APPENDIX 8.1A
FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

The Beehive Redevelopment, Cambridge
Railway Pensions Nominees Limited

Flood Risk Assessment & Drainage Strategy

October 2024

Waterman Infrastructure & Environment Limited
Pickfords Wharf, Clink Street, London, SE1 9DG
www.watermangroup.com

Client Name:	Railway Pension Nominees Limited
Document Reference:	WIE17469-110-R-1-1-6-FRADS_Project Otter
Project Number:	WIE17469-110

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS EN ISO 45001:2018)

Issue	Date	Prepared by	Checked by	Approved by
P01	02.08.24	Daniel Hontanosas (Flood Risk Consultant)	Gurveer Jutte (Civil Engineer)	Cameron Paton (Technical Director)
Comments		First draft for Client Team / Legal Review		
P02	16.08.24	Gurveer Jutte (Civil Engineer)	Gurveer Jutte (Civil Engineer)	Cameron Paton (Technical Director)
Comments		Final report for Outline Application		
P03	24.10.24	Gurveer Jutte (Civil Engineer)	Gurveer Jutte (Civil Engineer)	Cameron Paton (Technical Director)
Comments		Updated following comments from LLFA response		

Disclaimer

This report has been prepared by Waterman Infrastructure & Environment Limited, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

Contents

Figures

Tables

Appendices

H. Statutory Authority Consultations

I. LLFA Surface Water Drainage Pro-Forma

Executive Summary

Waterman was commissioned by Railway Pension Nominees Limited to prepare a Flood Risk Assessment incorporating a Surface Water Drainage Strategy to support the proposed redevelopment of the Beehive Centre, Coldham's Lane, Cambridge, for a new local centre, open space and employment (office and laboratory) floorspace.

Flood risk has been assessed in line with BS8533 and best practice. In accordance with NPPF and its associated PPG, all potential sources of flooding to the Site have been considered.

Review of published material indicates that the Site has not been subject to historical flooding.

The Site lies remote from Main Rivers and Ordinary Watercourses and is categorised within an area at very low probability of flooding (Flood Zone 1) from Main Rivers and the Sea.

No significant risk of flooding at the Site from emergent groundwater, surface water, sewers, or reservoir breach has been established based upon published documents and consideration of the local topography and setting.

Localised areas at risk of flooding from surface water and overland flow can be adequately managed by maintaining level differentials between finished ground floor levels and adjacent external levels, and by careful management of surface water runoff across the Proposed Development.

The Site would be expected to remain at low risk of flooding in the future throughout the lifetime of the Proposed Development taking into account anticipated climate change effects.

Safe routes of vehicular and pedestrian access and egress would also be available via Coldham's Lane and adjacent footpaths over the lifetime of the Proposed Development.

Surface water runoff from the Proposed Development will be managed sustainably at source, utilising a suite of SuDS measures and water quality enhancements integrated within the hard and soft landscape.

Post-development, there is a material overall reduction in flow rates and flow volumes to the receiving sewer networks providing a nett betterment to the receiving systems in line with national and local policy objectives.

The FRA demonstrates that the residual flood risks are manageable over the lifetime of the Proposed Development. The proposals are deemed to be 'safe' and sustainable in flood risk terms and in line with the requirements of local and national policies and guidance.

1. Introduction

Context

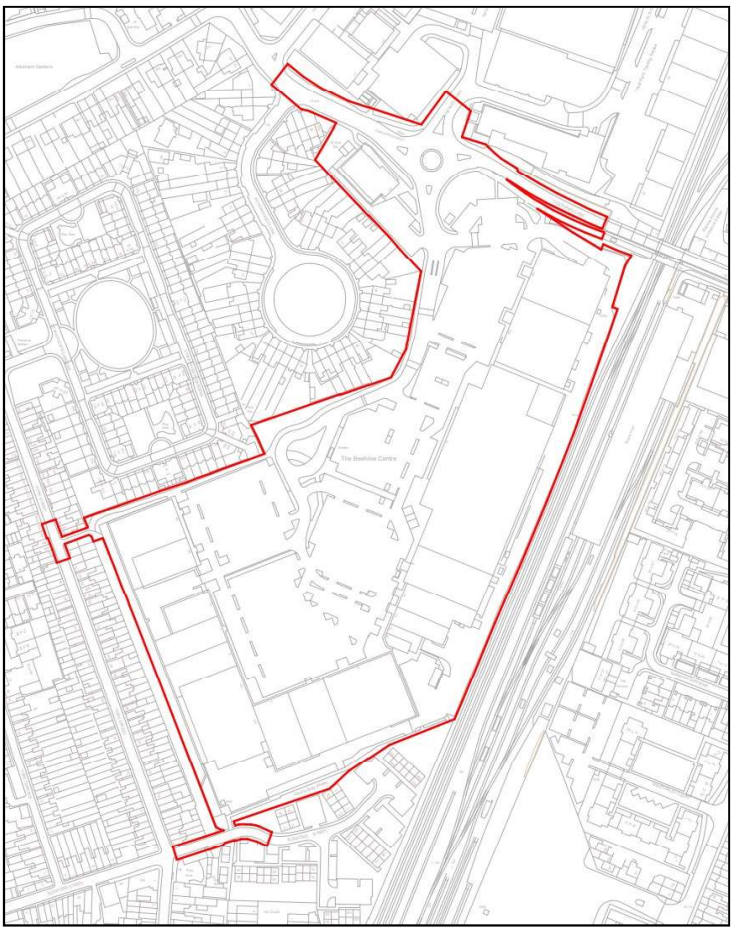
1.1. Waterman was commissioned by Railway Pension Nominees Limited ("the Applicant") to prepare a Flood Risk Assessment (FRA) incorporating a Drainage Strategy (DS) to support an outline planning application for the proposed redevelopment of the Beehive Centre, Coldham's Lane, Cambridge (hereafter referred to as "the Site").

1.2. This report assesses the potential effects of tidal, fluvial, pluvial, groundwater and artificial sources of flooding upon the Proposed Development, in line with national and local planning policy. In addition, the management of foul flows and surface water runoff is also assessed, so as not to have a detrimental effect to the Site or its surroundings.

Site Location

1.3. The Site address is The Beehive Centre, Coldham's Lane, Cambridge CB1 3ET (approx.), centred at National Grid Reference (NGR) 546625, 258550. Refer to Site Location Plan in Figure 1. The Site falls under the jurisdiction of Greater Cambridge Shared Planning Service, encompassing Cambridge City Council (CCC).

Figure 1: Site Location



Existing Site Features

1.4. The Site Area covers 7.85 hectares (ha) and comprises a mid-sized retail park with mixed uses and associated ground level at-grade car parking. Refer to Existing Site Plans in Appendix A.

1.5. The Site is accessed via Coldham's Lane which forms its northern boundary. The Site is bounded by the railway line to the east, by York Street and Sleaford Street to the south, and by existing residential areas to the west.

Topography

1.6. Topographical information for the Site and locale indicates that ground levels are circa 14.0m AOD along the southern boundary, sloping to circa 12.2m AOD along the southern edge of the retail park. Ground levels fall in a north easterly direction across the car park to circa 9.5m AOD at the Coldham's Lane junction. The lowest point of the Site lies at circa 9.0m AOD at the north eastern corner before levels rise to Coldham's Lane along the north eastern boundary.

1.7. Adjacent off-site levels to the south along York Street and Sleaford Street are elevated above the Site with levels of circa 14.0m AOD. Adjacent off-site levels to the north along Coldham's Lane are elevated above the Site with levels of circa 9.5m - 13.6m AOD along the footpath between the northern and north eastern site extents. Topographical information is included as Appendix B.

1.8. Off-site levels generally continue to fall in a north easterly direction away from the Site.

Local Hydrology

1.9. The Site falls within the natural surface water drainage catchment of a tributary of Coldham's Brook and River Cam, which flows in a northerly direction circa 250m to the north east of the Site, via Barnwell Lake, into the River Cam which flows circa 500m to the north west of the Site.

Existing Flood Defences

1.10. The Site does not benefit from, nor rely upon, the presence of formal fluvial flood defences.

Geology & Hydrogeology

1.11. Historical mapping records the Site as undeveloped or in use as allotments up until the 1960's, whereby various warehouses, a dairy, builders' yards, and a bakery were developed. The northern half of the Site was redeveloped in the 1980's into the existing Beehive Retail Centre layout, with the remainder of the Site being developed by 1994.

1.12. The Site's geology comprises tarmac / concrete hardstanding overlying Made Ground (up to 2.5m thick). The weathered base of the West Melbury Marly Chalk Formation lies beneath the Made Ground across the majority of the Site, up to 6.6m thick) whilst River Terrace Gravels (4.6m thick) are anticipated beneath the south western areas of the Site only. Both are underlain by Gault Clay Formation (>35.8 thick) and Lower Greensand Formation.

1.13. Gault Clay is unproductive strata, whilst the West Melbury Marly Chalk Formation and Lower Greensand Formation are designated Principal Aquifer.

1.14. Surface water abstractions are not recorded on the Site or immediate locale. Environment Agency (EA) mapping indicates that the Site is not located within a Groundwater Source Protection Zone (SPZ).

2. Planning Policy and Guidance

National Planning Policy Framework

2.1. The National Planning Policy Framework[i] (NPPF) states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

2.2. The NPPF states that when determining planning applications, Local Planning Authorities (LPA) should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific Flood Risk Assessment. Development should only be allowed in areas at risk of flooding where 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;
- The development is appropriately flood resistant and resilient;
- It incorporates Sustainable Drainage Systems (SuDS), unless there is clear evidence that this would be inappropriate;
- Any residual risk can be safely managed; and
- Safe access and escape routes are included where appropriate.

Planning Practice Guidance

2.3. The Planning Practice Guidance (PPG)[ii] provides additional guidance to LPAs to ensure effective implementation of the planning policies set out within the NPPF regarding development in areas at risk of flooding.

2.4. PPG states that developers and LPAs should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of SuDS. Referencing EA guidance, the PPG provides recommended contingency allowances for climate change over the anticipated lifetime of development. It also advises on flood resilience and resistance measures when dealing with the residual risks remaining after applying the sequential approach and mitigating actions.

2.5. The PPG also includes advice on flood risk vulnerability and flood zone compatibility. The following flood zones refer to the probability of river and sea flooding, without the presence of defences:

- Zone 1 - low probability: less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year;
- Zone 2 - medium probability: between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% to 0.1%) or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% to 0.1%) in any year;
- Zone 3a - high probability: 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability flooding from the sea (>0.5%) in any year; and
- Zone 3b - the functional floodplain: where water has to flow or be stored in times of flood; identification should take account of local circumstances but would typically flood with an annual probability of 1 in 30 (3.3%) or greater in any year or is designed to flood in an extreme 1 in 1,000 (0.1%) flood.

