

	AB004 - North of the Station (Local Plan ref: CR11e)											
Grid Reference	SU 714	90 471490		Post Code	•	RG1	8AL					
Topography	atto atto		Depart	 < 35 mAOD 41 - 4 35 - 36 mAOD 42 - 4 36 - 37 mAOD 43 - 4 37 - 38 mAOD 44 - 4 38 - 39 mAOD > 45 39 - 40mAOD The topography of the silargely flat, ranging betwa approximately 37.5m AC 39.4m AOD. 				41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD mAOD ite is /een DD and				
Flood Zone Map	Son Balance To Balance To Balanco		Peper		Legend River Site Boundary Flood Zone 2 Flood Zone 3 Flood Zone 3b							
Flood Zone 1	10%	Flood Zone 2	90%	Flood Zone 3a	0%	F	Flood Zone 3b	0%				
Surface Water	ante ante		Depet Depet	CarF	Risk o	f Surfa River Site Bour Iigh - 1 i robabilit Aedium - robabilit ow - 1 in Probabilit (ery Low robabilit	ce Water F ndary in 30 annual ty - 1 in 100 an ty n 1000 annu ty v - > 1 in 100 ty	looding nual al 0 annual				

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Develo Propos	pment sal	640-960 dwellings, 50,000m ² of offices, 3,000 - 6,000m ² net gain of retail, leisure, potential hotel. Vulnerability Classification Less Vulnerability (offices/retail), More Vulnerability (residential)							
Applica Climate Allowa	able e Change nces	The +25% and +35% peak river flow climate change allowances should therefore be used to assess a range of climate change scenarios. The +25% allowance should be used to provide a benchmark flood level against which mitigation measures should be set, and the +35% allowance used to assess residual risk to the development.							
Climate Extents	e Change s	Legend River Site Boundary 1 in 100 annual probability +25% Change 1 in 100 annual probability +35% Change							
1 in 10 probab	0 annual bility +25%	60%	1 in 100 annual probability +35%	70% 1 in 100) annual N/A				
	Flood Depth Flood of the present day 1 in 100 annual probability event. In the 1 in 1000 annual probability flood event, the site experiences maximum flood depths of typically 400mm. Flood depths in the climate change scenarios are typically 100mm in the +25% scenario, and 200mm in the +35% scenario.								
sk	Flood Dept No flooding probability f Flood depth in the +35%	h occurs in the p lood event, the s is in the climate scenario.	present day 1 in 100 ar site experiences maximu change scenarios are ty	nual probability event. In flood depths of typica pically 100mm in the +2	In the 1 in 1000 annual ly 400mm. 5% scenario, and 200mm				
Description of Flood Risk	Flood Dept No flooding probability f Flood depth in the +35% Flood Warr The River T rainfall ever rising river period of ad The EA iss advance wa residents ar	th loccurs in the p lood event, the s as in the climate scenario. Thames is a larg nts. The respon levels downstre dvance warning (sue flood warnir arning of a flood nd businesses to	present day 1 in 100 ar site experiences maximu change scenarios are ty I of Inundation ge catchment with floodi se time – i.e. the period am – can be significant (i.e. a period of days) be ngs for the area via the event can typically be p take appropriate action	nual probability event. In flood depths of typica pically 100mm in the +2 ng typically the result of between the rainfall over , and this ensures there fore flooding occurs in the eir 'Flood Information So rovided to allow the Cou	In the 1 in 1000 annual ly 400mm. 5% scenario, and 200mm sustained regional-scale er the catchment and the e is typically a significant e area. ervice' and considerable ncil, emergency services				





Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.2km north of the site, includes bank protection on its right bank with a design standard of 1 in 5 years. The condition is currently at 4 (poor), on a scale of 1 (very good) to 5 (very poor).

Other Sources of Flooding

The Level 1 SFRA indicates that the site has not been subject to historic river flooding, and is not noted to have been impacted by flood events from other sources. Vastern Road, located north of the site, has previously been impacted by flooding. External areas are noted to be impacted by surface water flooding, which, if surface water drainage strategy is not sufficiently incorporated into proposed development design, could result in ponding of water following heavy rainfall events. Site drainage must therefore be considered with respect to future development, and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding varies between '25% to 50%' and '>75%'. The Thames Water DG5 information indicates that the site is within a postcode (RG1 8) that has 21-50 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 2 'Medium Probability' (between 1 in 100 and 1 in 1000 annual probability of river flooding);
- The maximum flood depth during the 1 in 1000 annual probability event is typically 400mm;
- Approximately half of the site is impacted by the 1 in 100 annual probability +25% allowance for climate change flood event with general depths of 100mm, rising to 200mm in the 1 in 100 annual probability +35% climate change allowance scenario;
- The site is largely classified as at Very Low risk of surface water flooding, with localised areas between Low and High risk;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- The pedestrian access route via Vastern Road is impacted by the 1 in 100 annual probability +35% climate change allowance flood event. Further analysis of flood depths/flood hazard is required and development may be reliant on advance warning measures and provision of a Flood Risk Management/Evacuation Plan. For the commercial elements an evacuation plan should be sufficient and the building could be vacated and secured in advance of flooding.

The site is shown to be at 'Medium' probability of fluvial flooding, at a range of very low to high risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources but it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

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Spatial Planning

The site lies within Flood Zone 2 'Medium Probability', affected by flooding from the River Thames in the 1 in 1000 annual probability flood event. The majority of the site is shown to be impacted by the 1 in 100 annual probability +25% and +35% allowances for climate change flood events.

A review of flood risk within the site has been carried out, and it is considered feasible to design the site in such a way that it remains safe throughout the lifetime of the development.

