no requirement for breach modelling for the site.

The Risk of Flooding from Surface Water mapping identifies there is no potential for surface water to flow and pond within the site. There is potential for surface water to pond on Mill Lane, adjacent to the site.

Broadscale mapping identifies that there is 25% - <50% susceptibility for groundwater flooding to occur across the site.

Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating. Residential accommodation should be placed in the northern part of the site on higher ground, as this area is at a lower risk of flooding.
- Developments are not appropriate within the functional floodplain 3b unless it is water compatible. The Standard of Protection of flood defences on the River Wharfe is 5% AEP and therefore the site is not considered to be in the functional floodplain. This should be confirmed as part of a site-specific FRA.
- Finished floor levels should be set 300mm above the River Wharfe 1% AEP flood level including an allowance for climate change. Sleeping accommodation should be set 300mm above the flood level for the 1% AEP event including appropriate allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied). It is likely that ground floor sleeping accommodation will be appropriate in the sections of the site where there is very low risk of flooding for the 1% AEP event including appropriate allowance for climate change.
- The proposed development must not reduce the ability of the floodplain to store water. This should be considered in relation to the 1% AEP modelled flood event including an appropriate allowance for climate change. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- Breach modelling is not required to be undertaken as part of a site specific FRA as the standard of protection of flood defences on the River Wharfe is <1 % AEP..
- The site is located within the Flood Warning Area for River Wharfe at Tadcaster. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is located within a Source Protection Zone which means only attenuation based SuDs are likely to be permitted on the site. The River Wharfe is within close proximity to the site and it could be used as a potential discharge point.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.

Site Name: SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

Site ID:	SELB-CA	Area (ha):	60.43
Proposed Use:	Mixed Use – Employment and Retail	Vulnerability Classification:	Less Vulnerable
Watercourses near the site	River Ouse		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	0%	99%	1%	99%

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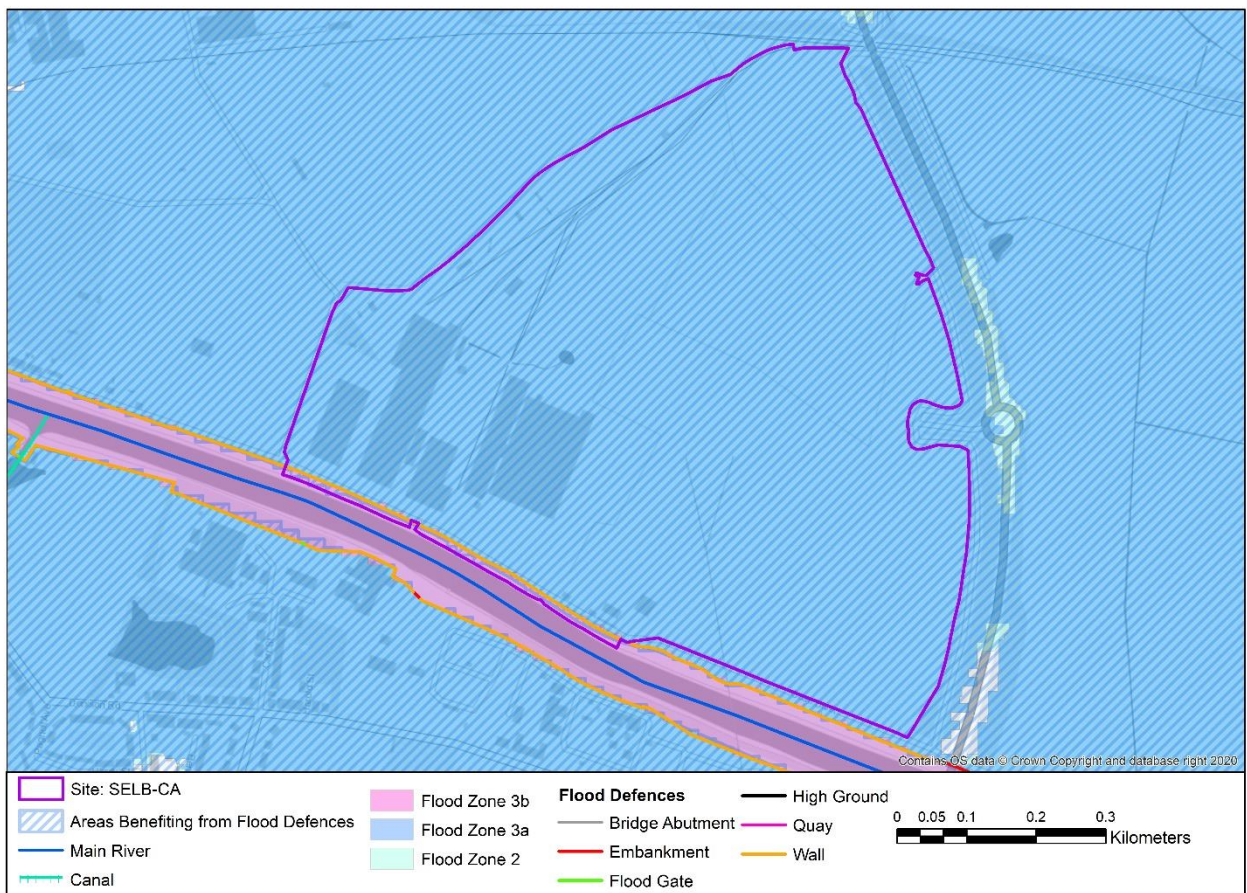


Figure A - Flood Zones

Flood Warning Area	River Ouse at Selby and Barlby
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Site Name: SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

River Flooding

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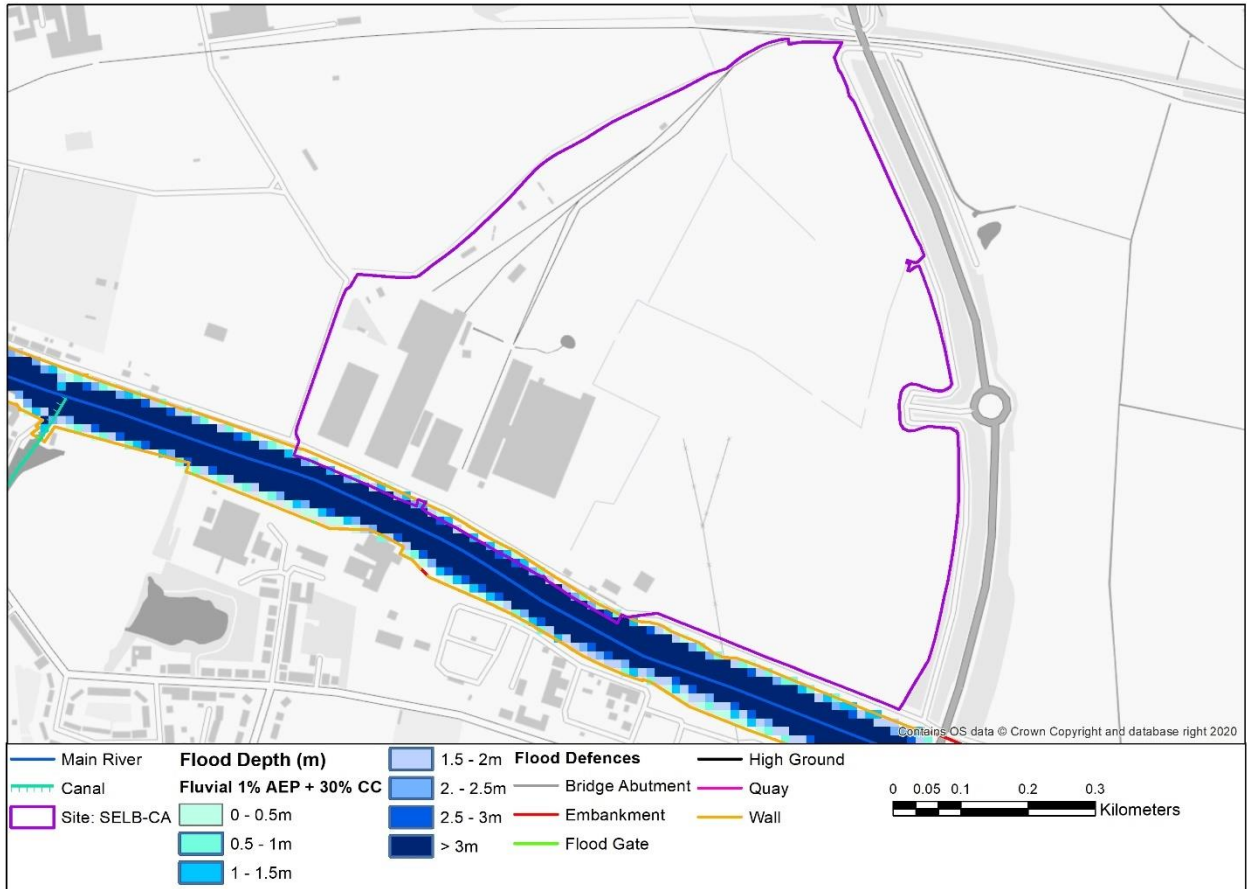


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

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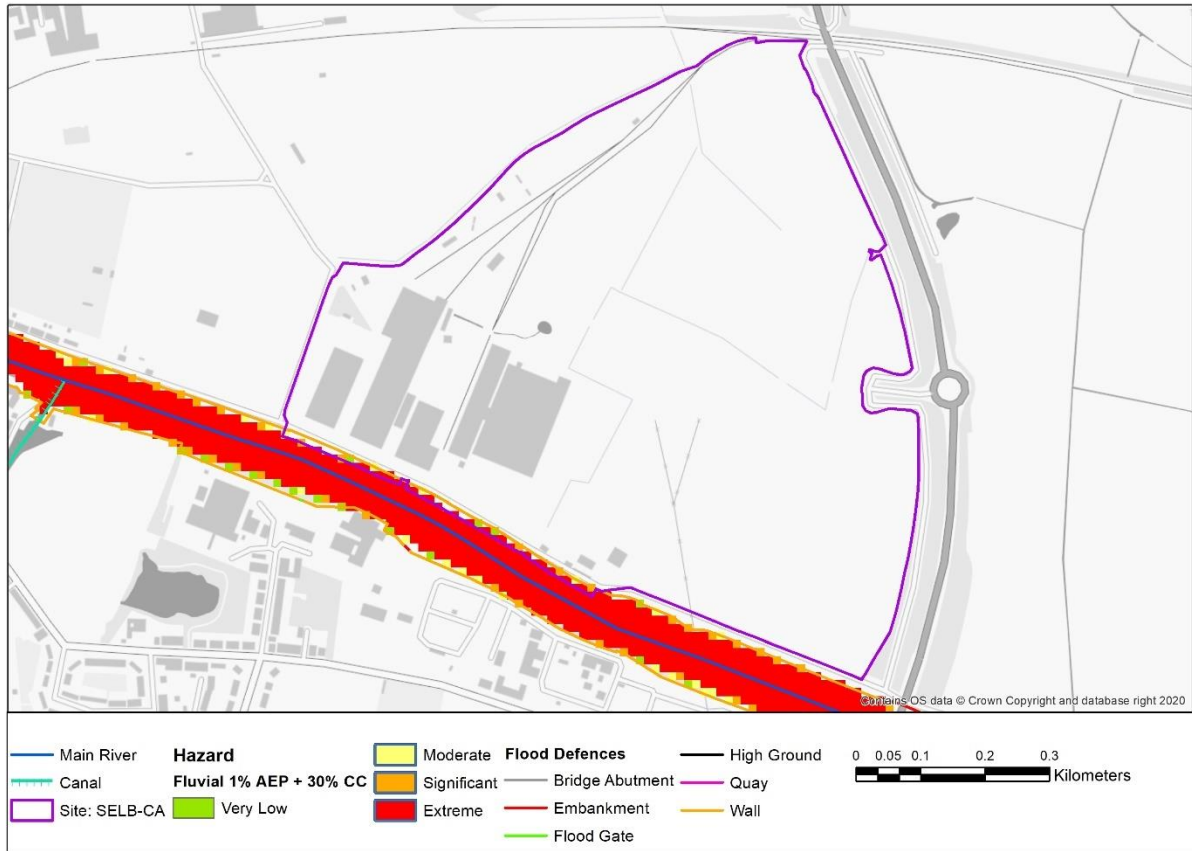