2.6. Flood risk vulnerability is split into five classifications in Table 2 of the PPG, as follows, and the compatibility of these within each Flood Zone is set out in Table 3 of the PPG:

- Essential Infrastructure, e.g. essential transport and utility infrastructure, wind turbines;
- Highly Vulnerable, e.g. emergency services (those required to be operational during flooding), basement dwellings;
- More Vulnerable, e.g. residential dwellings, hospitals, schools, hotels, drinking establishments;
- Less Vulnerable, e.g. retail, offices, storage and distribution, leisure, restaurants; and
- Water-Compatible Development, e.g. docks, marinas, wharves.

Water Industry Act

2.7. Anglian Water is the local Sewerage Undertaker and provides sewerage services under the guidance of the Water Industry Act 1991.

2.8. Under Section 106 of the Water Industry Act, the developer currently maintains the automatic right to 'communicate' with the public foul water sewer system.

Non-statutory Technical Standards for Sustainable Drainage Systems

2.9. The Non-statutory Technical Standards for Sustainable Drainage Systems[iii] was published in March 2015 and is the current guidance for the design, maintenance and operation of SuDS.

2.10. For previously developed land, the Standards set out that the peak runoff rates should be as close as is reasonably practicable to the greenfield rate but should never exceed the pre-development runoff rate.

2.11. The standards also set out that the drainage system should be designed so that flooding does not occur on any part of the Site for a 1 in 30 year rainfall event, and that no flooding of a building (including basement) would occur during a 1 in 100 year rainfall event.

2.12. It is also noted within the standards that pumping should only be used when it is not reasonably practicable to discharge by gravity.

Cambridge Local Plan

2.13. Cambridge Local Plan 2018 Policy 31 : Integrated Water Management and the Water Cycle

Development will be permitted provided that:

a. surface water is managed close to its source and on the surface where reasonably practicable to do so;

b. priority is given to the use of nature services;

c. water is seen as a resource and is re-used where practicable, offsetting potable water demand, and that a water sensitive approach is taken to the design of the development;

d. the features that manage surface water are commensurate with the design of the development in terms of size, form and materials and make an active contribution to making places for people;

e. surface water management features are multi-functional wherever possible in their land use;

f. any flat roof is a green or brown roof, providing that it is acceptable in terms of its context in the historic environment of Cambridge (see Policy 61: Conservation and Enhancement of Cambridge's Historic Environment) and the structural capacity of the roof if it is a refurbishment. Green or brown roofs should be widely used in large scale new communities;

g. there is no discharge from the developed site for rainfall depths up to 5 mm of any rainfall event;

h. the run-off from all hard surfaces shall receive an appropriate level of treatment in accordance with Sustainable Drainage Systems guidelines, SUDS Manual (CIRIA C753), to minimise the risk of pollution;

i. development adjacent to a water body actively seeks to enhance the water body in terms of its hydromorphology, biodiversity potential and setting;

j. watercourses are not culverted and any opportunity to remove culverts is taken; and

k. all hard surfaces are permeable surfaces where reasonably practicable, and having regard to groundwater protection.

2.14. Cambridge Local Plan 2018 Policy 32: Flood Risk

Potential flood risk from the development

Development will be permitted providing it is demonstrated that:

a. the peak rate of run-off over the lifetime of the development, allowing for climate change, is no greater for the developed site than it was for the undeveloped site;

b. the post-development volume of run-off, allowing for climate change over the development lifetime, is no greater than it would have been for the undeveloped site. If this cannot be achieved then the limiting discharge is 2 litre/s/ha for all events up to the 100-year return period event;

c. the development is designed so that the flooding of property in and adjacent to the development would not occur for a 1 in 100 year event, plus an allowance for climate change and in the event of local drainage system failure;

d. the discharge locations have the capacity to receive all foul and surface water flows from the development, including discharge by infiltration, into water bodies and into sewers;

e. there is a management and maintenance plan for the lifetime of the development, which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime; and

f. the destination of the discharge obeys the following priority order:

• firstly, to ground via infiltration;

• then, to a water body;

• then, to a surface water sewer.

Discharge to a foul water or combined sewer is unacceptable.

Potential flood risk to the development

Development will be permitted if an assessment of the flood risk is undertaken following the principles of the National Planning Policy Framework (2012) and additionally:

For a previously developed site:

Opportunities should be taken to reduce the existing flood risk by the positioning of any development so that it does not increase flood risk elsewhere by either displacement of flood water or interruption of flood flow routes, and it employs flood resilient and resistant construction including appropriate boundary treatment and has a safe means of evacuation.

Cambridgeshire Flood and Water SPD

2.15. The Cambridgeshire Flood and Water Supplementary Planning Document (SPD) supplements policy found in the Local Plan and provides guidance on the use of Sustainable Drainage Systems (SuDS) within new developments. It was endorsed by Cambridgeshire County Council (CCoC) in its capacity as Lead Local Flood Authority (LLFA). The SPD is supported by further LLFA guidance on surface water management.

Cambridgeshire Sustainable Design & Construction SPD

2.16. Consideration has also been given in preparing this planning application to the Sustainable Design and Construction SPD issued by CCoC in June 2007.

Sustainable Drainage : Cambridge Design and Adoption Guide

2.17. Sustainable Drainage : Cambridge Design and Adoption Guide provided by CCoC, sets out the design and adoption requirements that CCoC will be looking for, in order to ensure a smooth and satisfactory adoption process.

Surface Water Planning Guidance

2.18. CCoC published their Surface Water Planning Guidance in April 2024 helping to steer SuDS provision and policy requirements for major developments.

Greater Cambridge Strategic Flood Risk Assessment (SFRA)

2.19. Greater Cambridge Shared Planning Service's Level 1 Strategic Flood Risk Assessment (SFRA)[iv] was published in July 2021 and aims to provide a robust assessment of flood risk across the region from all potential sources of flooding.

Cambridgeshire Preliminary Flood Risk Assessment (PFRA)

2.20. The Cambridgeshire PFRA[v] was adopted in March 2011. This document has been prepared to help CCoC meet their duties to manage local flood risk and deliver the requirements of the Flood Risk Regulations 2009 in their role as a LLFA.

3. Development Proposals and Planning Context

Development Proposals

3.1. The Applicant is seeking outline planning permission for the redevelopment of the Beehive Centre. The Proposed Development consists of:

'the demolition and redevelopment of the Beehive Centre, including in Outline Application form for the demolition and redevelopment for a new local centre (E (a-f), F1(b-f), F2(b,d)), open space and employment (office and laboratory) floorspace (E(g)(i)(ii) to the ground floor and employment floorspace (office and laboratory) (E(g)(i)(ii) to the upper floors; along with supporting infrastructure, including pedestrian and cycle routes, vehicular access, car and cycle parking, servicing areas, landscaping and utilities.'

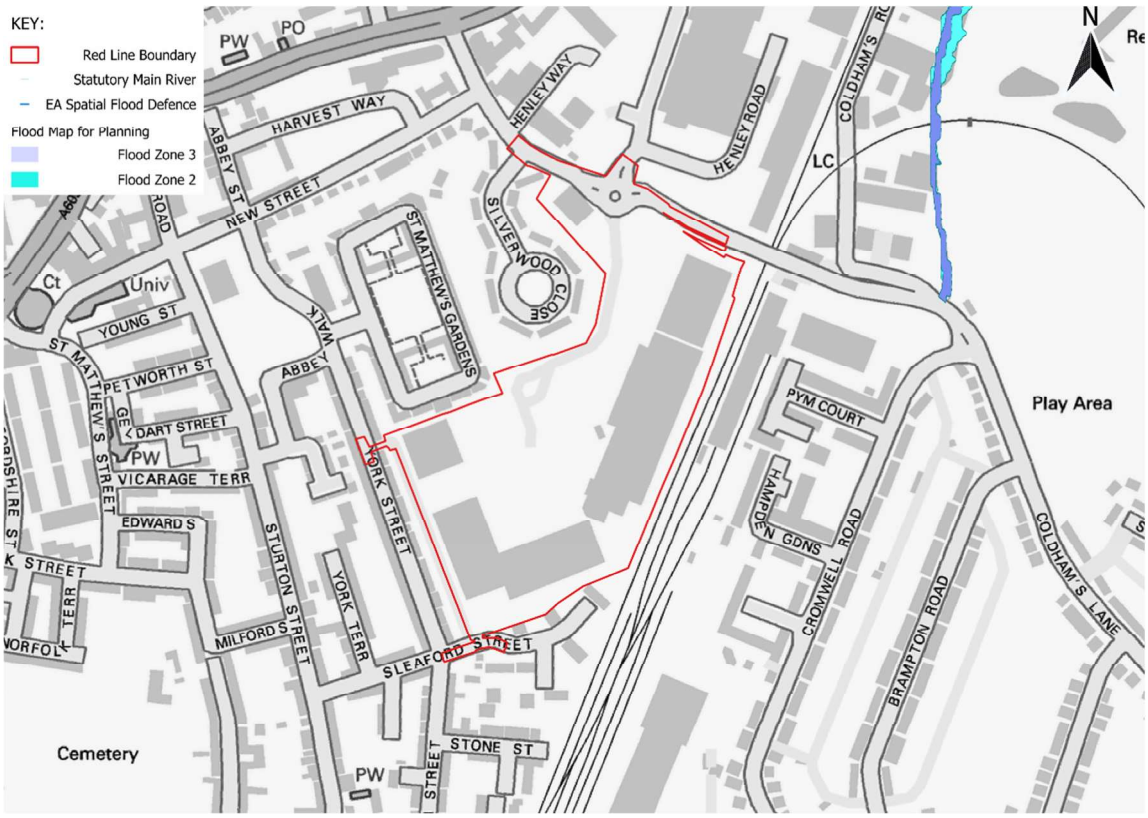
3.2. An Illustrative Masterplan and Development Proposals are presented in Appendix C. Lower ground floors are proposed beneath selected buildings to provide car parking, cycle storage plant rooms, servicing, and general storage. In flood risk planning terms these are categorised as lower ground floors rather than basements owing to being accessible via internal stair cores or lifts.

3.3. Target date for commencement of construction is Spring 2026.

Flood Zone Classification

3.4. Based on the Flood Map for Planning (reproduced at Figure 2), the Site lies within Flood Zone 1 (low probability of flooding).