It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +25%, assuming a 100 year lifetime for residential development;
- Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +25% climate change allowance flood event. The presence of a significant existing building footprint suggest that floodplain storage capacity could be improved through effective design measures;
- 3. Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA';
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 5. Safe access is available in the current 1 in 100 annual probability flood event and would therefore meet the requirements of Section 3.4 of the L2 SFRA provided a 'Flood Management and Evacuation Plan' is prepared to consider the impacts in the climate change scenarios. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +25% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 2 'Medium Probability';

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 Residual risk to the development should be investigated against the 1 in 100 annual probability +35% allowance for climate change flood event.







	AB005 - Riverside (Local Plan ref: CR11g)												
Grid Referend	SU 71 5	550 471550		Post Code	;	RG1 8D	D						
Topography	y y y Legend y y y y y y y y y y y y y						 40 41 42 43 44 44 45 of the s ing betw 8.2m AC 	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD ite is veen DD and					
Flood Zone Map	199 199	and the second s	Depot		Legend River Site Boundary Flood Zone 2 Flood Zone 3 Flood Zone 3b								
Flood Zone 1	30%	Flood Zone 2	60%	Flood Zone 3a	5%	Flo	ood ne 3b	5%					
Surface Water	Marine State	The second secon	Depot	CO CO	Risk o	f Surface River Site Bound High - 1 in 3 Probability Low - 1 in 1 Probability /ery Low - probability	Water F ary 30 annual in 100 ar 000 annu > 1 in 100	looding Inual Ial 00 annual					

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Develo Propos	opment sal	250 - 370 dv 2,000m² of l	vellings and 1,000 - eisure	Vulnerability Classification	I	Less Vulner More Vulner	able, able		
Applica Climate Allowa	able e Change Inces	The +25% a a range of c (i.e. based c The +25% a mitigation m to the develo	The +25% and +35% peak river flow climate change allowances should be used to assess a range of climate change scenarios, based on More Vulnerable proposed development (i.e. based on the highest vulnerability element proposed). The +25% allowance should be used to provide a benchmark flood level against which mitigation measures should be set, and the +35% allowance used to assess residual risk to the development.						
Climate Change Extents Change							Climate Climate		
1 in 10 probab	0 annual bility +25%	20%	1 in 100 annual probability +35%	25%	1 in 100 probabi	annual lity +70%	N/A		
	Flood Dep The site is probability In the appli	th unaffected in flood event, p icable climate	the present day 1 in 100 arts of the site experience change scenarios, the ma	annual probabilit maximum flood o jority of the site r	ty event. depths up emains u	In the 1 in 1 to 400mm. naffected by f	000 annual		
Risk	scenario, a	and 300mm in	the +35% scenario.	i parts of the site	are typic	ally 200mm i	n ine +25%		
Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained regional-scale rainfall events. The response time – i.e. the period between the rainfall over the catchment and the rising river levels downstream – can be significant, and this ensures there is typically a significant period of advance warning (i.e. a period of days) before flooding occurs in the area. The EA issue flood warnings for the area via their 'Flood Information Service' and considerable advance warning of a flood event can typically be provided to allow the Council, emergency services									
	Velocity of The site is climate cha is typically	f Flood Wate in occupied k ange allowand slow and velo	rs by buildings in an urbanise ce scenarios. When floodin potities will correspondingly	d area, and is in g does occur, the be slow with the	npacted t a rate of r direction	o a limited de ise and fall in of flow from v	egree in the water level vest to east		

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(subject to further interrogation of the EA modelling). However, the northern boundary is adjacent to the River Thames channel and higher velocity flows would be anticipated at this location.

Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located adjacent to the northern boundary of the site, includes bank protection on its right bank with a design standard of 1 in 5 years. The condition is currently at 4 (poor), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA indicates that the northern boundary of the site – due to the proximity of the River Thames – has been subject to historic river flooding in 1977, 2000, 2003, 2012 and 2013/14, and notes that an area east of the site has previously been impacted by fluvial flooding, caused by blockage. The site is not noted to have been impacted by historic flooding from other sources. Vastern Road, located south of the site, has previously been impacted by road flooding. Site drainage must be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding varies between '25% and 50%'. The Thames Water DG5 information indicates that the site is within a postcode (RG1 8) that has 21-50 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The majority of the site is classified as Flood Zone 2 'Medium Probability' (between 1 in 100 and 1 in 1000 annual probability of river flooding);
- The site is unaffected in the present day 1 in 100 annual probability event. Maximum flood depths during the 1 in 1000 annual probability event are up to 400mm;
- A minor portion of the western and northern boundaries is impacted by the 1 in 100 annual probability +25% allowance for climate change flood event with depths up to 200mm, rising to 300mm in the +35% climate change allowance scenario;
- The site is largely classified as at Very Low risk of surface water flooding, with a minor area of Low risk on the eastern boundary;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- The pedestrian access route via Vastern Road would be available in the present day 1 in 100 annual probability event but would be impacted in climate change scenarios. Further analysis of flood depths/flood hazard is required and development would be reliant on provision of a Flood Management and Evacuation Plan.

The site is shown to be at 'Medium' probability of fluvial flooding, at very low/low risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources but it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

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Spatial Planning

The site lies within Flood Zone 2 'Medium Probability', affected by flooding from the River Thames in the 1 in 1000 annual probability flood event. Small areas of the site are shown to be impacted by the 1 in 100 annual probability +25% and +35% allowances for climate change flood events.

A review of flood risk within the site has been carried out, and it is considered feasible to design the site in such a way that it remains safe throughout the lifetime of the development.

It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +25%, assuming a 100 year lifetime for residential development;
- Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +25% climate change allowance flood event;
- 3. Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA';
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 5. Safe access is available in the current 1 in 100 annual probability flood event and would therefore meet the requirements of Section 3.4 of the L2 SFRA provided a 'Flood Management and Evacuation Plan' is prepared to consider the impacts in the climate change scenarios. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +25% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 2 'Medium Probability';
- 7. Residual risk to the development should be investigated against the 1 in 100 annual probability +35% allowance for climate change flood event.

