

FLOOD RISK ASSESSMENT REPORT FOR THE PINNACLE, 20 TUDOR ROAD, READING, RG1 1NH

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PREPARED BY



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1. SITE DETAILS

Site Name	The Pinnacle
Site Address	The Pinnacle, 20 Tudor Road, Reading, RG1 1NH
Purpose of Development	Residential
Existing Land Use	Offices
County	Reading
Country	England
Local Planning Authority	Reading Borough Council

1.1. Site Location

The location plan of the project site is provided in Appendix A.

1.2. Existing Site Description and Topography

A drawing showing the existing site layout and the layout plans for each floor are included in Appendix A, and this shows the existing use on these floors as office use.

1.3. Proposed Development

The proposal involves the conversion of five floors of an existing office building to 72 residential units.

The layout and location of the proposed development are shown in the drawings provided in Appendix A.

2. PLANNING POLICIES

2.1. National Planning Policy

- National Planning Policy Framework (December 2024)
- National Planning Practice Guidance Suite (August 2022)

2.2. Local Planning Policy

This report has been written in conjunction with the following local planning policies:

- Reading Borough Council Level 1 and Level 2 Strategic Flood Risk Assessment.
- Reading Borough Council Preliminary Flood Risk Management Strategy.

3. FLOOD RISK

The possible causes of flooding set out in NPPF are considered in this section in relation to flood risk to the site itself and the effects of the development of the site on the flood risk elsewhere.

3.1. Flood Zones

The Environment Agency has developed a flood risk map, shown below which shows the relative risk of flooding for different return periods. Flood zones assume that no defences are present and so where these do exist they are only indicative of the potential for flooding.

The development lies within flood zone 2 of the Environment Agency's Flood risk map, as shown overleaf. Land located within flood zone 2 is at a medium low risk of flooding, having an associated annual probability of between less 1 in 100 and 1 in 1000.

