

Flood Emergency Evacuation Plan

J3932 Twickenham Riverside, TWI 3DX

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I. INTRODUCTION

I.1. Scope

Webb Yates Engineers have been commissioned to produce a Flood Evacuation Plan, henceforth referred to as 'The Plan', for the development associated with Twickenham Riverside, TW1 3DX. This Plan contains information on flood emergency response actions. The Plan has been informed by a Flood Risk Assessment (FRA), which demonstrates that the site meets the requirements of the National Planning Policy Framework (NPPF) and the London Borough of Richmond upon Thames' (LBRuT) requirements.

I.2. Aim and Objectives

The key aim of the Plan is to provide clear indicators confirming when the site should be evacuated in the unlikely event of a flood emergency. The Plan also provides key information for planning and responding to an evacuation.

2. LOCATION

2.1. Site Location

The site is located at Twickenham Riverside, TW1 3DX, shown in Figure 1. The site is bound by Water Lane to the north-east and Diamond Jubilee Gardens to the north-west, Wharf Lane to the south-west and The Embankment to the south-east. The total site area is approximately 1.2 ha. Currently, the southwestern portion of the site is occupied by the Diamond Jubilee Gardens. A car park is situated to the south-east of the site and commercial buildings occupy the north-east of the site.



Figure 1: Satellite image showing site location (Source: <https://www.google.co.uk/maps>).

2.2. Sources of Flooding

Based on the flood map (Figure 2), which is informed by Environment Agency Data, the site is partially situated in Flood Zone 3, however benefits from flood defence structures along the River Thames.

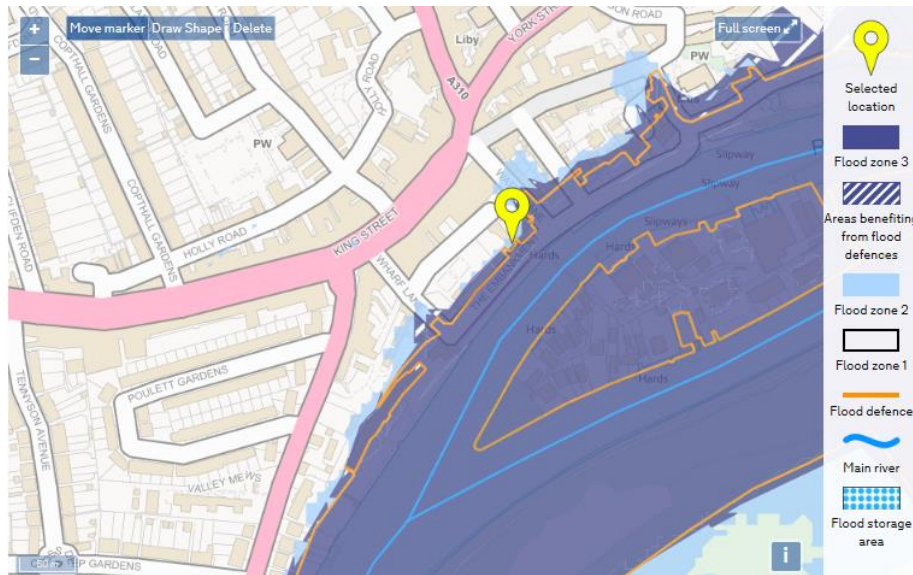


Figure 2: Government flood map for planning, showing site location and flood zones (Source: <https://flood-map-for-planning.service.gov.uk/>).

The River Thames is the main potential source of flooding, running along the southern site boundary. Flood defences are in place, shown in Figure 3, but do not protect The Embankment area along the edge of the River Thames. In addition, the presence of flood defences does not entirely remove the potential flood risk. Therefore, to manage the residual flood risk, this Flood Evacuation Plan has been developed to ensure the preparedness, in the event of a flood emergency, of site occupants.