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Planning Recommendations







		AB006 - Napi	er Road Junctio	on (Local Plan r	ef: CR11h)			
Grid Reference	se SU 7	1830 73870		Post Co	de	RG1 8	BN	
Topography			KING'S N		Elevati < 35 35 - 36 - 37 - 38 - 39 - The top largely approx 38.0m 	ion mAOD 36 mAO 37 mAO 38 mAO 39 mAO 40mAOE bograph flat, ran imately AOD.	 40 - √ 41 - √ 42 - √ 43 - √ 44 - √ 44 - √ 45 - √ 50 + √ 9 of the s ging betw 37.5m AC 	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD ite is veen DD and
Flood Zone Map			KING'S X		Legend Sit Flo	l e Bounda bod Zone bod Zone	ary 2 3	
Flood Zone 1	0%	Flood Zone 2	100%	Flood Zone 3a	9 0%	FI Zo	ood one 3b	0%
Surface Water					Risk o	f Surfac River Bite Bound High - 1 in probability Aedium - probability ow - 1 in Probability (ery Low probability	e Water F dary 30 annual 1 in 100 an 1000 annu / - > 1 in 100	looding nual al)0 annual

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Develo Propos	opment sal	200 3,0) - 300 dw 00m² retail o	vellings and 2,000 r commercial use	-	Vulnerability Classification	1	Less Vulner More Vulne	[.] able, rable
Applicable Climate Change AllowancesThe +25% and +35% peak river flow climate change allowances should therefore be to assess a range of climate change scenarios, based on More Vulnerable prop development (i.e. based on the highest vulnerability element proposed).The +25% allowance should be used to provide a benchmark flood level against w mitigation measures should be set, and the +35% allowance used to assess residua to the development.									
Climate Change Extents Change									
1 in 10 probat	0 annual bility +25%		65%	1 in 100 annual probability +35%		80%	1 in 100 probabi	annual lity +70%	N/A
d Risk	Flood Dep The site is probability 400mm. Flood dept in the +359 Flood War	th una floo hs in 6 sco ning	ffected in the d event, part the climate o enario. g and Period	e present day 1 in 10 ts of the site experie change scenarios are of Inundation	0 a enc	annual probabili ce maximum flo pically 100mm i	ty event. bod depth	In the 1 in 1 is between 1 % scenario, a	000 annual 00mm and and 200mm
 Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained regional-scale rainfall events. The response time – i.e. the period between the rainfall over the catchment and the rising river levels downstream – can be significant, and this ensures there is typically a significant period of advance warning (i.e. a period of days) before flooding occurs in the area. The EA issue flood warnings for the area via their 'Flood Information Service' and considerable advance warning of a flood event can typically be provided to allow the Council, emergency services residents and businesses to take appropriate action. 									
	Velocity o The site is is impacted fall in wate	f Flo occu l in tl r lev	od Waters upied by build he climate ch vel is slow an ubject to furth	dings in an urbanised ange allowance scen ad velocities will corre	ar ari əsp	ea, a significant os. When floodi oondingly be slo	t distance ng does c ow, with t	from the mai occur, the rate he direction o	n river, and of rise and of flow from





Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.14km north of the site, includes bank protection on its right bank with a design standard of 1 in 2 years. The condition is currently at a combination of 2 (good) and 4 (poor), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA shows that the site is not noted to have been impacted by historic river flooding, or by flooding from other sources. Flood information has been provided for Forbury Road, located west of the site, and is shown to have previously been impacted by flooding. Site drainage must be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding is '>75%'. The Thames Water DG5 information indicates that the site is within a postcode (RG1 8) that has 21-50 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Description of Flood Risk

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 2 'Medium Probability' (between 1 in 100 and 1 in 1000 annual probability of river flooding) and is not noted to have been impacted by historic flooding;
- The site is unaffected in the present day 1 in 100 annual probability event. The maximum flood depth during the 1 in 1000 annual probability event is typically between 100mm and 400mm;
- The majority of the site is impacted by the 1 in 100 annual probability +25% allowance for climate change flood event with general depths between 100mm and 200mm;
- Maximum flood depths for the 1 in 100 annual probability +35% climate change allowance typically vary between 200mm and 300mm;
- The site is largely classified as at Very Low risk of surface water flooding, with minor, localised areas between Low and Medium risk;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- The pedestrian access route via Napier Road is impacted by the 1 in 100 annual probability +25% climate change scenario. Further analysis of flood depths/flood hazard is required and development may be reliant on advance warning measures and provision of a Flood Risk Management/Evacuation Plan.

The site is shown to be at medium risk of fluvial flooding, at a range of very low to medium risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources but it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

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Spatial Planning

The site lies within Flood Zone 2 'Medium Probability', affected by flooding from the River Thames in the 1 in 1000 annual probability flood event. The majority of the site is shown to be impacted by the 1 in 100 annual probability +25% and +35% allowances for climate change flood events.

A review of flood risk within the site has been carried out, and it is considered feasible to design the site in such a way that it remains safe throughout the lifetime of the development.

It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +25%, assuming a 100 year lifetime for residential development;
- Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +25% climate change allowance flood event. The existing site contains a significant existing building footprint – however, a significant proportion of this is currently a floodable undercroft parking area;
- 3. Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings – Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA';
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 5. Safe access is available in the current 1 in 100 annual probability flood event and would therefore meet the requirements of Section 3.4 of the L2 SFRA provided a 'Flood Management and Evacuation Plan' is prepared to consider the impacts in the climate change scenarios. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +25% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 2 'Medium Probability';

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Planning Recommendations



 Residual risk to the development should be investigated against the 1 in 100 annual probability +35% allowance for climate change flood event.