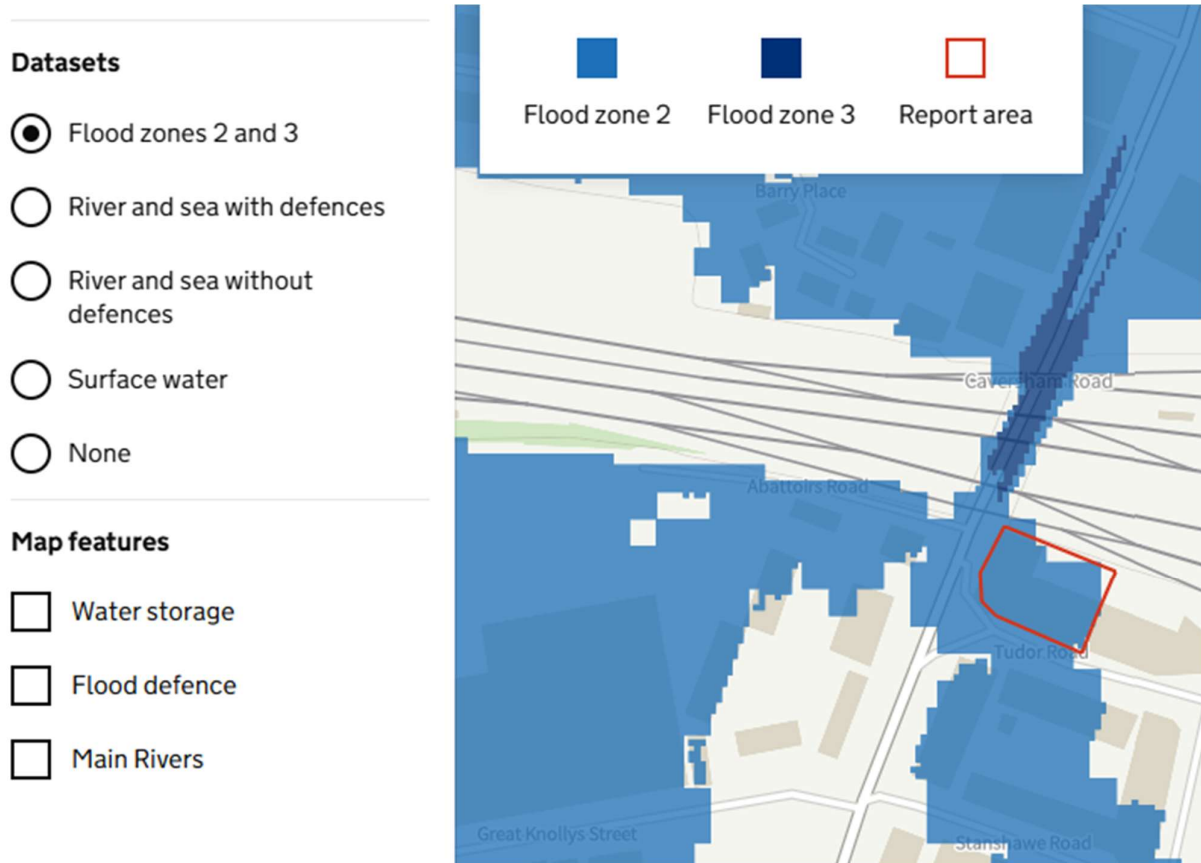


Figure 1 – Environment Agency Flood Map for flooding extent from rivers and sea for the proposed development.

As can be seen from the above map and the site boundary plan provided in Appendix A, the majority of the site is located within Flood zone 2, and in accordance with Table 1 from the NPPF's technical guidance, land within Flood zone 1 is suitable for any use subject to a Flood Risk Assessment. Therefore we have requested Environment Agency modelled flood level data, provided in Appendix A.

Assessment of this site has been based upon the Environment Agency's flood map, modelled flood level data, the Strategic Flood Risk Assessment report, the existing site plan, and the architect's proposed development layout.

Table 1: NPPF Flood Zone Guidance

Flood Zone Classification	Definition of Zone	Appropriate uses	FRA Requirements	Policy Aims
Zone 1 Low Probability	This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (0.1%<).	All uses of land are appropriate in this zone.	For development proposals on sites compromising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through addition of hard surfaces and the effect of new development on surface water run-off should be incorporated in a FRA. This need only be brief unless the factors above or other considerations require particular attention. See Annex E for minimum requirements.	In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of development, and the appropriate application sustainable drainage techniques.
Zone 2 Medium Probability	This zone comprises land assessed as having between a 1 in 1000 annual probability	The water-compatible less vulnerable and more vulnerable uses of land and essential infrastructure in	All development proposals should be accompanied by a	In this zone developers and local authorities should seek opportunities to reduce the overall level of flood risk in the

Flood Zone Classification	Definition of Zone	Appropriate uses	FRA Requirements	Policy Aims
	of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5%-0.1%) in any year	Table D 2 are appropriate in this zone. Infrastructure in Table D.2 are appropriate in this zone. Subject to the sequential Test being applied the highly vulnerable uses in Table D.2 are only appropriate in this zone if the exception Test (see para. D.9) is passed.	FRA. See Annex E for minimum requirements.	area through the layout of form and development, and the appropriate application of sustainable drainage techniques.
Zone 3a High Probability	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 greater annual probability of flooding from sea (>0.5%) in any year.	The water compatible and less vulnerable uses of land in Table D.2 are appropriate in this Zone. The highly vulnerable uses in Table D.2 should not be permitted in this zone. The more vulnerable and essential infrastructure uses in D.2 should only be permitted in this zone if the Exception Test (see para.	All development proposals in this zone should be accompanied by a FRA. See Annex E for minimum requirements.	In this zone, developers and local authorities should seek opportunities to: i. reduce the overall level of flood risk in the area through the layout and form of the development and appropriate application of sustainable drainage techniques. ii. relocate existing development to land in zones with a lower probability of flooding; and iii. create space for flooding to occur by restoring functional

Flood Zone Classification	Definition of Zone	Appropriate uses	FRA Requirements	Policy Aims
		D.9) is passed Essential Infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.		floodplain and flood pathways and by identifying, allocating and safeguarding open space for flood storage.
Zone 3b The Functional Flood Plan	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their SFRAs areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual	Only the water-compatible uses and the essential infrastructure listed in Table D.2 that has to be there should be permitted on this zone. It should be designed and constructed to: • remain operational and safe for users in times of flood; • result in no net loss of floodplain storage; • not impede water flows; and • not increase flood risk elsewhere • Essential infrastructure in this zone should pass the Exception Test.	All development proposals in this zone should be accompanied by a FRA. See Annex E for minimum requirements.	In this zone, developers and local authorities should seek opportunities to: i. reduce the overall level of flood risk area through the layout and form of the development and appropriate application of sustainable drainage techniques; and ii. relocate existing development to land with a lower probability of flooding.