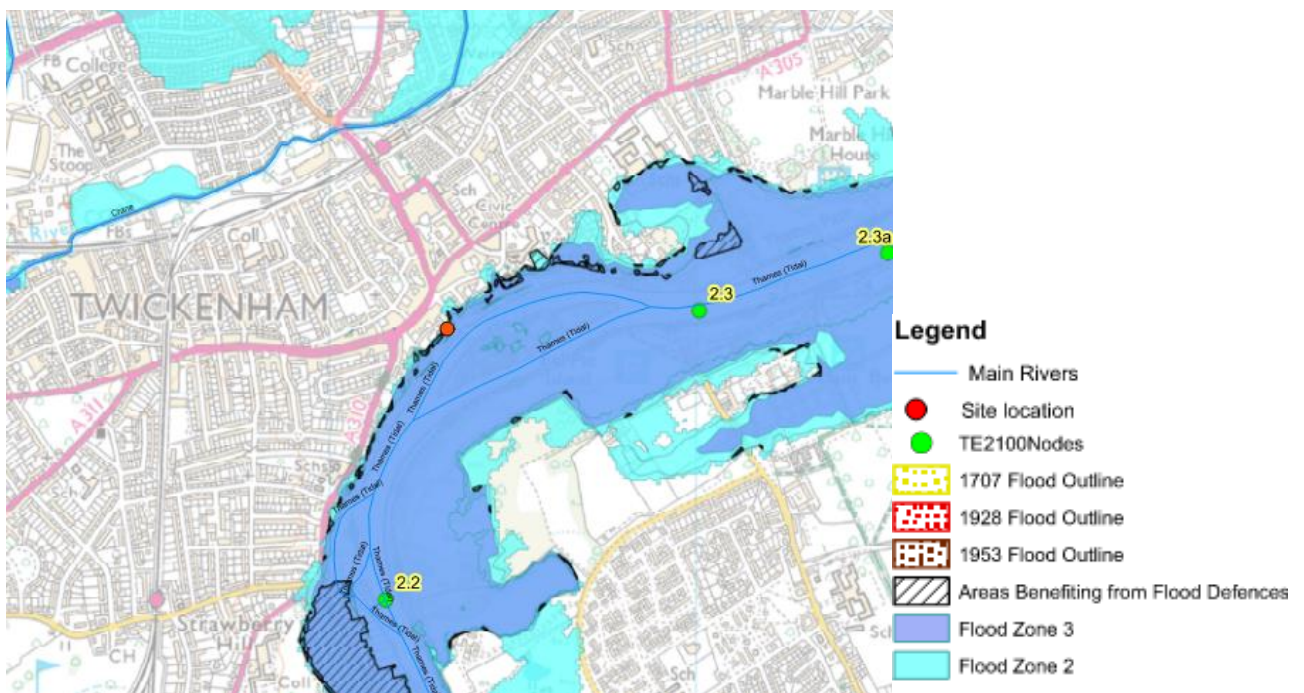


Figure 3 Flood defences and areas benefitting (Flood Map for Planning – Environment Agency)

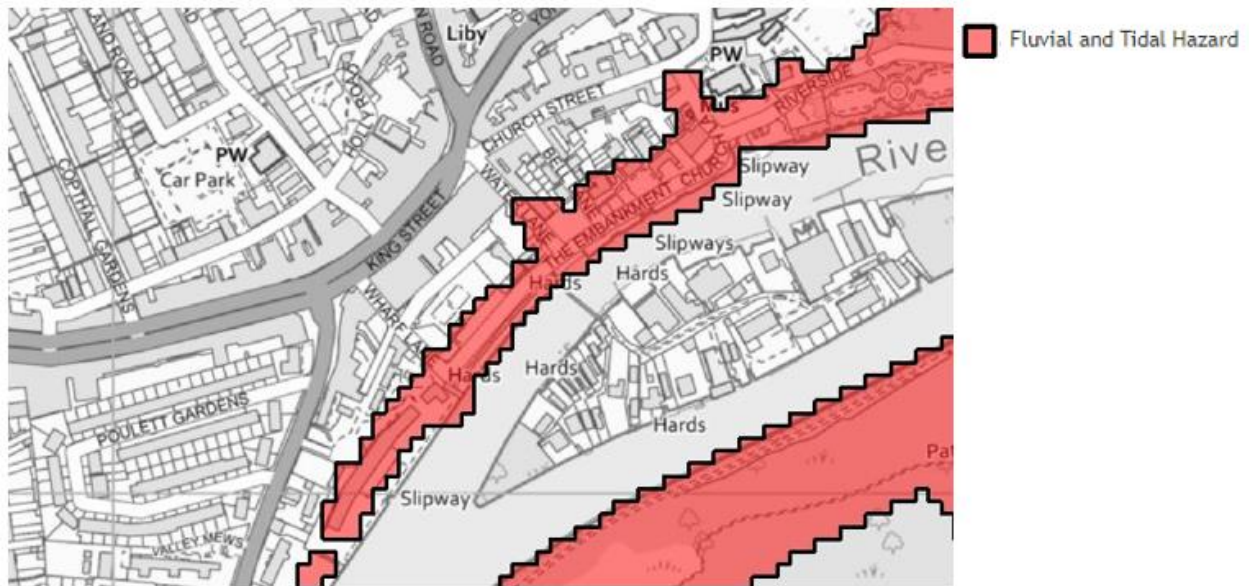


Figure 4 Fluvial and Tidal Hazard zones (Strategic Flood Risk Assessment – Fluvial and Tidal Flood Risk map, LBRuT)