Figure C - Maximum Hazard 1% AEP including climate change (+30%) , including flood defences

Site Name: SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

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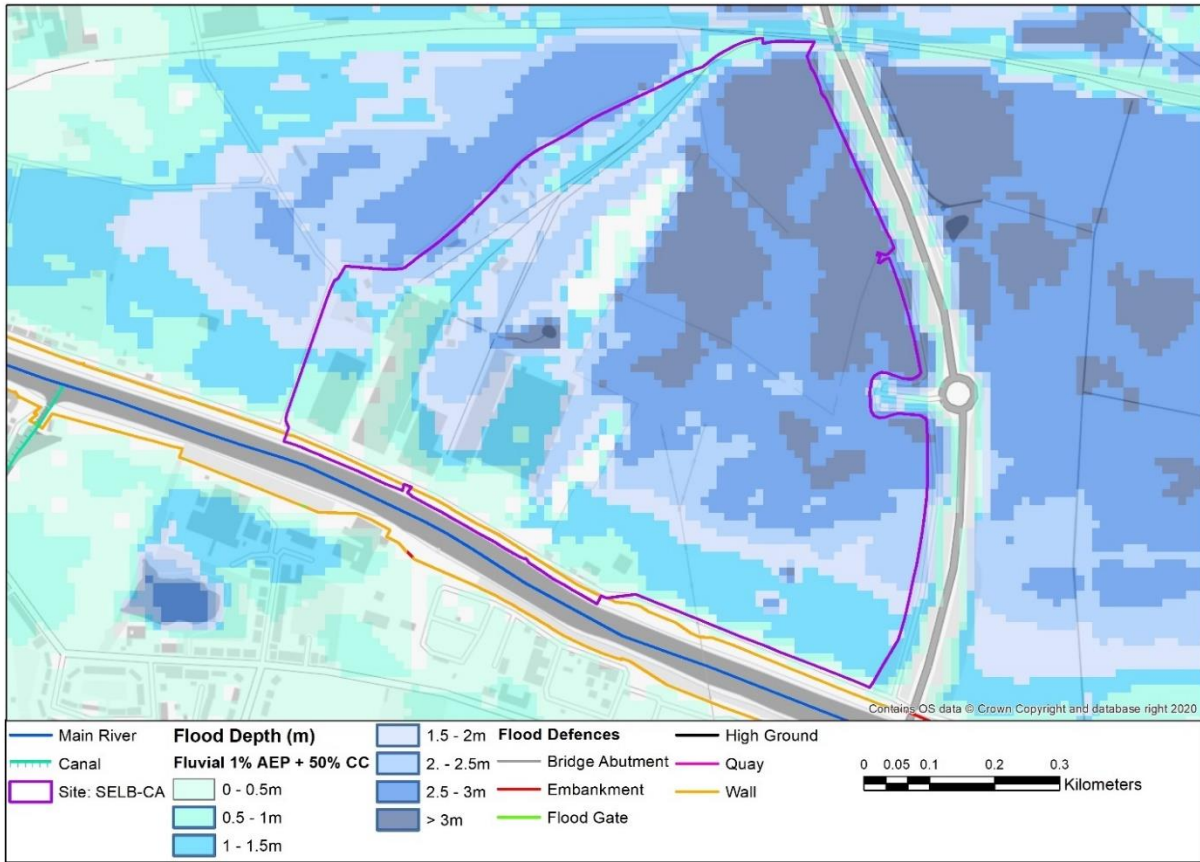


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%) , including flood defences

Site Name: SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

Breach Flooding

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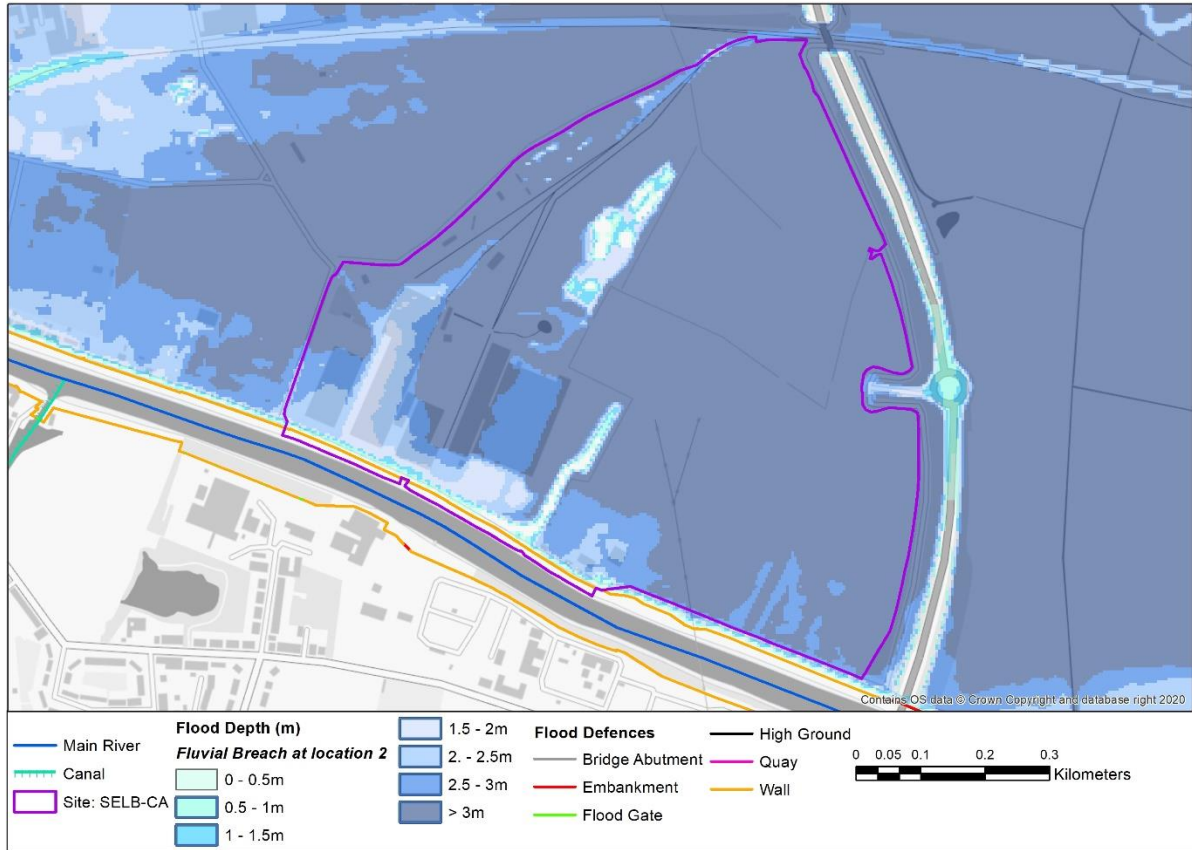


Figure E - Breach Assessment 1 % AEP + 50 % CC Fluvial: Maximum Flood Depth Upper End (2080s)

Site Name: SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

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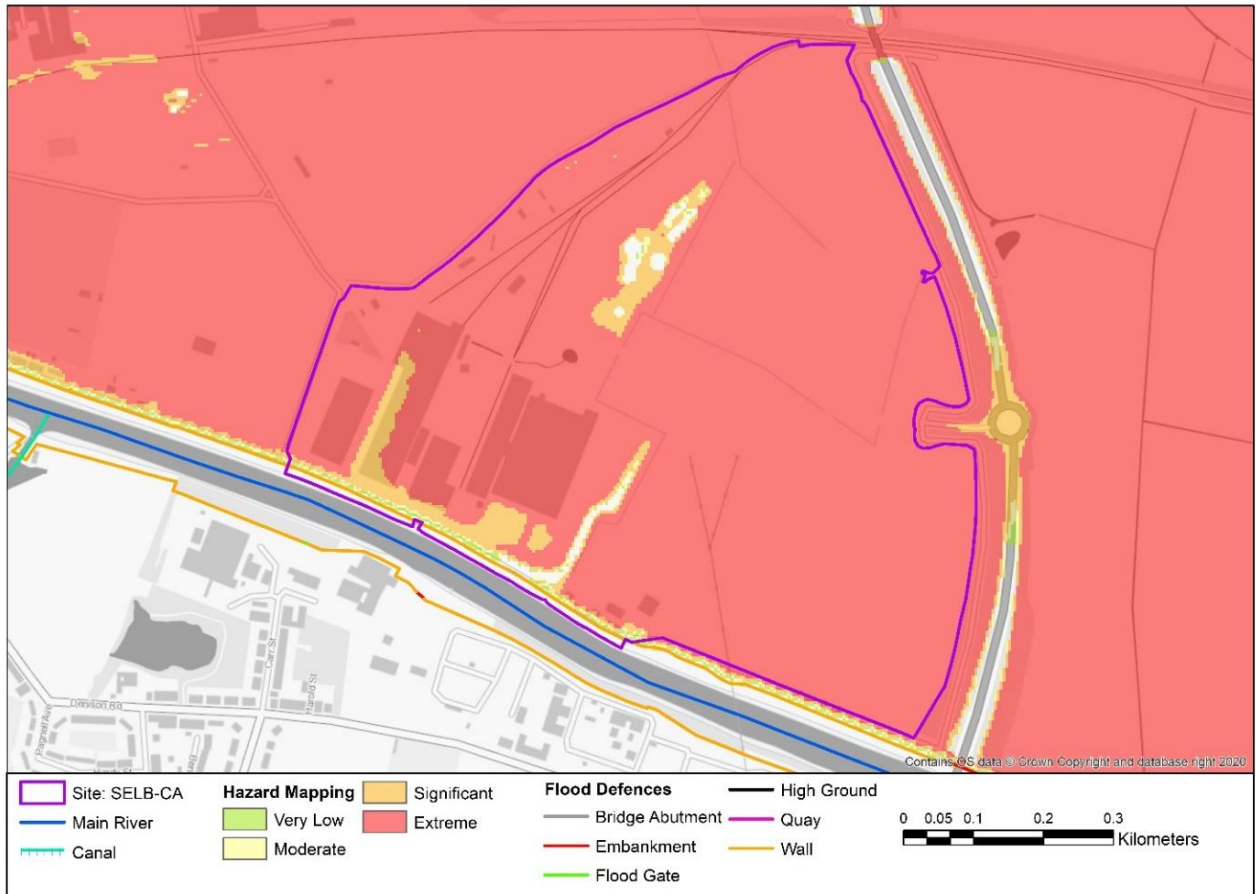


Figure F - Breach Assessment 1 % AEP + 50 % CC Fluvial: Maximum Flood Hazard Upper End (2080s)

