

Flood Risk Assessment

January 2025

The logo consists of a dark blue square with the letters 'EAS' in white, sans-serif font.

EAS

**Abbey Gardens
Abbey Street
Reading
RG1 3BA**

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The content of this report is based on information available as of January 2025, the validity of the statements made may therefore vary over time as planning guidance / policies and the evidence base change.

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1 Introduction

- 1.1 This Flood Risk Assessment (FRA) has been prepared to accompany a planning application for the change of use of part of the ground to fifth floors from office to residential under Class MA of the General Permitted Development Order at Abbey Gardens, Abbey Street, Reading, RG1 3BA (hereafter referred to as 'the site'). A site location plan is enclosed in **Appendix A**.
- 1.2 The proposed site layout is enclosed in **Appendix B**.
- 1.3 The site is partially located in Flood Zone 3. Areas in Flood Zone 3 are defined as having a 1% (1 in 100) or greater annual probability of river flooding. The site is located within a reservoir flood extent when there is also flooding from rivers and there are isolated areas along the perimeter of the building where surface water flooding is present.
- 1.4 This FRA will review all sources of flooding and detail necessary mitigation measures.
- 1.5 The contents of this FRA are based on the advice set out in the National Planning Policy Framework (NPPF) published in December 2024, Annex 3: Flood risk vulnerability classification, also from the NPPF and PPG 'Guidance for Flood Risk and Coastal Change', updated in August 2022.
- 1.6 This report is based on the Environment Agency flood maps, geology mapping, OS mapping, topographic survey, Strategic Flood Risk Assessment, and national & local policy.
- 1.7 This document includes the following sections:
 - Section 2 - describes the relevant policy;
 - Section 3 - site description, including site levels, proximity to watercourses etc.;
 - Section 4 - outlines potential sources of flooding;
 - Section 5 – details mitigation measures;
 - Section 6 – summarises and concludes the report

2 Policy Context

Introduction

2.1 This section sets out the policy context. This report is based on the advice set out in the National Planning Policy Framework (NPPF) last updated December 2024 and the Planning Practical Guidance (PPG) updated in August 2022.

2.2 Paragraph 181 of the NPPF discusses the use for site-specific flood-risk assessments and what the assessment should demonstrate:

“When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

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

2.3 Paragraph 181 footnote 63 of the NPPF states:

“A site-specific flood risk assessment should be provided for all developments in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.”

2.4 The flood zones are defined as:

- Flood Zone 1 - less than a 0.1% (1 in 1000) annual probability of river or tidal flooding.
- Flood Zone 2 - between a 0.1% and 1% (1 in 1000 and 1 in 100) annual probability of river flooding; or between a 0.1% and 0.5% (1 in 1000 and 1 in 200) annual probability of flooding from tidal sources.
- Flood Zone 3a- This zone comprises land assessed as having a 1% (1 in 100) or greater annual probability of river flooding; and for tidal flooding at least a 0.5% (1 in 200) annual probability of flooding from tidal sources.

- Flood Zone 3b - This zone comprises land where water has to flow or be stored in times of flood. This classification is usually classified as land which had a 3.33% (1 in 30) annual probability of flooding.

2.5 Paragraph 170 discusses the suitability of development location, particularly with regards to future risks induced by climate change:

“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.”

2.6 Paragraph 175 states:

“The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).”

2.7 Paragraph 182 of the NPPF discusses the application of sustainable drainage systems:

“Applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of proposals for major development should:

- a) take account of advice from the Lead Local Flood Authority;*
- b) have appropriate proposed minimum operational standards; and*
- c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development.”*

2.8 The site is shown to be partially located within the Flood Zone 3 on the Flood Map for Planning. The site is located in Flood Zone 3. Areas in Flood Zone 3 are defined as having a 1% (1 in 100) or greater annual probability of river flooding.

2.9 The EA Flood Map has been enclosed in **Appendix C**.

Local Policy

Reading Borough Local Plan (Adopted November 2019)

2.10 This document sets out our planning policies for development in Reading up to 2036.

2.11 Policy EN18 Flooding and Sustainable Drainage Systems states:

“Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF, and taking into account the effects of climate change. It will consider flooding from all sources, including fluvial, surface water, groundwater and sewer flooding. Where development in areas at risk of flooding is necessary, it will not reduce the capacity of the flood plain to store floodwater, impede the flow of floodwater or in any way increase the risks to life and property arising from flooding. Wherever possible, development should be designed to reduce flood risk, both on- and off-site.

All major developments must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government’s Technical Standards. Smaller schemes are encouraged to incorporate SuDS, where possible. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects. Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. All new developments in areas of flood risk should give priority to SuDS.”

Reading Borough Council Strategic Flood Risk Assessment (SFRA) June 2017

- 2.12 The SFRA assess all sources of flood risk across the borough and this information should be used for strategic planning and flood risk management.
- 2.13 Map A4 of the SFRA identifies the site to be located within the catchment of the River Kennet. Map A5 of the SFRA notes the location of ‘Key Hydraulic Features’ across the borough. The nearest feature is Blake’s Lock and Weir which is located approximately 500m downstream of the site.
- 2.14 Map G2 of the SFRA shows the site is located above a ‘Major Aquifer with High Permeability’.
- 2.15 Map F1 of the SFRA confirms the site is not located within a Historic Floodplain.
- 2.16 Figure 53 of the SFRA does not identify any recorded incidents of flooding at the site.
- 2.17 The only reservoir (as defined by the Reservoirs Act) of relevance to Reading Borough is Whiteknights Lake, located within the grounds of the University of Reading. It is an ornamental lake which was built in the 19th century and has a capacity of 70,000m³.
- 2.18 Map F7 of the SFRA provides a detailed reservoir flood map for Whitenights Lake. The map shows the extent and depth of flooding within the local area in the unlikely event of a breach. The site is shown to remain outside the modelled breach extent. A copy of Map F7 is enclosed in **Appendix D** of this report. Paragraph 6.4.1 of the SFRA states:

“Under Schedule 4 of the Flood and Water Management Act 2010, the EA has designated Whiteknights Reservoir as a “high risk” (Category A) large raised reservoir, because in the event of an uncontrolled release of water from the reservoir, the Environment Agency believes that human life could be endangered. As such Whiteknights Reservoir is subject to the full requirements of the amended Reservoirs Act 1975.”

- 2.19 Map F8 of the SFRA identifies the areas sustainable to groundwater flooding across the borough. The site is located in an area with a greater than 75% susceptibility to groundwater flooding.
- 2.20 Map F9 of the SFRA details the recorded incidents of sewer flooding informed by the Thames Water DG5 Register (dated February 2016). The site is located in the postal code area of RG1 1 which has 51-100 recorded incidents of sewer flooding. The site has not been specifically identified to have been affected.

3 Existing Site Assessment

Site Description

- 3.1 This Flood Risk Assessment (FRA) has been prepared to accompany a planning application for the change of use of part of the ground to fifth floors from office to residential under Class MA of the General Permitted Development Order at Abbey Gardens, Abbey Street, Reading, RG1 3BA.
- 3.2 A site location plan is enclosed in **Appendix A** and the proposed site plans are enclosed in **Appendix B**.
- 3.3 The site is located in the centre of Reading and is surrounded by commercial premises, hotels and leisure facilities on all sides.

Local Watercourses

- 3.4 The River Kennet, an EA Main River, flows through the centre of the site in within a concrete lined channel. The channel is located below street level and therefore flows under a podium level within the site. The River Thames, also an EA Main River is located approximately 600m north of the site.
- 3.5 Whiteknights Lake is located approximately 2.0km southeast of the site.

Site Levels

- 3.6 The topographic survey is enclosed in **Appendix E**. The finished floor level for the northern entrance of the building is 41.03mAOD. The central eastern entrance of the site has a finished floor level of 38.05mAOD. The lower basement car park in this location is noted to have a floor level of 35.10mAOD. The southern entrance to the building along Kings Road has a finished floor level of 39.63mAOD, rising to 41.02mAOD within the main ground floor area. A step free entrance in this location has a finished floor level of 38.58mAOD.
- 3.7 There are no entrances to the building along Abbey Street and levels along the perimeter of the building here range from 38.1mAOD to 38.6mAOD.

Geology

- 3.8 British Geological Survey (BGS) online mapping shows the site to be located on a bedrock of Seaford Chalk Formation and Newhaven Chalk Formation – chalk with superficial deposits of Alluvium - clay, silt, sand and gravel.
- 3.9 There are borehole records at the site however these are classified as confidential, and results cannot be viewed.

4 Potential Sources of Flooding

Fluvial

- 4.1 The site is shown to be partially located within the Flood Zone 3 on the Flood Map for Planning. Areas in Flood Zone 3 are defined as having a 1% (1 in 100) or greater annual probability of river flooding. The source of flooding at the site is the River Kennet, an EA Main River.
- 4.2 The EA Flood Map has been enclosed in **Appendix C**.

Flood Risk Assessment Data Request

- 4.3 A Flood Risk Assessment data request was submitted to the Environment Agency to further assess the fluvial flood risk at the site. The received data is enclosed in **Appendix C**. The Flood Map for Planning shows a negligible area of Flood Zone 3 located within the vicinity of the channel and does not appear to encroach out of the bank into the wider area.
- 4.4 It has been confirmed that the site is not currently protected by any formal defences.
- 4.5 The site is located in the 'Kennet and tributaries Management Catchment'. The site is located in Flood Zone 3a and the proposals introduce a 'more vulnerable' use. The central climate change allowance is the applicable allowance in this instance. The applicable 2080 central climate change allowance is 21%. This climate change allowance has not been modelled however a 25% allowance has been modelled and therefore these modelled results will be used to assess the flood levels at the site.

1D In-channel Flood Levels

- 4.6 1D in channel modelled nodes have been provided for a range of modelled events and is sourced from the Kennet (Tyle Mill to Thames Confluence) 2018 model.
- 4.7 The 1D node at the site which has the greatest 1%AEP+25% climate change flood level of 37.14mAOD is '061_22_2018_001KENN3_1322.2'. The 0.1%AEP flood level for this 1D node is 37.22mAOD.

2D Modelled Floodplain Levels

- 4.8 2D modelled floodplain levels have also been provided and these levels provide a more accurate representation of the likely flood levels at the site.
- 4.9 The closest 2D node to the site is 'Flood Point 3'. The 1%AEP +25% climate change 2D flood level is 37.12mAOD. The 0.1%AEP 2D flood level is 37.19mAOD.
- 4.10 Assessing the 2D flood levels against the topographical survey levels at the site, it can be confirmed that the finished floor levels at the ground floor level remain above even the 0.1%AEP 2D flood level of 37.19mAOD.

- 4.11 The lowest recorded ground finished floor level of 38.05mAOD is 0.86m above the 0.1%AEP 2D flood level. This finished floor level is also the closets to the River Kennet in the central eastern area of the building.
- 4.12 The lower basement car park could experience a flood depth of 2.02m based on the 1%AEP +25% climate change 2D flood level and a flood depth of 2.09m based on the 0.1%AEP 2D flood level.
- 4.13 The top of bank levels recorded along the River Kennet where it flows through the centre of the site is 37.50mAOD, 310mm above the 0.1%AEP 2D flood level. Along the eastern boundary of the site, the lowest recorded top of bank level is 37.49mAOD, 300mm above the 0.1%AEP 2D flood level. it can be concluded that even in the extreme 0.1%AE event, flood flows are likely to remain within the channel.
- 4.14 Mitigation measures to manage the risk posed to the basement level are detailed in Section 6 of this report.

Modelled Flood Outlines

- 4.15 A negligible area within the immediate vicinity of the channel at the site's location is shown to be within the 20%AEP modelled flood outline.
- 4.16 The site appears to be located outside all 1%AEP +climate change modelled flood outlines and the 0.1%AEP modelled flood outlines.

Historic Flood Data

- 4.17 The site has been identified to have been affected by fluvial flooding the winter of 2013/2014 however the corresponding flood outlines map does not show any flood outline within the red line boundary. Flooding is however shown downstream of the site, particularly at the location of the confluence of the branches of the River Kennet.

Hazard Mapping

- 4.18 Hazard mapping has been provided for the 1%AEP+25% and 35% climate change events. A hazard rating of 'danger for all' is present within the site however, this extent of this hazard rating does not extend across the site and is limited to the channel itself or limited to the immediate top of bank areas.

Surface Water

- 4.19 Surface water flooding refers to flooding caused when the intensity of rainfall, particularly in urban areas, can create runoff which temporarily overwhelms the capacity of the local drainage systems or does not infiltrate into the ground. The water ponds on the ground and flows towards low-lying land. This source of flood risk is also known as 'pluvial'.
- 4.20 The site is shown to be located at low to high risk of surface water flooding. A copy of the Long-Term Flood Map is enclosed in **Appendix F**.

- 4.21 A high-risk scenario indicates a greater than 1 in 30 probability (3.3% AEP) of surface water flooding each year, i.e., the most frequently occurring scenario. In a high-risk scenario, the site and surrounding area is shown to remain outside the modelled surface water flood extent.
- 4.22 A medium risk scenario indicates a probability of surface water flooding between 1 in 30 and 1 in 100 each year (1% AEP). In a medium-risk scenario, there is a negligible area of flooding with depths shown to be up to 900mm along the northeastern perimeter of the site. Surface water flooding is also present within Abbey Street along the southwestern perimeter of the building with depths shown to be below 300mm.
- 4.23 A low-risk scenario indicates a probability of surface water flooding between 1 in 100 and 1 in 1000 each year (0.1%AEP) (i.e., the least frequent but worst-case scenario). In a low-risk scenario, flood depths within Abbey Street are shown to increase up to 900mm. Flooding in the northeastern corner of the site is shown to exceed depths of 900mm. This is likely attributable to the presence of the watercourse in this location as the surface water mapping shows this depth along the route of the watercourse in the local area.
- 4.24 To further assess the surface water flood depths at the site, the surface water flood depths for the 0.1%AEP event were downloaded from the Defra data services platform and processed in QGIS. The surface water mapping can be viewed in **Appendix F**.
- 4.25 In the 0.1%AEP event, flood depths within Abbey Road in the southwestern corner of the building are shown to reach levels up to 600mm. Such depths are restricted to the centre of the carriageway. Along the perimeter of the building, flood levels are shown to be up to 300mm. There are no thresholds into the building along Abbey Road.
- 4.26 Flood depths along the northeastern perimeter of the building are shown to exceed 1.2m. The surface water mapping suggests flood waters pool in this area due to the restriction of flow at the confluence of the two branches of the River Kennet here. The lowest recorded topographical level in this location is 36.01mAOD and the closest entrance finished floor level is 2.04mAOD above this. Much of this area shown to experience flooding is shown as an area of vegetation on the topographical survey. The modelling also suggests flood waters do not encroach into the building but remain restricted to the immediate top of bank area.
- 4.27 Along the north-western perimeter of the site, flood depths are shown to reach up to 1.2m however in this location are a set of steps down to the River Kennet and therefore surface water is unlikely to enter the building here but rather pool in the low point adjacent to the channel. Figure 4.1 below is an extract from the 0.1%AEP surface water flood depths enclosed in **Appendix F** and an extract from online mapping which shows the step down. This area corresponds with the area of flooding with depths are up to 1.2mAOD.