2.3. Proposed Land Use

The development will comprise of a number of different units, including:

- Boat storage is located on the Embankment within flood zone 3b, this is classified as ‘Water Compatible’ development
- Restaurants and cafes at ground floor level;
- Business and retail units at ground floor level;
- Residential units, on first, second and third floors; and
- A new public square and areas of public realm throughout.

2.4. Important Infrastructure and Vulnerable Areas

Figure 5 shows the location of the most hazardous areas of the site if a breach event occurred. Within the areas not raised above the flood defence walls, only ‘Water Compatible’ areas are proposed. ‘More Vulnerable’ uses of the development (residential) have been confined to the upper levels of the developments (1st floor and above), providing even greater flood security.

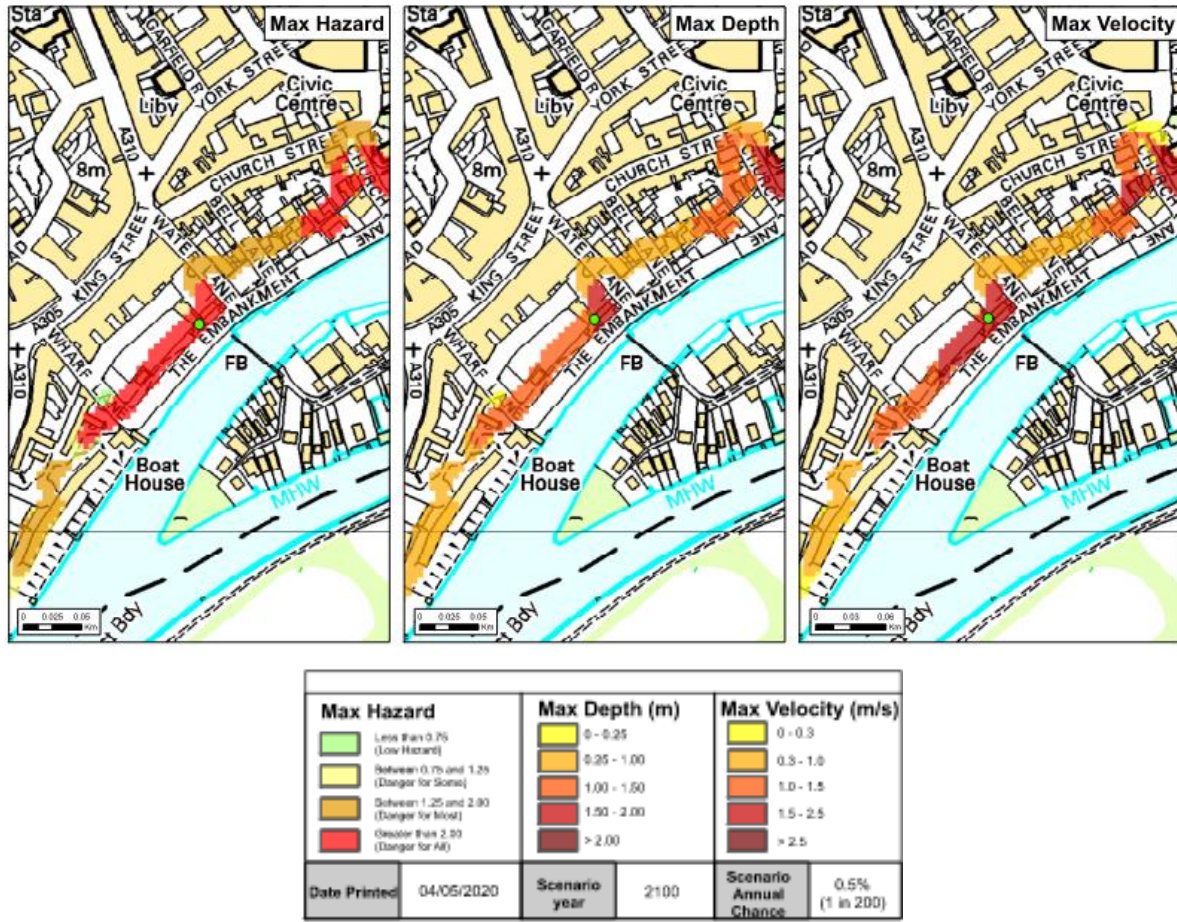


Figure 5 Thames Tidal Breach Hazard Mapping (Environment Agency)

3. FLOOD RISK ASSESSMENT SUMMARY

The site is currently within Flood Zones 1, 2, 3a and 3b. The proposed development is “water compatible” within Flood Zone 3b and all other proposed buildings will be located in Flood Zone 1, and protected by the new flood defence structures. Please refer to the Flood Risk Assessment for further information.