Flood Zone Classification	Definition of Zone	Appropriate uses	FRA Requirements	Policy Aims
	probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood should provide a starting point for consideration and discussions to identify the functional floodplain.			

3.2. Flood Vulnerability

Table 2 below, which has been extracted from NPPF's technical guidance, highlights the flood risk vulnerability of various developments. This information is based partly on DEFRA/Environment Agency research and 'Flood Risks to People' (FD2321/Tr2) and also on the need of some uses to keep functioning during flooding.

Buildings that combine a mixture of uses should be places into the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.

The impact of a flood on a particular uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore. The flood risk management infrastructure and risk mitigation measures needed ensure the development is may differ between uses within a particular vulnerability classification.

Table 2: NPPF's Flood Risk Vulnerability Classification

Essential Infrastructure	• Essential transport infrastructure and strategic utility infrastructure, including electricity generating stations and grinds and primary substations.
Highly Vulnerable	• Police, Ambulance and Fire stations and command centres, and telecommunications installations and emergency disposal points. • Basement Dwellings, caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substance consent.
More Vulnerable	• Hospitals, residential institutions such as care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling house, student halls of residence, drinking establishments, nightclubs,

	hotels and sites used for holiday or short-let caravans and camping. • Non-residential uses for health service, nurseries and educations. • Landfill and waste management facilities for hazardous waste.
Less Vulnerable	• Buildings used for shops, financial, professional and other services, restaurants and cafes, offices, industry, storage and distribution and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities), mineral workings and processing (except for sand and gravel). • Water treatment plants and sewerage treatment plans (if adequate pollution control measures are in place.)
Water-compatible Development	• Flood control infrastructure, water transmission infrastructure and pumping stations. • Sewerage transmission infrastructure and pumping stations. • Sand and Gravel workings • Docks, marinas and wharves, navigational facilities. • MOD defence installations • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation) • Lifeguard and coastguard stations • Amenity open space, nature conservation and sports recreation. • Essential sleeping or residential accommodation for staff required by users in this category, subject to a warning and evacuation plan.

From the flood risk vulnerability classification table above, taken from the NPPF's technical Guidance, Buildings used for dwelling houses come within the 'more vulnerable' classification. However, based on the Environmental Agencies flood map, the development site is located within Flood Zone 2 and in accordance with Table 3, overleaf, is therefore suitable for any development, subject to this Flood Risk Assessment.

Table 3: NPPF's Flood Risk Vulnerability and Flood Zone Compatibility

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

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

4. FLOOD RISK ASSESMENT

The possible causes of flooding set out in NPPF's technical guidance are considered in this section in relation to the flood risk to the site itself and the effects of the development of the site on flood risk elsewhere.

4.1. Fluvial or Tidal Flooding

The site is located north of the River Kennet, and south of the River Thames. With the risk of flooding caused by the River Thames This is confirmed by the Environment Agency data is provided in Appendix B.

The site is also not at risk of tidal flooding, this can also be confirmed by the Environment Agency's Flood map in Section 3.1.

4.2. Flooding from Land (Overland Flow)

The proposed development site is at a very low risk of surface water flooding, as is the road immediately adjacent to the site, and this can be confirmed by the Environment Agency's Flood map shown overleaf.