Figure 4.1- Extract from Google images and surface water flood mapping

- 4.28 It is concluded that surface water flooding as modelled is heavily influenced by the fluvial mechanisms at the sites location and assessing depths, location of building thresholds and finished floor levels, surface water flooding is unlikely to enter the ground floor level of the building.

Basement Car Park Surface Water Flood Risk

- 4.29 Whilst surface water is unlikely to enter the ground floor level, the basement car park is however more vulnerable to surface water flooding. It is noted that there are gullies located at the entrance of the car park, which would prevent some surface water from flowing into the basement car park. However, in the extreme 0.1%AEP event, it is assumed these would be at full capacity and thus offer no protection against surface water from Abbey Street flowing into the basement car park.
- 4.30 Surface water sourced from Abbey Street would flow down the set of steps (as highlighted in Figure 4.1) and enter the watercourse and pool around the top of bank. As site levels fall from the top of bank towards the basement car park entrance, flows have a direct pathway to enter the basement level.
- 4.31 The fall of the road down into the basement also provides a direct pathway for surface water to enter the basement car park direct from Abbey Street (see Figure 4.2 below).
- 4.32 The topographical survey records a lower basement car park floor level of 35.10mAOD. The 0.1%AEP maximum given flood depth is 1.2mAOD. In the absence of site-specific modelling, it is not possible to determine the flood depth where the Defra mapping notes 'depths exceed 1.2m', therefore for the purpose of this assessment the greatest known modelled flood depth of 1.2m has been used.

- 4.33 Taking this 0.1%AEP surface water flood depth, a surface water flood level of 36.3mAOD could be experienced at basement level. When compared with the lowest ground floor level of 38.05mAOD, a freeboard of 1.75m is present.

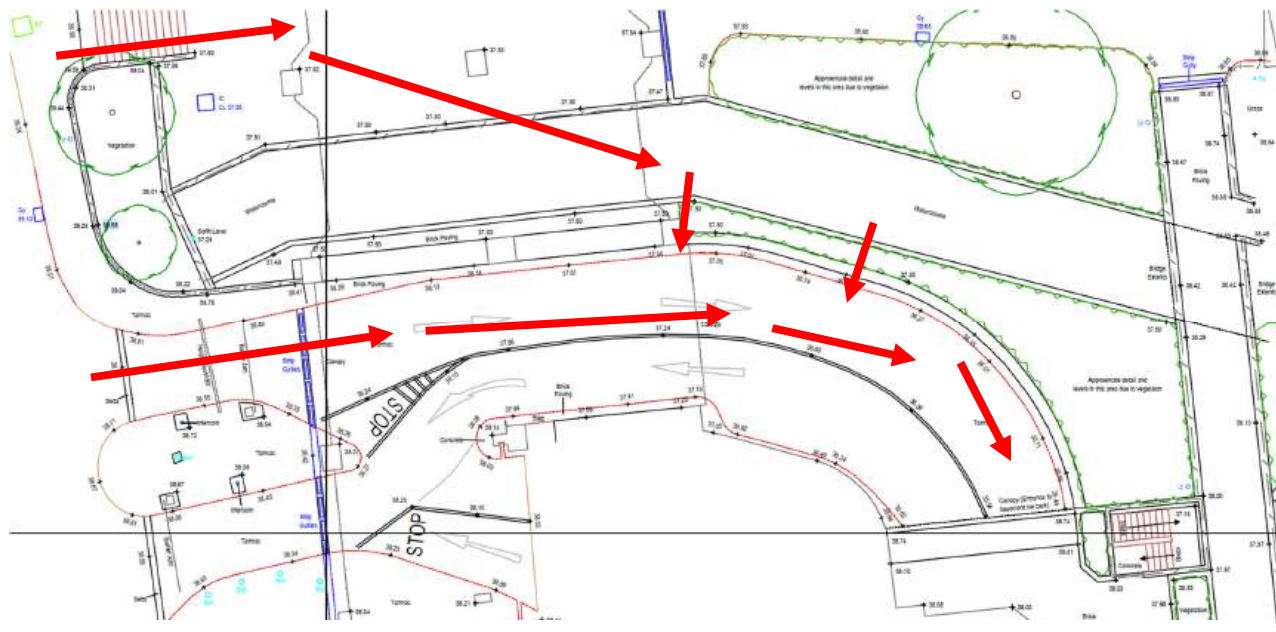


Figure 4.2- Surface Water Flow Route (Extract from topographical survey)

Reservoir

- 4.34 The site is located within a reservoir flood extent when there is also flooding from rivers on the Long-Term Flood Map.
- 4.35 Given the sensitivity of data surrounding reservoirs and the varying factors contributing to reservoir failure (i.e. location of a breach and severity of a breach) it is not possible to comment on flood depths, rate of inundation or velocity of flood flows as such modelled information is not publicly available.
- 4.36 Noteworthy, the site is located on the edge of the reservoir extent and therefore the rate of inundation is unlikely to be rapid. Moreover, depths are also likely to be negligible on the edge of the flood extent.
- 4.37 Comparing the finished floor levels and surrounding ground levels, it can be demonstrated that there is freeboard available on all entrances, providing a level of protection to the ground floor level.
- 4.38 At the location of the southern entrance along Kings Road, the pavement level in this location is 38.52mAOD and the ground floor finished floor level is 41.02mAOD, 2.5m above the surrounding ground level. At the location of the central eastern entrance, the ground floor

finished floor level is 38.05mAOD, surrounding ground levels are around 37.9mAOD, 150mm lower than the finished floor level.

- 4.39 At the location of the northern entrance, the ground floor finished floor level is 41.03mAOD and the surrounding ground level is around 40.5mAOD, 530mm lower than the finished floor level.
- 4.40 Map F7 of the SFRA provides a detailed reservoir flood map for Whitenights Lake. The map shows the extent and depth of flooding within the local area in the unlikely event of a breach. The site is located outside the flood extent.
- 4.41 In the unlikely event of a reservoir flood, flood waters would flow into and pool in the basement car park.
- 4.42 Mitigation measures to manage the reservoir flood risk are detailed in Section 6 of this report.

Groundwater

- 4.43 Given the extensive presence of hardstanding at the site, the emergence of groundwater is considered to be low. There is no habitable accommodation located in the lower ground floor level.

Sewer

- 4.44 Sewer flooding generally results from localised short-term intense rainfall events overloading the capacity of the private and public drainage or due to failures within the public sewer.
- 4.45 The likelihood of this occurring and the impact of the flooding is such that the risk of flooding from sewer sources is considered low.
- 4.46 As there is no additional impermeable area and no changes to the building footprint, the existing surface water drainage system will continue to serve the proposed use. Therefore, no additional runoff will be directed to the onsite drainage as a result of the development and thus there is no increased risk of localised onsite sewer flooding.

5 Mitigation Measures

- 5.1 With reference to Annex 3: Flood risk vulnerability classification of the NPPF, the proposed residential use at the site is 'more vulnerable' therefore appropriate mitigation measures have been detailed below.

Flood Warnings

- 5.2 The site is in the 'Properties closest to the River Kennet at the Burghfield, Southcote, Coley and Holybrook' Flood Warning Area and it is recommended all residents subscribe to the EA Flood Warning Service. Signing up to EA Flood Warnings would therefore improve the overall flood awareness and preparedness for residents.
- 5.3 The EA operate a flood forecasting and warning service in areas at risk of flooding from rivers or the sea, which relies on direct measurements of rainfall, river levels, tide levels, in-house predictive models, rainfall radar data and information from the Met Office. This service operates 24 hours a day, 365 days a year.
- 5.4 It is recommended that the residents subscribe to the EA flood warning service by using the link: <https://www.fws.environment-agency.gov.uk/app/olr/home>. Alternatively, registration can be completed by telephone via the EA Floodline on 0345 988 1188 or Tynetalk 0345 602 6340.
- 5.5 For information on EA Flood Information in the local area, the GOV.UK website can be used: <https://flood-warning-information.service.gov.uk/>

MET Office Weather Warnings

- 5.6 Although warnings cannot be given for surface water flooding, such an event is likely to correspond with prolonged and/or heavy rainfall. It is therefore recommended that all residents sign up to receive MET office weather warnings: <https://www.metoffice.gov.uk/about-us/news-and-media/media-centre/subscribe-to-email-alerts>.

Access and Egress

- 5.7 The site is surrounded by areas in Flood Zone 1 to the north, south and west providing safe access and egress above and outside the modelled flood extent. Moreover, it has been concluded that the finished floor levels of the ground floor across the building remains above the 0.1%AEP flood level therefore evacuation is not strictly required. The building entrances in the north leading to Abbey Square and in the south onto Kings Road are outside the 0.1%AEP surface water flood extent.
- 5.8 An access and egress route is demonstrated in Figure 5.1 below.
- 5.9 Residents should not attempt to walk or drive through flood water and would remain safe and dry within the site.
- 5.10 With regards to the reservoir flood risk, as the site is located on the edge of the flood extent, it is anticipated that a warning would reach the local area providing time for evacuation prior to

the onset of flooding. Residents should follow the evacuation route as shown in Figure 5.1 into areas shown to be outside the reservoir flood extent.

- 5.11 Noteworthy, internal staircases also provide ground floor residents with access to a first-floor refuge area.

Flood Warning Notice

- 5.12 To improve flood awareness at the site, it is recommended that Flood Warning Notice is displaced in all communal lobby entrances. An example Flood Warning Notice can be viewed in Figure 5.2.
- 5.13 A full Flood Plan could be provided post planning via a suitably worded condition.

Basement Car Park Closure

- 5.14 All entrances to the basement car park should be fitted with a flood defence barrier such as the Flood Control International Drop Down Flood Barrier or similar approved which is deployed when sensors detect waters. An example provide can be viewed here: <https://floodcontrolinternational.com/drop-down-flood-barriers/>. The flood defence barrier could also be combined with a flood telemetry system to send flood warnings to management and residents.
- 5.15 Upon receipt of a Flood Warning residents or upon the presence of flood waters, residents should be prepared for the basement car park to be closed and no attempt to drive through flood waters should be made.



Figure 5.1- Access and Egress Route

Source: Extract from Flood Map for Planning

← Access and Egress Route

Flood Warning Notice

You are advised to subscribe to the Environment Agency Floodline Service and check the current flood warning status issued by the Environment Agency



FLOOD ALERT – BE PREPARED!



FLOOD WARNING – ACT NOW! BASEMENT CAR PARK SUBJECT TO CLOSE



**SEVERE FLOOD WARNING – EXTREME DANGER TO PEOPLE AND PROPERTY!
DO NOT DRIVE OR WALK THROUGH FLOOD WATERS**

For more information call the Floodline or visit the Environment Agency website here: <https://flood-warning-information.service.gov.uk/>

Floodline: 0345 988 1188 (24 hours a day, calls charged at local rate)

Figure 5.2- Example Flood Warning Notice

6 Conclusion

- 6.1 This Flood Risk Assessment (FRA) has been prepared to accompany a planning application for the change of use of part of the ground to fifth floors from office to residential under Class MA of the General Permitted Development Order at Abbey Gardens, Abbey Street, Reading, RG1 3BA.

Flood Risk Summary

- 6.2 The site is shown to be partially located within the Flood Zone 3 on the Flood Map for Planning. Areas in Flood Zone 3 are defined as having a 1% (1 in 100) or greater annual probability of river flooding. The source of flooding at the site is the River Kennet, an EA Main River.
- 6.3 A data request was submitted to the EA and modelled data from the Kennet (Tyle Mill to Thames Confluence) 2018 model was provided. 2D flood levels were provided and as these provide an accurate representation of flood levels across the floodplain, these have been used to assess the fluvial flood depths at the site.
- 6.4 The closest 2D node to the site is 'Flood Point 3'. The 1% AEP +25% climate change 2D flood level is 37.12mAOD. The 0.1% AEP 2D flood level is 37.19mAOD.
- 6.5 Assessing the 2D flood levels against the topographical survey levels at the site, it can be confirmed that the finished floor levels at the ground floor level remain above even the 0.1% AEP 2D flood level of 37.19mAOD. The top of bank levels recorded along the River Kennet where it flows through the centre of the site is 37.50mAOD, 310mm above the 0.1% AEP 2D flood level. Along the eastern boundary of the site, the lowest recorded top of bank level is 37.49mAOD, 300mm above the 0.1% AEP 2D flood level. It can be concluded that even in the extreme 0.1% AE event, flood flows are likely to remain within the channel.
- 6.6 It is concluded that surface water flooding as modelled is heavily influenced by the fluvial mechanisms at the site's location and assessing depths, location of building thresholds and finished floor levels, surface water flooding is unlikely to enter the ground floor level of the building. The basement level car park is however more vulnerable to surface water flooding with pathways sourced direct from Abbey Street as well as out of channel flow.
- 6.7 The only reservoir (as defined by the Reservoirs Act) of relevance to Reading Borough is Whiteknights Lake. The site is located on the edge of the reservoir extent and therefore the rate of inundation is unlikely to be rapid. Moreover, depths are also likely to be negligible on the edge of the flood extent. The SFRA provides a detailed reservoir flood map for Whiteknights Lake. The map shows the extent and depth of flooding within the local area in the unlikely event of a breach. The site is located outside the flood extent.
- 6.8 With reference to Annex 3: Flood risk vulnerability classification of the NPPF, the proposed residential use at the site is considered to be 'more vulnerable'. In acknowledgement of the addition of residential ground floor sleeping accommodation a range of mitigation measures have been detailed in this report which protect residents from flooding as well as improve flood awareness and preparedness at the site.
- 6.9 Mitigation measures include:

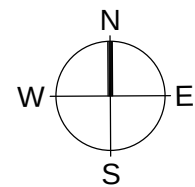
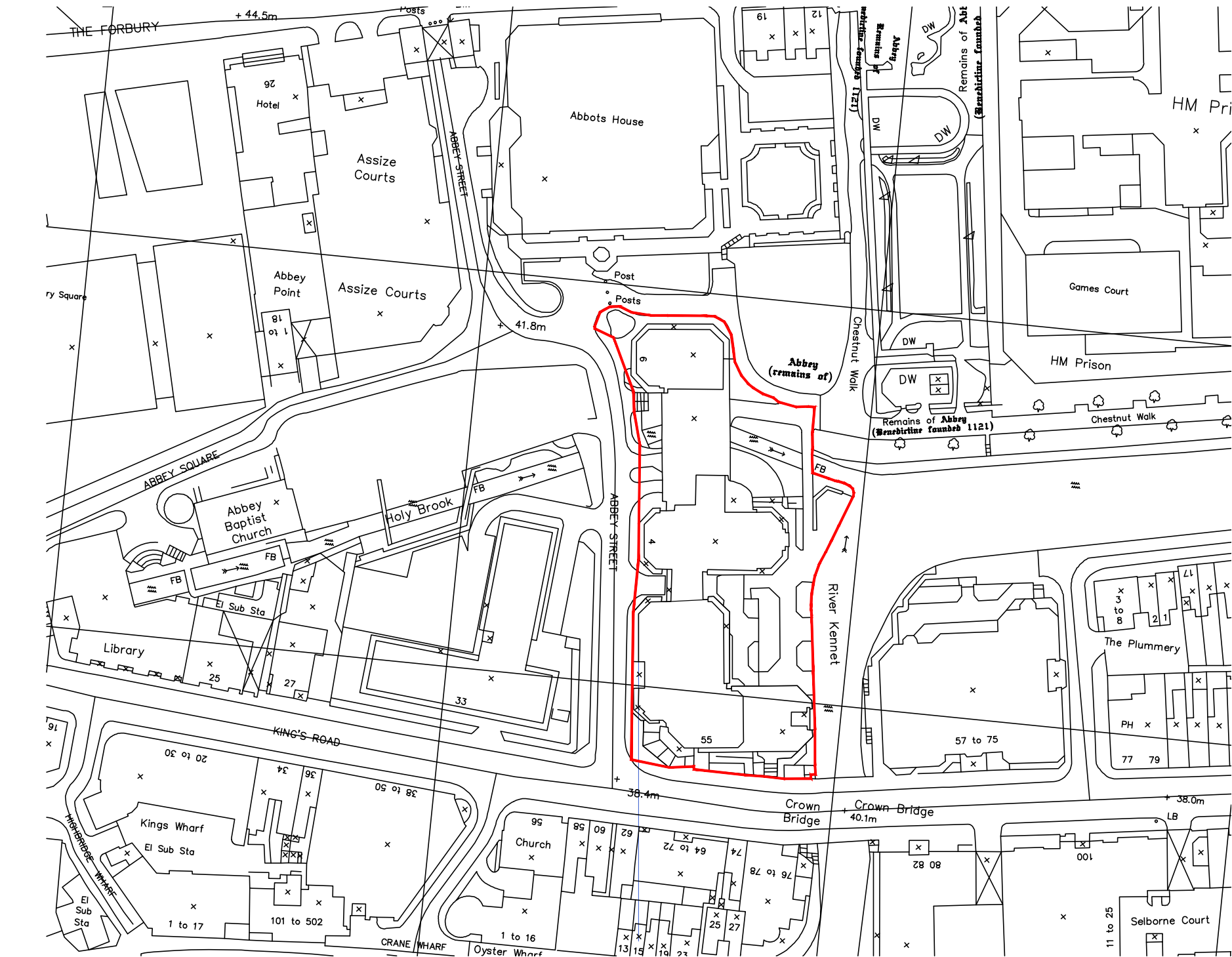
- Comparing the finished floor levels and surrounding ground levels, it can be demonstrated that there is freeboard available on all entrances, providing a level of protection to the ground floor level.
- Recommendation all residents sign up to receive MET Office weather warnings and EA Flood Warnings.
- All entrances into the building are located in Flood Zone 1 and the southern and northern entrances remains outside the modelled surface water flood extent therefore a suitable access and egress route has been demonstrated.
- Display of Flood Warning notice.
- Flood barriers to be installed the entrance to the basement car park with additional telemetry system providing building management and residents with a site specific flood warning.

6.10 In conclusion, this report has evaluated all sources of flooding and proposed a range of suitable mitigation measures to improve flood awareness and preparedness at the site.

Appendices

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Appendix: A – Location Plan



Site Layout Plan
SCALE 1:1250



SITE OWNERSHIP -

NOTES

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Project: 24-013 Abbey Gardens
Drawing: Site Layout Plan
Date: 24.10.2024 drawn by: YY check: CC
Scale: 1:1250@A3 dwg no.: 200 rev. no.: P.01

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P L A N N I N G

Appendix: B – Proposed Plans

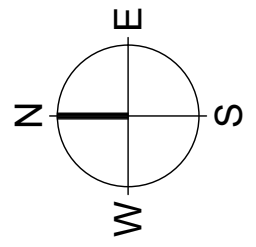
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	1B1P		CIRCULATION
	1B2P		CYCLE STORE
	2B3P		SERVICING / BACK OF HOUSE
	2B4P		OUTSIDE SCOPE OF THIS APPLICATION

Drawing Status:	P L A N N I N G	
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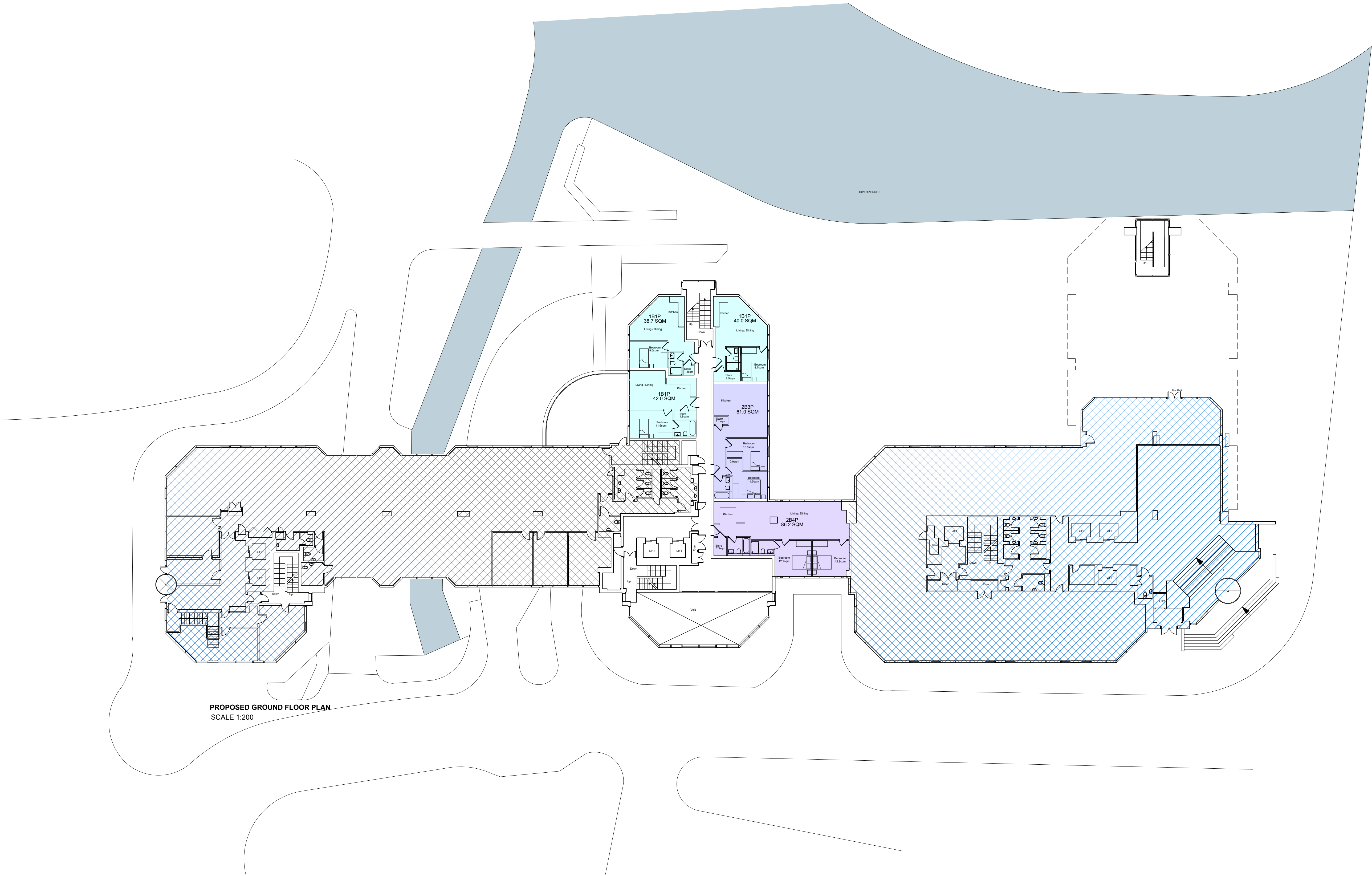
Project: 24-013 Abbey Gardens

Drawing: Proposed Lower Ground Floor Plan

Date: 24.10.2024 drawn by: YY check: CC

Scale: 1:200@A1 drwg no.: 309 rev. no.: P.01

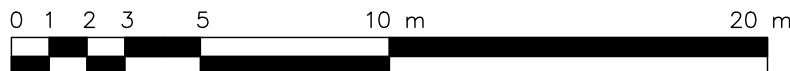
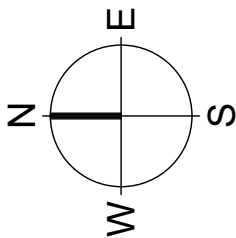
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PROPOSED GROUND FLOOR PLAN
SCALE 1:200

NOTES

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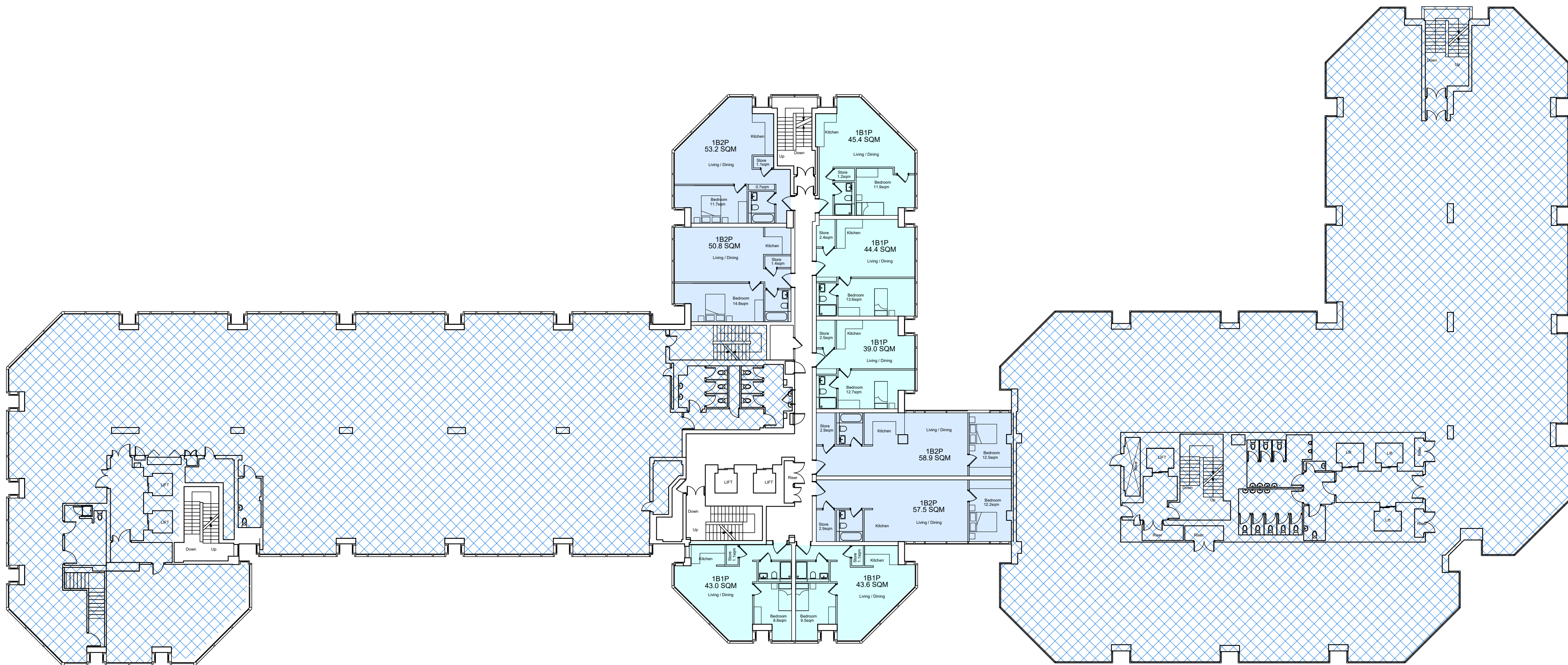
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1B2P	CYCLE STORE
2B3P	SERVICING / BACK OF HOUSE
2B4P	OUTSIDE SCOPE OF THIS APPLICATION

Drawing Status:	P L A N N I N G	
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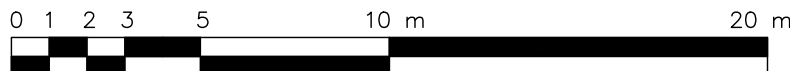
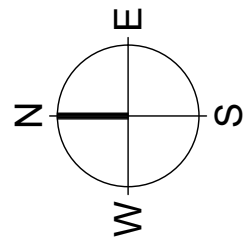
Project: 24-013 Abbey Gardens
Drawing: Proposed Ground Floor Plan
Date: 24.10.2024 drawn by: YY check: CC
Scale: 1:200@A1 drwg no.: 310 rev. no.: P.01
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PROPOSED 1ST FLOOR PLAN
SCALE 1:200