This report assessed the risk of flooding from a variety of sources. A summary of these risks is included in the table below:

Table 1: Flood Risk Summary Table

Source of flooding	Risk summary and mitigations
Rivers and the Sea (Raised land FZ1)	Very Low risk of flooding including in a breach scenario.
Rivers and the Sea, the Embankment and areas of the site lower than 6.94m	High Risk of flooding. Flood evacuation plan has been developed and only Water Compatible development is within the high-risk area.
Groundwater	Based on the SFRA information and the Site Investigation report the risk of groundwater flooding is Low.
Sewers	Low risk based on historic data available in the SFRA.
Surface Water	Low risk of surface water flooding for Water Lane, Wharf Lane and The Embankment. Very Low risk of surface water flooding for the raised residential area of the site. The runoff rate to the surface water network has been reduced and new site attenuation is proposed. Therefore, the risk of surface water flooding has been reduced.
Reservoirs, Canals	There is some risk of flooding from reservoirs and canals, however this flood risk is contained to areas with Water Compatible infrastructure. The remainder of the proposed development is at a topographic level above this flood risk.

The proposed design includes the relocation of flood defence structures. In accordance with LBRuT and Environment Agency requirements the proposed flood defence structures have been designed to a level greater than the minimum prescribed by the TE2100 level. The design allows essential maintenance and upgrading to be carried out in the future.

3.1. Impact of Climate Change

The Plan has been written utilising the most up-to-date data at the time of writing, to ensure the correct climate change guidance has been applied. Climate risks have been considered over the lifetime of the development, alongside the impact of the design responses to flood risk and coastal change.

4. FLOOD WARNING, ALERT NOTICES AND MITIGATION MEASURES

4.1. Mitigation Measures

The site layout has been carefully considered to ensure areas with the most vulnerable uses are restricted to higher ground, at lower risk of flooding from all sources. The areas most at risk of flooding are 'Water Compatible' and mitigation measures have been introduced to minimise possible damage if flooding does occur.

A boathouse and public space, including seating, is located in the flood risk zone of the site. If flooding was to occur, the boathouse has a caged interior to prevent internal items from being washed away, whilst public use items (such as seating and bins) have been fixed to the ground to reduce the likelihood of becoming a hazard in flood waters.

Any services within the flood zone will be water resistant and key components, such as main fuse boards, located above the flood level.

All drainage within the basement in the Wharf Building will be pumped and fitted with non-return valves to stop flood water entering the property through the drainage network.




New buildings will be raised to 0.46 m above the fluvial flood levels for the 1 in 100-year event, plus 35% for climate change. Therefore, specific measures are not required. Neighbouring ground levels surrounding the buildings are as such that water will drain away from the buildings.

4.2. Flood Warning

It is recommended that all occupiers sign up to the Environment Agency's flood warning service, so that when the Environment Agency issues a flood alert or warning the service will send an automated warning message.

It should be noted that the site is also situated in a larger geographical area where the Environment Agency provides a general early Flood Alert notification for possible flooding. Therefore, the Flood Alert may not specifically apply to the application site itself and its immediate peripheries. The EA flood warnings are outlined in Table 2.