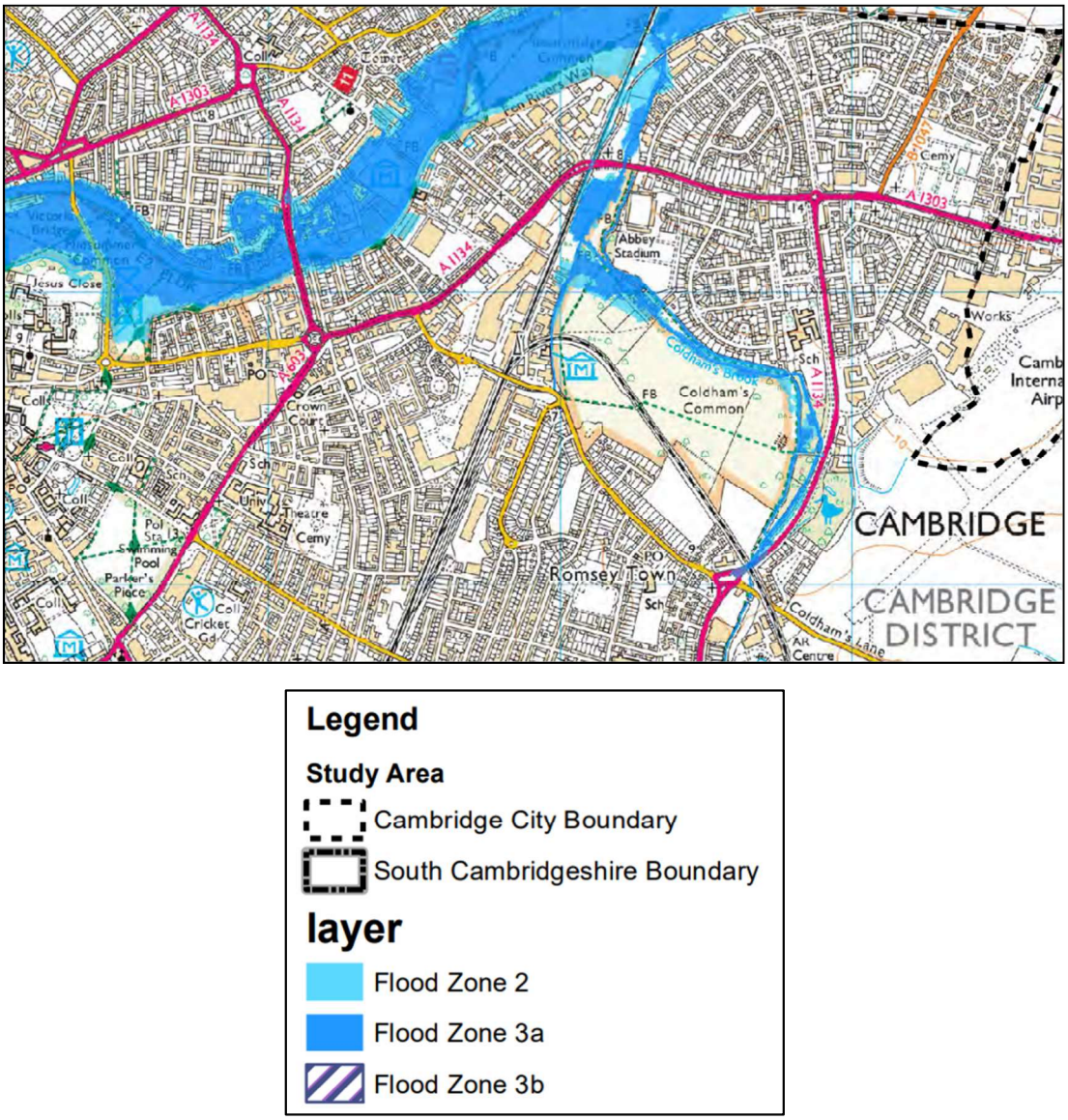
Figure 2: Flood Map for Planning



Strategic Flood Risk Assessment Classification

3.5. Appendix D1 of the Level 1 SFRA confirms that the Site lies in Flood Zone 1. Refer to mapping extract in Figure 3.

Figure 3: SFRA Flood Risk Constraints Map Extract



Functional Floodplain Appraisal

3.6. Appendix D1 and Appendix D6 of the Level 1 SFRA clearly confirms that the Site is located outside the functional floodplain (i.e. Flood Zone 3b) associated with Main Rivers.

Flood Risk Vulnerability

3.7. NPPF *Table 2: Flood risk vulnerability classification* identifies that offices, laboratory and local centre uses would be considered a '*Less Vulnerable*' use, which represents no uplift from the *'Less Vulnerable'* classification that applies to the currently consented retail use and car parking.

Flood Risk Compatibility

3.8. NPPF *Table 3: Flood risk vulnerability and flood zone 'compatibility'* (replicated below) confirms that the proposed development is appropriate for *'Less Vulnerable'* uses in Flood Zone 1 without the need to satisfy the Exception Test. Refer to green highlighted cells.

Flood Risk Vulnerability and Flood Zone Compatibility

	Flood Risk Vulnerability Classification (NPPF Table 2)	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (NPPF Table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	x	Exception Test Required	✓
	Zone 3b (functional floodplain)	Exception Test Required	✓	x	X	x

Key: ✓ Development is appropriate x Development should not be permitted

Sequential Test and Exception Test

3.9. PPG paragraph 027 provides an overview on the application of the Sequential Test to individual planning applications.

3.10. NPPF requires an applicant, where appropriate, to apply the Sequential Test in order to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.

3.11. NPPF paragraph 162 states:

> *"The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The Strategic Flood Risk Assessment will provide the basis for applying this test. A sequential approach should be used in areas known to be at risk now or in the future from any form of flooding."*

3.12. The Site lies in Flood Zone 1, and built development is proposed in areas of lowest surface water flood risk, and it is not possible for development to be located in zones with a lower risk of flooding. The Site, therefore, satisfies the Sequential Test and does not require the Exception Test to be applied.

4. Technical Assessment of Flood Risk

Assessment Methodology

4.1. This report has also been prepared in accordance with the advice and requirements prescribed in current best practice documents relating to management of flood risk in development set out in BS8533[vi] and the EA's National Standing Advice on Development and Flood Risk.

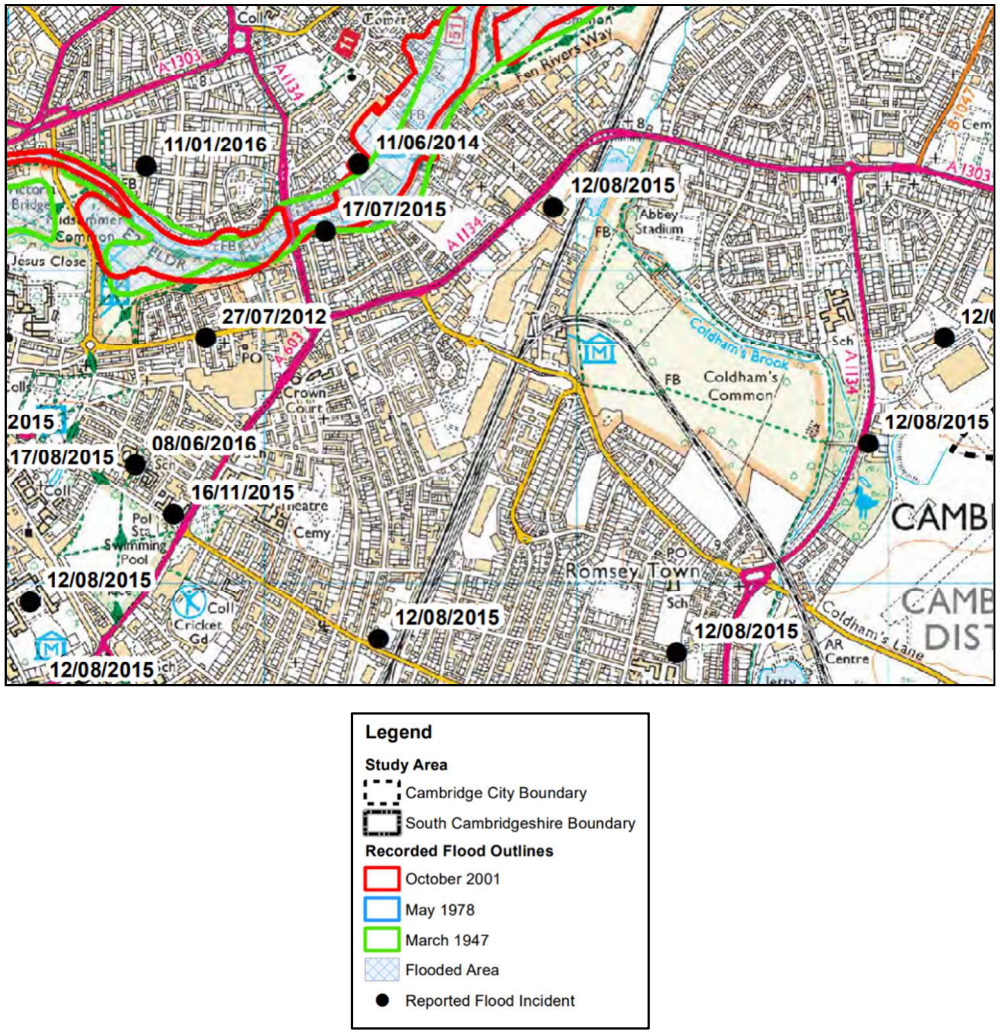
4.2. BS8533 and PPG guidance sets out that FRAs should consider climate change effects upon non-residential development proposals over a 75 year lifetime of development.

Fluvial & Tidal Flooding

Historic Flooding

4.3. Based upon published records, there is no history of fluvial flooding incidents at or immediately adjacent to the Site. Appendix D7 of the Level 1 SFRA only indicates one incident of flooding several hundred metres to the north of the Site. Refer to mapping extract in Figure 4.

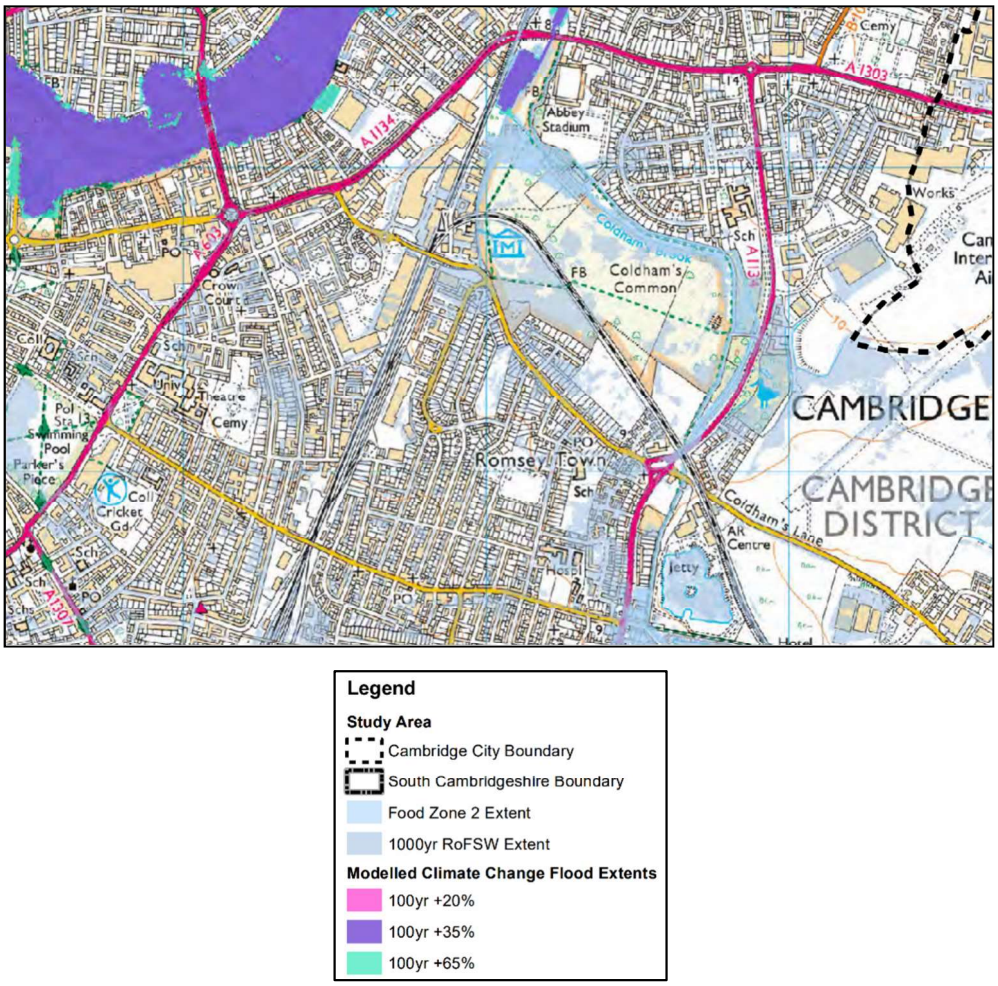
Figure 4: SFRA Historic Flooding Map Extract



