

SITE ASSESSMENT - Bentall Centre

Address: Wood Street, Kingston, KT1 1TP	Area: 1.96 Ha
	Site Reference: SA 010

Current Use	Proposed Use
Shopping Centre	Mixed Commercial Class E uses (Office and retail)

Current Vulnerability Classification	Proposed Vulnerability Classification
Less Vulnerable	Less Vulnerable

Current Risk Summary					
Fluvial / Tidal			Groundwater		
FZ2	100	% of Site	<25	52.8	% of Site
FZ3a	0	% of Site	25-50	0	% of Site
FZ3b	0	% of Site	50-75	47.2	% of Site
Surface Water			>75	0	% of Site
1 in 30	0	% of Site	Artificial		
1 in 100	2.1	% of Site	Reservoir	Y	At risk?
1 in 1000	13.9	% of Site	Canal	N	At risk?
Sewer Flooding			Town Centre		
No. Incidents	65		Y/N		Y

Flood Defences
The site is not in an area benefitting from flood defences.
Flood Warning Area
The EA Flood Warning Service is available at this site.

FLUVIAL / TIDAL

Risk Assessment (Defended) - River Thames				
Parameter	FZ3b	FZ3a	*FZ3a+CC	Units
Speed of inundation	N/A	N/A	N/A	Hrs
Min. Depth	N/A	N/A	0.09	m
Max. Depth	N/A	N/A	1.19	m
Max. Velocity	N/A	N/A	0.61	m/s
Max Flood Level	N/A	N/A	8.26	m AOD
Max Ground Level	8.32	8.32	8.32	m AOD
Min Ground Level	7.01	7.01	7.01	m AOD
Max Flood Hazard	N/A	N/A	1.86	N/A
Duration of Flood	N/A	N/A	N/A	Hrs

* The +35% Climate Change Allowance event (central allowance) is reviewed

Risk Assessment (Defended) - Hogsmill River				
Parameter	FZ3b	FZ3a	*FZ3a+CC	Units
Speed of inundation	N/A	N/A	12:00	Hrs
Min. Depth	N/A	N/A	0	m
Max. Depth	N/A	N/A	0.57	m
Max. Velocity	N/A	N/A	0.26	m/s
Max. Hazard	N/A	N/A	1.30	N/A
Duration of Flood	N/A	N/A	>15.45	Hrs

Description of Flood Mechanism

- The site is at risk of flooding from the River Thames and the Hogsmill River.
- The River Thames, which is located 1 km from the western boundary of the site, presents the highest risk to the site.
- The predicted flood risk extent for climate change scenario for the River Thames covers the entire site area.
- The 1 in 100 undefended scenario for both River Thames or the River Hogsmill does not extend into the site.
- Figure 1 and Figure 2 show the fluvial flood risk from the River Thames.

Note: the EA are due to update River Thames model

Figure 1 - Fluvial Flood Depth Map

Site Access / Egress

- Safe access / egress routes should be identified (see Surface Water section).
- Safe refuge areas must be provided on site to account for the predicted impact of climate change on the site.

Figure 2 - Fluvial Flood Hazard Map

Mitigation / FRA Requirements

- Self-contained basement dwellings and bedrooms are not permitted. See SFRA Level 2 Report mitigation requirement number 4.10 for additional basement stipulations.
- See SFRA Level 2 Report mitigation requirements number 4.2, 4.4 and 4.5 for further development stipulations.
- Develop a Flood Emergency and Evacuation Plan for the site.
- Site users should be signed up to EA's Flood Warning Service.

SURFACE WATER

Risk Assessment				
Parameter	1 in 30	1 in 100	*1 in 1000	Units
Min. Depth	0	0	0	m
Max. Depth	0	0.30-0.60	0.9-1.20	m
Max. Velocity	0	0.25-0.50	0.50-1.00	m/s
Max. Hazard	0	0.75-1.25	1.25-2.00	N/A

*The 1 in 1000 year flood extent represents the potential climate change adjusted impact of current risk

Description of Flood Mechanism

- Only a small area of the site is predicted to be at risk of surface water flooding in to 1 in 1000 year flood event (Flood Zone 3a). In this scenario, surface water is predicted to pond in the centre of the site and along the south-eastern border of the site.
- Climate change is predicted to increase the flood extent, depth, maximum velocity and flood hazard rating.

Site Access / Egress

Safe access and egress routes should be directed towards the north-east corner of the site on Dolphin Street where there is no flooding is predicted.

Figure 3 - RoFSW Flood Depth Map

Mitigation - Flood Risk Requirements

- Developments should be restricted to areas of lower flood risk and directed away from the south-eastern corner of the site.
- See SFRA - Level 2 Report mitigation requirement number 4.2, 4.5, 4.6 for further development stipulations.

Figure 4 - RoFSW Flood Hazard Map

Mitigation - Surface Water Drainage

- A Kingston SuDS Proforma must be submitted with planning application.
- Developments should apply the Sustainable Drainage Hierarchy set out in Policy SI13 of the London Plan.
- Ground investigations are required to confirm whether infiltration based SuDS are suitable.

SITE ASSESSMENT - Bentall Centre		
SEWER	GROUNDWATER	ARTIFICIAL
Risk Assessment	Risk Assessment	Risk Assessment
<ul style="list-style-type: none"> The site is served by separate surface water and foul sewer networks. The site falls within a postcode area where there are 65 reported flood incidents from sewer flooding. 	<ul style="list-style-type: none"> The western half of the site is classified as having 50-75% susceptibility to groundwater flooding, while the eastern half of the site is classified as having <25% susceptibility to groundwater flooding. The site is underlain by Langley Silt Member superficial deposits and London Clay bedrock geology. 	<ul style="list-style-type: none"> The site is at risk from a number of reservoirs including the Hampton (Grand Junction, Stain Hill, Sunnyside), Island barn Queen Elizabeth II, Queen Mother, Staines (North & South), Walton (Bessborough & Knight), Wraysbury reservoirs. If any of these reservoirs breach on a wet day i.e. when the local rivers at capacity, the site will be at risk of flooding.
Mitigation Requirements	Mitigation Requirements	Mitigation Requirements
<ul style="list-style-type: none"> Applicant must consult with TWUL to confirm if the development site has historically flooded. TWUL must agree to any proposed sewer connection. Where historic flooding has occurred, the applicant must show how this risk will be managed for the lifetime of the development. 	<ul style="list-style-type: none"> Applicant should carry out a screening study (as a minimum) to establish if there are any subterranean flood risk issues that may require further investigation. If there is a potential level of impact, mitigation actions must be proposed. Must be prepared by a chartered professional or specialist. 	<ul style="list-style-type: none"> Propose appropriate and proportionate risk management measures. A suitable emergency response plan should be put in place, including an emergency warning system in the event of a reservoir flooding incident. Local Authority Emergency Planning Officers must be consulted to create a reservoir failure emergency and evacuation plan.

Figure 5 - Thames Water Sewer Flood Map

Figure 6 - Areas Susceptible to Groundwater Flooding Map

Figure 7 - Reservoir Flood Map - Wet Day

PLANNING CONSIDERATIONS
Safety of Development
<p>A. Can the development be future proofed for climate change considerations?</p> <ul style="list-style-type: none"> Yes. See SFRA - Level 2 Report mitigation requirement number 4.3 and 4.4 for the required finished floor levels and flood resistant / resilient building stipulations. <p>B. Can the development be designed safe throughout its lifetime without increasing flood risk elsewhere?</p> <ul style="list-style-type: none"> Yes. The development must use surface water drainage techniques to manage surface water runoff onsite through above ground SuDS and / or below ground attenuation. Green drainage infrastructure should be prioritised to provide wider ecological / biodiversity benefits as per London Plan Policy SI 13. See SFRA - Level 2 Report mitigation requirement number 4.5 for compensatory flood storage stipulations. <p>C. What is the cumulative impact of the development land use change and will flood risk increase?</p> <ul style="list-style-type: none"> The development land use is not changing. It is proposed to be used for commercial uses. The site is currently a brownfield site with hardstanding areas and little green space. This offers an opportunity to improve flood attenuation through new development. Development must mitigate any increase in impermeable area to the site with flood plain compensation and runoff storage to prevent any increase in flood risk. An increase in impermeable area coverage on site will increase surface water runoff and flood risk if not managed properly. <p>D. How can the development reduce risk overall?</p> <ul style="list-style-type: none"> Directing development away from the south-eastern corner and centre of the site. Include SuDS to manage surface water runoff and reduce run-off rates to comply with Policy DM 4 in Kingston's Core Strategy. By Complying with SFRA - Level 2 Report mitigation requirement numbers 4.2, 4.4 and 4.5. <p>E. Will development require a flood risk permit/watercourse consent?</p> <ul style="list-style-type: none"> No. The site is not located within 8m of a Main River or 5m of an Ordinary Watercourse. <p>F. Is the Exception Test required?</p> <ul style="list-style-type: none"> The Exception Test is not required as the proposal is for development with a 'Less Vulnerable' classification in Flood Zone 2.