NOTES

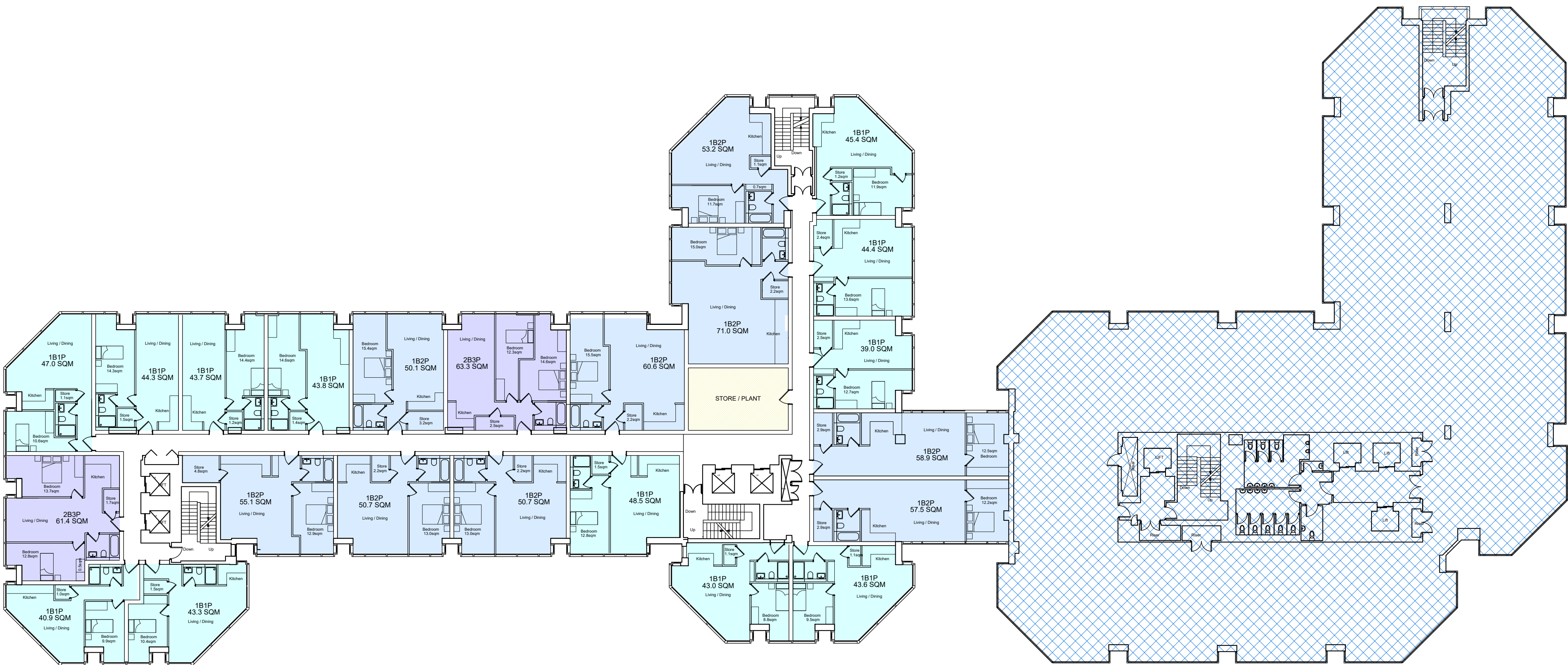
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- | | |
|------|-----------------------------------|
| 1B1P | CIRCULATION |
| 1B2P | CYCLE STORE |
| 2B3P | SERVICING / BACK OF HOUSE |
| 2B4P | OUTSIDE SCOPE OF THIS APPLICATION |

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Project: 24-013 Abbey Gardens
Drawing: Proposed 1st Floor Plan
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Scale: 1:200@A1 drwg no.: 311 rev. no.: P.01
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PROPOSED 2ND - 4TH FLOOR PLAN
SCALE 1:200

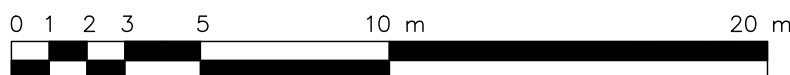
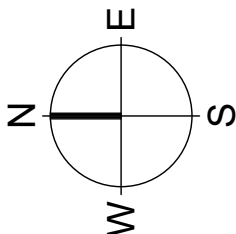
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1B1P	CIRCULATION
1B2P	CYCLE STORE
2B3P	SERVICING / BACK OF HOUSE
2B4P	OUTSIDE SCOPE OF THIS APPLICATION

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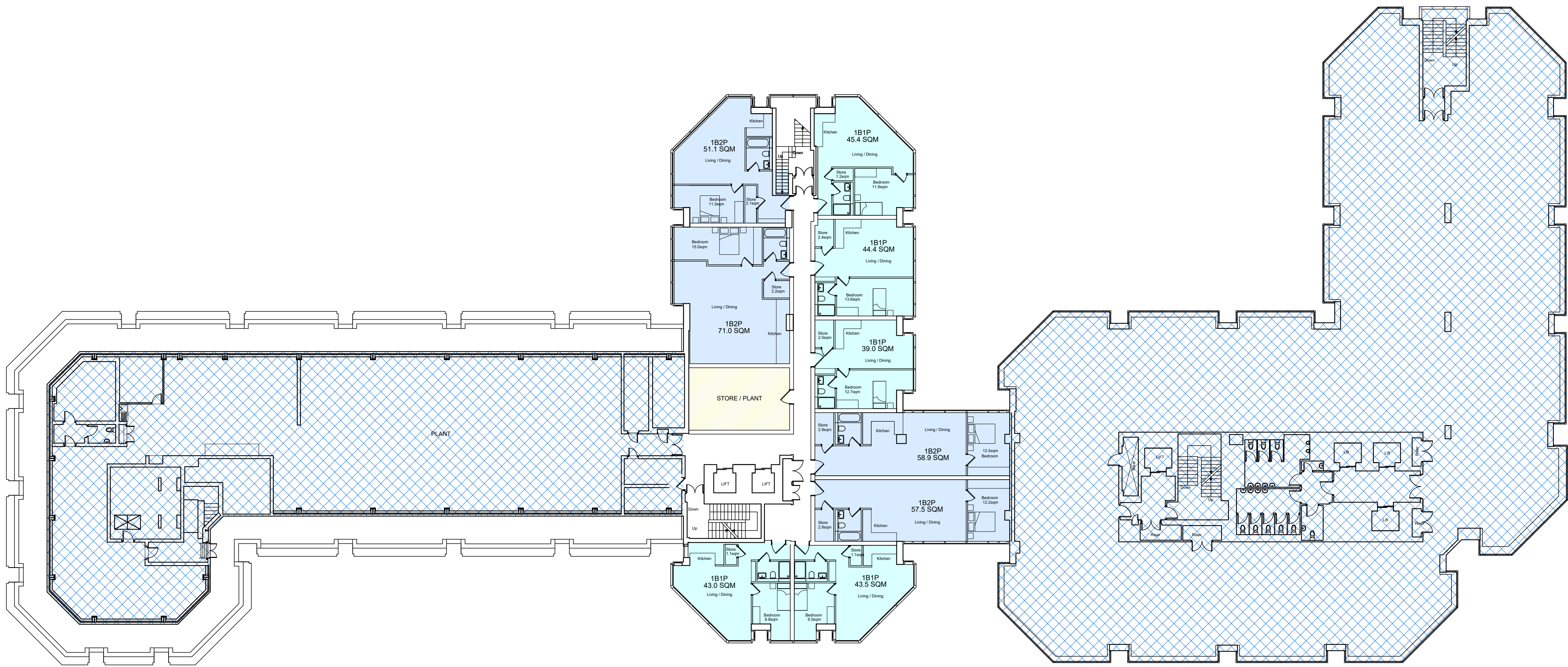
Project: 24-013 Abbey Gardens

Drawing: Proposed 2nd-4th Floor Plan

Date: 24.10.2024 drawn by: YY check: CC

Scale: 1:200@A1 drwg no.: 312 rev. no.: P.01

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PROPOSED 5TH FLOOR PLAN
SCALE 1:200

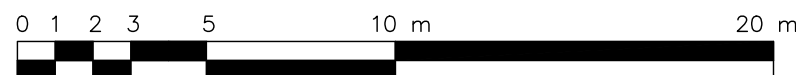
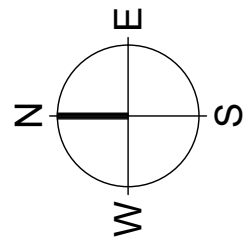
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1B1P	CIRCULATION
1B2P	CYCLE STORE
2B3P	SERVICING / BACK OF HOUSE
2B4P	OUTSIDE SCOPE OF THIS APPLICATION

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W : www.sada-architecture.com

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Project: 24-013 Abbey Gardens

Drawing: Proposed 5th Floor Plan

Date: 24.10.2024 drawn by: YY check: CC

Scale: 1:200@A1 drwg no.: 315 rev. no.: P.01

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Appendix: C – Flood Map for Planning & EA Data

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
471962/173436

Created
19 Dec 2024 12:07

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2024 OS AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
471962/173436

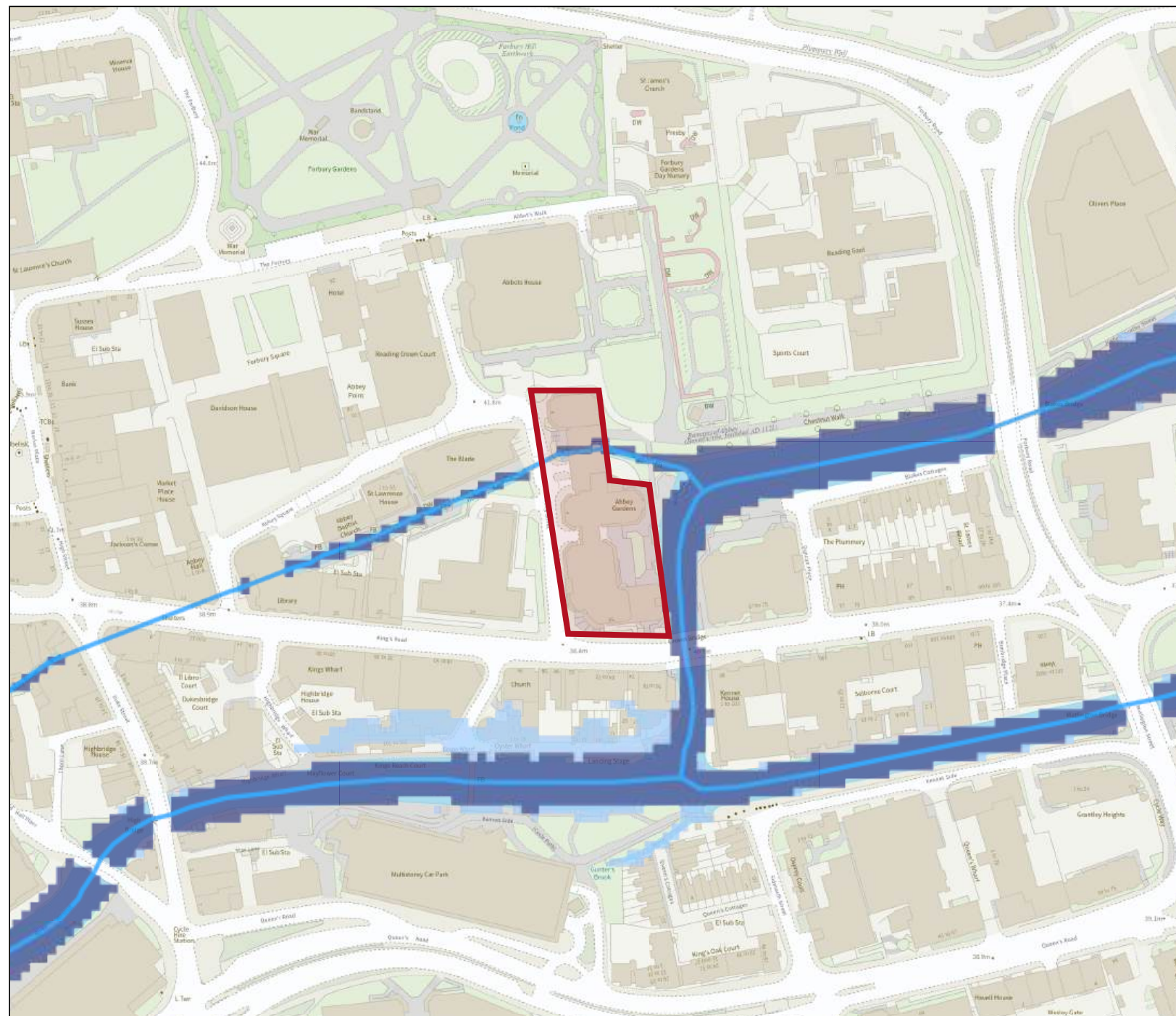
Scale
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Created
19 Dec 2024 12:07