Site Name: SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

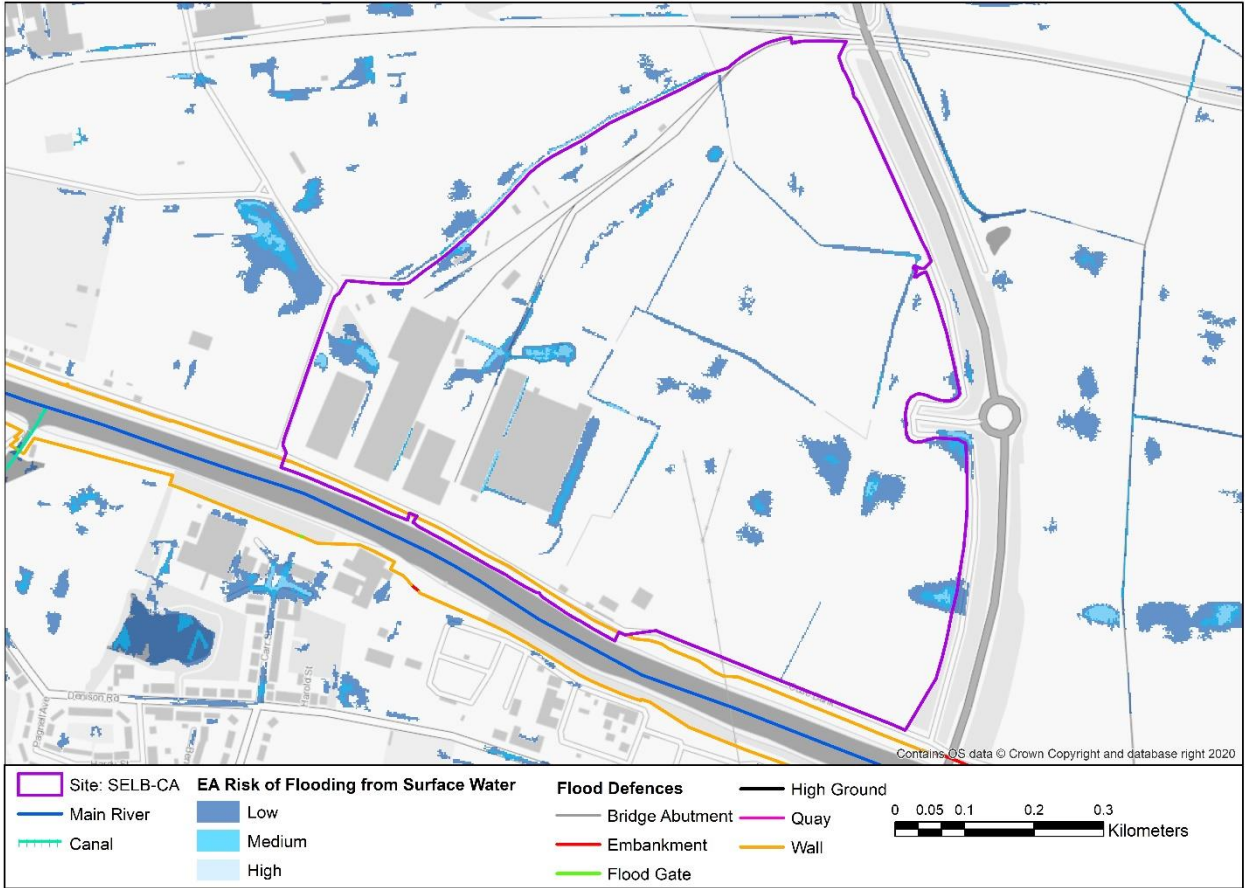


Figure G - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Peat and Silt
Susceptibility to Groundwater Flooding (BGS)		There is mixed potential for groundwater flooding to occur across the site. The site has predominantly <75% susceptibility but a small portion is classified as 25% - <50%.	
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir).		

Site Name: SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

Summary

The majority of the site (99%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, with a small area (1%) of Flood Zone 3b Functional Floodplain. The site is wholly located in an Area Benefiting from Defences.

Flood defences (walls) border the site to the South which protect the site from flooding from the River Ouse. There is still a residual risk of the site flooding, if the walls are overtopped or breached. The walls are classified as being in Fair condition.

Modelling shows the site is not at risk of flooding when considering the 1% AEP plus 30% climate change uplift, but it is at risk when a 50% uplift is applied to the 1% AEP event. Flood depths vary from 0 - >3m on the site for the 1% AEP plus 50% climate uplift.

The existing flood defences protect areas of Selby from fluvial and tidal inundation and therefore the risk of flooding to Selby is a residual risk, only if the defences fail (breach). Breach modelling for 18 locations was carried out as part of the update to the Environment Agency Upper Humber model. Breach number 2 was located on the left bank of the River Ouse between the A19 and the railway swing bridge in the vicinity of Barlby Bridge Community Primary School. This breach was modelled with Climate change at the 1% AEP event as part of an FRA (for Olympia Park) carried out in the area and therefore could be analysed for the purposes of this assessment. The results from the Olympia Park Breach Assessment show that the site is at residual risk of fluvial flooding during a breach in the Ouse defences. Flood water would inundate the majority of the site to a depth of >3.0m, with a corresponding hazard rating of Extreme ('danger for all') on the site, and Significant hazard rating on part of the A63 ('danger for most people') for the year 2100. Flood levels on the site vary from 0.5 - >3m AOD for the year 2100.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site, and also on Carr Lane adjacent to the site.

Broadscale mapping identifies that there is mixed potential for groundwater flooding to occur across the site. The site has predominantly <75% susceptibility but a small portion is classified as 25% - <50%.

Site Specific Recommendations

The proposed use for the site includes employment and retail which are defined as Less Vulnerable. These sites have been considered due to the interest in developing these sites to provide additional information for developers.

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating. Infrastructure should be sequentially placed in areas of lower flood water depth, and should be preferably placed in the North portion of the site, furthest from the River Ouse.
- Finished floor levels should be set 300mm above the River Ouse 1% AEP flood level resulting from a breach of defences including an appropriate allowance for climate change (to be discussed with the Environment Agency upon appointment to confirm if the Climate Change uplifts used in this report are appropriate). There is no flooding in the 1% AEP plus 30% climate change due to the presence of defences, therefore site levels should be based upon those from a breach assessment (as discussed above).
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 50% climate change uplift but none for the 1% AEP plus 30% climate change uplift. The entire site is at risk of flooding when the flood defences are breached for the 1% AEP plus 50% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The River Ouse is within close proximity to the site and it could be used as a potential discharge point.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.
- Developments are not appropriate within the functional floodplain 3b unless it is water compatible.

Site Name: SELB-CB– Land between A19 and A63 bypass, Selby			
Site ID:	SELB-CB	Area (ha):	5.62
Proposed Use:	Employment	Vulnerability Classification:	Less Vulnerable
Watercourses near the site	River Ouse		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	0%	100%	0%	100%

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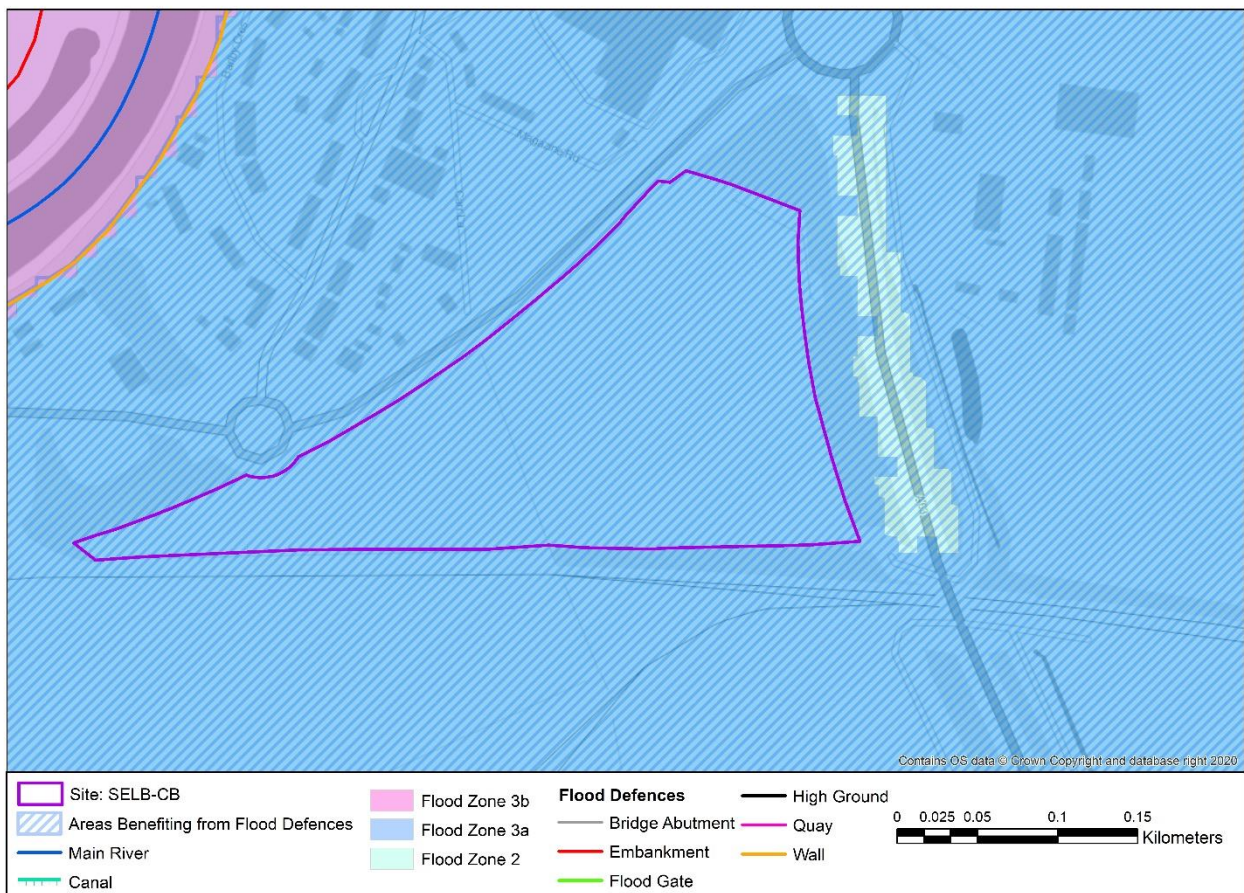


Figure A - Flood Zones

Flood Warning Area	River Ouse at Selby and Barlby
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Site Name: SELB-CB– Land between A19 and A63 bypass, Selby