Climate Change Effects

4.4. Appendix D4 of the Level 1 SFRA confirms that the risk of fluvial flooding remains very low at the Site even taking into account the 1 in 100 annual probability event with an overly onerous 65% uplift in peak flood flows to represent future climate change effects. Refer to mapping extract in Figure 5.

Figure 5: SFRA Modelled Climate Change Extents Map Extract



Surface Water Flooding & Overland Flow

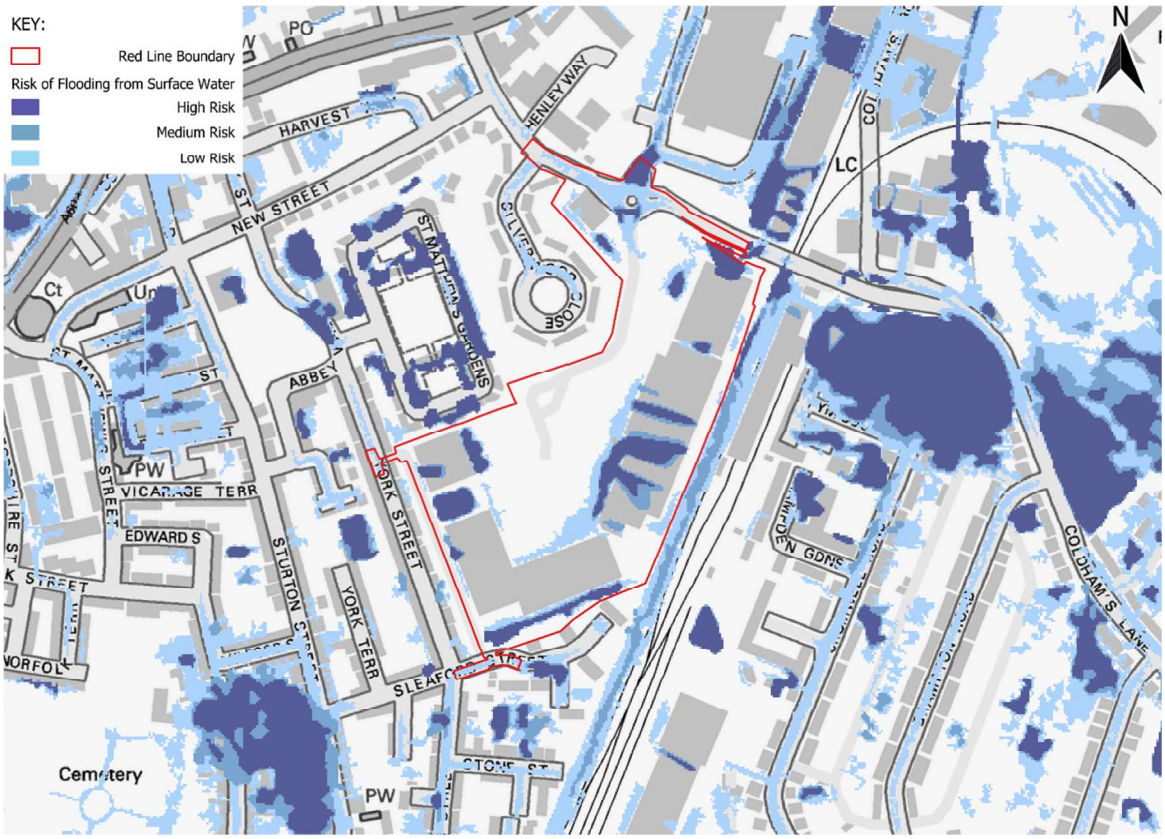
4.5. SFRA mapping records various incidents of Surface Water Flooding (Pluvial) in Cambridge. However, no incidents of Surface Water Flooding are reported at, or in close proximity to, the Site.

4.6. Mapping presented within the Cambridge and Milton Surface Water Management Plan – Detailed Assessment and Options Appraisal Report (SWMP) indicates that the Site lies outside (to the south west of) the designated boundary of the 'Cherry Hinton Wetspot', an area shown to be at elated risk of surface water flooding. SWMP mapping largely mimics the EA and SFRA mapping.

4.7. Surface water modelling has been undertaken by the EA in order to seek to establish areas at risk of surface water flooding based upon latest hydrological techniques and surface terrain data.

Extracts from the Long Term Flood Risk Information (LTFRI) Surface Water Flood Maps are presented in Figure 6 - 10 which confirms that the majority of the Site is designated as being at a 'very low' risk of surface water flooding.

Figure 6: Surface Water Flood Extents



High Risk – Chance of flooding greater than 1 in 30
Medium Risk – Chance of flooding between 1 in 30 and 1 in 100
Low Risk – Chance of flooding between 1 in 100 and 1 in 1000
Very Low Risk – Chance of flooding less than 1 in 1000

4.8. For surface water events with a chance of occurrence of between 1 in 30 and 1 in 100, flood depths across localised lowest lying car park areas and along lowered walkways between retail units are predicted to remain below 300mm and can be classed as shallow surface 'ponding'. Refer to Figure 7 and Figure 8.

4.9. Even for the most significant surface water events with a chance of occurrence of between 1 in 100 and 1 in 1000, flood depths across a narrow strip of the lowest lying car park areas and along lowered walkways between retail units are predicted to remain below 300mm. Only very localised external areas at the very north eastern corner of the Site and within the south eastern extent of the car park are predicted to flood depths just exceeding 300mm. Refer to Figure 9 and Figure 10.

4.10. No significant overland flood flow pathways across the Site are evident from published mapping or consideration of local topography. Movement and velocity of flood flows in a north easterly direction across the Site surface are predicted to be minor as they are interrupted and managed by the presence of topographical valleys comprising channel drainage. Any residual overland flood flows are naturally conveyed northwards away from the Site following the natural topography. Refer to Figures 7 - 10.

4.11. Track levels along the railway are generally at a slightly lower elevation than the Site and therefore naturally provide a preferential flow pathway for runoff generated from off-site areas to the east.

4.12. Highway levels bounding the southern and north-eastern extents of the Site are all at a higher elevation than the Site itself, however, road surfaces are generally cambered away from the Site and intermediate footpath levels are elevated thus providing resistance to off-site overland flood flows entering the Site.

4.13. Based upon the above, it is considered that the risk of surface water flooding is low at the present day and remaining low over the anticipated lifetime of the Proposed Development incorporating allowances for climate change. This is validated by Appendix D4 of the Level 1 SFRA mapping (refer to Figure 5) which only identifies localised south eastern and north eastern portions of the Site as being at risk of surface water flooding for the 1 in 1,000 year event used as conservative way of representing future climate change effects upon the 1 in 100 year storm event.

Figure 7: Surface Water Flood Depth (Medium Risk Scenario)

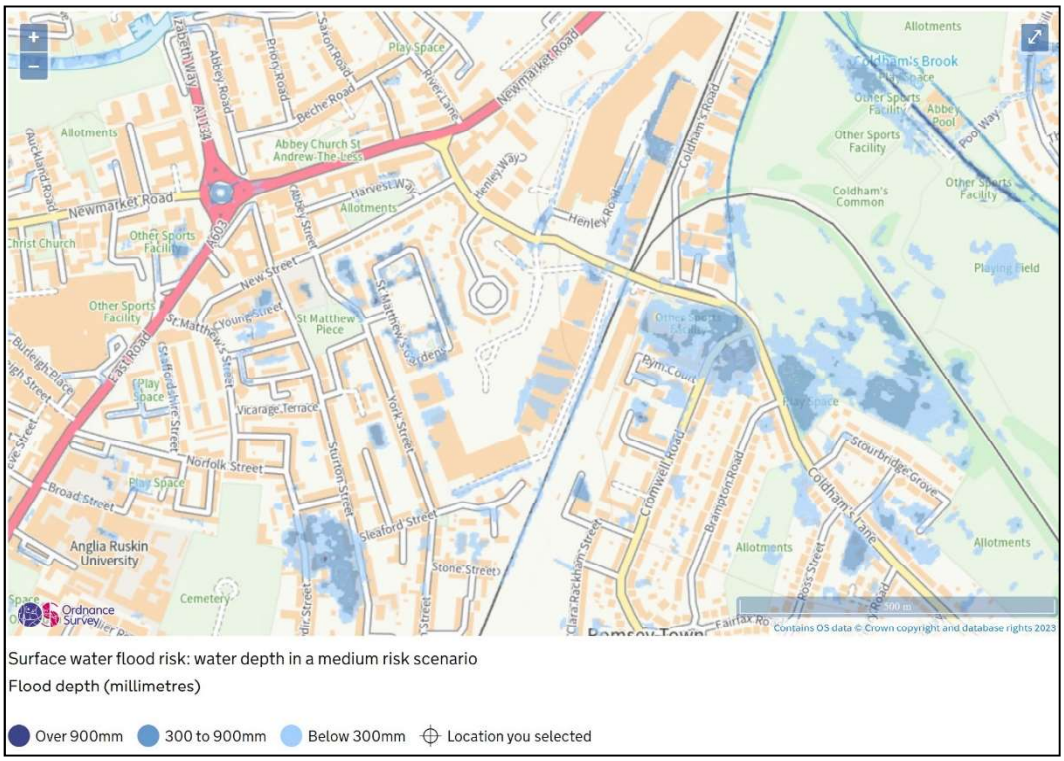


Figure 8: Surface Water Flood Velocity (Medium Risk Scenario)