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

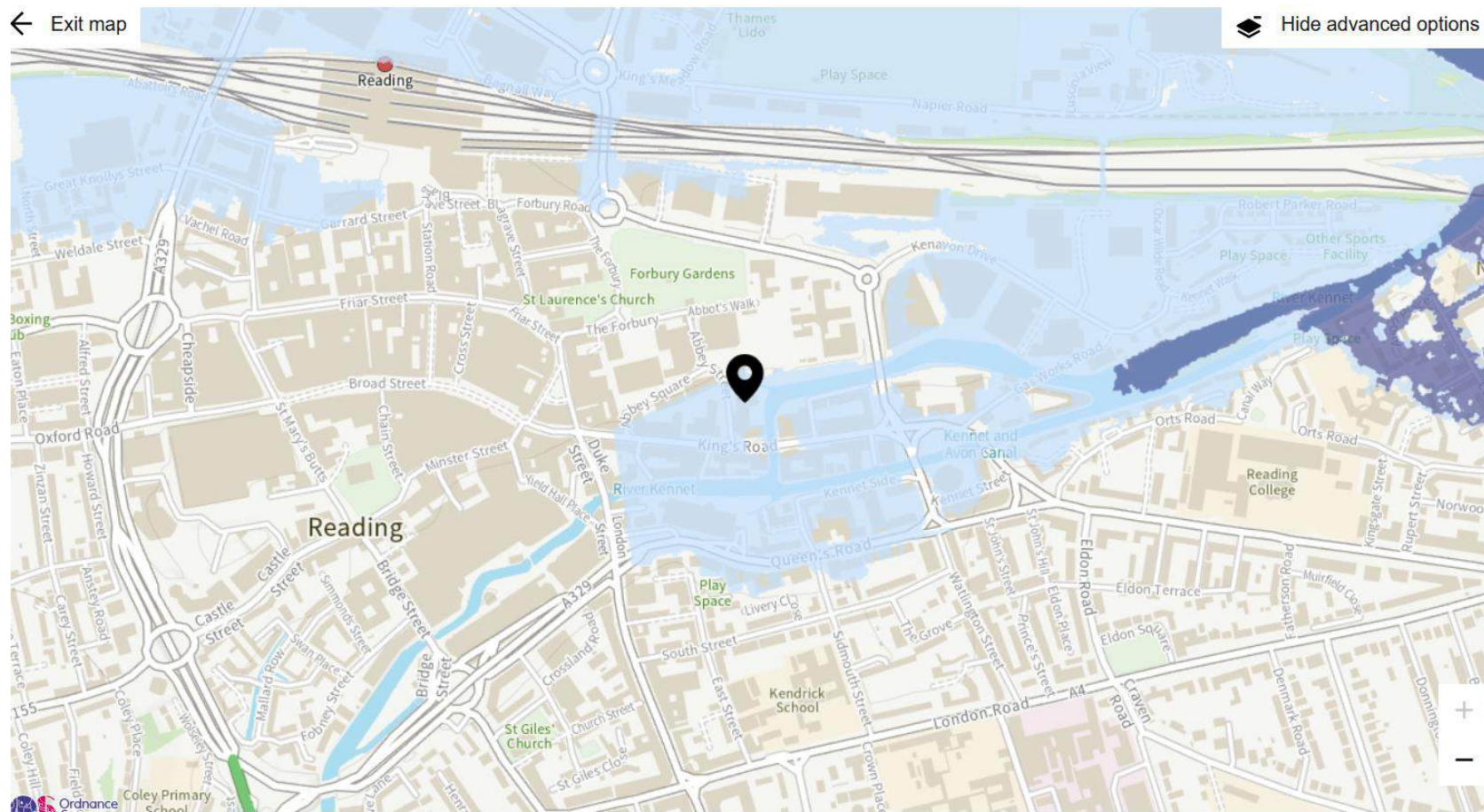
0 20 40 60m

Page 2 of 2



← Exit map

Hide advanced options



Ordnance Survey

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Key

Surface water

- ☐ Extent
- ☐ Depth
- ☐ Velocity

Rivers and the sea

- ☐ Extent

Reservoirs

- ☒ Extent
- ☐ When river levels are normal
- ☐ When there is also flooding from rivers

Map details

- ☒ Show flooding
- ☒ Selected address

Product 4 (Detailed Flood Risk) for RG1 3BA

Our Ref: THM385842

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies. This is:

- i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq metres; and all domestic extensions", and
- ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;

Statutory (Sealed) Main River (where available within map extents);

A table showing:

- i) Model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
- ii) Flood defence locations unique identifiers and attributes; (supplied separately)
- iii) Historic flood events outlines unique identifiers and attributes; and
- iv) Local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please request our guidance which sets out the requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at:

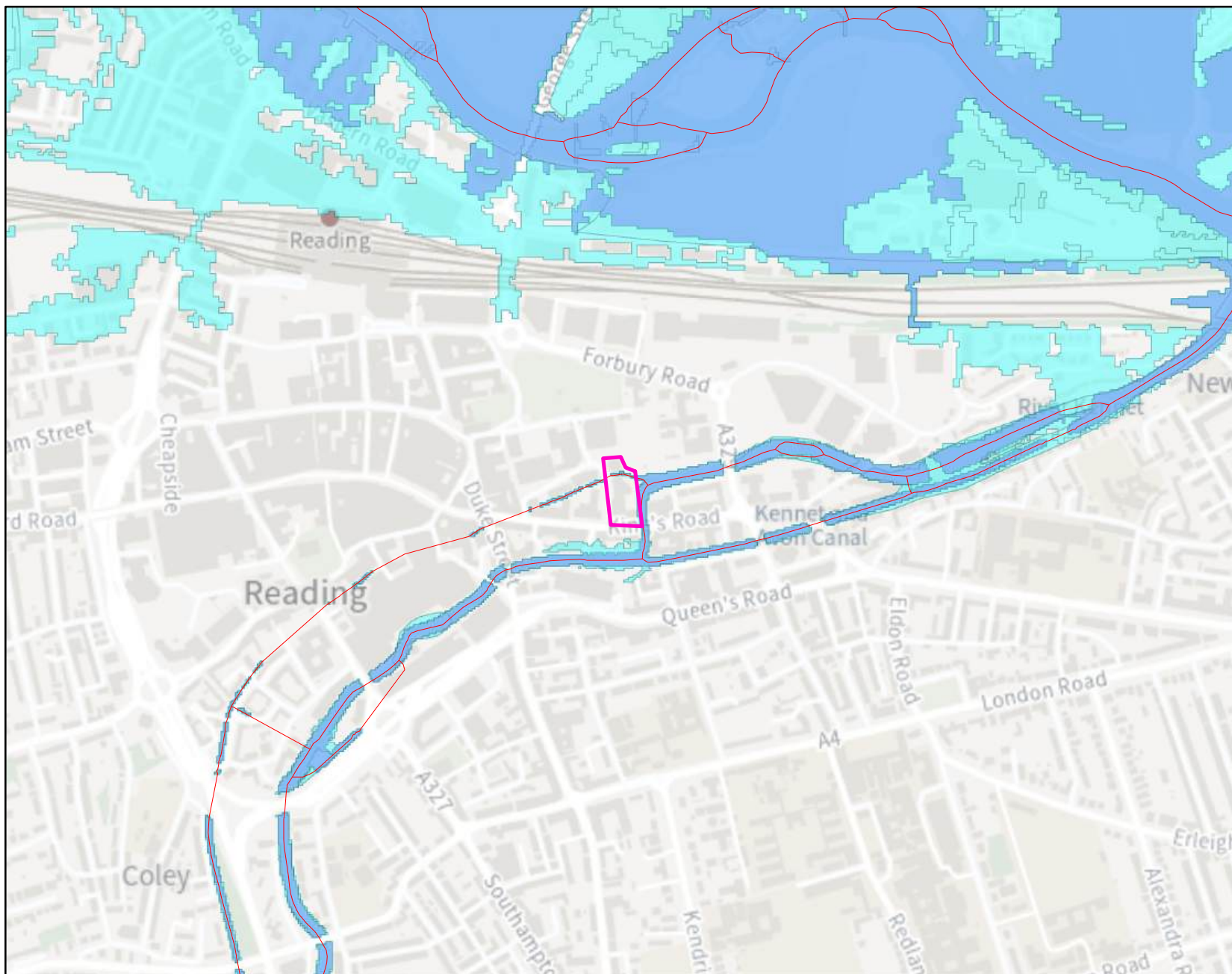
<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at:

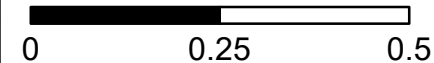
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Flood Map for Planning centred on RG1 3BA

Created on 02/12/24 REF: THM385842



Kilometres



Legend

- Site
- Statutory Main Rivers
- Flood Map - Flood defences
- Flood Map - Flood Storage Areas
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Defence information

Defence Location: No defences on Main River

Description: This location is not currently protected by any formal defences and we do not currently have any flood alleviation works planned for the area. However we continue to maintain certain watercourses and the schedule of these can be found on our internet pages.

Model information

THM385842

Model: **Kennet (Tyle Mill to Thames Confluence) 2018**

Description: The information provided is taken from the Kennet (Tyle Mill to Thames confluence) 2018. The study was carried out using 1D-2D modelling software (Flood modeller-Tuflow).

Model design runs:

1 in 2/ 50% AEP; 1 in 5 / 20% AEP; 1 in 20 / 5% AEP; 1 in 30/ 3.3% AEP; 1 in 75 / 1.3% AEP; 1 in 100 / 1% AEP; 1 in 100+15% / 1% + 15% AEP with climate change; 1 in 100+25% / 1% + 25% AEP with climate change; 1 in 100+35% / 1% + 35% AEP with climate change; 1 in 100+70% / 1% + 70% AEP with climate change; and 1 in 1000 / 0.1% AEP.

Mapped Outputs:

1 in 2/ 50% AEP; 1 in 5 / 20% AEP; 1 in 20 / 5% AEP; 1 in 30/ 3.3% AEP; 1 in 75 / 1.3% AEP; 1 in 100 / 1% AEP; 1 in 100+15% / 1% + 15% AEP with climate change; 1 in 100+25% / 1% + 25% AEP with climate change; 1 in 100+35% / 1% + 35% AEP with climate change; 1 in 100+70% / 1% + 70% AEP with climate change; and 1 in 1000 / 0.1% AEP.

Modelled in-channel flood flows and levels

THM385842

The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below:

				Flood Levels (mAOD)											
Node label	Model	Easting	Northing	20% AEP	5% AEP	3.3% AEP	1% AEP	1% AEP (+10% increase in flows)	1% AEP (+15% increase in flows)	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP	
061 22 2018 001HOLY2 0038.1	Kennet (Tyle Mill to Thames Confluence) 2018	471984	173461	36.67	36.79	36.82	36.91			37.02		37.08	37.13	37.31	37.16
061 22 2018 001HOLY2 0078.1	Kennet (Tyle Mill to Thames Confluence) 2018	471944	173463	36.68	36.80	36.83	36.92			37.02		37.09	37.14	37.32	37.16
061 22 2018 001HOLY2 0147.1	Kennet (Tyle Mill to Thames Confluence) 2018	471881	173435	36.73	36.84	36.87	36.95			37.05		37.12	37.17	37.36	37.20
061 22 2018 001HOLY2 0351.1	Kennet (Tyle Mill to Thames Confluence) 2018	471694	173356	37.26	37.27	37.27	37.28			37.30		37.36	37.43	37.61	37.46
061 22 2018 001KENC10 059.1	Kennet (Tyle Mill to Thames Confluence) 2018	472319	173382	36.62	36.73	36.76	36.84			36.93		37.00	37.03	37.21	37.06
061 22 2018 001KENC10 087.1	Kennet (Tyle Mill to Thames Confluence) 2018	472026	173310	36.70	36.84	36.88	36.98			37.10		37.17	37.22	37.42	37.25
061 22 2018 001KENC10 087.2	Kennet (Tyle Mill to Thames Confluence) 2018	472201	173347	36.64	36.77	36.80	36.88			36.99		37.06	37.09	37.28	37.12
061 22 2018 001KENN3 1103.1	Kennet (Tyle Mill to Thames Confluence) 2018	472142	173476	36.63	36.75	36.78	36.86			36.96		37.02	37.07	37.24	37.09
061 22 2018 001KENN3 1322.2	Kennet (Tyle Mill to Thames Confluence) 2018	472000	173382	36.69	36.83	36.86	36.95			37.07		37.14	37.18	37.38	37.22
061 22 2018 001KENN3 1465.1	Kennet (Tyle Mill to Thames Confluence) 2018	471903	173315	36.75	36.91	36.95	37.06			37.19		37.27	37.33	37.55	37.36

				Flood Flows (m3/s)											
Node label	Model	Easting	Northing	20% AEP	5% AEP	3.3% AEP	1% AEP	1% AEP (+10% increase in flows)	1% AEP (+15% increase in flows)	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP	
061 22 2018 001HOLY2 0038.1	Kennet (Tyle Mill to Thames Confluence) 2018	471984	173461	2.50	2.57	2.68	2.62		2.77		3.14	3.62	4.58	3.87	
061 22 2018 001HOLY2 0078.1	Kennet (Tyle Mill to Thames Confluence) 2018	471944	173463	2.50	2.56	2.65	2.61		2.77		3.14	3.61	4.58	3.86	
061 22 2018 001HOLY2 0147.1	Kennet (Tyle Mill to Thames Confluence) 2018	471881	173435	2.50	2.57	2.65	2.62		2.77		3.14	3.61	4.58	3.87	
061 22 2018 001HOLY2 0351.1	Kennet (Tyle Mill to Thames Confluence) 2018	471694	173356	2.50	2.56	2.57	2.60		2.77		3.14	3.61	4.57	3.85	
061 22 2018 001KENC10 059.1	Kennet (Tyle Mill to Thames Confluence) 2018	472319	173382	26.98	34.11	36.02	41.33		47.86		52.27	54.62	67.24	56.48	
061 22 2018 001KENC10 087.1	Kennet (Tyle Mill to Thames Confluence) 2018	472026	173310	26.98	34.11	36.02	41.33		47.86		52.11	54.62	67.01	56.48	
061 22 2018 001KENC10 087.2	Kennet (Tyle Mill to Thames Confluence) 2018	472201	173347	26.98	34.12	36.03	41.33		47.86		52.44	54.62	67.69	56.48	
061 22 2018 001KENN3 1103.1	Kennet (Tyle Mill to Thames Confluence) 2018	472142	173476	27.22	34.80	36.86	42.44		49.41		53.98	57.14	70.79	59.27	
061 22 2018 001KENN3 1322.2	Kennet (Tyle Mill to Thames Confluence) 2018	472000	173382	24.74	32.24	34.28	39.84		46.67		50.88	53.55	66.24	55.43	
061 22 2018 001KENN3 1465.1	Kennet (Tyle Mill to Thames Confluence) 2018	471903	173315	51.72	66.35	70.31	81.17		94.44		102.54	107.87	131.93	111.53	

Note:

Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>.