Table 2 Environment Agency Flood Warnings

EA Flood Warning	Explanation	What to do
 <p>FLOOD ALERT FLOODING IS POSSIBLE. BE PREPARED</p>	<p>Flooding of low lying land and roads is expected.</p> <p>Be alert, be prepared, and watch out.</p>	<ul style="list-style-type: none"> ➤ Monitor local news and weather forecasts ➤ Be aware of water levels near you. ➤ Be prepared to act on your flood plan ➤ Check on the safety of pets and livestock ➤ Prepare a flood kit of essential items ➤ Charge your mobile phone
 <p>FLOOD WARNING FLOODING IS EXPECTED. IMMEDIATE ACTION REQUIRED.</p>	<p>Flooding of homes and businesses is expected.</p> <p>Act now!</p>	<ul style="list-style-type: none"> ➤ Move cars, pets, food, valuables and important documents to safety. ➤ Get flood protection equipment in place. ➤ Turn off gas, electricity and water supplies if safe to do so ➤ Put flood protection equipment in place ➤ Be prepared to evacuate your home. ➤ Protect yourself, your family and help others. ➤ Act on your flood plan
 <p>SEVERE FLOOD WARNING SEVERE FLOODING. DANGER TO LIFE</p>	<p>Severe flooding is expected.</p> <p>There is extreme danger to life and property.</p> <p>Act now!</p>	<ul style="list-style-type: none"> ➤ Stay in a safe place with a means of escape ➤ Be ready should you need to evacuate ➤ Co-operate with the emergency services ➤ Call 999 if you are in immediate danger

4.3. Flood Alert Notice

A Flood Alert Notice should be displayed in a prominent, clearly visible place, or places, on the site to indicate the current flood alert status issued by the Environment Agency. Figure 6 is an example of a Flood Alert Notice.

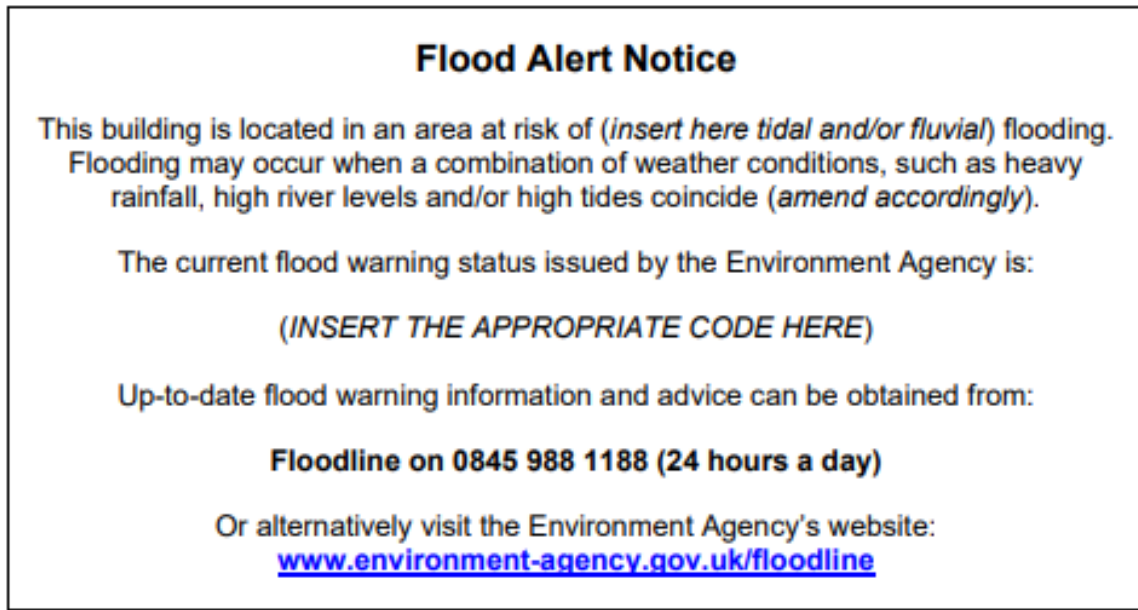


Figure 6: Flood Alert Notice Example

5. FLOOD MANAGEMENT AND EVACUATION

5.1. Actions Upon Receiving Alerts and Warnings

The site is located along the Tidal Thames, whereby flood warnings will be issued by the EA no later than 2 hours before the tide reaches this area; however, it is expected the warnings will generally be issued about 6 hours in advance of high tide.

The flood evacuation warning triggers and the corresponding procedures are outlined in Table 3.

Table 3: Flood Evacuation Procedures

Warning Trigger		Procedures
1	Environment Agency Flood Alert	Review Flood Warning and Evacuation Plan Procedures
2	Environment Agency Flood Warning	LBRuT's Property Management Team to issue Flood Warning, representing a state of readiness ahead of a potential flood situation. Move any critical equipment and information to a safe location. Encourage site occupants to evacuate via Water Lane.
3	Environment Agency Severe Flood Warning	Occupiers to immediately start evacuation of site. Use allocated evacuation route to facilitate/direct the safe evacuation of all personnel. LBRuT's Property Management Team to contact the Emergency Services and EA to confirm that the site is being closed due to possible risk of flooding.