	AB007 - Napier Court (Local Plan ref: CR11i)										
Grid Referen	ce SU 7203	30 73860		Post Code	•	RG1 8E	SW				
Topography		Energie	King's Me (Recreation	eadow Ground)	Elevati < 35 35 - 36 - 37 - 38 - 39 - The top largely approx 38.0m	on mAOD 36 mAOD 37 mAOD 38 mAOD 39 mAOD 40mAOD bography flat, rang imately 3 AOD.	 40 41 42 43 44 44 45 of the s ning betw 7.5m AC 	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD mAOD ite is veen DD and			
Flood Zone Map		Energia	King's Me (Recreation	Cound)	Legen R S F F	d liver lite Bound lood Zone lood Zone	ary e 2 e 3 e 3b				
Flood Zone 1	30%	Flood Zone 2	70%	Flood Zone 3a	0%	Flo Zor	ood ne 3b	0%			
Surface Water			King's M (Recreation	Ground)	Risk o	f Surface River Site Bound Iigh - 1 in 3 robability Medium - 1 robability ow - 1 in 1 Probability Yery Low - robability	• Water F ary 30 annual in 100 an 000 annu > 1 in 100	ilooding Inual al)0 annual			

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Develo Propos	opment sal	180 ·	- 260 dwelli	ngs	Vulnerability Classification	I	More Vuln	erable			
Applic: Climate Allowa	able e Change inces	The deve is lar The to as provi +35%	The site is located within Flood Zone 2 'Medium Probability', and the proposed evelopment is classified as More Vulnerable (the extent of Flood Zone 1 'Low Probability' is largely limited to the existing building footprint). The +25% and +35% peak river flow climate change allowances should therefore be used to assess a range of climate change scenarios. The +25% allowance should be used to provide a benchmark flood level against which mitigation measures should be set, and the -35% allowance used to assess residual risk to the development.								
Climate Extent	e Change s	Energis House House House									
1 in 10 probab	0 annual bility +25%		10%	1 in 100 annual probability +35%	30%	1 in 100 a probabili	innual ty +70%	N/A			
isk	Flood Dep The site is in 1000 and Flood dept in the +35%	th unaffe nual p hs in t 6 scer	ected in the robability flo he climate o nario.	present day 1 in 100 a ood event typically vary change scenarios are ty	nnual probability between 100mr pically 100mm i	v event. Th n and 300n n the +25%	ne flood dep nm over the 5 scenario, a	ths in the 1 site. and 200mm			
escription of Flood R	The River rainfall eve rising river period of a The EA is advance w residents a	Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained regional-scale rainfall events. The response time – i.e. the period between the rainfall over the catchment and the rising river levels downstream – can be significant, and this ensures there is typically a significant period of advance warning (i.e. a period of days) before flooding occurs in the area. The EA issue flood warnings for the area via their 'Flood Information Service' and considerable advance warning of a flood event can typically be provided to allow the Council, emergency services residents and businesses to take appropriate action.									
	Velocity of The site is is impacted fall in wate west to eas	f Floo occup I in the r leve st (sub	od Waters bied by build e climate ch el is slow an bject to furth	lings in an urbanised ar ange allowance scenar d velocities will corres er interrogation of the E	ea, a significant os. When floodi condingly be slo A modelling).	distance fr ng does oc ow, with the	rom the mai cur, the rate e direction c	n river, and of rise and of flow from			

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Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.14km north of the site, includes bank protection on its right bank with a design standard of 1 in 5 years. The condition is currently at 2 (good), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA indicates that the site has not been subject to historic river flooding, and is not noted to have been impacted by flood events from other sources. Site drainage must be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding is '>75%'. The Thames Water DG5 information indicates that the site is within a postcode (RG1 8) that has 21-50 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 2 'Medium Probability' (between 1 in 100 and 1 in 1000 annual probability of river flooding) and has not been subject to historic river flooding;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 100mm and 300mm;
- A minor portion of the site is impacted by the 1 in 100 annual probability +25% allowance for climate change flood event with general depths between 10mm and 100mm;
- Maximum flood depths for the 1 in 100 annual probability +35% climate change allowance typically vary between 10mm and 200mm;
- The site is largely classified as at Very Low risk of surface water flooding, with minor, localised areas at Low risk;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- The pedestrian access route via Napier Road is partly impacted by the 1 in 100 annual probability +25% climate change allowance scenario. Further analysis of flood depths/flood hazard is required and development may be reliant on advance warning measures and provision of a Flood Risk Management /Evacuation Plan.

The site is shown to be at medium risk of fluvial flooding, at a range of Very Low to Low risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources but it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

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Description of Flood Risk



Spatial Planning

The site lies within Flood Zone 2 'Medium Probability', affected by flooding from the River Thames in the 1 in 1000 annual probability flood event. A small proportion of the site is shown to be impacted by the 1 in 100 annual probability +25% and +35% allowances for climate change flood events.

A review of flood risk within the site has been carried out, and it is considered feasible to design the site in such a way that it remains safe throughout the lifetime of the development.

It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +25%, assuming a 100 year lifetime for the residential development;
- Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +25% climate change allowance flood event. The presence of a significant existing building footprint suggests that floodplain storage capacity could be improved through effective design measures;
- 3. Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA';
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 5. Safe access is available in the current 1 in 100 annual probability flood event and would therefore meet the requirements of Section 3.4 of the L2 SFRA provided a 'Flood Management and Evacuation Plan' is prepared to consider the impacts in the climate change scenarios. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +25% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 2 'Medium Probability';

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Planning Recommendations



 Residual risk to the development should be investigated against the 1 in 100 annual probability +35% allowance for climate change flood event.