Modelled floodplain flood levels

THM385842

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

2D grid cell reference	Model	Easting	Northing	flood levels (mAOD)										
				20% AEP	5% AEP	3.3 AEP	1% AEP	1% AEP (+10% increase in flows)	1% AEP (+15% increase in flows)	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
Flood Point 1	Kennet (Tyle Mill to Thames Confluence) 2018	472068	173462	36.65	36.77	36.81	36.89		37.00		37.06	37.10	37.29	37.13
Flood Point 2	Kennet (Tyle Mill to Thames Confluence) 2018	472019	173443	36.67	36.79	36.83	36.91		37.02		37.09	37.13	37.32	37.16
Flood Point 3	Kennet (Tyle Mill to Thames Confluence) 2018	472003	173411	36.68	36.81	36.85	36.94		37.05		37.12	37.16	37.35	37.19
Flood Point 4	Kennet (Tyle Mill to Thames Confluence) 2018	471981	173332	NoData	NoData	NoData	NoData		37.13		37.20	37.25	37.47	37.29
Flood Point 5	Kennet (Tyle Mill to Thames Confluence) 2018	471914	173338	NoData	NoData	NoData	NoData		37.18		37.26	37.32	37.54	37.35

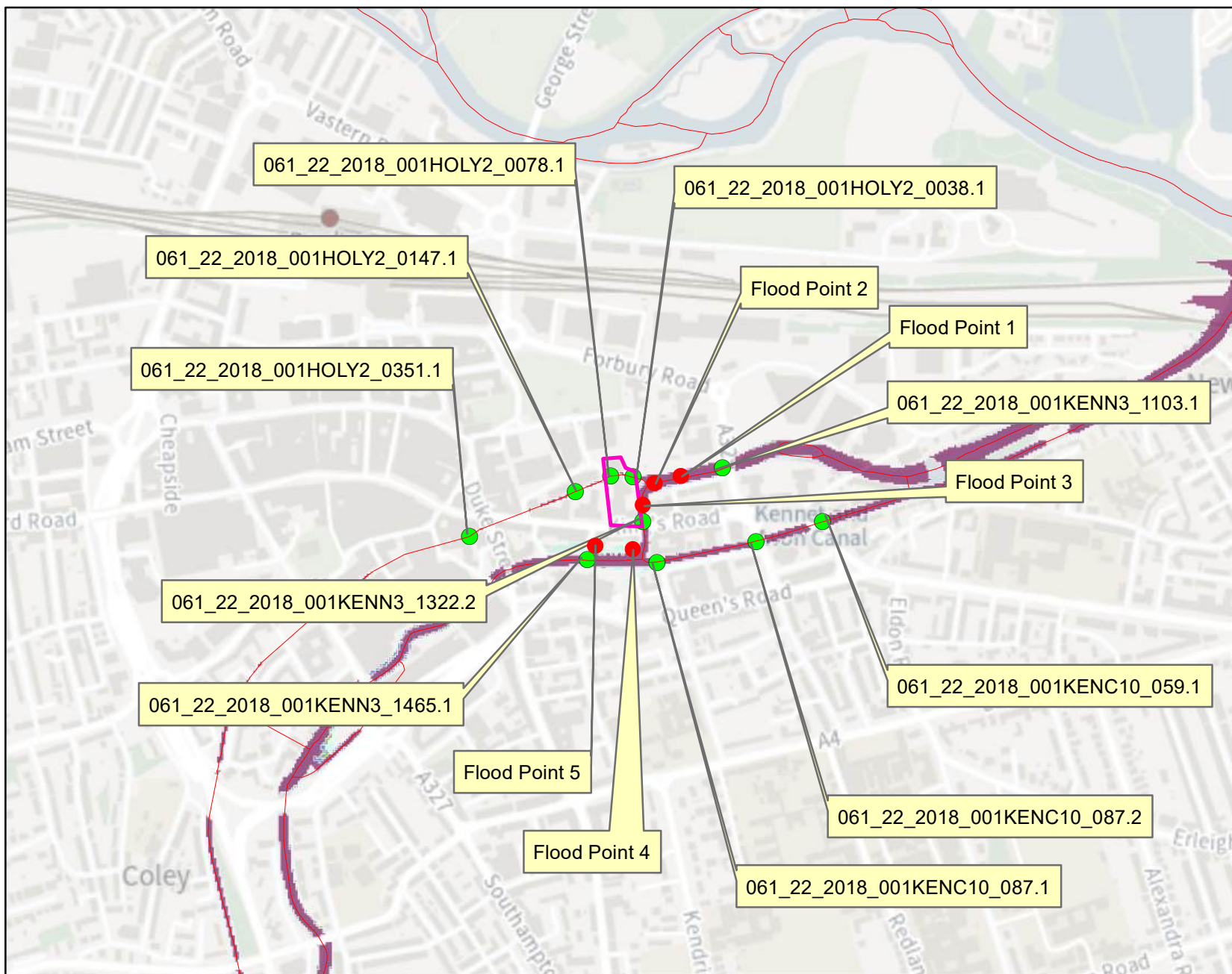
This flood model has represented the floodplain as a grid.
The flood water levels have been calculated for each grid cell.

Note:
Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

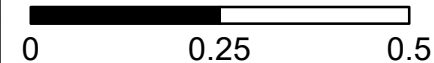
For further advice on the new allowances please visit
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Detailed FRA Map centred on RG1 3BA

Created on 02/12/24 REF: THM385842



Kilometres



Legend

- Site
- Statutory Main Rivers
- Model Nodes
- 20% AEP Flood Outline
- 5% AEP Flood Outline
- 3.3% AEP Flood Outline
- 1% AEP Flood Outline
- 0.1% AEP Flood Outline

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occurring in any given year

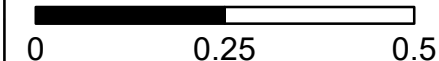
Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Detailed FRA Map centred on RG1 3BA

Created on 02/12/24 REF: THM385842



Kilometres



Legend

- Site
- Statutory Main Rivers
- Model Nodes
- 1%+15% CC AEP Flood Outline
- 1%+25% CC AEP Flood Outline
- 1%+35% CC AEP Flood Outline
- 1%+70% CC AEP Flood Outline

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occurring in any given year

Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Historic flood data

THM385842

Our records show that the area of your site has been affected by flooding.
Information on the floods that have affected your site is provided in the table below:

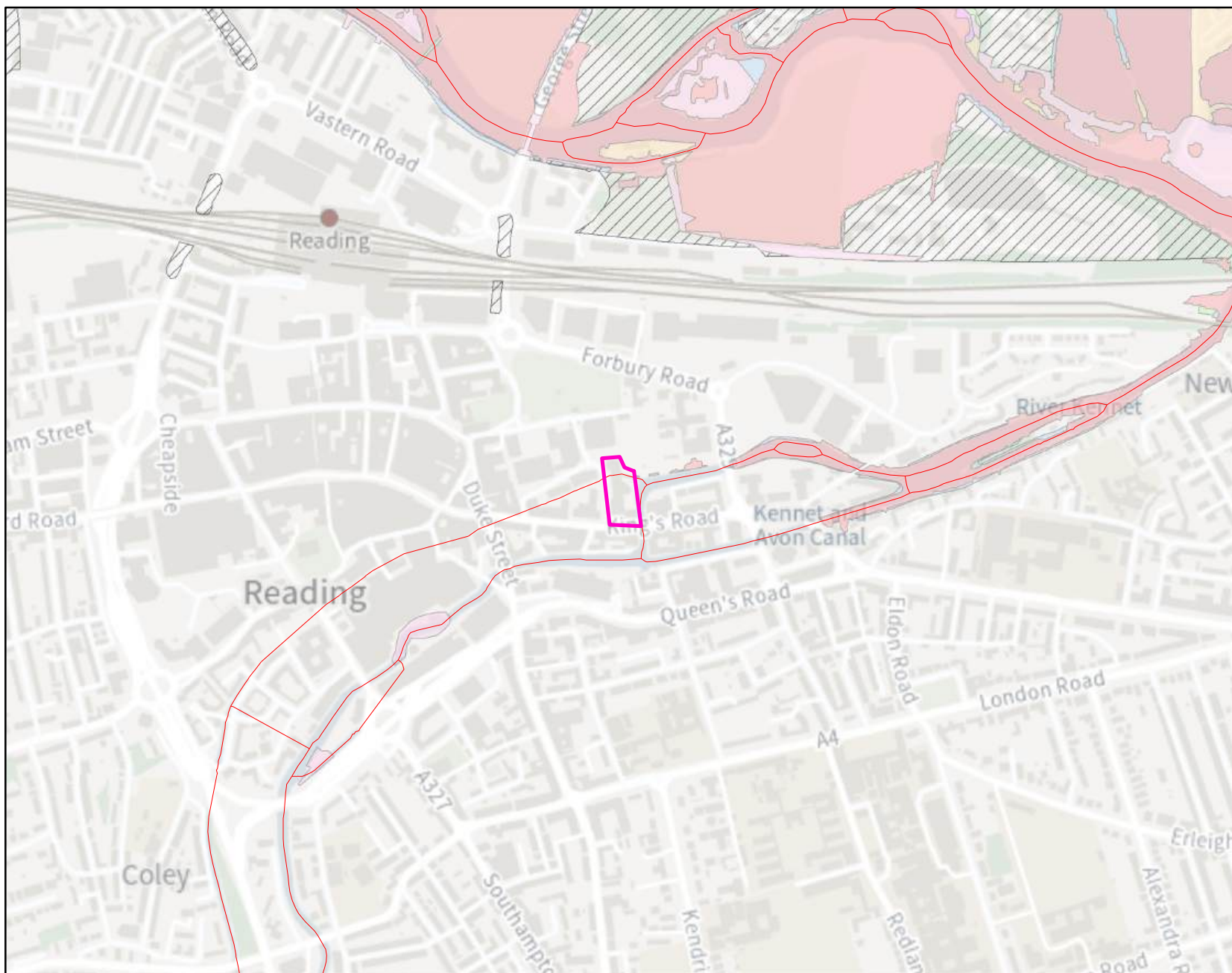
Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
EA0120144097369	Winter 2013/2014	23/11/2013	28/02/2014	main river	channel capacity exceeded (no raised defences)

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

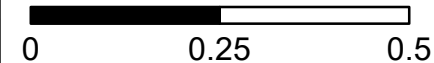
Start and End Dates shown above may represent a wider range where the exact dates are not available.

Historic Flood Map centred on RG1 3BA

Created on 02/12/24 REF: THM385842



Kilometres



Legend

- Site
- Statutory Main Rivers

year

- 1947
- 1974
- 1977
- 2000
- 2002/3
- 2007
- 2014

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Hazard Mapping

THM385842

Hazard Mapping methodology:

To calculate flood hazard with the debris factor we have used the supplementary note to Flood Risk to People Methodology (see below).

The following calculation is used:

$$HR = d \times (v+0.5) + DF$$

Where HR = flood hazard rating

d = depth of flooding (m)

v = velocity of floodwaters (m/sec)

DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

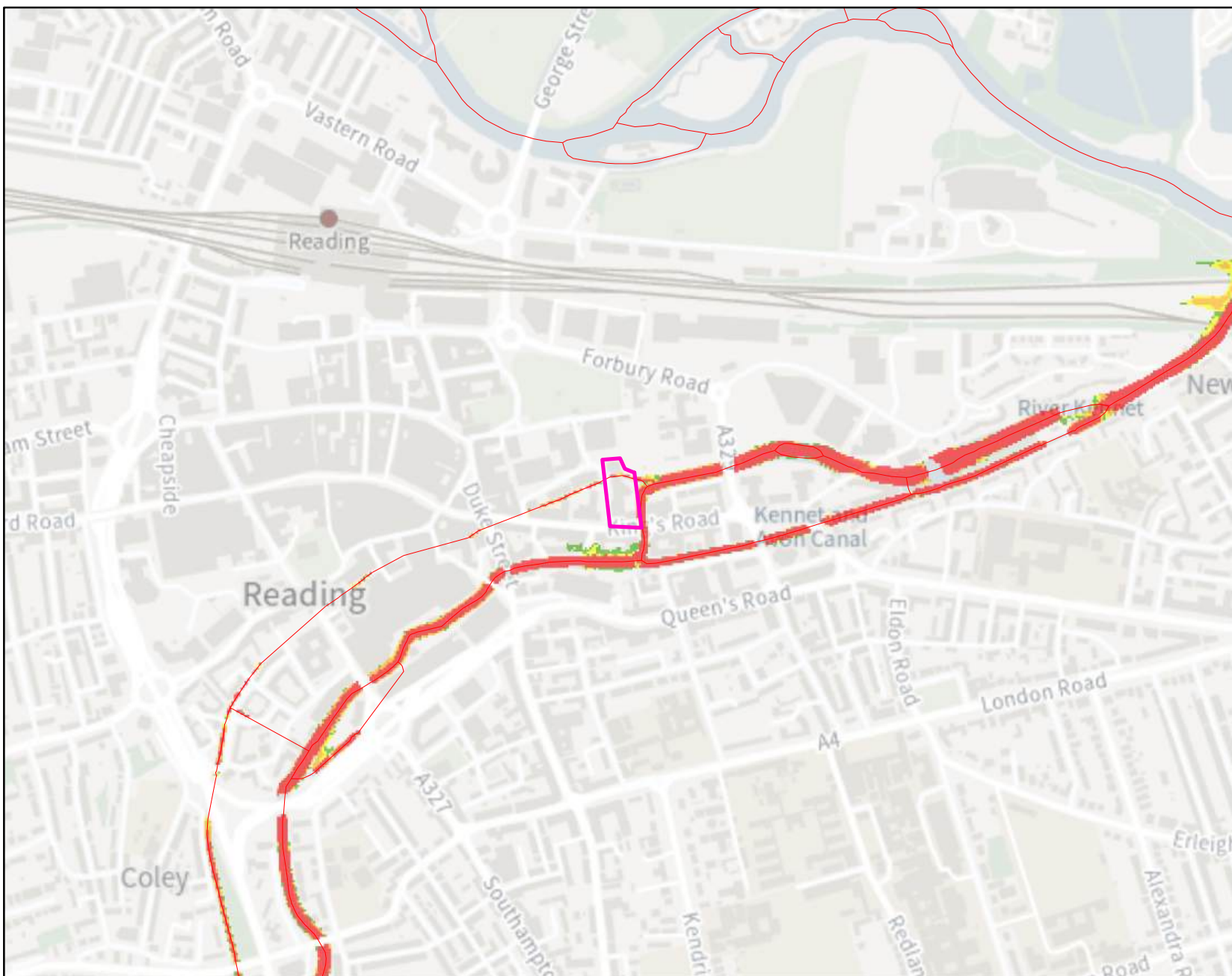
The resultant hazard rating is then classified according to:

Flood Hazard	Colour	Hazard to People Classification
Less than 0.75	Green	Very low hazard - Caution
0.75 to 1.25	Yellow	Danger for some - includes children, the elderly and the infirm
1.25 to 2.0	Orange	Danger for most - includes the general public
More than 2.0	Red	Danger for all - includes the emergency services

REF: HR Wallingford and Environment Agency (May 2008) Supplementary note of flood hazard ratings and thresholds for development planning and control purpose – Clarification of the Table 113.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1

Hazard Map 1%+25%CC centred on RG1 3BA

Created on 02/12/24 REF: THM385842



Legend

- Site
- Statutory Main Rivers
- Very low hazard – Caution
- Danger for some – includes children, the elderly and the infirm
- Danger for most – includes the general public
- Danger for all – includes the emergency services