5.2. Access and Egress Routes

As the Environment Agency does not perform a flood evacuation role during a flood incident, it is for the council to define acceptable access and egress routes. LBRuT states that there should be safe access to and from the development, and depending on the safe access and egress routes, on-site and/or temporary refuge may be required.

Figure 7 shows a map of the site, showing the ground elevation increasing towards the north of the site. Multiple access and egress routes are suggested, due to the nature of the site. These access and egress routes should be signposted on site.

A safe zone is highlighted, which is the area of the site that is raised above the flood defence walls. An assembly point will be located within the safe zone; the precise location should be agreed with LBRuT's Property Management Team. In addition, access routes to the safe zone from the flood risk area of the site are highlighted. If a rapid inundation event occurs, occupants of the site should egress to the safe zone and, if needed, along the suggested safe egress routes.

Rescue by Emergency Services is not necessary due to the provision of safe egress routes. If required, access for emergency vehicles can be provided via the safe egress route on Water Lane.

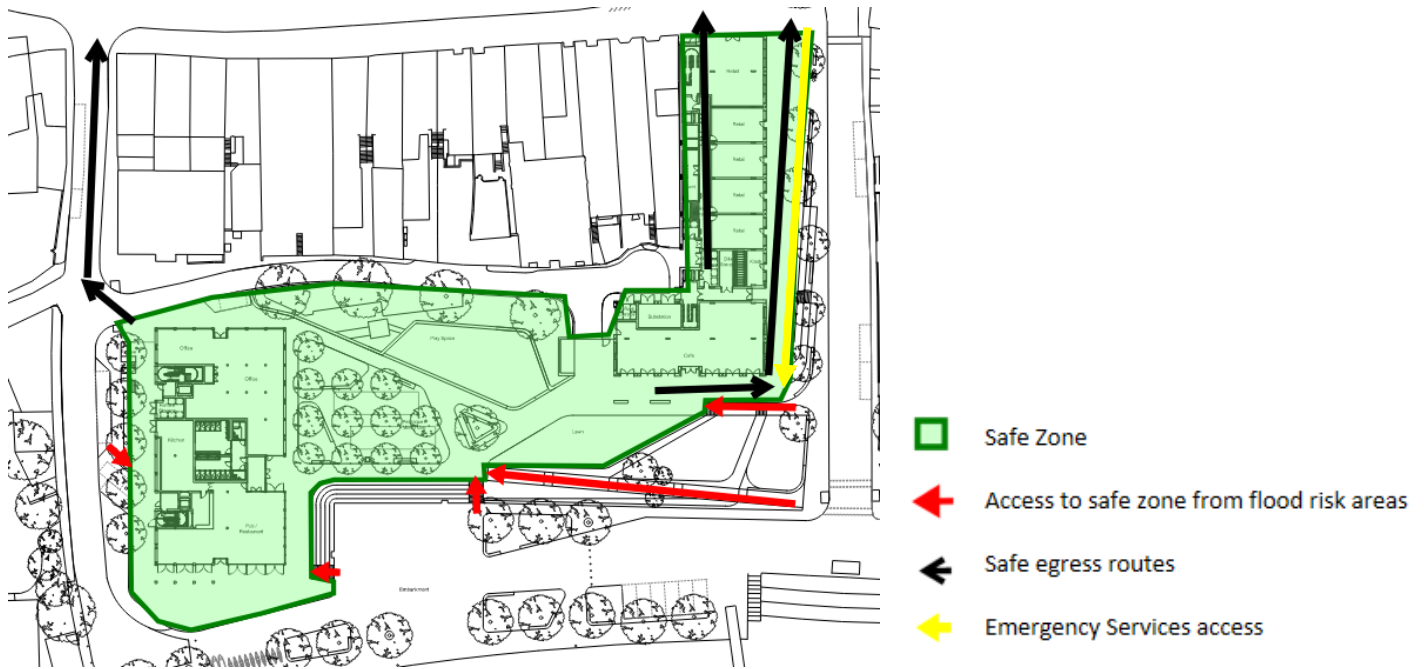


Figure 7 Map of site showing safe zone and recommended access and egress routes

5.2.1. Safe Refuge

If safe refuge is required, the more vulnerable locations of the site are located on the upper floors only and can be utilised as a place of safe refuge. However, the safe refuge will be an isolated safe zone and should only be considered if the access and egress routes are inaccessible. In addition, it is suggested that a Flood Kit should be stored and kept at the on-site refuge to support a short-term stay. The EA has a suggested flood kit list, however depending on the personal needs of the occupants, additional items not suggested in the EA's list may be required.