	AB073 - 28-30 Richfield Avenue (Local Plan ref: WR3c)												
Grid Reference	e SU 70940 470940	Post Code	RG1 8EQ										
Topography	Hotel AVENUE CREMYLL ROAD CREMYLL ROAD CREMYLL ROAD	Hotel											
Flood Zone Map	AVENUE CREMYLL ROAD		 nd River Site Boundary Flood Zone 2 Flood Zone 3 Flood Zone 3b 										
Flood Zone 1	0% Flood 20ne 2 100% F	a lood Zone 0%	Flood Zone 3b 0%										
Surface Water	Hotel NENUE CILIANTI ROAD E	Risk	of Surface Water Flooding River Site Boundary High - 1 in 30 annual probability Medium - 1 in 100 annual probability Low - 1 in 1000 annual Probability Very Low - > 1 in 1000 annual probability										

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Develo Propos	opment sal	50 - 80 dwelling	gs	Vulnerability Classification	I	More Vulr	nerable			
Applicable Climate Change Allowances The +25% and +35% peak river flow climate change allowances should therefore be to to assess a range of climate change scenarios. The +25% allowance should be used provide a benchmark flood level against which mitigation measures should be set, and +35% allowance used to assess residual risk to the development.										
Climat Extent	e Change s	AVENUE	Park Con Park Con Par	Hotel	Legend Rive Site 1 in prob Cha 1 in prob Cha	er Boundary 100 annual pability +25% nge 100 annual pability +35% nge	o Climate			
1 in 10 probat	0 annual bility +25%	0%	1 in 100 annual probability +35%	40%	1 in 100 a probabilit	innual ty +70%	N/A			
ood Risk	Flood Depth The flood depths in the 1 in 1000 annual probability flood event vary from 100mm to 200mm over the extent of the site. Flood depths in the climate change scenarios are typically 100mm in the +35% scenario (the site is unaffected in the +25% scenario). Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained regional-scale rainfall events. The response time – i.e. the period between the rainfall over the catchment and the									
escription of FI	period of advance warning (i.e. a period of days) before flooding occurs in the area. The EA issue flood warnings for the area via their 'Flood Information Service' and considerable advance warning of a flood event can typically be provided to allow the Council, emergency services residents and businesses to take appropriate action.									
Δ	Velocity o The site is is impacted rate of rise of flow fron	f Flood Waters occupied by buil d in the higher co and fall in water n west to east (so	dings in an urbanised are entral climate change allo level is slow and velocitio ubject to further interroga	ea, a significant owance scenar es will correspo tion of the EA r	distance fr io. When fl indingly be nodelling).	rom the ma ooding doe slow, with t	in river, and s occur, the he direction			





Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.3km east of the site, includes bank protection on its right bank with a design standard of 1 in 5 years. The condition is currently at 4 (poor), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The SFRA indicates that the site has been subject to historic river flooding in 1947 and 1977, but is not noted to have been impacted by flood events from other sources.

Some external areas are noted to be at low risk of surface water flooding, which, if surface water drainage strategy is not sufficiently incorporated into proposed development design, could result in ponding of water following heavy rainfall events. Site drainage must therefore be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding varies between '25% to 50%'. The Thames Water DG5 information indicates that the site is within a postcode (RG1 8) that has 21-50 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 2 'Medium Probability' (between 1 in 100 and 1 in 1000 annual probability of river flooding), and has been subject to historic river flooding in 1947 and 1977;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 100mm and 200mm;
- The site is not impacted by the 1 in 100 annual probability +25% allowance for climate change flood event;
- Parts of the site are impacted in the 1 in 100 annual probability +35% climate change allowance event with maximum flood depths of approximately 100mm;
- The site is largely classified as at Very Low risk of surface water flooding, with small areas surrounding the existing building classified as Low risk;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- Continuous safe access is currently available during the 1 in 100 annual probability event via Richfield Avenue to the north. The safe route remains available in the 1 in 100 annual probability +25% allowance for climate change flood event and only becomes affected in the +35% scenario.

The site is shown to be at medium risk of fluvial flooding, at a range of very low to low risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources; however, it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

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	A num	per of important design recommendations are set out below.							
	Spatia The sit the 1 in annual shown A revie site in the foll stage. applica	Spatial Planning The site lies within Flood Zone 2 'Medium Probability', affected by flooding from the River Thames in the 1 in 1000 annual probability flood event. The site is not shown to be impacted by the 1 in 100 annual probability +25% allowance for climate change event, and approximately half of the site is shown to be impacted by the +35% allowance for climate change flood event. A review of flood risk within the site has been carried out, and it is considered feasible to design the site in such a way that it remains safe throughout the lifetime of the development. It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.							
commendations	Desigr 1.	Recommendations Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +25%, assuming a 100 year lifetime for residential development. The site is not shown to be impacted by this event, and therefore floor levels should be raised an appropriate freeboard above the external general ground level;							
	2.	The site is not impacted by the 1 in 100 annual probability plus 25% climate change allowance flood event, therefore the flood storage during this design event is not expected to be impacted through development proposals. The presence of a significant existing building footprint also suggests that floodplain storage capacity in more extreme events could be improved through effective design measures;							
Planning Rec	3.	Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings – Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA';							
	4.	Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;							
	5.	Safe access would be available in the 1 in 100 annual probability +25% climate change allowance scenario and is in accordance with the requirements in Section 3.4 of the L2 SFRA. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;							
	6.	It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated an appropriate freeboard above the general							





ground level. Basement dwellings in Flood Zone 2 'Medium Probability' are considered appropriate subject to the Exception Test.

7. Residual risk to the development should be investigated against the 1 in 100 annual probability +35% allowance for climate change flood event.