River Flooding

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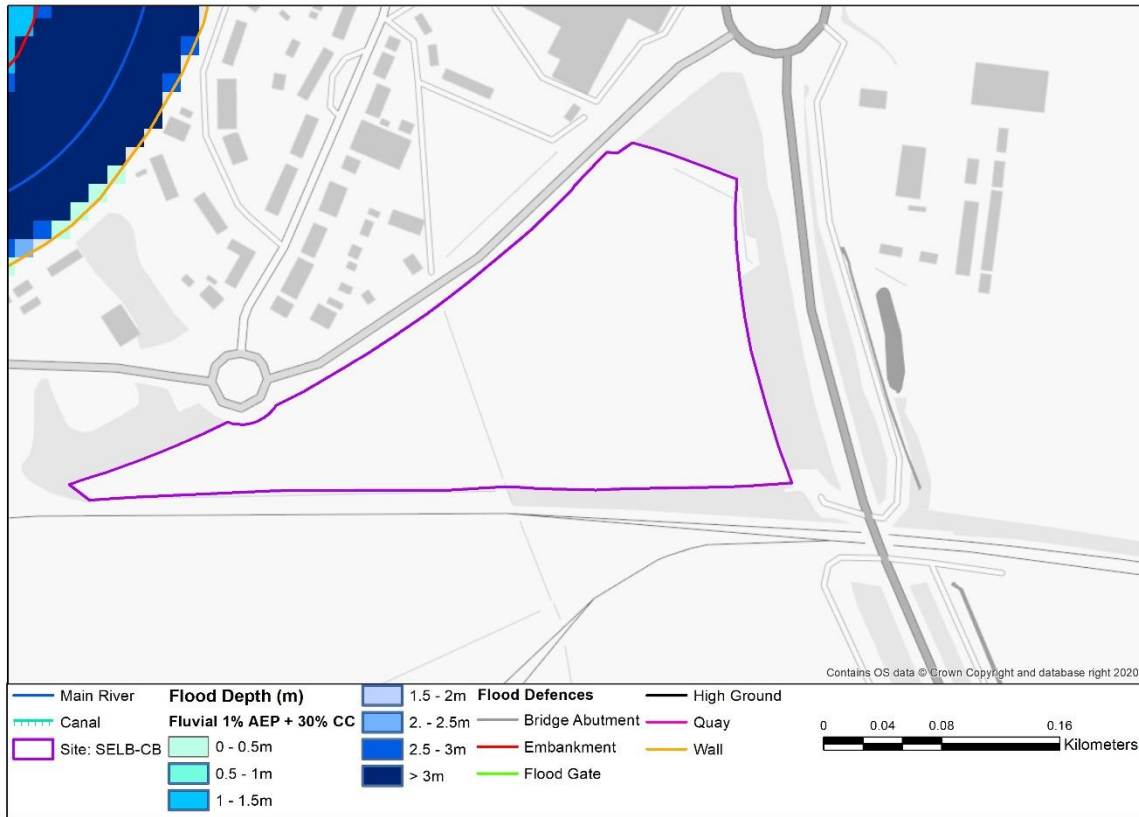


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-CB– Land between A19 and A63 bypass, Selby

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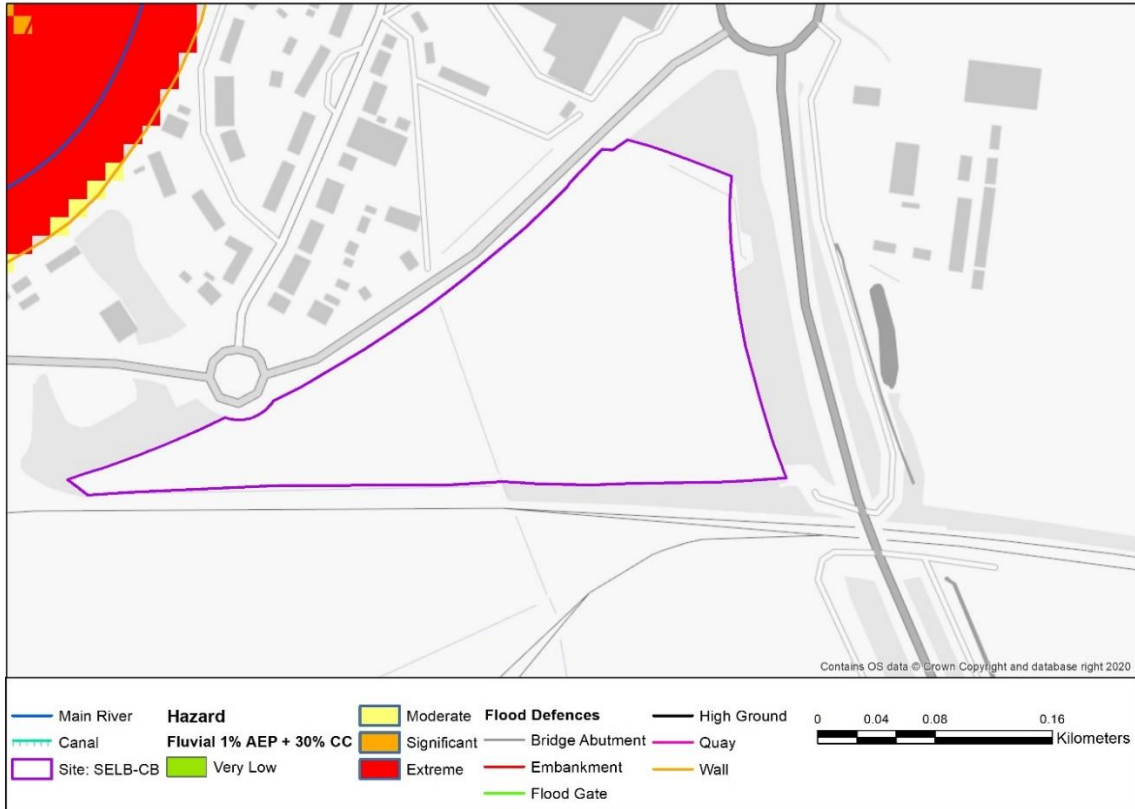


Figure C - Hazard 1% AEP including climate change (+30%), including flood defences

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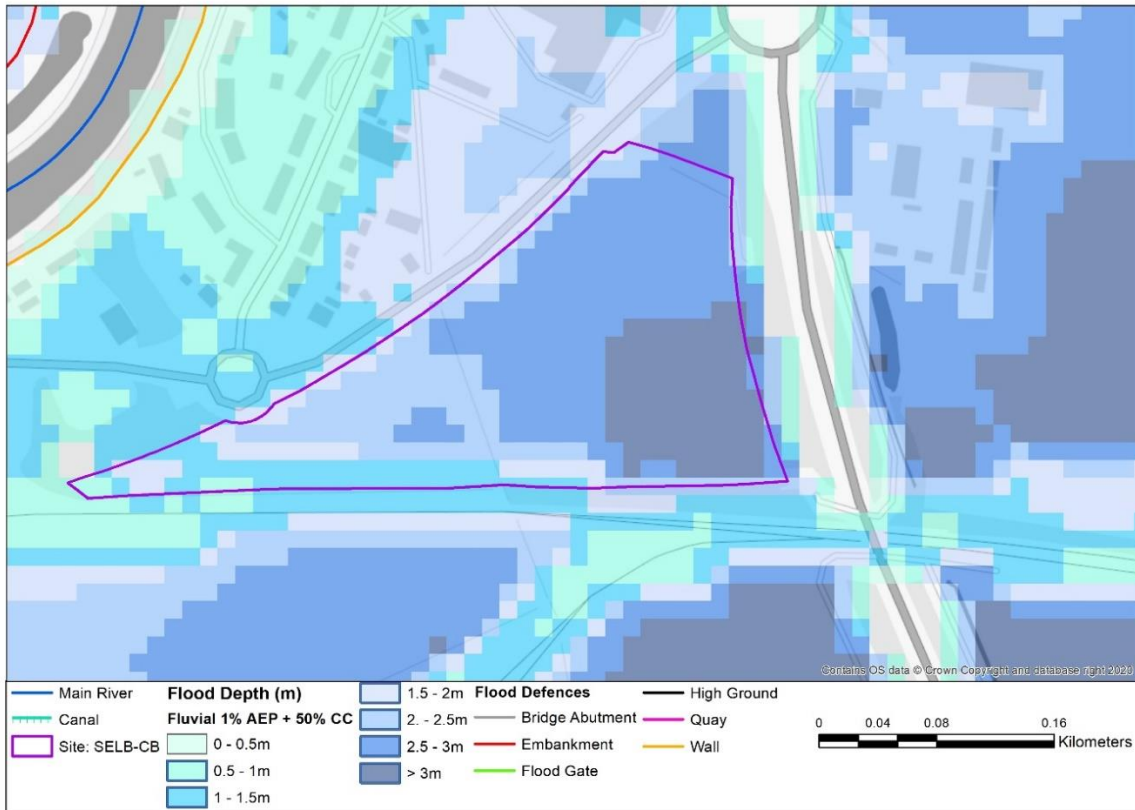


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: SELB-CB– Land between A19 and A63 bypass, Selby

Breach Flooding

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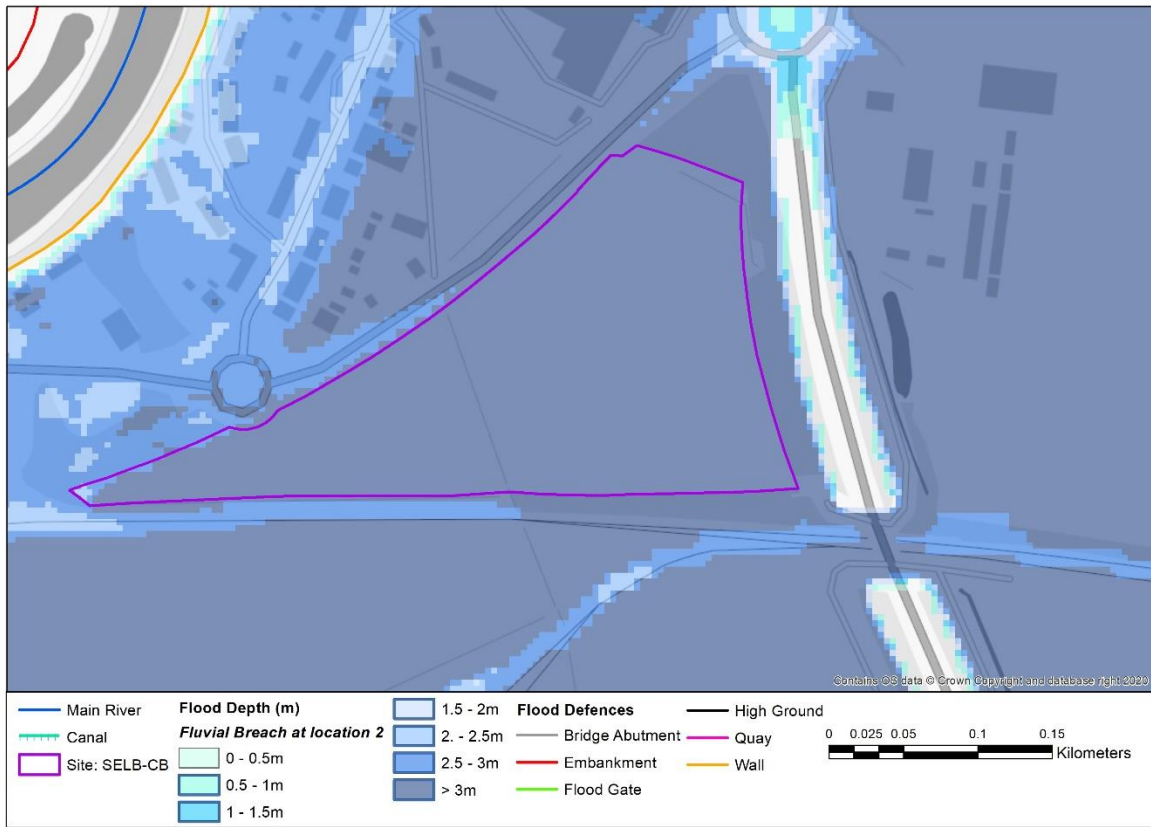


Figure E - Breach Assessment 1 % AEP + 50 % CC Fluvial: Maximum Flood Depth Upper End (2080s)