5.2.1.1. Environment Agency Flood Alert/Warning

In the event of a Flood Alert or Flood Warning, it is recommended that occupants are evacuated from site, without utilising the safe zone to reduce the possibility of being stranded. Access and Egress to the site can be granted via the suggested routes shown in Figure 7.

5.2.1.2. Environment Agency Severe Flood Warning

It is recommended that an evacuation route to the Safe Zone is devised by the Building Construction Manager. This Zone should be used in the event of a Severe Flood Warning or if flood water has already started to enter the site. If sufficient time and preparedness has been accomplished, then all site occupants should be able to leave the site along the suggested egress routes before the Flood Waters approach.

Access and egress to the site, for emergency services during a breaching event, to the site can be granted via the suggested access and egress routes in Figure 7.

Once the site has been built the evacuation route should be reviewed by LBRuT's Management Team and revised if deemed necessary.

5.3. Actions Post Evacuation and Water Level Falling

As detailed, the Environment Agency Flood Warnings identify a 'potential' rather than 'actual' threat. It should be noted that not all events would result in an automatic progression from one warning to another with the result being flooding and evacuation of the site. It is possible for smaller events to trigger initial warnings with water levels subsequently falling before flooding of the application site occurs.

Should water levels within the River Thames exhibit a sustained fall at any point during the event, this would be identified by the River Level monitors and an automatic notification sent to LBRuT's team manager. With notification that the river level is falling, LBRuT's team manager can downgrade the response to at the site.

5.4. Dangers of Flood Water

Following a flood, a reminder of the dangers associated with flood water should be issued by LBRuT's Property Management Team to all occupiers of the site, as shown in Figure 8. This may be issued through the use of signage on site, or through other means deemed appropriate by LBRuT's Property Management Team.

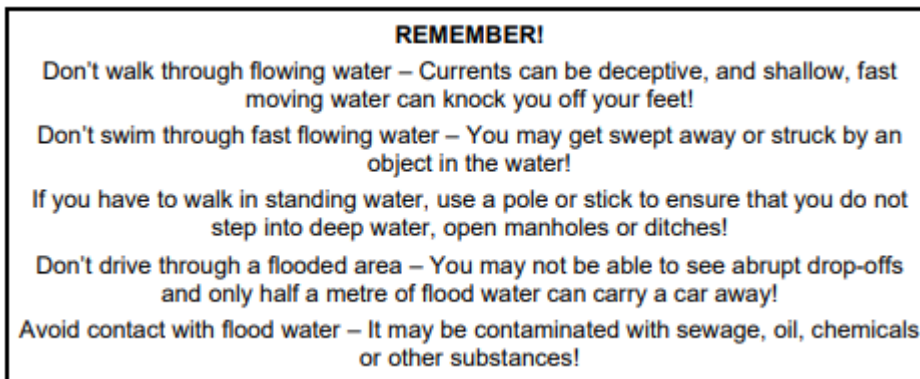


Figure 8 Reminder of the dangers of flood water

5.5. Post Flooding Clean Up Plan

Depending on the severity of the flooding, LBRuT's team manager should coordinate with the relevant authorities to implement a Post Flooding Clean Up Plan. The structures within the area most at risk of flooding are deemed 'Water Compatible' and have been designed to allow for water to flow through, alongside having easily accessible points to aid with clean up.

6. KEY CONTACTS AND INFORMATION

Table 4 lists contact numbers for personnel and agencies that have key roles during a flood emergency. This table should be completed by LBRuT's Property Management Team and issued to all occupiers.

Table 4: Key Personnel and their Contact Numbers

	Name	Role	Contact Number
	LBRuT's Team Manager		
	Building Contractor Manager		
	Environment Agency Floodline	The Environment Agency will issue a flood warning to LBRuT's Team Manager and the Building Contractor Manager	0345 988 1188

6.1. Emergency Services

Table 5 provides contact numbers for relevant Emergency Services.

In an emergency where there is real and immediate threat to life or property always dial 999.

Table 5: Contact Numbers for Emergency Services.

Body	Contact Numbers
Twickenham Fire Station	020 8555 1200
Twickenham Police Station	020 8607 9199 or 101
Environment Agency	0345 988 1188

If medical attention is required within the workplace First Aiders should be in attendance and a record of the individual affected and the circumstances relating to the incident should be kept.

The closest hospital with an Accident and Emergency Department to the Site, is West Middlesex University Hospital. The Hospital can be contacted on 020 8560 2121, the address is: Twickenham Road, Isleworth, TW7 6AF.