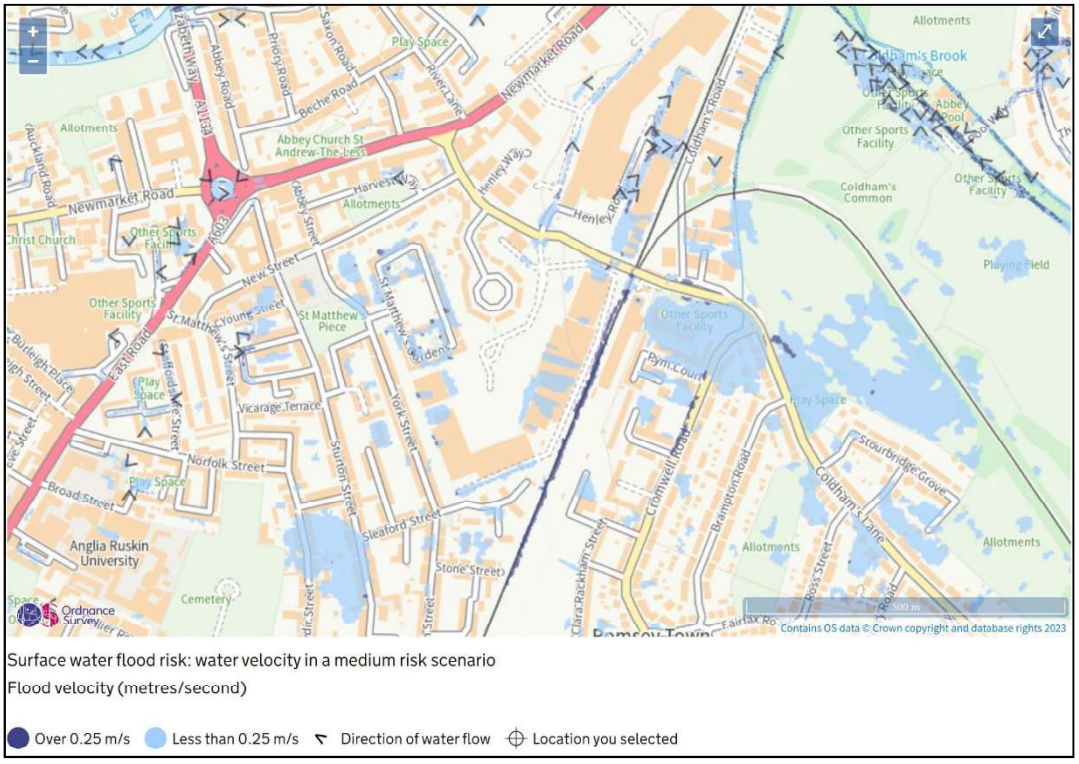


Figure 9: Surface Water Flood Depth (Low Risk Scenario)

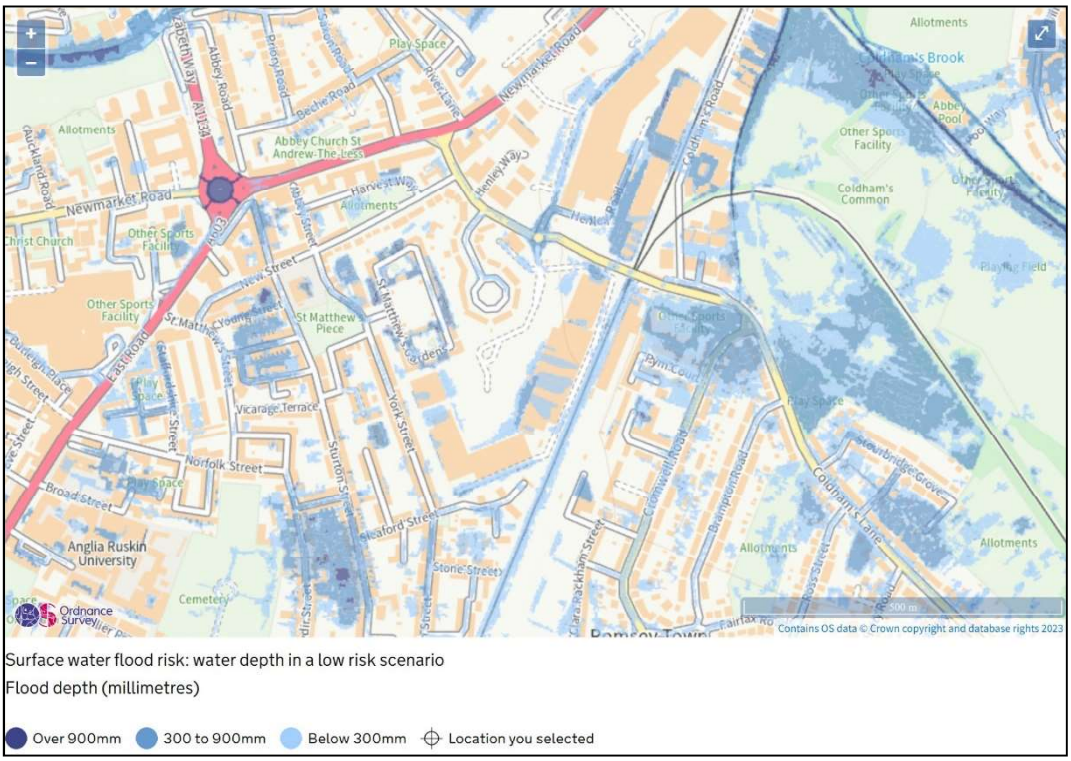
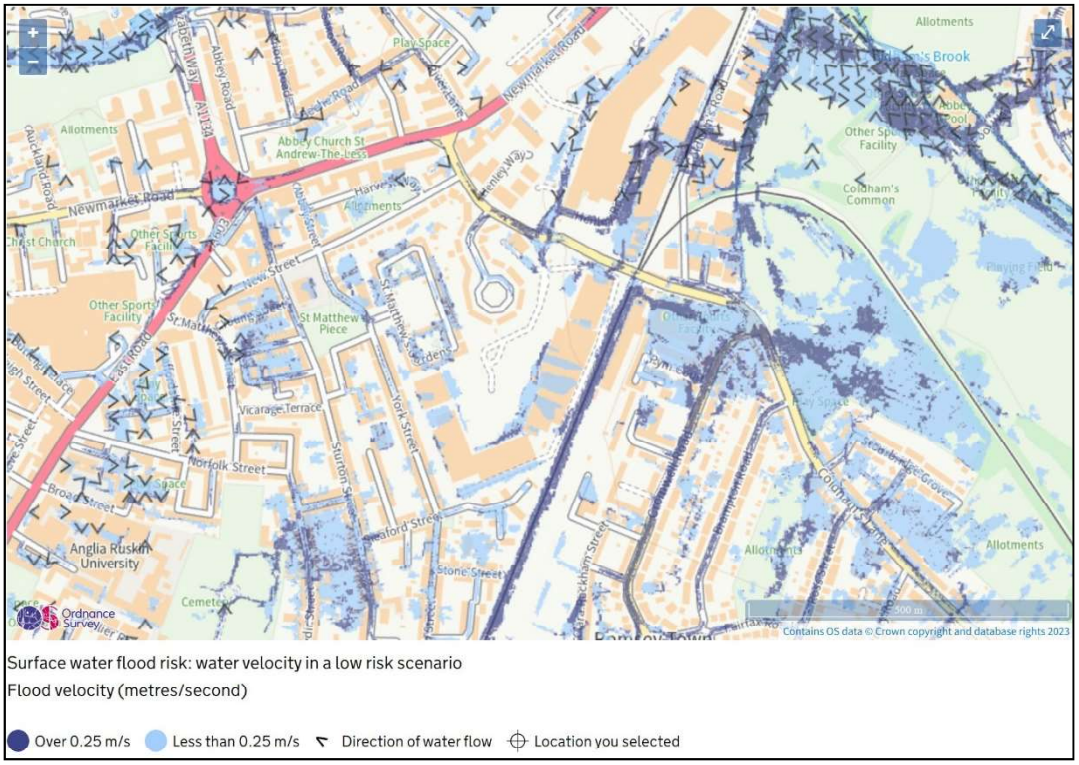


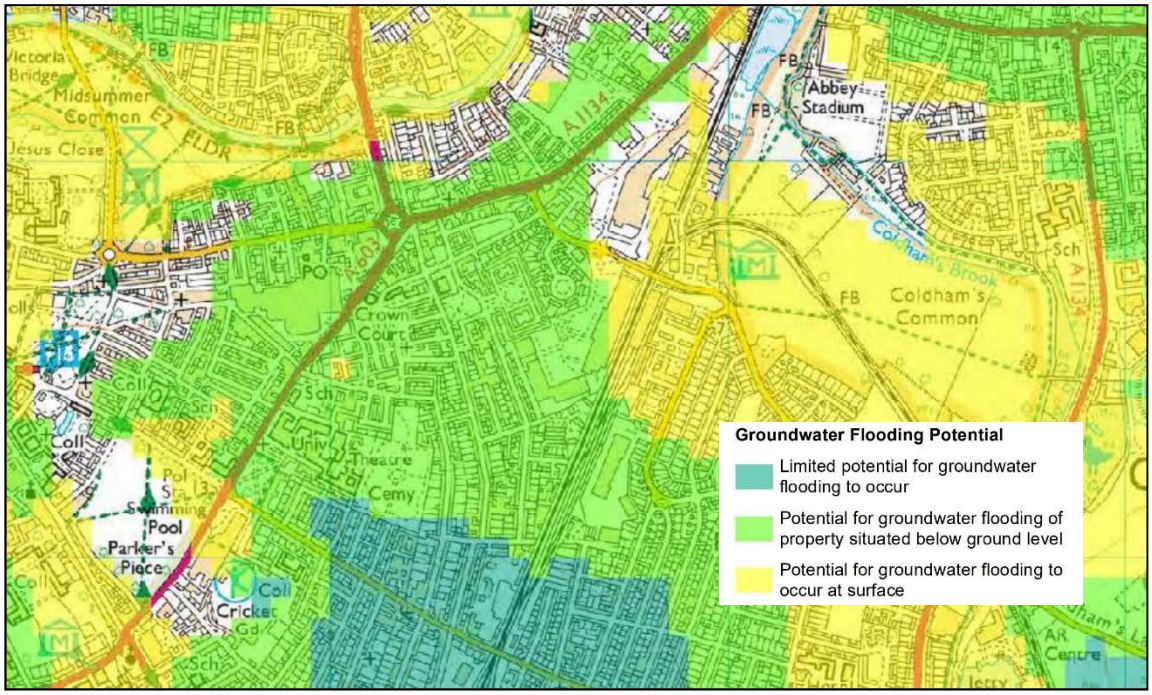
Figure 10: Surface Water Flood Velocity (Low Risk Scenario)



Groundwater Flooding

4.14. Based upon Appendix D10 of the Level 1 SFRA the majority of the Site is shown to be at low potential for groundwater flooding. The majority of the Site is designated as having *'Potential for groundwater flooding of property situated below ground level'* which is typical of an area with a relatively shallow groundwater table. Refer to extract in Figure 11.