Site Name: SELB-CB– Land between A19 and A63 bypass, Selby

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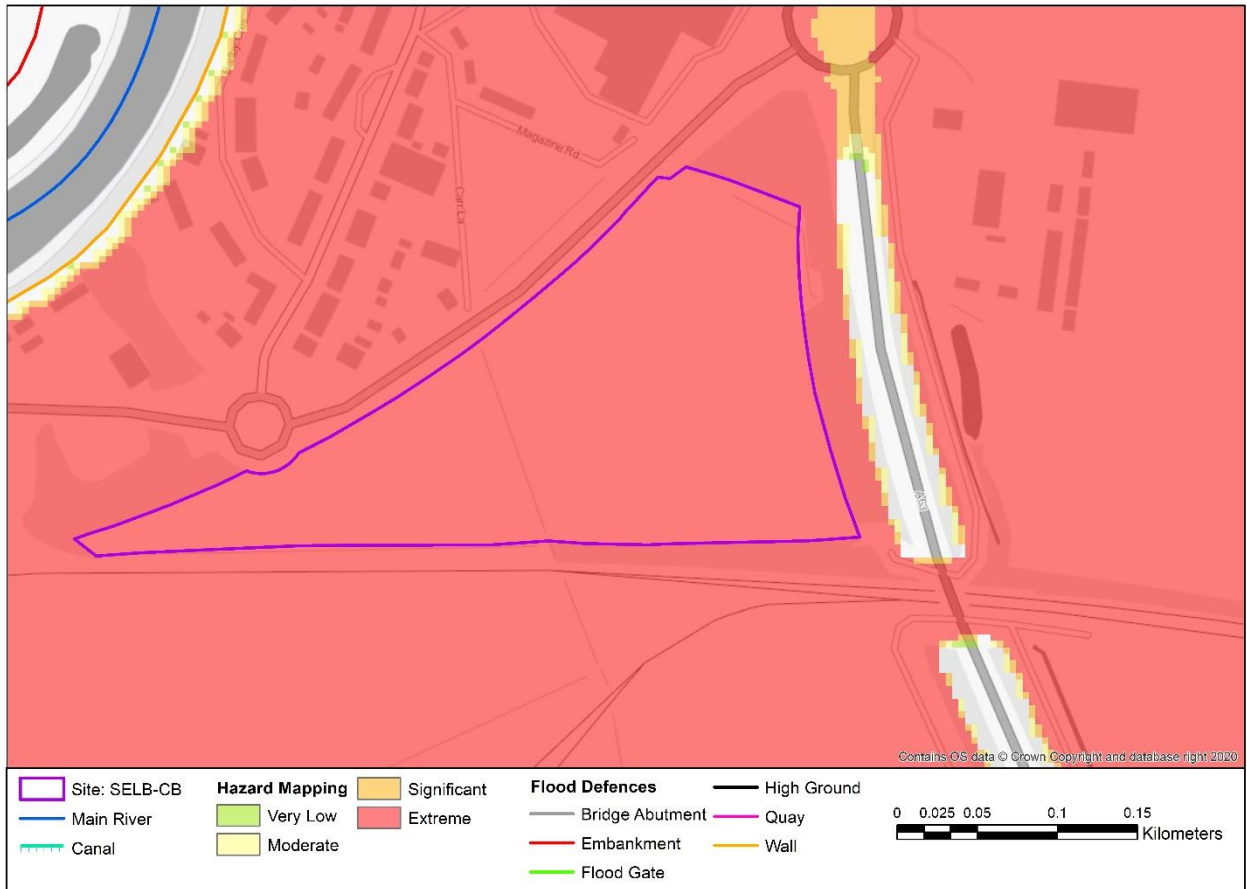


Figure F - Breach Assessment 1 % AEP + 50 % CC Fluvial: Maximum Hazard Upper End (2080s)

Site Name: SELB-CB– Land between A19 and A63 bypass, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High

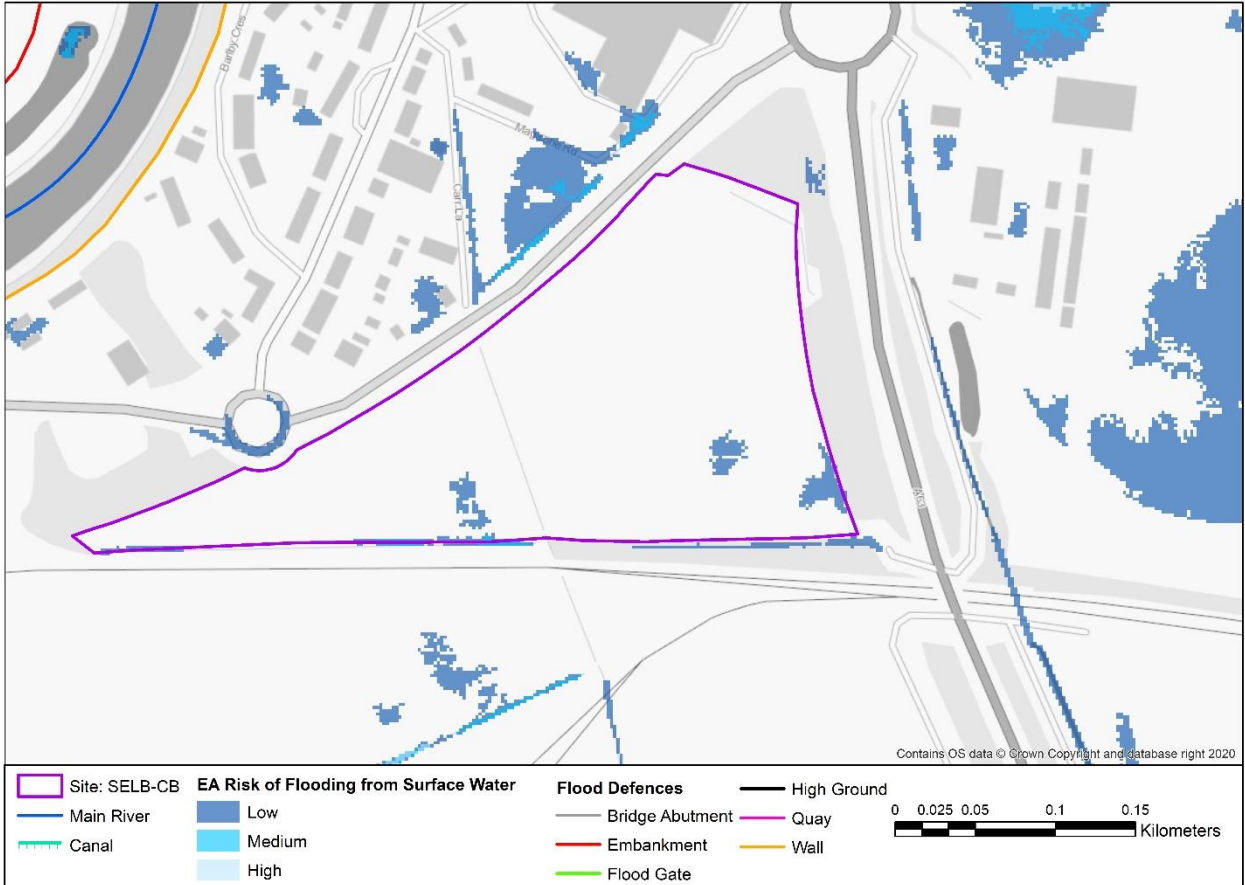


Figure G - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Peat and Silt
Susceptibility to Groundwater Flooding (BGS)		There is mixed potential for groundwater flooding to occur across the site. The site has predominantly <75% susceptibility but a small portion is classified as 25% - <50%.	
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir. (It is not possible to determine which reservoir).		

Site Name: SELB-CB– Land between A19 and A63 bypass, Selby

Summary

The entire site (100%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea.

There are no flood defences that directly line the site. The closest flood defences are on the River Ouse are approximately 200m away and they are flood walls classified as being in Fair condition. The site is at residual risk of flooding if these defences along the River Ouse are breached or are overtopped.

Modelling shows the site is not at risk of flooding when considering the 1% AEP plus 30% climate change uplift, but it is at risk when a 50% uplift is applied to the 1% AEP event. Flood depths vary from 1.5 - >3m on the site for the 1% AEP plus 50% climate uplift.

The existing flood defences protect areas of Selby from fluvial and tidal inundation and therefore the risk of flooding to Selby is a residual risk, only if the defences fail (breach). Breach modelling for 18 locations was carried out as part of the update to the Environment Agency Upper Humber model. Breach number 2 was located on the left bank of the River Ouse between the A19 and the railway swing bridge in the vicinity of Barlby Bridge Community Primary School. This breach was modelled with Climate change at the 1% AEP event as part of an FRA (for Olympia Park) carried out in the area and therefore could be analysed for the purposes of this assessment. The results from the Olympia Park Breach Assessment show that the site is at residual risk of fluvial flooding during a breach in the Ouse defences. Flood water would inundate the majority of the site to a depth of >3.0m, with a corresponding hazard rating of Extreme ('danger for all') on the site and on Carr Lane, and Significant hazard rating on part of the A63 ('danger for most people') for the year 2100. Flood levels on the site vary from 1.5 - >3m AOD for the year 2100.

The Risk of Flooding from Surface Water mapping identifies there is limited potential for surface water to pond within the site. Minor ponding of surface water will occur along the railway embankment to the south of the site.

Broadscale mapping identifies that there is mixed potential for groundwater flooding to occur across the site. The site has predominantly <75% susceptibility but a small portion is classified as 25% - <50%.

Site Specific Recommendations

The proposed use for the site includes employment and retail which are defined as Less Vulnerable. These sites have been considered due to the interest in developing these sites to provide additional information for developers.

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard rating. Infrastructure should be sequentially placed in areas of lower flood water depth, and should be preferably placed in the East portion of the site, furthest from the River Ouse.
- Finished floor levels should be set 300mm above the River Ouse 1% AEP flood level resulting from a breach of defences including an appropriate allowance for climate change (to be discussed with the Environment Agency upon appointment to confirm if the Climate Change uplifts used in this report are appropriate). There is no flooding in the 1% AEP plus 30% climate change due to the presence of defences, therefore site levels should be based upon those from a breach assessment (as discussed above).
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 50% climate change uplift but none for the 1% AEP plus 30% climate change uplift. The entire site is at risk of flooding when the flood defences are breached for the 1% AEP plus 50% climate change uplift. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The River Ouse is within close proximity to the site and it could be used as a potential discharge point.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: SELB-CO– Land at Former Police Station Site, Selby				
Site ID:	SELB-CO	Area (ha):	0.61	
Proposed Use:	Employment	Vulnerability Classification:	Less Vulnerable	
Watercourses near the site	River Ouse, Selby Canal			
Area of site within each Flood Zones and associated mapping				
Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	80%	20%	0%	20%