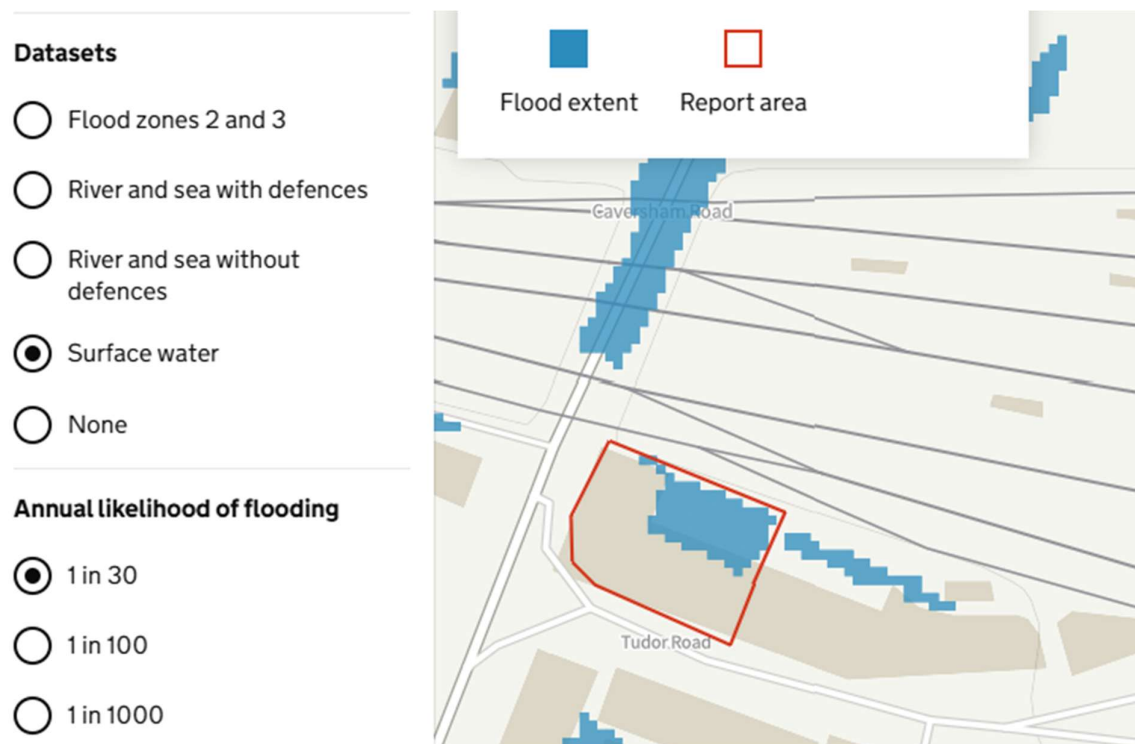


Figure 2 – Environment Agency Surface Water Flood Map, 1 in 30 year storm event, for the proposed development.