Figure 11: Groundwater Flooding Potential



4.15. It is evident from local topography that the Site does not lie in a topographic depression in which groundwater could emerge and inundate the Site after progressing overland.

4.16. Based upon limited evidence of flooding incidents in the locale, the presence of Made Ground beneath the Site almost entirely covered by impermeable surfacing, the risk of groundwater emergence resulting in inundation of buildings is considered to be very low at the present day and remaining low over the anticipated lifetime of the Proposed Development incorporating allowances for climate change.

4.17. Despite the overall low risk, it is prudent to consider some basic mitigation measures to ensure the lower ground floors remain dry and functional. Ensuring that the lower ground floors are adequately waterproofed using appropriate membranes and sealants.

4.18. Additionally, designing the structure to withstand hydrostatic pressure from potential groundwater and using materials resistant to water damage for lower ground floor constructions will enhance resilience. Incorporating allowances for climate change in the design to account for potential future changes in groundwater levels and developing an emergency response plan to address potential groundwater flooding scenarios, even if they are deemed unlikely, will provide added security and peace of mind for the lower ground floors of the proposed development.

Sewer & Water Main Flooding

4.19. Based upon Appendix D11 of the Level 1 SFRA, the Site lies within an area of *'2-5 recorded incidents of sewer flooding'* which represents one of the lowest risk bands. As a result, the Site can be deemed to be at low risk of flooding from public sewers.

4.20. Asset records indicate the presence of a short section of 375mm diameter public surface water sewer that traverses an existing area of soft landscaping at the very northern tip of the Site just to the east of the Coldham's Lane access. Refer to Figure 12.

4.21. The 375mm diameter public surface water sewer conveys flows in an easterly direction beneath Coldham's Lane just to the north of the Site. Immediately adjacent to the north eastern boundary of the Site, the sewer increases to 525mm diameter. A 525mm diameter public foul sewer conveys flows in a westerly direction beneath Coldham's Lane. Refer to Figure 12.

4.22. A 525mm diameter public surface water sewer and 300mm diameter public foul sewer convey flows in a north westerly direction beneath York Street adjacent to the south western boundary of the Site. Refer to Figure 13.

4.23. Coldham's Lane highway surfaces are generally cambered away from the Site and intermediate footpath levels are elevated thus providing resistance to overland flood flows from surcharged sewers entering the Site. Whilst the York Street highway is elevated above the Site, overland flood flows from surcharged sewers would tend to progress northwards following the local topography rather than enter the Site. Based upon the above, it is considered that the risk of sewer flooding is very low at the present day and remaining low over the anticipated lifetime of the Proposed Development incorporating allowances for climate change.

4.24. Public water main records indicate the presence of potable water mains routed beneath the Coldham's Lane and York Street carriageways. Other water mains in the locale are nominal bore.

4.25. Burst water mains and failure of public sewerage infrastructure could inherently pose a residual risk to any site, and are not specifically covered within a FRA. However, risk to the Site is considered to be low due to the natural sloping topography providing pathways for excess flows from burst mains to progress overland away from the Site towards lower lying land.

4.26. Existing private drainage arrangements are covered further within Chapter 6 of this report. Excess surface water ponding would be readily accommodated at shallow depth across the extensive areas of car parking. Flood risk to the Site from the existing private foul drainage arrangements, which incorporate a small package foul pumping station in the south east of the Site, is considered to be low. Even in the event of failure or blockage of the pumping station, or power outage, excess flows from the network would tend to be accommodated within the service yard located a few metres downgradient.

Figure 12: Public Sewer Records Extract (North)

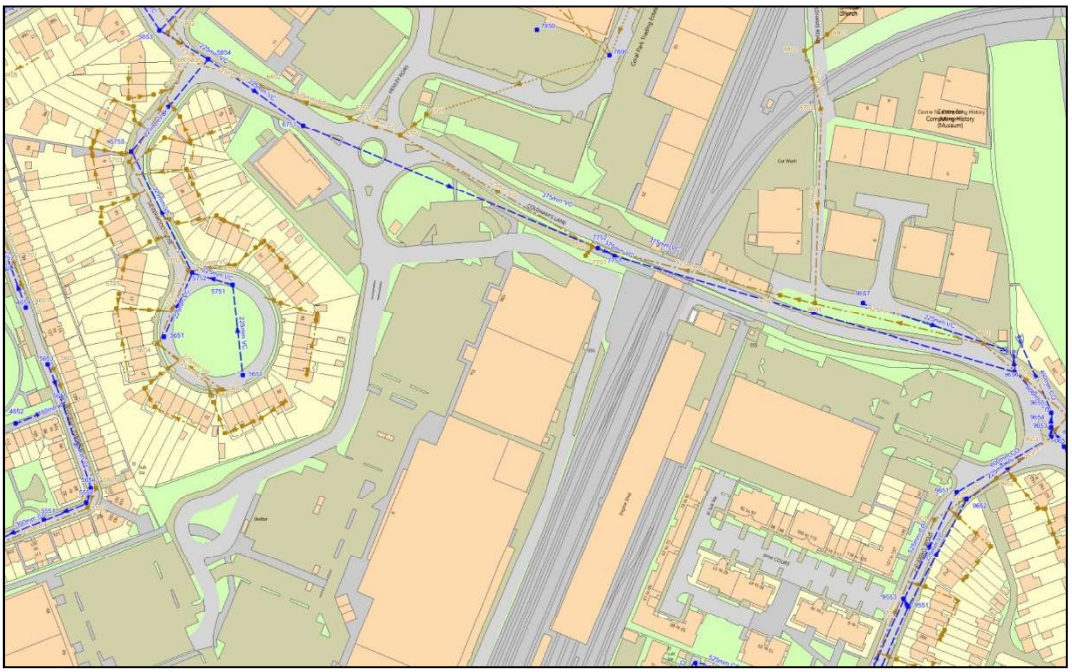


Figure 13: Public Sewer Records Extract (South)

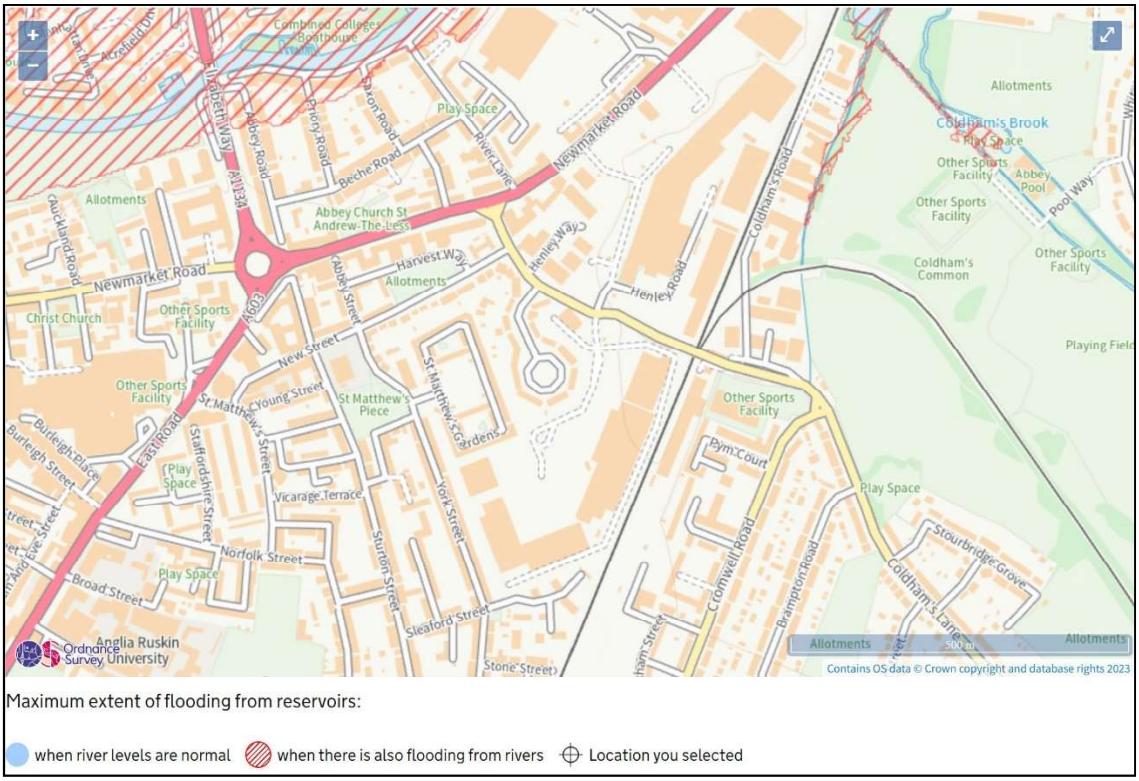
Flooding from Canals and Artificial Sources

4.27. There are no Canals or Artificial Waterbodies within close proximity to the Site, therefore, the risk of flooding from breach of Canal embankments or walls is considered to be very low.

Flooding from Reservoirs

4.28. Based upon LTFRI mapping and Appendix D9 of the Level 1 SFRA, the Site is not deemed to be at risk of flooding from reservoir embankment breach (failure). Refer to Figure 14.

Figure 14: Reservoir Flood Risk (Floodwater Depth)



Flood Risk to Off-Site Areas

Floodplain Storage Displacement

4.29. No functional floodplain or active flood storage is displaced as a result of the proposed scheme (as the proposed building footprint lies outside of predicted floodplain extents); therefore, no specific mitigation measures in the form of compensatory flood storage need to be specified.

Regrading of Existing Levels

4.30. Minor reprofiling of land is anticipated; thereby overland flow routes will not be materially affected by the proposed scheme. Risk to off-site areas would not be detrimentally affected.

Surface Water Runoff

4.31. Hardstanding areas draining to off-site sewers and watercourses will remain at, or below, the coverage of existing arrangements, and existing drainage connections will also remain in-situ,

therefore no detrimental impacts upon drainage or downstream hydrology would be anticipated 'without mitigation'.

4.32. In accordance with the requirements of the NPPF, Local Plan policies, and SFRA guidance, 'post development' runoff rates will be restricted to those rates generated by the 'pre-developed' site, or less, for up to and including the critical 1% annual probability storm event taking into account the impacts of climate change (applied as a 40% uplift in peak rainfall intensity) for the lifetime of the Proposed Development.

4.33. Furthermore, with the implementation of rainwater harvesting and reuse, and a suite of sustainable drainage (SuDS) measures, together with an uplift in soft landscaping post-development, the overall volume of surface water discharged into the public drainage network will be reduced post-development.

4.34. Potential measures for offsetting the impacts of climate change on surface water runoff over the lifetime of the Proposed Development are described in Section 6.

Foul Flows

4.35. Foul flows generated by the Proposed Development will be discharged to the local public foul sewer system via the existing Cambridge Retail Park sewer network.