6.2. Other Useful Numbers

Table 6 provides a list of other useful numbers for the Site. This table should be completed by the LBRuT’s Property Management Team.

Once construction of the site is complete this table should be periodically reviewed, and if necessary updated, by LBRuT’s Property Management Team during the lifetime of the site.

Table 6: Other Useful Contact Numbers

Body	Name	Contact Number
Electricity Provider		
Gas Provider		
Water Company		
Telephone Provider		
Local Authority	London Borough of Richmond upon Thames	020 8831 6108

6.3. Location of Services

Table 7 lists the location of key service cut-off switches and valves. This table should be completed by the Building Contractor during the construction of the site. Once the site has been built this table should be reviewed and if necessary updated by LBRuT’s Property Management Team for the lifetime of the site. If it is safe to do so, it is recommended that these services are turned off by the Building Construction Manager during construction phase when the site is being evacuated, following construction this should be carried out by a member of LBRuT’s Property Management Team.

Table 7: Location of Service Cut-Off Switches and Valves

Service	Location of Cut-off Switches and Valves
Electricity	
Gas	
Water	

7. TRAINING

During the construction phase a Flood Manager would be appointed by the building contractor and during the lifetime of the site LBRuT's Management Team would appoint a Flood Manager. These Flood Managers would ensure that all construction personnel and future occupants of the site respectively are aware of the potential flood risk and of how to respond in the event of a flooding emergency. The training for construction personnel and post construction operatives would, as a minimum, cover:

- Requirements of the Flood Warning and Evacuation Plan;
- confirmation of Key Roles, clearly identifying positions held, responsibilities, communication and chain of command;
- staff duties;
- evacuation routes;
- staff safety during a flood event;
- electrical systems emergency shut off procedures;
- operation of the communications / public address system, signage and traffic management systems; and
- training drills.
- All construction staff shall be trained as part of the site induction process and all staff shall be re-trained annually.

8. FLOOD WARNING AND EVACUATION PLAN REVIEW

The Flood Warning and Evacuation Plan would be subject to update/ review:

- whenever there are changes to any of the contact numbers, names or roles held within the Plan;
- or, as per LBRuT’s Guidance on Producing a Flood Emergency Plan, at a minimum of every three years.

All updates / reviews shall be documented and recorded. LBRuT’s Property Management Team shall ensure an up-to-date version of the Plan is available at all times during the construction phase, and during the lifetime of the development the LBRuT Council shall ensure an up-to-date version of the Plan is available at all times.

When the Emergency Plan is updated Table 8 should be completed for document control and to understand why changes were needed.

Table 8: Flood Evacuation Procedures Document Control

Version	Date	Prepared by	Checked by	Approved by	Reason for Revision

9. APPENDIX A: USEFUL INFORMATION

General advice:

- Find out if your property is at risk of flooding - <http://www.environmentagency.gov.uk/homeandleisure/floods>
- Sign up to receive flood warnings - <https://www.gov.uk/sign-up-for-flood-warnings>
- Monitoring flood warnings and river levels- <https://www.gov.uk/check-if-youre-at-risk-of-flooding>
- Make a personal flood plan <https://www.gov.uk/prepare-for-a-flood/make-a-flood-plan>
- Preparing your property for flooding - <https://www.gov.uk/government/publications/prepare-yourproperty-for-flooding>
- What to do before, during and after a flood - <https://www.gov.uk/government/publications/floodingwhat-to-do-before-during-and-after-a-flood>
- Advice on obtaining home insurance - <https://www.gov.uk/prepare-for-a-flood/get-insurance>

Improving the resistance and resilience of your property:

- Improving your property's flood protection - <https://www.gov.uk/prepare-for-a-flood/improve-yourpropertys-flood-protection>
- Blue Pages - directory of businesses providing flood resistance and resilience products - <http://www.bluepages.org.uk/>

Business/commercial premises specific advice:

- Prepare your business for flooding - <https://www.gov.uk/government/publications/preparing-your-business-for-flooding>
- London Borough of Richmond on Thames Flood Risk Strategy - https://www.richmond.gov.uk/flood_risk_assessment
- Direct Government Preparing for Emergencies - <https://www.gov.uk/government/policies/reducing-the-threats-of-flooding-and-coastal-change/supporting-pages/planning-for-and-dealing-with-floodemergencies>
- UK Resilience - <http://www.cabinetoffice.gov.uk/ukresilience.aspx>