	AB075 - 115-117 Caversham Road (Local Plan ref: CR11f - part)											
Grid Reference	e SU 712	260 74180			Post Code	•	RG1 8A	٨R				
Topography	Sch Crown Sond			BEL ANDS		Elevati < 35 35 - 36 - 37 - 38 - 39 - The top largely approx 38.5m	on mAOD 36 mAOD 37 mAOD 38 mAOD 39 mAOD 40mAOD 40mAOD bography flat, rang imately 3 AOD.	 40 41 42 43 44 44 45 of the s jing betw. 7.8m AC 	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD ite is /een DD and			
Flood Zone Map	Sch Jog Bank			BE AATES		Legend Sit	l e Boundar pod Zone 2 pod Zone 3	ry 2 3				
Flood Zone 1	0%	Flood Zone 2	100%	Flo 3a	ood Zone	0%	Flo	ood ne 3b	0%			
Surface Water	sch D				Ø	Risk o	f Surface liver ligh - 1 in 3 robability fedium - 1 robability ow - 1 in 1 robability dery Low - robability	• Water F ary 30 annual in 100 an 000 annu > 1 in 100	looding nual al)0 annual			

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Develo Propos	opment sal	rent75-115 dwellings (wider site includes AB081)Vulnerability Classification		1	More Vulnerable				
Applica Climate Allowa	able e Change Inces	The +25% and +35% peak river flow climate change allowances should therefore be used to assess a range of climate change scenarios. The +25% allowance should be used to provide a benchmark flood level against which mitigation measures should be set, and the +35% allowance used to assess residual risk to the development.							
Climate Extent	e Change s	Sch Javar Bank			Legend Rive Site 1 in prob Cha 1 in prob Cha	er Boundary 100 annual pability +25% nge 100 annual pability +35% nge	o Climate o Climate		
1 in 10 probab	0 annual bility +25%	70%	1 in 100 annual probability +35%	85%	1 in 100 a probabilit	innual ty +70%	N/A		
on of Flood Risk	Flood Dep The flood c over the sit Flood dept in the +35% Flood War The River rainfall eve rising river period of a The EA is:	d depths in the 1 in 1000 annual probability flood event typically vary from 100mm to 500mm site. apths in the climate change scenarios are typically 300mm in the +25% scenario, and 400mm 35% scenario. Varning and Period of Inundation er Thames is a large catchment with flooding typically the result of sustained regional-scale events. The response time – i.e. the period between the rainfall over the catchment and the ver levels downstream – can be significant, and this ensures there is typically a significant f advance warning (i.e. a period of days) before flooding occurs in the area. issue flood warnings for the area via their 'Flood Information Service' and considerable							
escriptio	advance warning of a flood event can typically be provided to allow the Council, emergency services residents and businesses to take appropriate action.								
	The site is occupied by buildings in an urbanised area, a significant distance from the main river, and is impacted in the climate change allowance scenarios. When flooding does occur, the rate of rise and fall in water level is slow and velocities will correspondingly be slow, with the direction of flow from west to east (subject to further interrogation of the EA modelling).								





Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.25km north east of the site, includes bank protection on its right bank with a design standard of 1 in 5 years. The condition is currently at 4 (poor), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The SFRA data indicates that the site has not been subject to historic river flooding, but the site, or an area in the close vicinity of the site, was impacted by groundwater flooding during the 2000-01 and 2002-03 events. It is not noted to have been impacted by flood events from other sources.

External areas are noted to be impacted by surface water flooding, which, if surface water drainage strategy is not sufficiently incorporated into proposed development design, could result in ponding of water following heavy rainfall events. Site drainage must therefore be considered accordingly, and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding varies between '25% to 50%'. The Thames Water DG5 information indicates that the site is within a postcode (RG1 8) that has 21-50 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 2 'Medium Probability' (between 1 in 100 and 1 in 1000 annual probability of river flooding) and has not been subject to historic river flooding;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 100mm and 500mm;
- The majority of the site is impacted by the 1 in 100 annual probability +25% allowance for climate change flood event with general depths between 100mm and 300mm;
- Maximum flood depths for the 1 in 100 annual probability +35% climate change allowance typically vary between 100mm and 400mm;
- The site is mainly classified as at Very Low risk of surface water flooding, with localised areas between Low and High risk;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- Continuous safe access is currently available during the 1 in 100 annual probability event via Vastern Road. The access route via Caversham Road/Vastern Road is partly impacted by the 1 in 100 annual probability +25% climate change allowance scenario. Development would be reliant on advance warning measures and the suitability of a Flood Risk Management/Evacuation Plan should be considered.

The site is shown to be at medium risk of fluvial flooding, at a range of very low to high risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources. Subject to further analysis of the safe access arrangements, it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.





It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event. A number of important design recommendations are set out below. Spatial Planning The site lies within Flood Zone 2 'Medium Probability', affected by flooding from the River Thames in the 1 in 1000 annual probability flood event. The majority of the site is shown to be impacted by the 1 in 100 annual probability +25% and +35% allowances for climate change flood events. A review of flood risk within the site has been carried out, and it is considered feasible to design the site in such a way that it remains safe throughout the lifetime of the development. It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA. **Design Recommendations** 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +25%, assuming a 100 year lifetime for residential development; 2. Flood storage should be analysed to show that the proposed building footprint of the Planning Recommendations development will not cause a detriment to the available storage during the 1 in 100 annual probability +25% climate change allowance flood event. The presence of a significant existing building footprint suggests that floodplain storage capacity could be improved through effective design measures; 3. Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings - Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA'; 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes; 5. Safe access would be available in the current 1 in 100 annual probability flood event. The impacts on the route should be assessed for the 1 in 100 annual probability +25% climate change allowance and a Flood Management and Evacuation Plan' should be prepared to ensure the development is in accordance with the requirements in Section 3.4 of the L2 SFRA. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event: 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +25%

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allowance for climate change flood level. Basement dwellings in Flood Zone 2 'Medium Probability' are considered appropriate subject to the Exception Test;

7. Residual risk to the development should be investigated against the 1 in 100 annual probability +35% allowance for climate change flood event.