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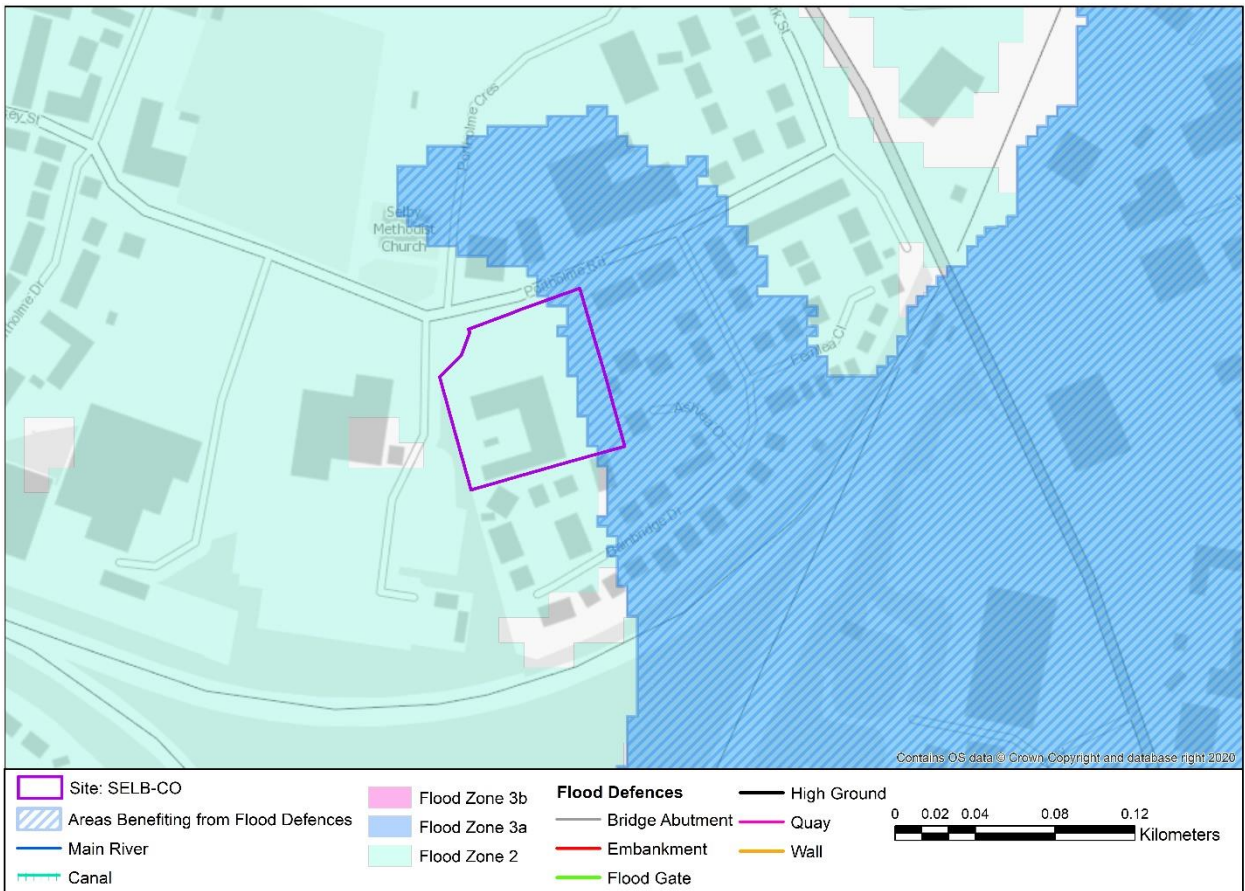


Figure A - Flood Zones

Flood Warning Area	River Ouse at Selby and Barlby
---------------------------	--------------------------------

Site Name: SELB-CO– Land at Former Police Station Site, Selby

River Flooding

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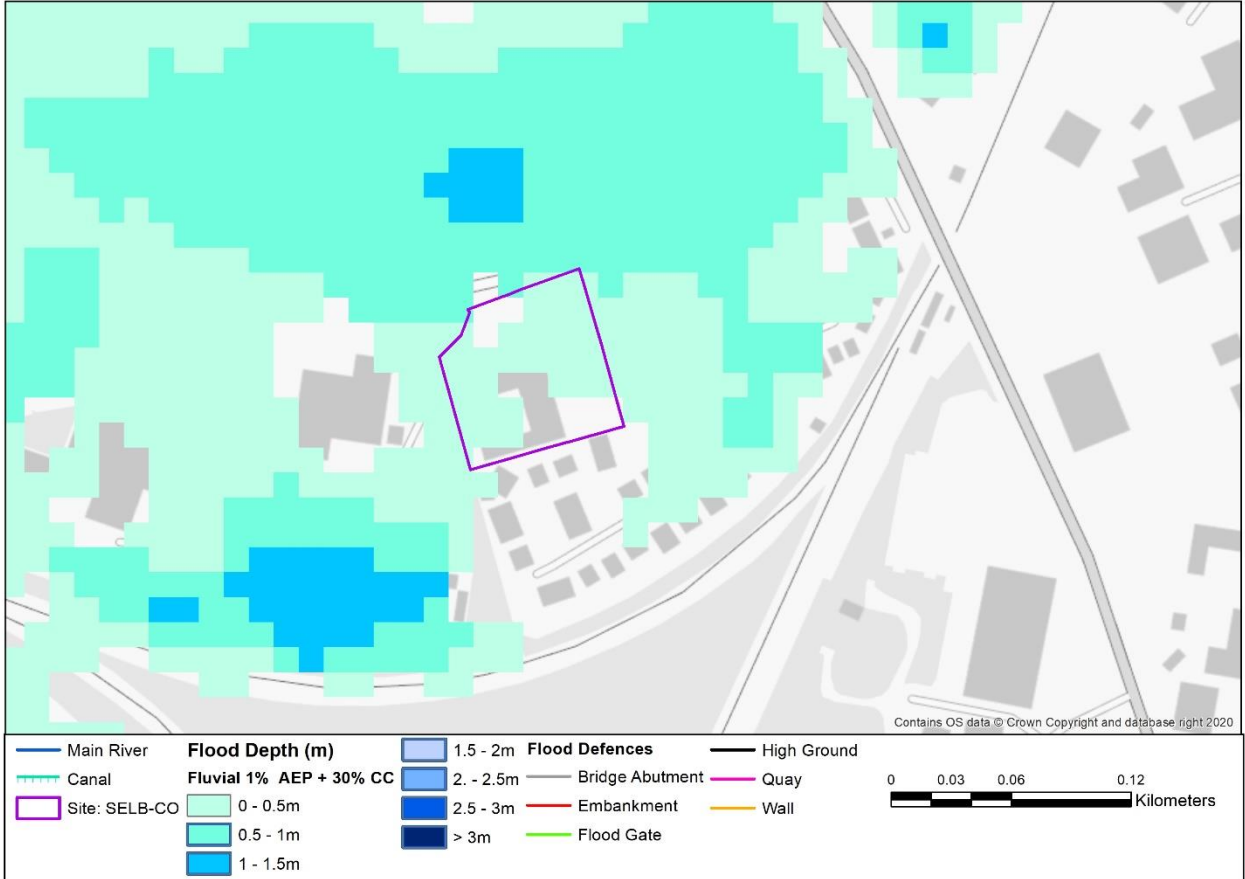


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-CO– Land at Former Police Station Site, Selby

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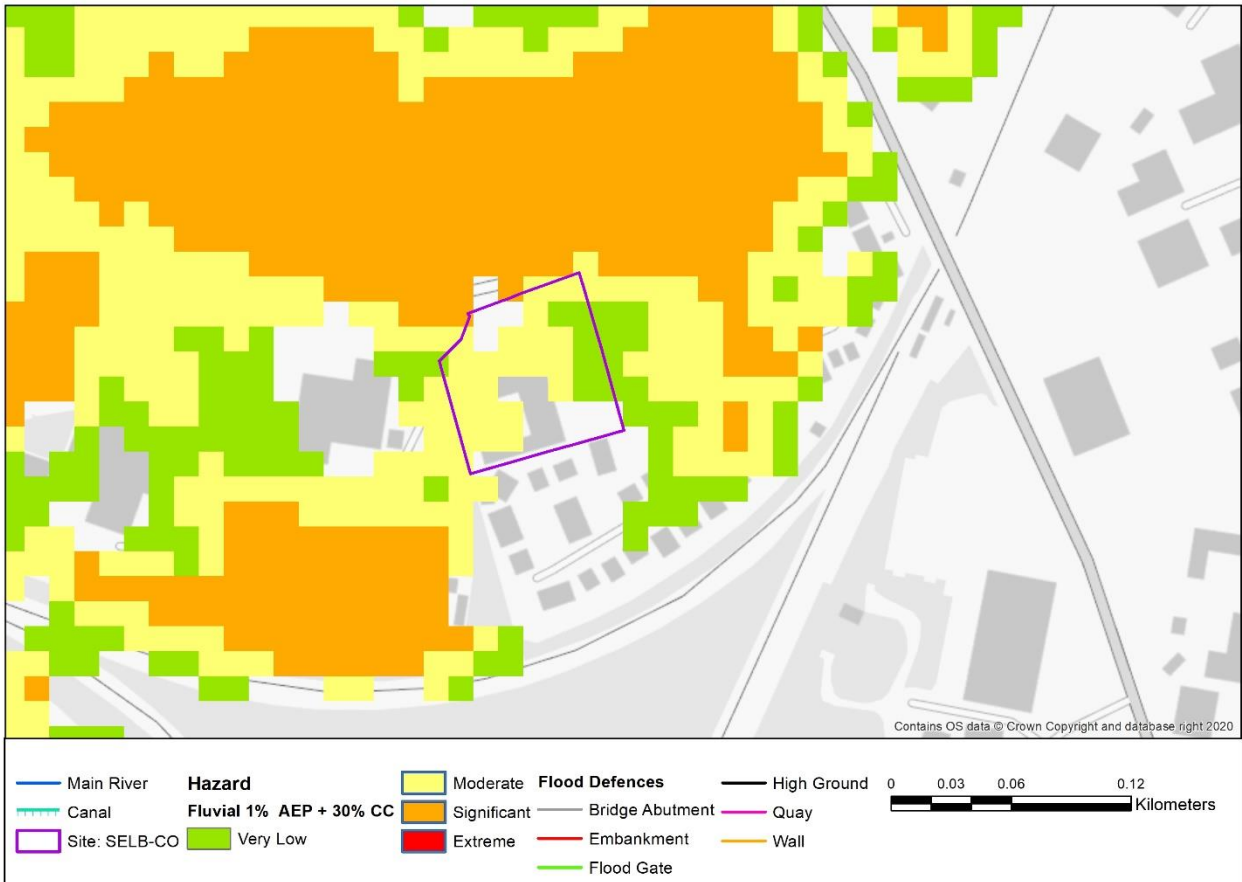


Figure C - Maximum Hazard 1% AEP including climate change (+30%), including flood defences