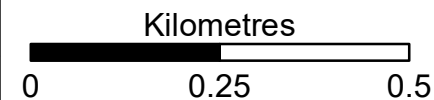
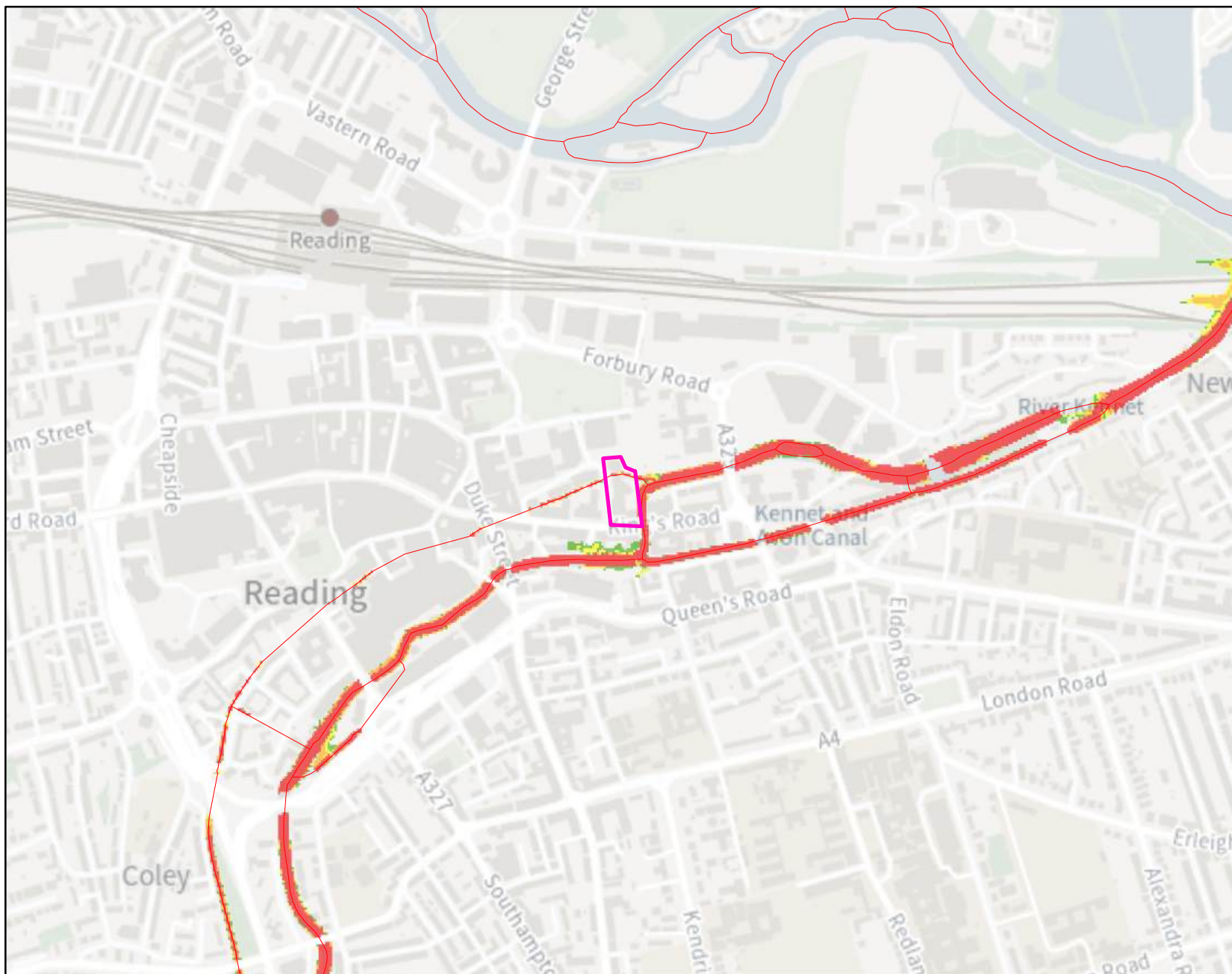
For hazard and debris factor we used HR Wallingford and Environment Agency (May 2008) supplementary note on flood hazard ratings and thresholds for development planning and control purpose. The following calculation is used:

$$HR = d \times (v + 0.5) + DF$$

HR = flood hazard rating
d = depth of flooding (m)
v = velocity of floodwaters (m/sec)
DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

Hazard Map 1%+35%CC centred on RG1 3BA

Created on 02/12/24 REF: THM385842



Legend

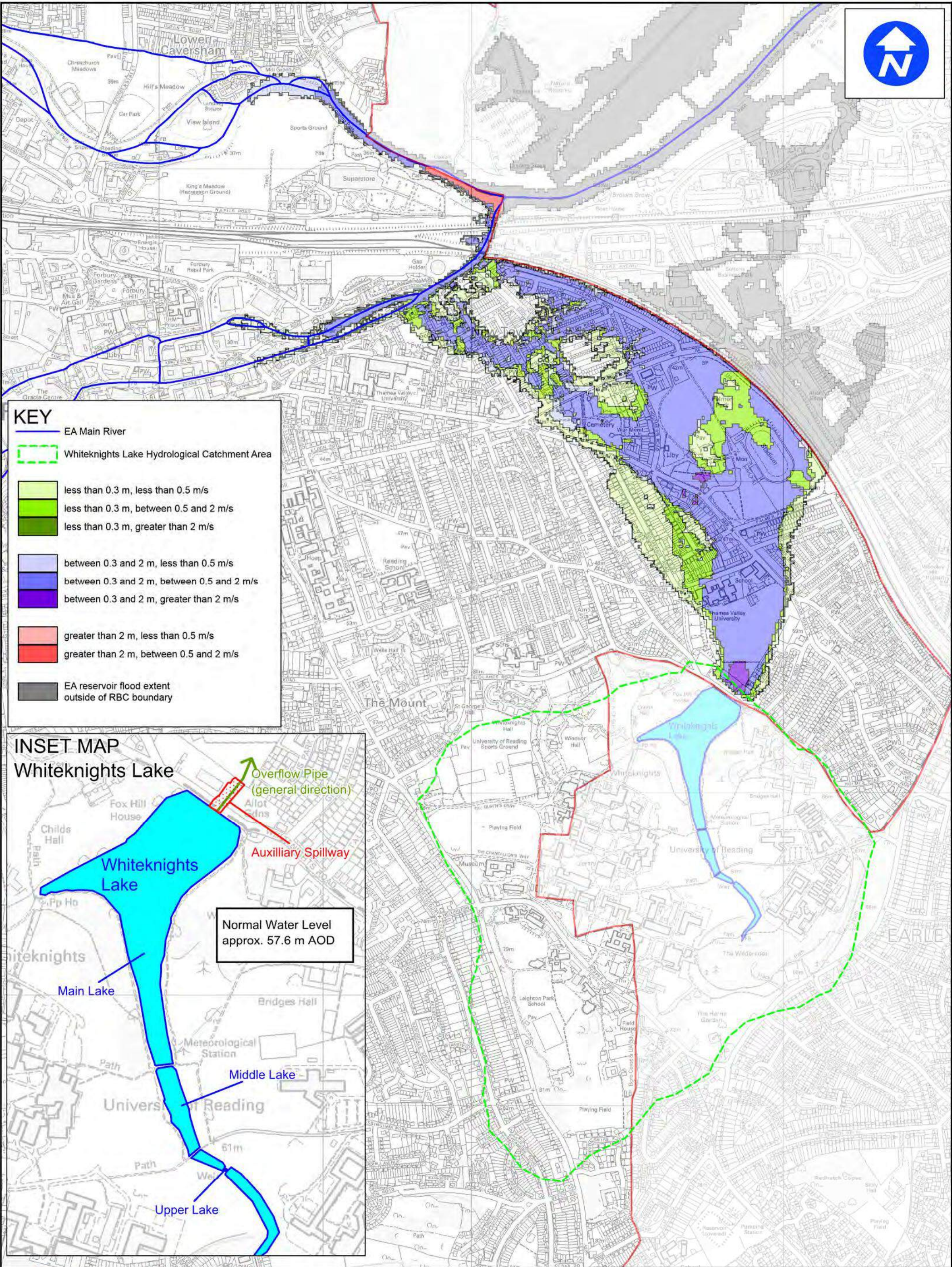
- Site
- Statutory Main Rivers
- Very low hazard – Caution
- Danger for some – includes children, the elderly and the infirm
- Danger for most – includes the general public
- Danger for all – includes the emergency services

For hazard and debris factor we used HR Wallingford and Environment Agency (May 2008) supplementary note on flood hazard ratings and thresholds for development planning and control purpose. The following calculation is used:

$$HR = d \times (v + 0.5) + DF$$

HR = flood hazard rating
d = depth of flooding (m)
v = velocity of floodwaters (m/sec)
DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

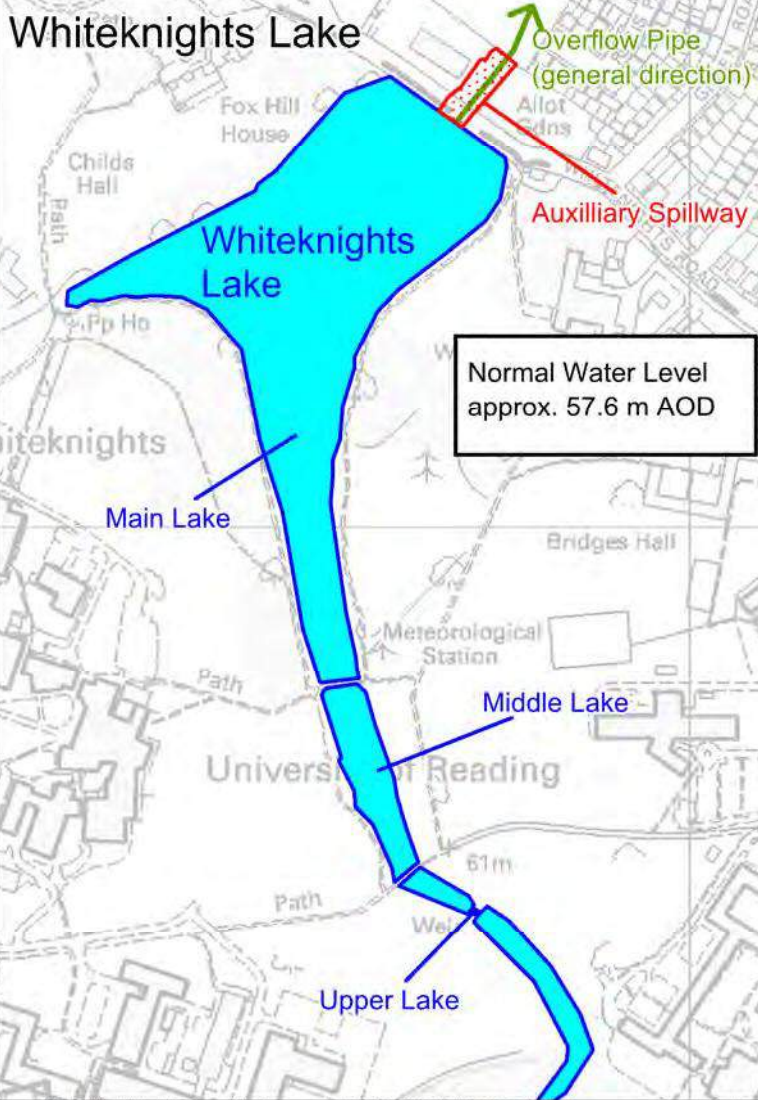
Appendix: D – SFRA Mapping



KEY

- EA Main River
- Whiteknights Lake Hydrological Catchment Area
- less than 0.3 m, less than 0.5 m/s
- less than 0.3 m, between 0.5 and 2 m/s
- less than 0.3 m, greater than 2 m/s
- between 0.3 and 2 m, less than 0.5 m/s
- between 0.3 and 2 m, between 0.5 and 2 m/s
- between 0.3 and 2 m, greater than 2 m/s
- greater than 2 m, less than 0.5 m/s
- greater than 2 m, between 0.5 and 2 m/s
- EA reservoir flood extent outside of RBC boundary

INSET MAP



www.peterbrett.com
Peter Brett Associates LLP
READING
Tel: 0118 950 0761 Fax: 0118 959 7498



Contains Ordnance Survey data © Crown copyright and database right 2015

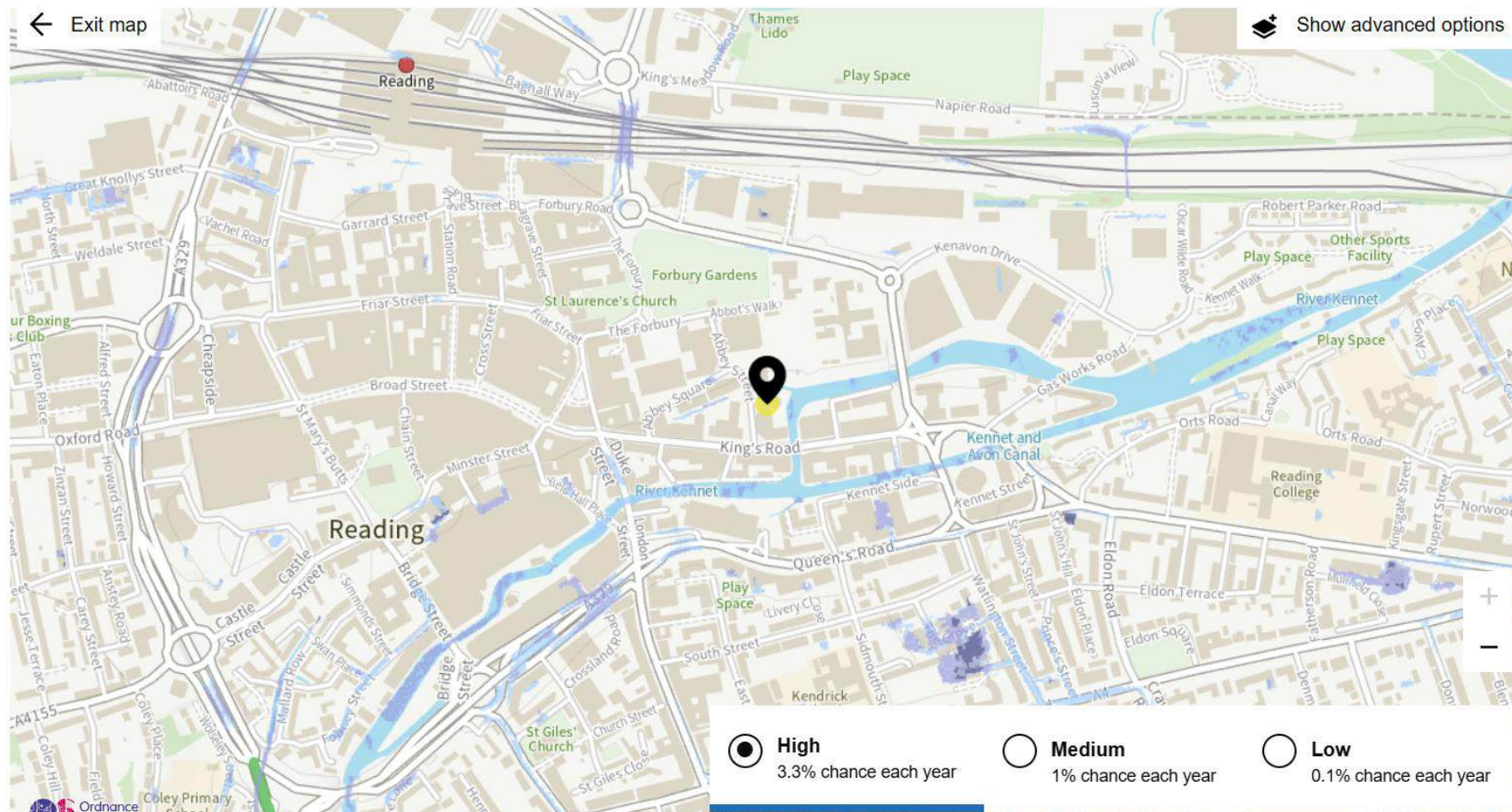
RBC SFRA

Detailed Reservoir Flood Map
Whiteknights Lake

Date: 04/04/16
Scale: NTS
Drawn By: SB Checked By: RF
Rev: -
Figure Number Map F7