AB081 - Shurgard Self Storage, 75-77 Caversham Road (Local Plan ref: CR11f - part)									
Grid Reference	SU 712	SU 71240 74120		Post Code	Post Code		RG1 8AN		
Topography		La Card			Elevati < 35 35 - 36 - 37 - 38 - 39 - The top largely approx 38.5m	on mAOD 36 mAOD 37 mAOD 38 mAOD 39 mAOD 40mAOD 40mAOD cography o flat, rangin imately 37 AOD.	 40 - 4 41 - 4 42 - 4 43 - 4 44 - 4 > 45 of the sing betwork of the solution of	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD ite is veen DD and	
Flood Zone Map	NON NON	AND A ROAD	Site Boundary Flood Zone 2 Flood Zone 3						
Flood Zone 1	0%	Flood Zone 2	100%	Flood Zone 3a	0%	Floo Zon	od e 3b	0%	
Surface Water	JI T	D	AA1165		Risk o	f Surface N River Site Boundar Iigh - 1 in 30 Probability Ow - 1 in 10 Probability Yery Low - > Probability	Water F ry 0 annual n 100 an 000 annu - 1 in 100	nual al 00 annual	

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Develo Propos	opment sal	75 - 115 dwel including AB0	lings (wider site 75)	Vulnerability Classification		More Vulnerable		
Applica Climate Allowa	able e Change Inces	The +25% and +35% peak river flow climate change allowances should therefore be used to assess a range of climate change scenarios. The +25% allowance should be used to provide a benchmark flood level against which mitigation measures should be set, and the +35% allowance used to assess residual risk to the development.						
Climate Extent	e Change s	TOR YES			Legend Rive Site 1 in prob Cha 1 in Cha	er Boundary 100 annual pability +25% nge 100 annual pability +35% nge	o Climate o Climate	
1 in 10 probab	0 annual bility +25%	50%	1 in 100 annual probability +35%	70%	1 in 100 a probabilit	nnual ty +70%	N/A	
Description of Flood Risk	 Flood Depth The flood depths in the 1 in 1000 annual probability flood event typically vary from 100mm to 400mm over the extent of the site. Flood depths in the climate change scenarios are typically 200mm in the +25% scenario, and 300mm in the +35% scenario. Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained regional-scale rainfall events. The response time – i.e. the period between the rainfall over the catchment and the rising river levels downstream – can be significant, and this ensures there is typically a significant period of advance warning (i.e. a period of days) before flooding occurs in the area. The EA issue flood warnings for the area via their 'Flood Information Service' and considerable advance warning of a flood event can typically be provided to allow the Council, emergency services residents and businesses to take appropriate action. Velocity of Flood Waters The site is occupied by buildings in an urbanised area, a significant distance from the main river, and is impacted in the climate change allowance scenarios. When flooding does occur, the rate of rise and fall in water level is slow and velocities will accordingly be slow, with the direction of flow from west to east (subject to further interrogation of the EA modelling). 							





Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.26km north east of the site, includes bank protection on its right bank with a design standard of 1 in 5 years. The condition is currently at 4 (poor), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA indicates that the site has not been subject to historic river flooding, but notes that an area in the close vicinity of the site was impacted by groundwater flooding during the 2000-01 and 2002-03 events. It is not noted to have been impacted by flood events from other sources.

Site drainage must be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding varies between '25%' and 50%'. The Thames Water DG5 information indicates that the site is within a postcode (RG1 8) that has 21-50 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Description of Flood Risk

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 2 'Medium Probability' (between 1 in 100 and 1 in 1000 annual probability of river flooding) and has not been subject to historic river flooding;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 100mm and 400mm;
- Approximately half of the site is impacted by the 1 in 100 annual probability +25% allowance for climate change flood event with general depths of 200mm;
- Maximum flood depths for the 1 in 100 annual probability +35% climate change allowance are typically 300mm;
- The site is largely classified as at Very Low risk of surface water flooding, with localised areas of Low risk;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- Continuous safe access is currently available during the 1 in 100 annual probability event. The
 access route is impacted by the 1 in 100 annual probability +25% climate change allowance
 scenario. Development would be reliant on advance warning measures and the suitability of
 a Flood Risk Management/Evacuation Plan should be considered.

The site is shown to be at medium risk of fluvial flooding, at a range of very low to high risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources. Subject to further analysis of safe access arrangements, it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.





Spatial Planning

The site lies within Flood Zone 2 'Medium Probability', affected by flooding from the River Thames in the 1 in 1000 annual probability flood event. The majority of the site is shown to be impacted by the 1 in 100 annual probability +25% and +35% allowances for climate change flood events.

A review of flood risk within the site has been carried out, and it is considered feasible to design the site in such a way that it remains safe throughout the lifetime of the development. It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +25%, assuming a 100 year lifetime for residential development;
- Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +25% climate change allowance flood event. The presence of a significant existing building footprint suggests that floodplain storage capacity could be improved through effective design measures;
- Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings – Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA;
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 5. Safe access would be available in the current 1 in 100 annual probability flood event. The impacts on the route should be assessed for the 1 in 100 annual probability +25% climate change allowance and a Flood Management and Evacuation Plan' should be prepared to ensure the development is in accordance with the requirements in Section 3.4 of the L2 SFRA. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +25% allowance for climate change flood level. Basement dwellings in Flood Zone 2 'Medium Probability' are considered appropriate subject to the Exception Test;
- 7. Residual risk to the development should be investigated against the 1 in 100 annual probability +35% allowance for climate change flood event.