Site Name: SELB-CO– Land at Former Police Station Site, Selby

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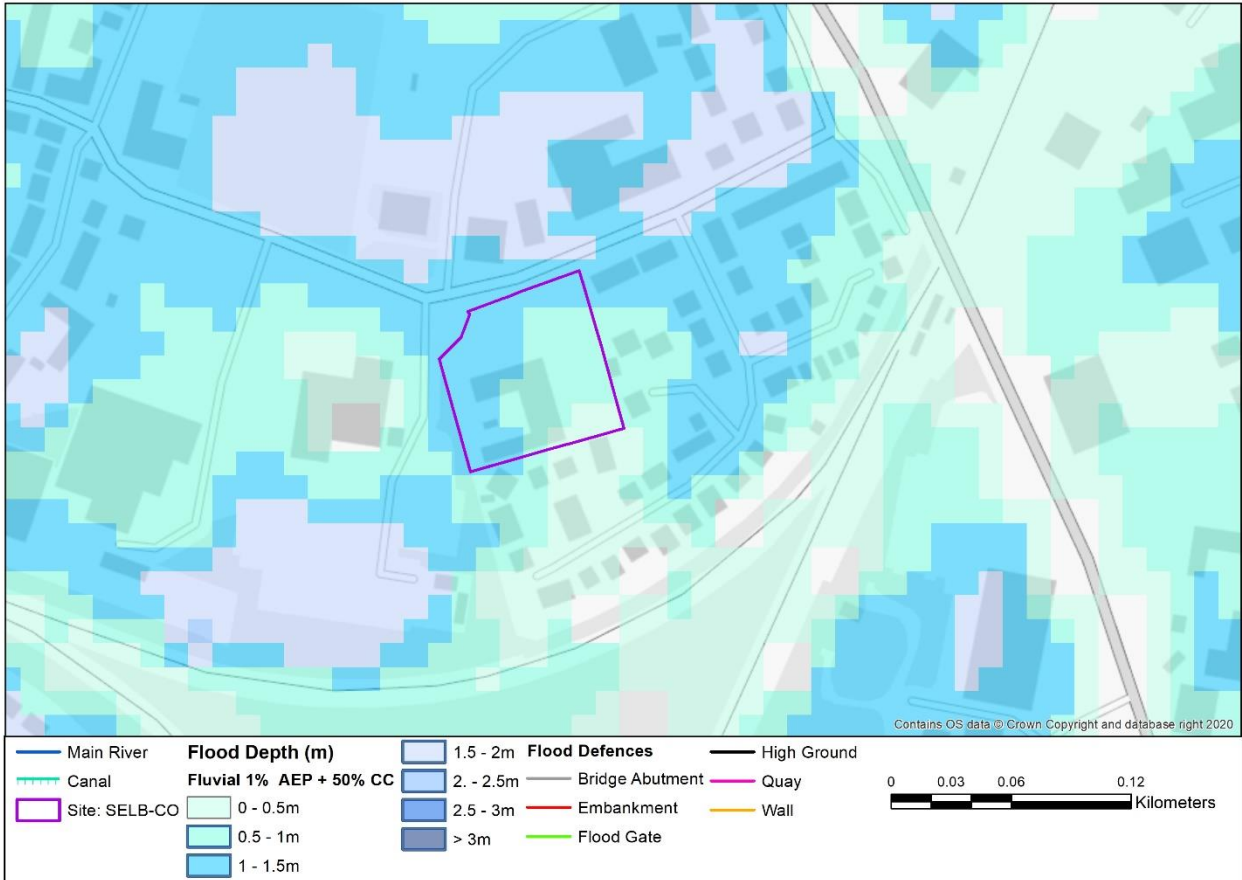


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: SELB-CO– Land at Former Police Station Site, Selby

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW) Low, Medium, High



Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay and Silt
Susceptibility to Groundwater Flooding (BGS)	<25%		
Other Sources			
Risk of flooding from reservoirs	The Long Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir. (It is not possible to determine which reservoir).		

Site Name: SELB-CO– Land at Former Police Station Site, Selby

Summary

The majority of the site (80%) is defined as Flood Zone 2 Medium probability of flooding from rivers or the sea, with a small area (20%) of Flood Zone 3a High probability of flooding from rivers or the sea.

Whilst the site does not border any watercourse, it is close to both the Selby Canal (400m away) and the River Ouse (600m away). Defences in the form of walls and flood gates line the River Ouse in closest proximity to the site that are in Good- Fair condition. Around 20% of the site is defined as being protected by defences (Area benefitting from defences) and there is a residual risk of this site flooding if these defences are breached or overtopped. Selby Canal is managed by the Canals and Rivers Trust and the only 'formal' defence along the canal is the flood gate which protects the Canal from flooding directly from the Ouse.

Modelling shows the site to be at risk of flooding when considering the impact of climate change, the risk is more significant for the 50% uplift on the 1% AEP compared to 30%. During the modelled 1% AEP event including 30%, climate change, approximately half of the site is at risk of flooding. Flood levels vary from 0.0 – 0.5m on the site (for 1% AEP plus 30% uplift). The site is split between Very Low and Moderate risk for the 1% AEP plus 30% uplift for climate change. During the modelled 1% AEP event including 50% climate change, most of the site is at risk of flooding. Flood levels vary from 0.5 – 1.5m on the site.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is advised.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site, and also on Portholme Road adjacent to the site.

Broadscale mapping identifies that there is <25% susceptibility for groundwater flooding to occur across the site.

Site Specific Recommendations

The proposed use for the site includes employment which is defined as Less Vulnerable. Flood risk has been considered due to the interest in developing these sites and in order to provide additional information for developers.

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard rating. Developments should be positioned preferentially to the West of the site in Flood Zone 2 where the risk of flooding is lower.
- Breach modelling should be undertaken as part of a site specific FRA
- There is flooding present in the 1% AEP plus 30% and 50% uplift for climate change due to overtopping of defences, therefore the finished floor levels for the site should be based upon those resulting from a breach in defences. Finished floor levels or raised development platforms should be set 300mm above the River Ouse/ Selby Canal 1% AEP flood level resulting from a breach of defences including an allowance for climate change (to be discussed with the Environment Agency to ensure that current guidance is applied).
- The proposed development must not reduce the ability of the floodplain to store water. There is flooding of the site for the 1% AEP modelled flood event including 30% allowance for climate change and the 1% AEP with a 50% allowance for climate change. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level (1% AEP) including an appropriate allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- As part of a site specific FRA, the Canal and River Trust must be consulted to understand the risk of flooding from the canal and any potential impacts of the operation philosophy for the lock / flood gate where the canal meets the River Ouse.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. There are no obvious potential discharge points within close proximity of the site.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Canal and Rivers Trust upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

Site Name: TADC-AI– Land East of Britannia Car Park, Tadcaster

Site ID:	TADC-AI	Area (ha):	0.43
Proposed Use:	Car Parking	Vulnerability Classification:	Less Vulnerable
Watercourses near the site	River Wharfe		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	9%	13%	78%	0%

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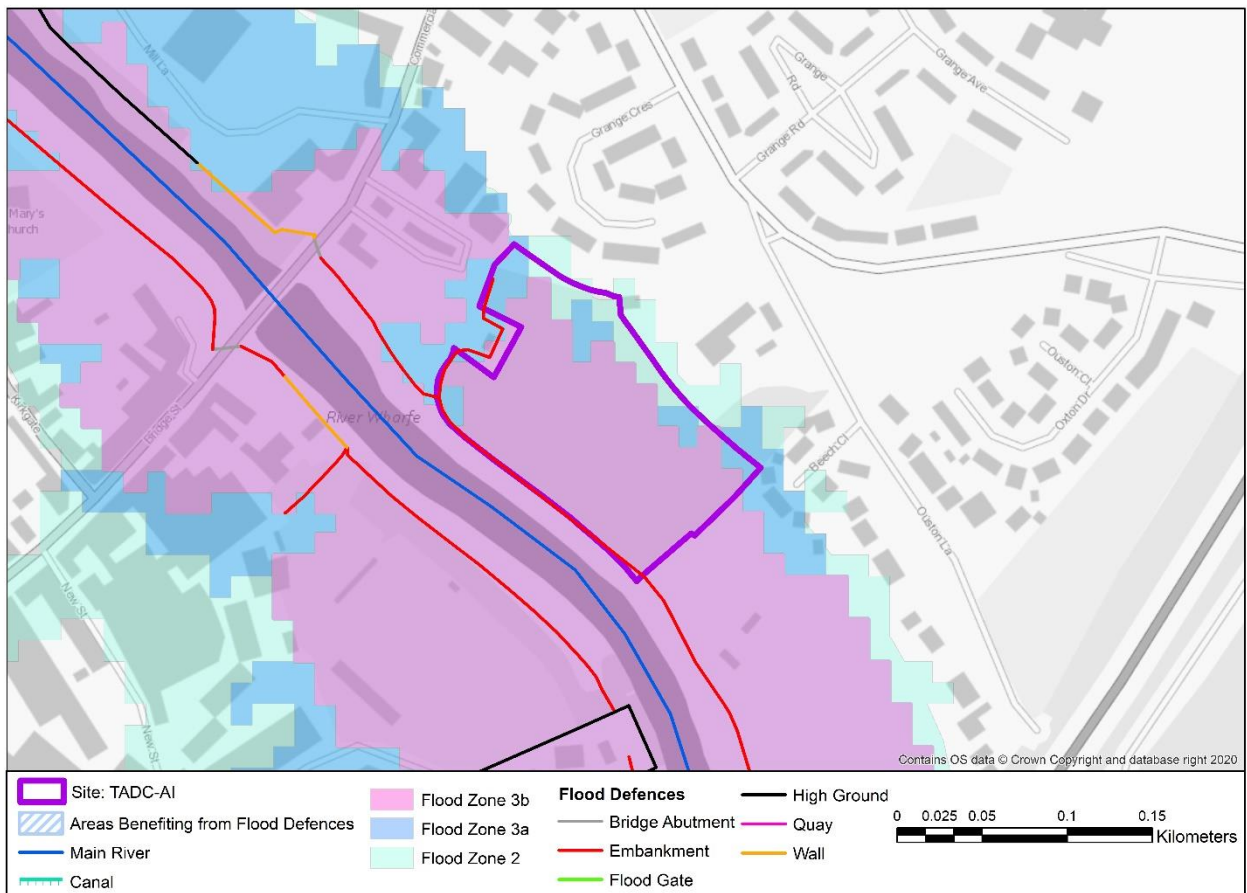


Figure A - Flood Zones

Flood Warning Area	River Wharfe at Tadcaster
---------------------------	---------------------------

Site Name: TADC-AI- Land East of Britannia Car Park, Tadcaster

River Flooding

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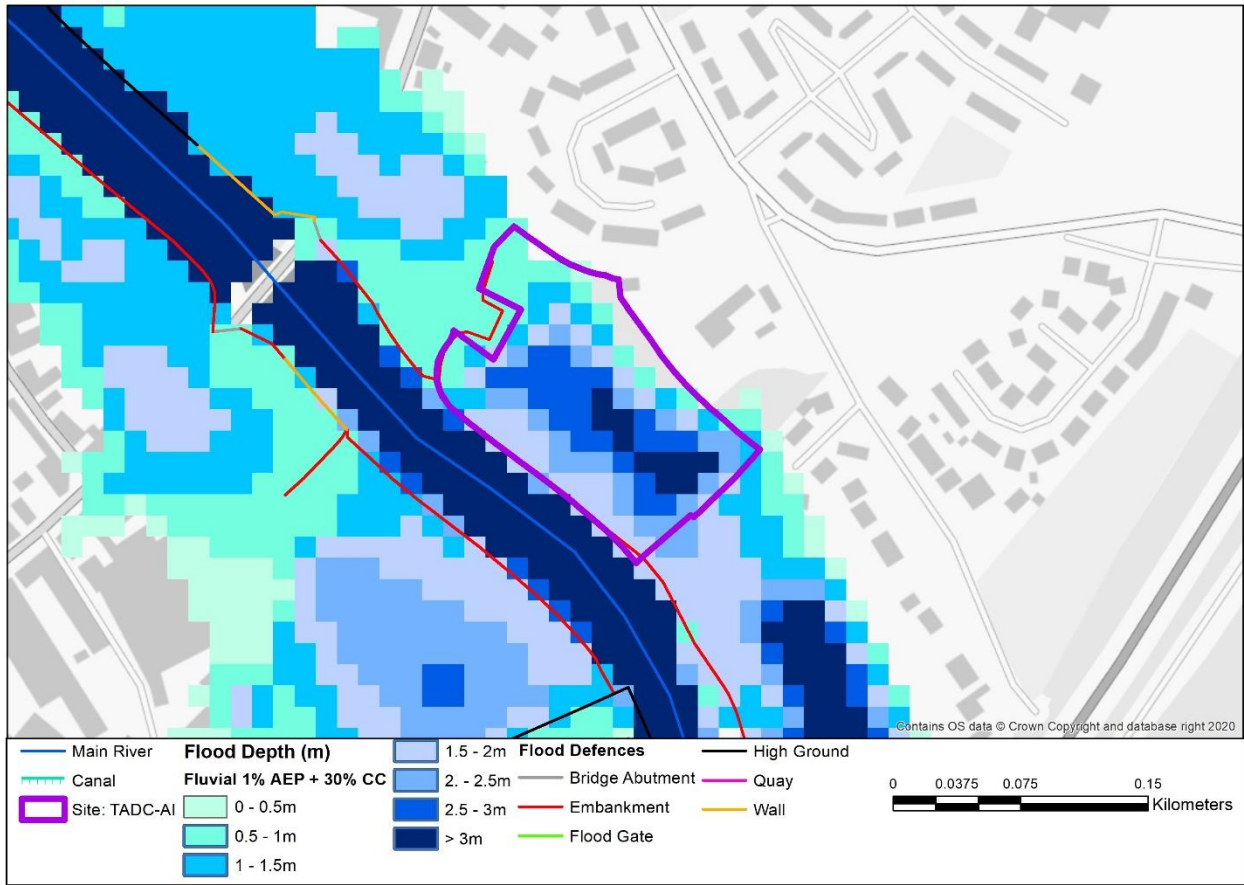