4.36. Foul flows generated by the Proposed Development will represent a material increase on pre-development rates owing to the nature of the land uses.

4.37. A Pre-Development Enquiry has been submitted to Anglian Water owing to the uplift in average foul flow anticipated from the Proposed Development. Sufficient capacity is expected to be available within the existing 525mm diameter public sewer beneath Coldham's Lane to accommodate the increase in flows. This will be verified with Anglian Water at the appropriate time.

4.38. Treatment capacity at the Milton Water Recycling Centre (WRC) is understood to be limited at the present time, although schemes and strategies are programmed to enable Anglian Water to facilitate anticipated levels of population growth over the anticipated lifetime of the Proposed Development.

4.39. By accepting the anticipated uplift in flows attributed to the proposed development, Anglian Water would inherently take on the responsibility for reinforcing their sewerage network so as not to result in an increased risk of offsite flooding post-development.

5. Proposed Flood Management Measures

Finished Floor Levels & Level Differentials

5.1. Finished floor level for the ground floor of buildings across the Proposed Development will be set between 12.20m AOD adjacent to the southern boundary, gradually reducing in a northerly direction to 9.80m AOD adjacent to the north eastern boundary.

5.2. 'Flush access' is required at key points around building perimeters to allow unhindered access to the main entrance doorway and service yard door.

5.3. Aside from the points of doorway access, a minimum level differential of 150mm will be maintained along the building perimeter to provide a degree of 'freeboard' to prevent the ingress of any overland flow from surface water into the proposed buildings over the lifetime of the Proposed Development by providing a level differential above shallow overland flood flow routes.

5.4. Where the level differential cannot be achieved along the building perimeter it will be provided at the interface between the outer edge of the development platform, or pathway, and external landscape or car parking areas.

Lower Ground Floor Threshold Levels

5.5. Lower ground floors are proposed beneath selected buildings to provide car parking, cycle storage plant rooms, servicing, and general storage. Despite the low risk of flooding anticipated at the Site threshold levels for entrances to lower ground floor areas, including ramped access for vehicles, will be raised a minimum of 150mm above adjacent external ground levels to provide a degree of 'freeboard' to prevent the ingress of any overland flow from surface water into the proposed lower ground floor areas over the lifetime of the Proposed Development by providing a level differential above shallow overland flood flow routes.

Flood Resilience

5.6. Due to the low risk of flooding anticipated at the Site no formal flood resilience measures are deemed to be required at ground floor level within the buildings.

5.7. In the event that adequate level differentials are unable to be achieved careful consideration will be given to the introduction of flood resilient materials within the flooring, construction materials, and surface finishes at ground floor.

5.8. Careful consideration will be given to flood resilient construction materials, and surface finishes at lower ground floor for areas that could potentially be vulnerable in the event of ingress of floodwater during extreme events.

5.9. Lower ground floors will be formed using 'tanked' construction techniques, incorporating waterproofing measures as appropriate, to mitigate against ingress of groundwater.

Overland Flow Mitigation

5.10. The elevation of the buildings in relation to external ground levels will allow any existing overland flow paths to remain unhindered. This allows floodwater to be routed around and away from the buildings as per the baseline scenario.

5.11. No further mitigation is required to address potential overland flows.

Flood Storage or Conveyance Compensation

5.12. No fluvial floodplain storage or conveyance capacity is displaced as a result of the proposals, therefore, no flood storage or conveyance compensation is required.

Safe Route of Access and Egress

5.13. Site users are afforded safe (typically dry) routes of access and egress via the northern, southern and western boundaries of the Site for up to and including the 1 in 1,000 year fluvial and surface water flood events (including future allowances for climate change over the lifetime of the Proposed Development).

5.14. Proposed vehicular access and egress routes to the Site are expected to be categorised as 'Low Hazard' at this location.

Residual Risk

5.15. Residual risk of flooding from exceedance flows from sewers, failure of infrastructure, or extreme groundwater conditions, are deemed to be low.

6. Surface Water Drainage Strategy

Existing Drainage Regime

Public Sewers

6.1. Anglian Water sewer records (refer to Figure 12 and Figure 13) indicate that public surface water and foul sewers bound the Site. Refer to Section 4.18 – 4.21 of this report.

Private Surface Water Sewers

6.2. A private drainage schematic plan and existing drainage layout information gathered from a utilities survey (refer to Appendix D) indicates that the Site is served by a number of points of connection to the public sewer networks. Refer to summary of private sewer outfalls in Table 1.

Table 1: Private Surface Water Sewer Outfalls

Diameter	Outfall Direction / Description	Point of Connection to AW Network (Manhole Ref.)
225mm	NW : Coldham's Lane (West of Site Access)	6751
500mm	NE : Coldham's Lane (Adjacent to Railway)	d/s of 7751
300mm	SW : York Street (Pedestrian Access)	u/s of 3652
300mm	SW : York Street (Pedestrian Access)	u/s of 3652

6.3. Runoff from the south western portion of the Site drains via building roof downpipes, traditional gullies and channel drainage systems to a 300mm surface water sewer beneath the pedestrian access adjacent to the Pets at Home store which eventually outfalls to York Street.

6.4. Western highway areas and the existing bus loop are drained, via a Class 1 bypass separator, to a second 300mm surface water sewer beneath the pedestrian access adjacent to the Pets at Home store which eventually outfalls to the York Street public sewer network.

6.5. Runoff the central and south eastern portion of the Site is drained via building roof downpipes, traditional gullies and channel drainage systems to 450mm and 600mm diameter surface water sewers, to a box culvert attenuation storage arrangement beneath the southern car park. Outflows from the attenuation storage tank are regulated by a 300mm diameter sewer located further north beneath car park areas adjacent to the access road which drains further northern car parking areas, via a Class 1 bypass separator, before routing flows in a north easterly direction towards the existing service road.

6.6. Runoff from the eastern and north eastern portion of the Site is drained via building roof downpipes, traditional gullies and channel drainage systems to a 500mm diameter surface water which routes flows in a northerly direction beneath the existing service road to a Class 1 bypass separator. Flows from the two networks combine at the north eastern end of the service yard within a 500mm diameter surface water which outfalls to the Coldham's Lane public sewer network adjacent to the railway.

6.7. Runoff from north western highway areas drain, via a Class 1 interceptor, to a 225mm diameter surface water sewer before collecting runoff from the very north western portion of the Site, eventually outfalling to the Coldham's Lane public sewer network adjacent to the western leg of the roundabout.

Private Foul Water Sewers

6.8. A private drainage schematic plan and existing drainage layout information gathered from a utilities survey (refer to Appendix D) indicates that the Site is served by a number of points of connection to the public sewer networks. Refer to Table 2.

Table 2: Private Foul Water Sewer Outfalls

Diameter	Outfall Direction / Description	Point of Connection to AW Network (Manhole Ref.)
150mm	NW : Coldham's Lane (West of Site Access)	d/s of 6802
110mm	SE : Sleaford Street (pumped)	5301

6.9. Foul flows from the northern 'half' of the Site are drained via private 100mm - 150mm diameter foul sewers in a north westerly direction to the 150mm diameter private foul sewer routed to the rear of Porcelanosa, eventually draining to the 525mm diameter public foul sewer beneath Coldham's Lane.

6.10. Foul flows from the southern 'half' of the Site are drained via private 150mm diameter foul sewers along the south western and south eastern boundaries to a private pumping station at the very southern tip of the Site at the southern end of the service road. Flows are pumped to the head of the nearby 225mm diameter public foul sewer beneath Sleaford Street.

6.11. Small sump pump arrangements serve two small retail units towards the south eastern boundary of the Site, lifting nominal flows to the local networks indicated above.

Existing Site Surface Water Runoff Assessment

Existing Site

6.12. The existing contributing surface water drainage catchment has been assessed as follows:

Impermeable Area (draining north west)	*0.590 ha*
Impermeable Area (draining north east)	*5.729 ha*
Impermeable Area (draining south west)	*0.510 ha*
Public Highways (retained as existing)	*0.730 ha*
Soft Landscape (not formally drained)	*0.720 ha*
Total Site Area	*7.850 ha*

6.13. Existing runoff rates have been modelled for a suite of storm events based upon the Flood Estimation Handbook (FEH) methodology using MicroDrainage WinDes software. Refer to calculations in Appendix E. A summary of runoff rates generated by the existing Site (excluding retained public highways) has been presented in Table 3. Note, the existing model was based on the underground services survey and private drainage schematic appended in Appendix D.

Table 3: Existing Site Brownfield Runoff Analysis

Return Period (1 in X Years)	Brownfield Rate (NW Outfall) Model Node 5.003 (l/s)	Brownfield Rate (NE Outfall) Model Node 1.012 (l/s)	Brownfield Rate (SW Outfall) Model Node 4.001 (l/s)	Brownfield Runoff Rate (Site) (l/s)
2 (Q_{BAR})	53.8	242.8	68.8	365.4
30	65.2	431.9	114.1	611.2
100	65.4	487.7	119.1	672.2
100 + 40% CC	66.0	553.3	126.3	745.6

Pre-Developed 'Greenfield' Site

6.14. The proposed drainage regime should aim to restrict surface water runoff from the Site, as close as reasonably practicable, to the greenfield runoff rate, in line with the CCoC LLFA Surface Water Planning Guidance (2024). The greenfield run off rates for the Site are summarised in Table 4. The proposed discharge rates for the Development will be restricted via the use of SuDS attenuation features and flow control devices at the Site outfall. The proposals are discussed in further detail in Summary of SuDS Design and Approach section. The UK SuDS Online Tool calculation results are available in Appendix E, using Institute of Hydrology 124 methodology based upon subsoil conditions with a soil class of 2.

6.15. As per the LLFA Surface Water Planning Guidance, the development should restrict flows using a simple control to 'QBAR greenfield' runoff rate. The QBAR 'greenfield' runoff rate has been calculated to be 1.35 l/s/ha.

Table 4: Greenfield runoff rates summary

Return Period (1 in X Years)	Greenfield Runoff Rate (l/s/ha)
QBAR	1.35
1	1.17
30	3.3
100	4.79
200	5.66

Drainage Hierarchy

6.16. Proposed management of surface water runoff from the Site has been assessed in line with the Drainage Hierarchy advocated by the LLFA and best practice and is summarised in Table 5 below, in descending order of preference.