Appendix E – Topographical Survey

Appendix F – Surface Water Flood Maps



Key

Surface water

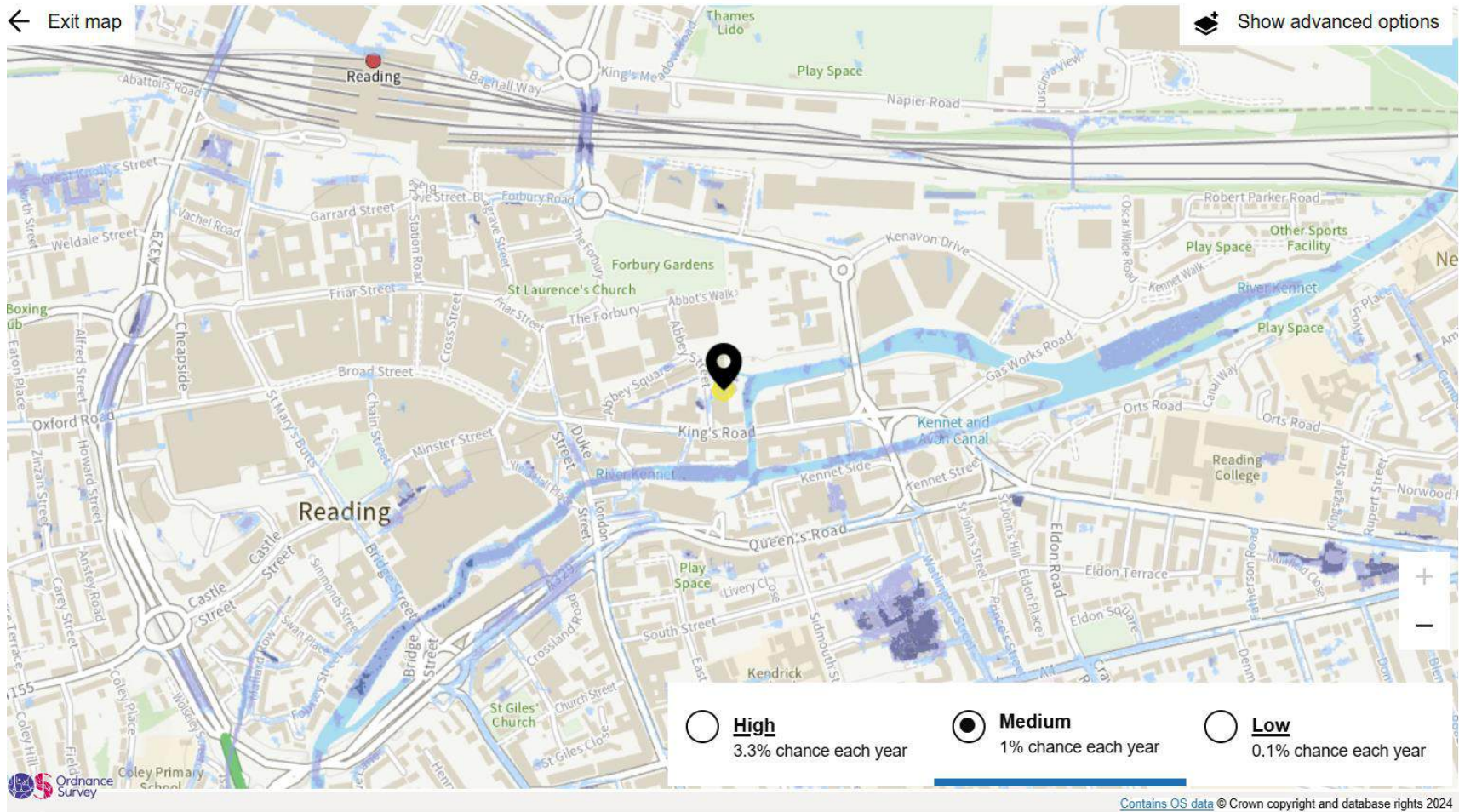
- ☐ Extent
- ☒ Depth
 - Above 90cm
 - 30cm to 90cm
 - Below 30cm

Map details

- ☒ Show flooding
- ☒ Selected address
- ☒ 15m boundary

Pause to updates of flood risk data

We have [paused updates to information about flood risk](#) from rivers and the sea and surface water while we get ready for new data.



Key

Surface water

○ Extent

● Depth

■ Above 90cm

■ 30cm to 90cm

■ Below 30cm

Map details

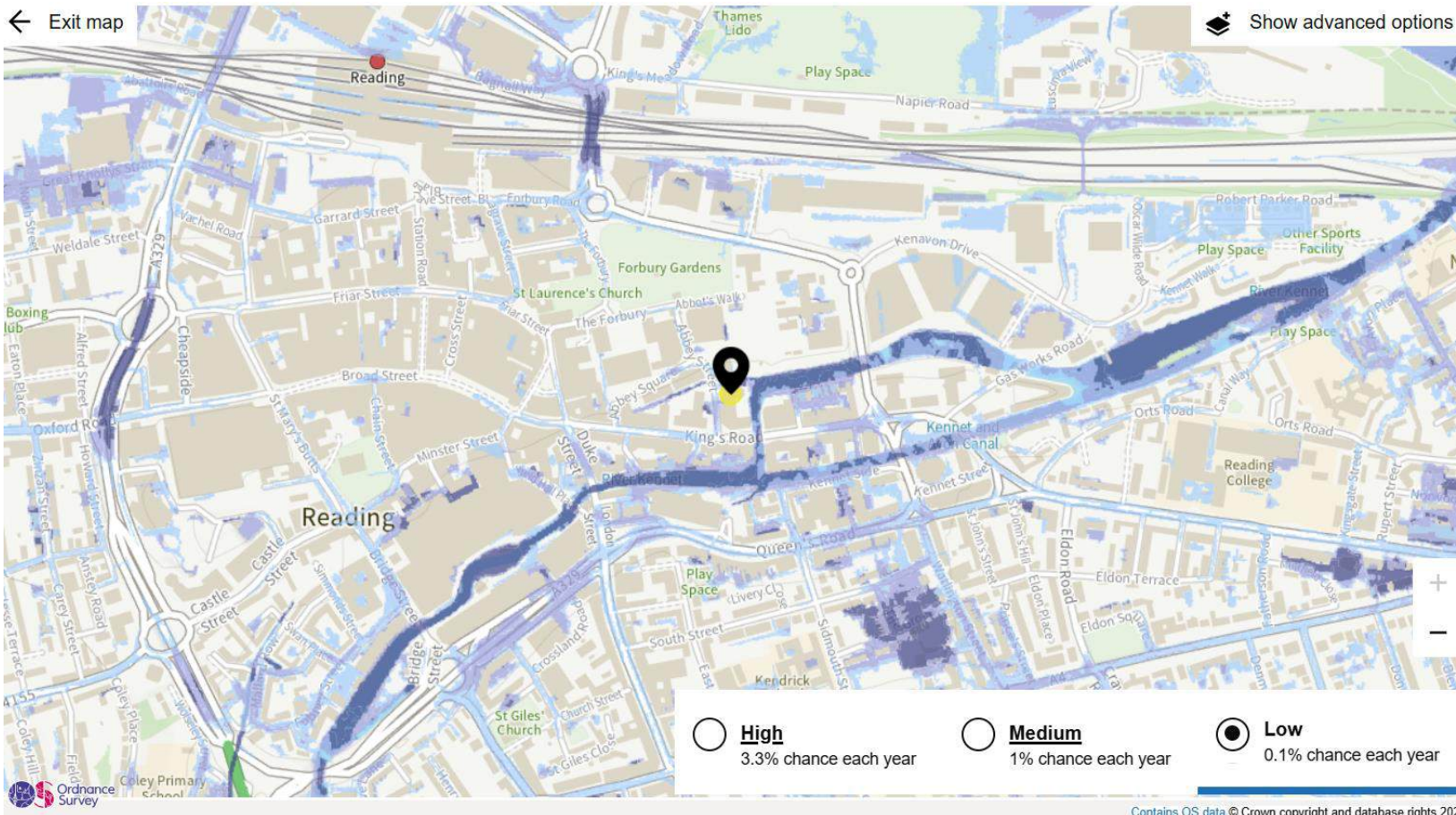
☒ Show flooding

☒ Selected address

● 15m boundary

Pause to updates of flood risk data

We have [paused updates to information about flood risk](#) from rivers and the sea and surface water while we get ready for new data.



Key

Surface water

☐ Extent

☒ Depth

Above 90cm

30cm to 90cm

Below 30cm

Map details

☒ Show flooding

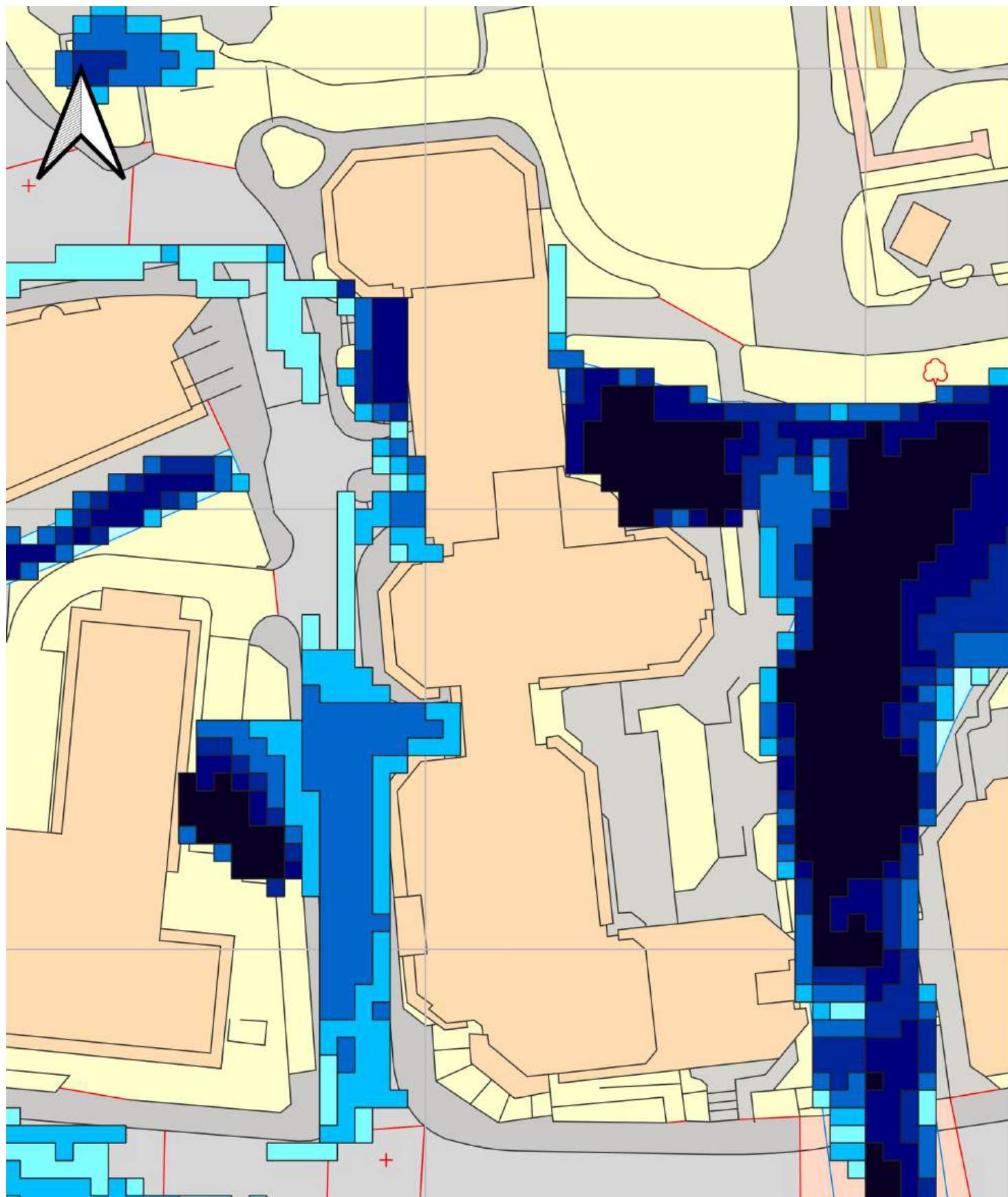
☒ Selected address

15m boundary

Pause to updates of flood risk data

We have [paused updates to information about flood risk](#) from rivers and the sea and surface water while we get ready for new data.

Abbey Gardens, Reading- 0.1%AEP Surface Water Flood Depths



Surface Water Flood Depths (m)