Figure B - Maximum Flood Depth 1% AEP including climate change (+30%), including flood defences

Site Name: TADC-AI- Land East of Britannia Car Park, Tadcaster

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Figure C - Maximum Hazard 1% AEP including climate change (+30%), including flood defences

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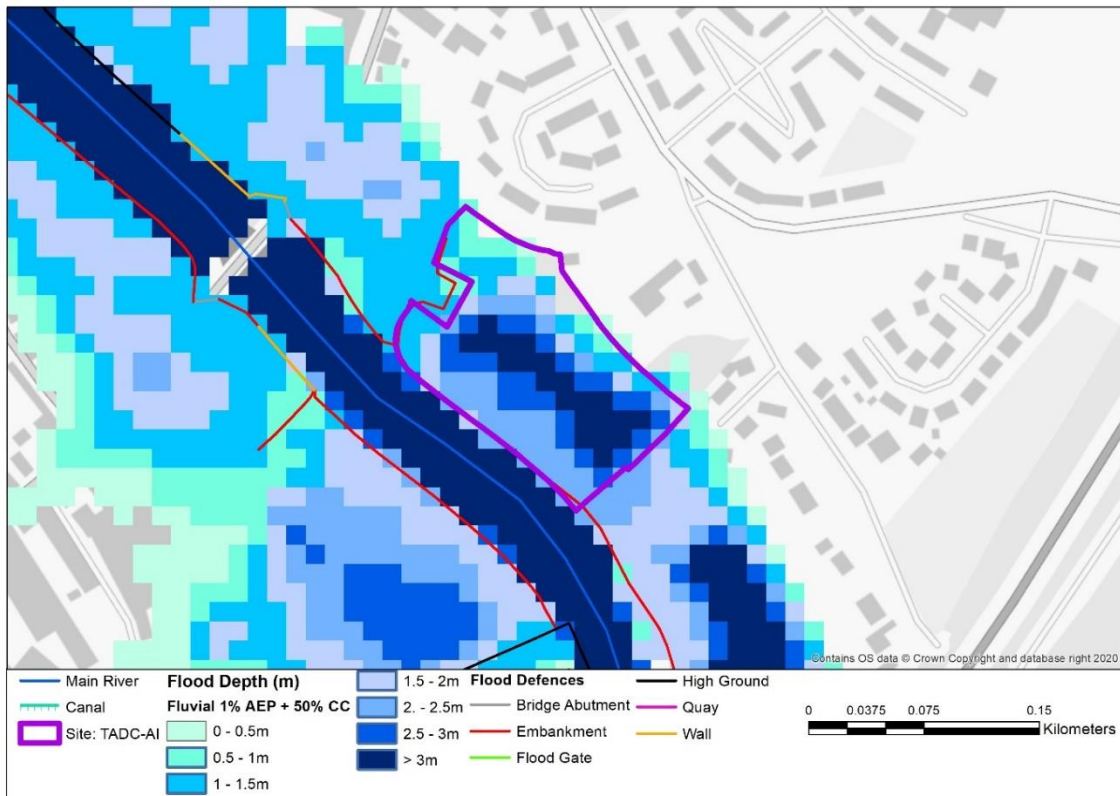


Figure D - Maximum Flood Depth 1% AEP including climate change (+50%), including flood defences

Site Name: TADC-AI– Land East of Britannia Car Park, Tadcaster

Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

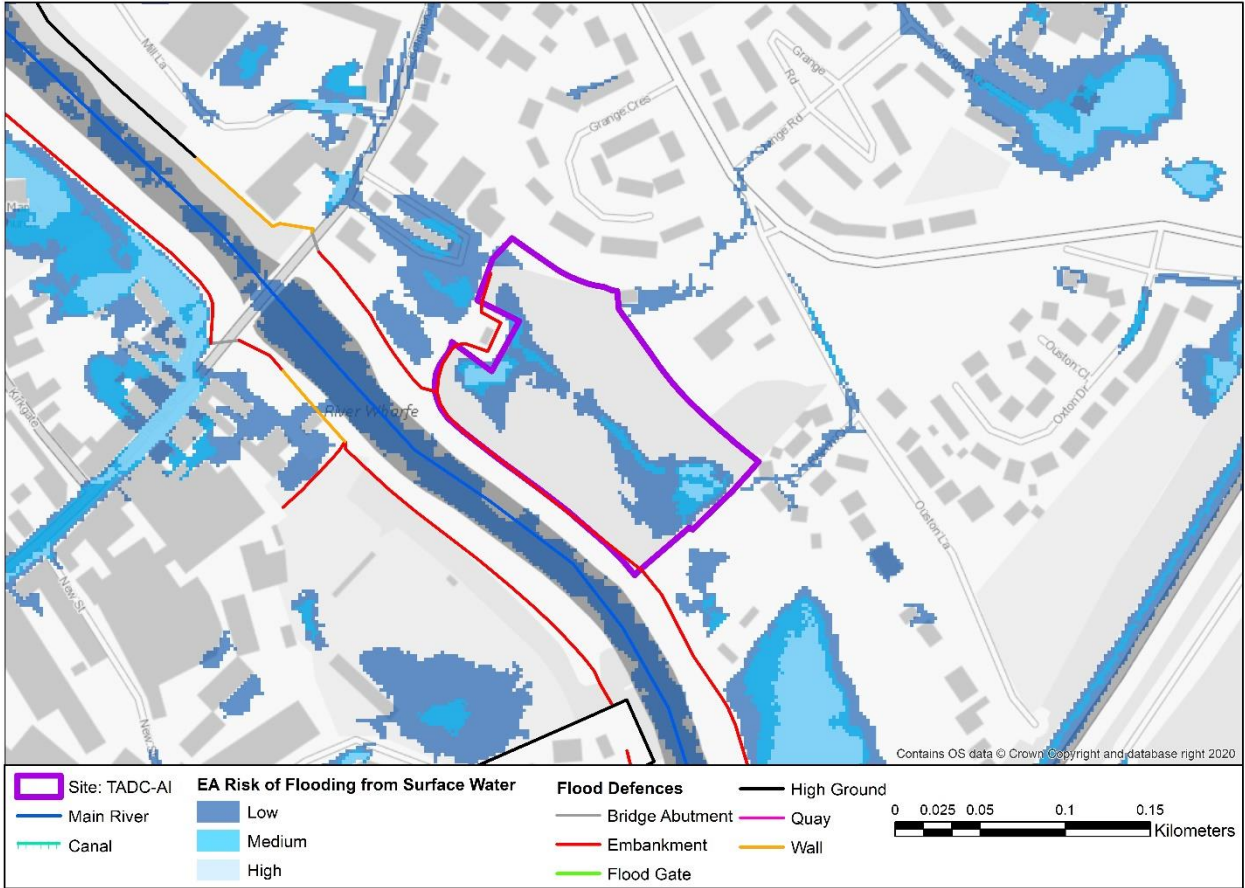


Figure E - Risk of Flooding from Surface Water (RoFSW)

Groundwater Flooding

Bedrock Geology

Brotherton Formation - Limestone, Dolomitic

Superficial Geology

Clay, Sand and Gravel

Susceptibility to Groundwater Flooding (BGS)

There is mixed potential for groundwater flooding to occur across the site. The site has predominantly 25% -<50% susceptibility but a small portion is classified as 50% - 75%.

Other Sources

Risk of flooding from reservoirs

The Long Term Flood Risk Map shows that the site is not at risk of flooding, in the event of a breach or failure of a reservoir.

Site Name: TADC-AI– Land East of Britannia Car Park, Tadcaster

Summary

The River Wharfe flows south alongside the site to the east. The site is divided between Flood Zone 3a High probability of flooding from Rivers or sea (13 %), (78 %) Flood Zone 3b Functional Floodplain and (9 %) Flood Zone 2 Medium probability of flooding from Rivers or sea. The current SoP of defences which line the site is a 1 in 25 year Standard of Protection (SoP) or 4% AEP which means that Flood Zone 3b is not relevant and is classified as Flood Zone 3a.

Defences line the site along the River Wharfe which are embankments that range from Fair to Poor Condition. The flood defences in Tadcaster are built currently to a 1 in 25 year or a 4% AEP Standard of Protection (SoP). Work is currently underway to upgrade the flood defences in Tadcaster and the applicant should consult the Environment Agency to understand if this will change the Flood Zones or Flood Risk on this site.

Modelling shows the site to be at risk of flooding from River Wharfe when considering the impact of climate change, the risk is slightly more significant for the 50% uplift on the 1% AEP compared to 30%. During the modelled 1% AEP event including 30%, climate change, the entire site is at risk. Flood levels vary from 0.5m – >3m on the site (for 1% AEP plus 30% uplift). The site is almost entirely at Extreme risk in terms of Flood hazard 1% AEP plus 30% uplift to flows. During the modelled 1% AEP event including 50%, climate change, most of the site is at risk of flooding. Flood levels vary from 0.5 - >3m on the site but the area of deeper flooding is larger compared to 1% AEP plus 30% uplift to flows.

The existing flood defences protect areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site to date and it is recommended to be considered.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site, and also on the paved surface surrounding the Bus Station adjacent to the site.

There is mixed potential for groundwater flooding to occur across the site. The site has predominantly <75% susceptibility but a small portion is classified as 25% - <50%.

Site Specific Recommendations

The proposed use for the site includes a car park which are defined as Less Vulnerable. Flood risk has been considered due to the interest in developing these sites and in order to provide additional information for developers.

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site with a Very Low – Moderate Flood Hazard. rating.
- Developments are not appropriate within the functional floodplain 3b unless it is water compatible. It is thought that the new Flood Alleviation Scheme will raise the SoP above a 1 in 25 year (the current SoP) which means that the site would be reclassified at a minimum as Flood Zone 3a which would allow for the development of the Car Park as proposed. The proposed development must not reduce the ability of the floodplain to store water. This should be considered in relation to the 1% AEP modelled flood event including an appropriate allowance for climate change (this should be discussed with the Environment Agency upon appointment to ensure the latest guidance is used). Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- Breach modelling is not required to be undertaken as part of a site specific FRA
- The site is located within the Flood Warning Area for River Wharfe at Tadcaster. The Car Park Operator should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by the Car Park Operator demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is located within a Source Protection Zone which means only attenuation based SuDs are likely to be permitted on the site. The River Wharfe is within close proximity to the site and it could be used as a potential discharge point.
- All major developments (10 or more dwellings and 100m² floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation