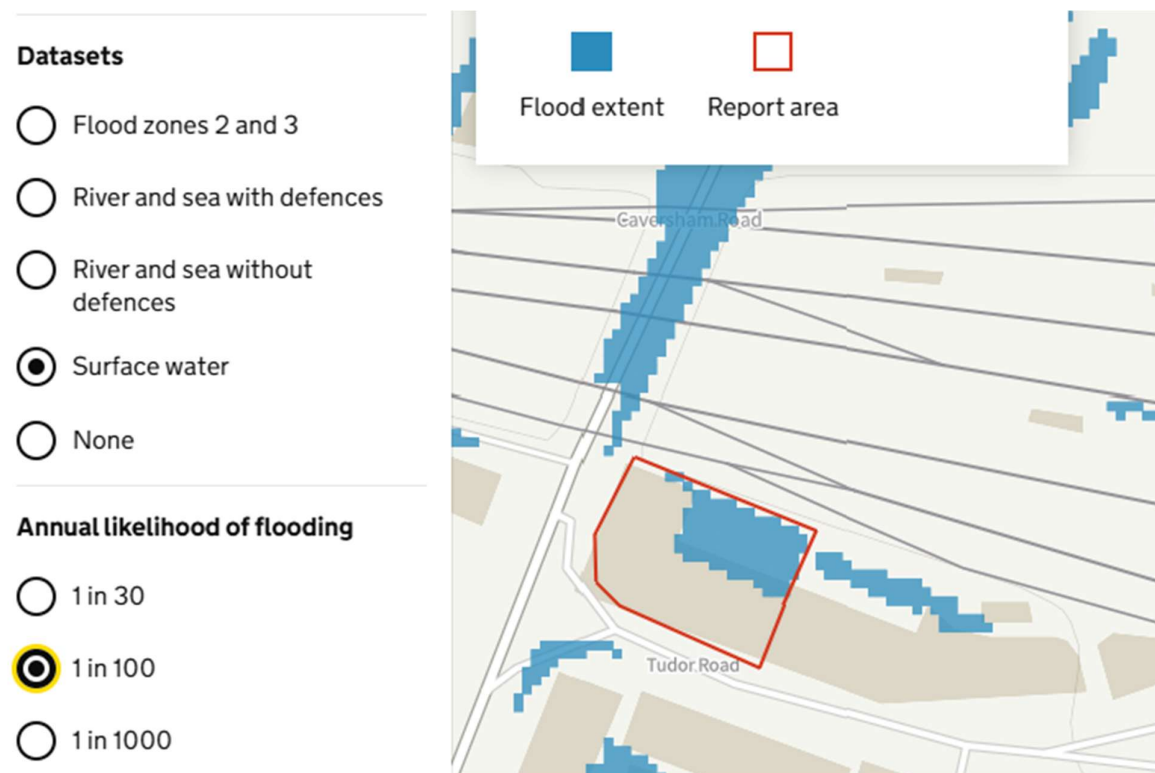


Figure 3 – Environment Agency Surface Water Flood Map, 1 in 100 year storm event, for the proposed development.

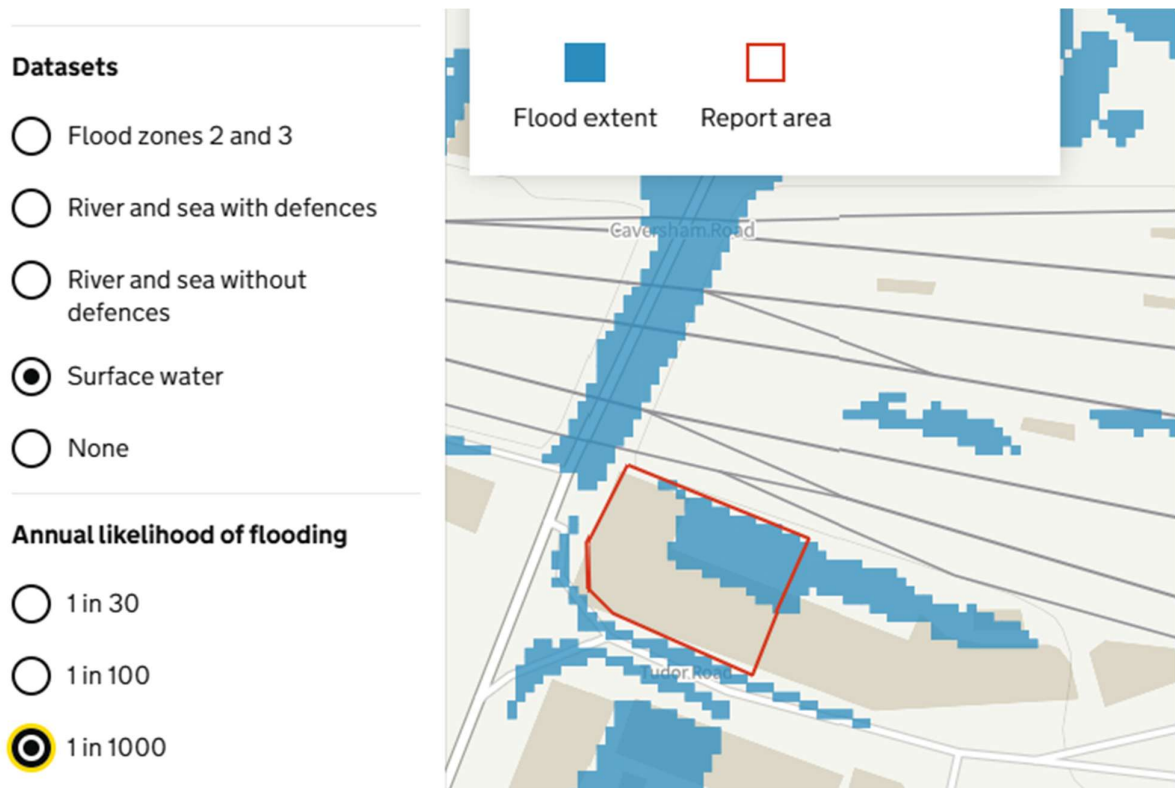


Figure 4 – Environment Agency Surface Water Flood Map, 1 in 1000 year storm event, for the proposed development.

This surface water flooding is caused by water ponding in naturally low lying areas at the site, however the flooding only extends to under the undercroft car parking area, and will not enter the building. The main entrance is not affected by this surface water flood risk, therefore no flood water will enter the building, via this route.

Judging from a site visit, for which a video can be provided, the levels at this area show that the maximum depth of flooding in this area is unlikely to be higher than 250mm for the 1 in 1000 year storm event.

4.3. Flooding from Groundwater

The Environment Agency's website confirms that groundwater flooding is unlikely in this area. As the proposals are for internal changes and reconfiguration, there will be no deep excavations proposed.

4.4. Flooding from Sewers

There is no risk of sewer flooding at this site, and this is confirmed by the Strategic Flood Risk Assessment Report.

4.5. Flooding from Reservoirs

There is a risk of reservoir flooding to this site from any reservoirs. This can also be confirmed by the map, from the Environment Agency's website, shown overleaf.

The likelihood of a reservoir failing is very low, and flood warning measures are in place.

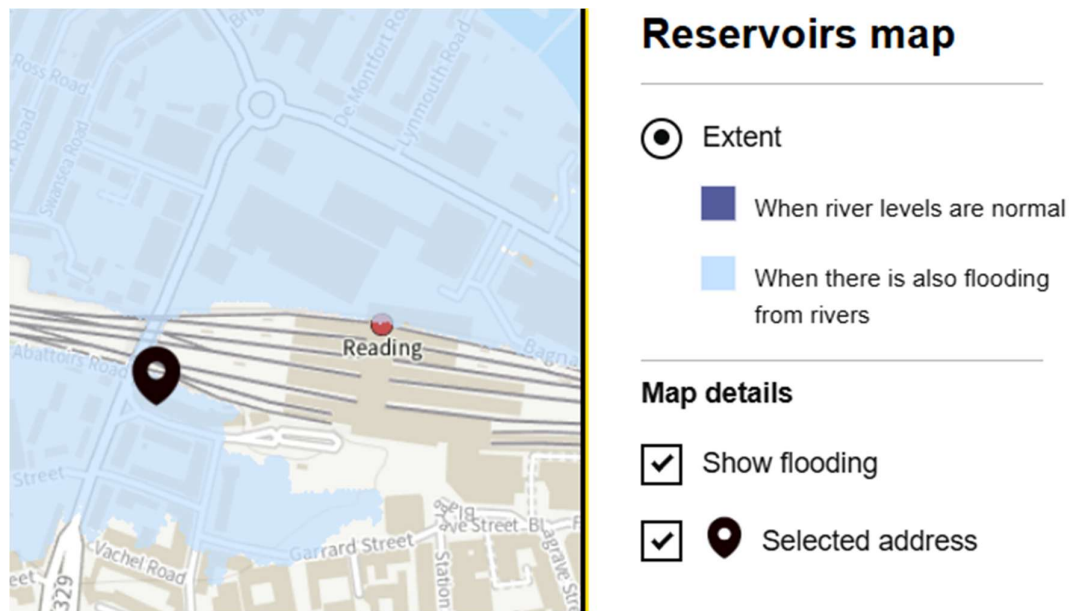


Figure 5 – Environment Agency Reservoir Flood Map, 1 in 1000 year storm event, for the proposed development.

5. SAFE ACCESS AND EGRESS

Although the proposed development site is at a very low risk of fluvial and pluvial flooding. Key routes surrounding the site are at a risk of fluvial and pluvial flooding, therefore there will be issues with access and egress to the site during extreme fluvial and pluvial events, and residents needs to be made aware of hidden dangers such as blown manholes.

Occupants will be required to sign up to the Environment Agency's Flood line on 0345 988 1188 in order to receive flood warnings, as well as making sure they are aware of any extreme storm events that may cause surface water flooding. The fluvial flooding events will restrict access and egress to the site therefore the residents will be advised to remain in their properties once a flood warning has been issued.

However the surface water flooding is localised along the access and egress routes, therefore the occupants are advised not to drive through flood water, and to avoid journeys during extreme storm events which may cause localised flooding along the access and egress routes.

6. MITIGATION AND RESILIENCE MEASURES

7. CONCLUSIONS

The purpose of this report is to satisfy the local planning authority that the risk of flooding from all sources has been assessed, and the proposed floors for this 'change of use' from office to residential are not a risk of flooding, and these proposals will not increase flood risk at the site or elsewhere.

Key routes surrounding the site are at a risk of flooding, however a discussion of access and egress and appropriate measures have been provided in this report.

APPENDIX A - DRAWINGS