Table 5: Drainage Hierarchy

Drainage Method	Comments
1. Store rainwater for later use;	Spatial provision will be made within the buildings for rainwater harvesting infrastructure to allow reuse of harvested rainwater for WC flushing. Rainwater harvesting will also be provided beneath external areas with a significant water demand to provide irrigation for orchards, food growing areas and areas of soft landscaping and trees.
2. Use infiltration techniques, such as porous surfaces in non-clay areas;	Underlying Made Ground associated with former landfill activity, together with a relatively shallow groundwater table, effectively precludes the disposal of runoff to ground via infiltration.
3. Attenuate rainwater in ponds or open water features for gradual release;	Due to the urban nature of the Site and the lack of available external space, land availability for significant ponds or open water features is extremely limited. A dry basin feature (impermeable membrane lined) has been integrated within the external landscaping proposals within the western portion of the Site, which will provide a degree of attenuation. Rain gardens comprising shallow detention areas for runoff will be included within the soft landscaping proposals, taking due regard for tree root protection zones.
4. Attenuate rainwater by storing in tanks or sealed water features for gradual release;	Surface water attenuation storage will be provided at roof level of selected buildings (subject to constraints from roof top M&E plant, exhaust gas flues, light wells, and access shafts). Storage will be provided within blue roof attenuation cells and/or the substrate of proposed green roof areas. Strategically located surface water attenuation storage will also be provided in the form of below ground storage tanks with

		associated flow control devices designed to regulate runoff from external hardstanding areas and overflows from roof level storage. Further attenuation and source control will be provided within the void storage inherent within the permeable substrate of lined and under-drained permeable paving.
5.	Discharge rainwater direct to a watercourse;	The Site lies a significant distance from a watercourse. The requirement to cross third party land and public highway precludes the potential to discharge directly to a watercourse.
6.	Discharge rainwater to a surface water sewer/drain; and	The Site is currently served by private surface water sewers connecting to public surface water sewers. Discharge to surface water sewer will therefore remain the primary means of disposal of surface water runoff from the Site, albeit at a significantly reduced overall discharge rate.
7.	Discharge rainwater to the combined sewer.	No surface water runoff will be discharged to the public combined sewer network.

Sustainable Drainage Systems

6.17. Sustainable drainage (SuDS) techniques will be used for the disposal and management of surface water runoff from the proposed development, taking into account Site-specific constraints.

6.18. SuDS mimic the natural drainage system and provide a method of surface water drainage which can decrease the quantity of water discharged, and hence reduce the risk of flooding. In addition to reducing flood risk, SuDS features can improve water quality, and provide biodiversity and amenity benefits.

6.19. A variety of SuDS are available to reduce or temporarily hold back the discharge of surface water runoff. The potential for SuDS was considered throughout the design development. Table 6 outlines SuDS techniques and their constraints and opportunities at the Site.

Table 6: Sustainable Drainage Techniques

SuDS Technique	Constraints / Comments	✓/×
Rainwater harvesting (source control)	Spatial provision will be made within the buildings for rainwater harvesting infrastructure to allow reuse of harvested rainwater for WC flushing. Rainwater harvesting will also be provided beneath external areas with a significant water demand to provide irrigation for orchards, food growing areas and areas of soft landscaping and trees.	✓
Green roofs (source control)	All office unit blocks will have a green / blue roof	✓
Infiltration devices & Soakaways (source control)	Underlying Made Ground associated with former landfill activity, together with a relatively shallow groundwater table, effectively precludes the disposal of runoff to ground via infiltration.	×
Pervious surfaces (source control)	As per 'infiltration devices' above. Lined and under-drained permeable paving will be provided across selected non-trafficked hard landscape areas and public realm.	✓
Swales, filter drains & perforated pipes (permeable conveyance)	As per 'infiltration devices' above. Effectively precludes the use of filter drains for conveyance or for the disposal of surface water runoff to ground.	×

SuDS Technique	Constraints / Comments	✓/×
Filter Strips (permeable conveyance)	Selected areas of edge treatment to soft landscaping and rain gardens will function as filter strips for treatment of surface water runoff.	✓
Infiltration basins (end of pipe treatment)	Underlying Made Ground associated with former landfill activity, together with a relatively shallow groundwater table, building footprint coverage (lack of external areas) effectively precludes the use of infiltration basins for the disposal of surface water runoff to ground.	×
Bioretention Systems / Rain Garden (end of pipe treatment)	Selected tree pits proposed within the hard landscape can provide bioretention opportunities, subject to species type. Rain gardens will be included within the scheme for the disposal and treatment of surface water runoff from community areas and public realm. Planters will provide further opportunities for bioretention.	✓
Ponds / Basin (end of pipe treatment)	A wetland feature has been integrated within the external landscaping proposals within the southern portion of the Site. Lack of available external areas precludes the use of larger ponds or basins.	✓
Attenuation (Blue Roof)	Blue roof geo-cellular cells and associated waterproof membrane / insultation will be provided at roof level of selected buildings (subject to constraints from roof top M&E plant, exhaust gas flues, light wells, and access shafts). Potentially further limited by the aspirations for rainwater harvesting.	✓
Attenuation Underground (end of pipe treatment)	Below ground attenuation storage with appropriate flow control devices will be provided beneath selected locations to ensure higher magnitude events and overflows from rainwater harvesting arrangements will be managed at source.	✓

Climate Change Allowances

6.20. The NPPF and PPG place emphasis on the need to fully consider – and design for – the impacts of climate change as set out in the planning guidance. The potential increase in peak rainfall intensity needs to be considered in the surface water drainage strategy for new developments.

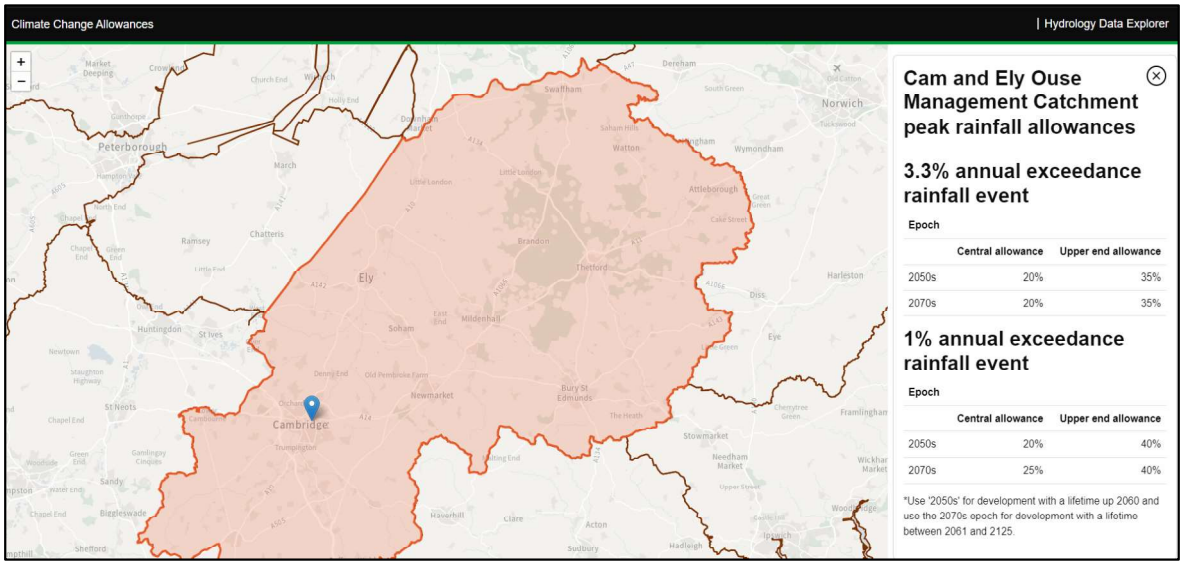
6.21. The EA's online *Guidance Flood risk assessments: climate change allowances* (2022) states to consider development to have a minimum lifetime of a 100 years.

6.22. The proposed surface water drainage strategy should be designed so that for the upper end allowance in the 3.3% and 1% annual exceedance probability event:

- There is no increase in flood risk elsewhere
- The Proposed Development will be safe from surface water flooding

6.23. As shown in Figure 15, the Site is located within the Cam and Ely Ouse Management Catchment. Therefore, for the 3.3% Annual Exceedance Event (AEP) climate change factor is 35% and for the 1% AEP (1 in 100-year AEP) the climate change factor to be used is 40%. This is also in line with the CCoC LLFA *Surface Water Planning Guidance (2024).*

Figure 15: Climate change allowances for the Site (EA, 2024).



Proposed Catchment Areas and Maximum Discharge Rate

6.24. An extract of the proposed catchment area plan is shown in Figure 16 and refer to Appendix F for full drawing *17469-WAT-OTT-XX-DR-C-920509- Proposed Surface Water Catchment Layout.* The Proposed Development includes a full application Site boundary area of 7.85 Ha, with a total proposed impermeable area of 5.31 Ha, which includes all the building roof areas and public realm / private roads/ footways/ cycleways.

6.25. The Site is split into two catchments, the Northern catchment (2.24 Ha) and Southern catchment (3.07 Ha), which discharge to Coldham's Lane and York Street respectively.

6.26. It should be noted that;

- The existing public highway areas (Coldham's Lane junction roundabout, Sleaford Street and York Street junctions) are to be retained and maintain their existing drainage regime. The application will involve some relining of kerbing and lane directions, with replacement of any drainage features such as gullys as required.
- Existing trees and hedges along the Site boundary are to be retained. The areas have been excluded from hydraulic calculations as it will retain existing drainage regime and assumed to be 100% permeable.
- The proposed roof runoff is assumed to be 100% impermeable but should be noted there are areas of green roof which have not been included in the hydraulic model and attenuation calculations but will provide water quality benefits and increase the time of concentration for these areas.

Figure 16: Extract of proposed catchment layout.

6.27. Based on the impermeable area of each catchment, the respective maximum discharge rates for each catchment are;

- Northern catchment – impermeable area 2.24 Ha, therefore using the equivalent greenfield QBAR rate of 1.35 l/s/ha, this would be a maximum discharge rate of 3.0 L/s to the public surface water sewer at Coldham's Lane
- Southern catchment – impermeable area 3.07 Ha, therefore using the equivalent greenfield QBAR rate of 1.35 l/s/ha, this would be a maximum discharge rate of 4.1 L/s to the public surface water sewer at York Street

6.28. As noted previously, the total existing discharge rate for the QBAR (1–2-year event) is 365.4 L/s into the existing Anglian Water sewers from the Site. The proposed total QBAR rate is now 7.1 L/s, therefore this will be a betterment of 98% and thus significantly reducing the likelihood of downstream flooding and an improvement to the capacity of the local drainage network for the surrounding areas.

Summary of Design Parameters and Results

6.29. The proposed surface water drainage system would be designed to convey surface water only, with foul water being discharged separately. The design would be in accordance with BS EN 752 – Drain and Sewer Systems Outside Buildings, BS EN 12056 – Gravity Drainage Systems Inside Buildings, and Approved Document H of Building Regulations.

6.30. In accordance with the requirements of the NPPF, Local Plan policies, and SFRA guidance, 'post development' runoff rates will be restricted to those rates generated by the 'pre-developed' site, or less, for up to and including the critical 1% annual probability storm event taking into account the impacts of climate change (applied as a 40% uplift in peak rainfall intensity) for the lifetime of the development.

6.31. A suite of SuDS measures have been proposed to manage runoff at source and improve water quality and biodiversity post-development.