AB096 – Great Brigham's Mead (Local Plan ref: Not Identified)									
Grid Reference	SU 71	SU 71370 74220		Post Code		RG1 8DL			
Topography	The Providence of the			Contraction of the second seco	Elevati < 35 35 - 36 - 37 - 38 - 39 - The top largely north, r approx 38.3m	on mAOD 36 mAOD 37 mAOD 38 mAOD 39 mAOD 40mAOD bography flat, fallir anging b imately 3 AOD.	 40 - 4 41 - 4 42 - 4 43 - 4 44 - 4 44 - 4 45 66 the s 66.5m AC 	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD ite is south to DD and	
Flood Zone Map	THE BOLD	BR ANIES	River Site Boundary Flood Zone 2 Flood Zone 3 Flood Zone 3b						
Flood Zone 1	0%	Flood Zone 2	10%	Flood Zone 3a	90%	Flo	ood ne 3b	0%	
Surface Water	Risk of Surface Water FI River Site Boundary High - 1 in 30 annual probability Medium - 1 in 100 annual probability Low - 1 in 1000 annual Probability Very Low - > 1 in 1000					looding nual al)0 annual			






Develo Propos	opment sal	Residential dv	vellings	Vulnerability Classification	I	More Vulr	nerable	
Applica Climate Allowa	able e Change Inces	The +35% and to assess a ra provide a bend +70% allowan	d +70% peak river flow clin ange of climate change so chmark flood level against ace used to assess residua	nate change allo enarios. The +3 which mitigation al risk to the dev	owances sh 35% allowa n measures velopment.	nould theref ance should s should be	ore be used be used to set, and the	
Climate Extents	e Change s	Image: Constraint of the second se						
1 in 10 probab	100 annual bability +25%N/A1 in 100 annual probability +35%98%1 in 100 annual probability +70%				annual ty +70%	100%		
Description of Flood Risk	ability +25%N/Aprobability +35%98%probability +70%100%Flood DepthThe flood depths in the 1 in 100 annual probability flood event vary from 100mm to 300mm over the site. The flood depths in the 1 in 1000 annual probability flood event vary from 600mm to 800mm.Flood depths in the climate change scenarios are typically 500mm in the +35% scenario, and 800mm in the +70% scenario.Flood Warning and Period of InundationThe River Thames is a large catchment with flooding typically the result of sustained regional-scale rainfall events. The response time – i.e. the period between the rainfall over the catchment and the rising river levels downstream – can be significant, and this ensures there is typically a significant period of advance warning (i.e. a period of days) before flooding occurs in the area.The EA issue flood warnings for the area via their 'Flood Information Service' and considerable advance warning of a flood event can typically be provided to allow the Council, emergency services residents and businesses to take appropriate action.Velocity of Flood WatersThe site is in an urbanised area, separated from the main river channel by built development, and is impacted in severe flood events (1 in 100 annual probability and greater). When flooding does occur, the rate of rise and fall in water level is slow and velocities will also be slow. Any fluvial flooding in the area would typically be of slow velocity with the direction of flow from west to east, subject to further interrogation of the EA modelling							





Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.1km north of the site, includes natural high ground of its right bank with a design standard of 1 in 5 years. The condition is currently at 4 (poor), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The SFRA data indicates the site has not been subject to historic fluvial flooding and is not noted to have been impacted by flood events from other sources.

There are two records of groundwater flooding located west of the site, specifically for the 2000/01 and 2002/03 events. Vastern Road has previously been impacted by highway flooding. Isolated external areas of the site are noted to be potentially at risk of surface water flooding, which, if a surface water drainage strategy is not appropriately considered in the proposed development design, could result in ponding of water following heavy rainfall events.

The susceptibility to groundwater flooding site varies between '25% and 50%'. The Thames Water DG5 information indicates that the site is within a postcode (RG1 8) that has 21-50 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The majority of the site is classified as Flood Zone 3a 'High Probability', with a 1 in 100 annual probability of river flooding. Available data indicate no historic records of flooding over the site;
- The flood depth during the 1 in 100 annual probability event is typically between 100mm and 300mm;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 600mm and 800mm;
- The majority of the site is impacted by the 1 in 100 annual probability +35% climate change flood event, with flood depths typically between 400mm and 600mm;
- The whole site is impacted in the 1 in 100 annual probability +70% climate change flood event, with maximum flood depths rising to between 700mm and 900mm;
- The site is largely classified as at Very Low risk of surface water flooding, with localised areas between Low and Medium risk;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- Continuous safe access is currently available during the 1 in 100 annual probability event via Vastern Road. At the peak of the 1 in 100 annual probability +35% climate change allowance flood event, flood depths on the access route rise to over 250mm, thereby impacting on pedestrian safe access. Development would be reliant on advance warning measures and the suitability of a Flood Risk Management/Evacuation Plan should be considered.

The site is shown to be at high risk of fluvial flooding, and at a range of very low to medium risk of surface water flooding. The site may be susceptible to groundwater and sewer flooding, the extent to which could be determined using site-specific information. The site is therefore potentially at risk of flooding from a number of sources, however, it is considered feasible that the site can be developed





	safely a sources access stage, event.	and in accordance with the requirements of the NPPF to mitigate the potential risks of these s of flooding – subject to approval in principle to a management/evacuation plan to address safe . It is important that the design process considers the risk of flooding at the earliest conceptual encompassing measures that will ensure the safety of future tenants/residents during a flood A number of important design recommendations are set out below.					
	Spatia The site 1 in 100 annual	I Planning e lies within Flood Zone 3a 'High Probability', affected by flooding from the River Thames in the D annual probability flood event. The majority of the site is shown to be impacted by the 1 in 100 probability +35% and +70% allowances for climate change flood events.					
	A low design depths	point is located on the northern boundary, which experiences significant flood depths in the event. This low point should not be utilised for development due to the large modelled flood					
ions	A revie site in s the follo stage. A applica	A review of flood risk within the site has been carried out, and it is considered feasible to design the site in such a way that it remains safe throughout the lifetime of the development. It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.					
	Desigr 1.	Recommendations Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +35%, assuming a 100 year lifetime for residential development;					
g Recommenda	2.	Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +35% climate change allowance flood event. The presence of a significant existing building footprint suggests that floodplain storage capacity could be improved through effective design measures;					
Planning	3.	Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings – Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA;					
	4.	Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;					
	5.	Safe access would be available in the current 1 in 100 annual probability flood event from the southern boundary of the site. The impacts on the route should be assessed for the 1 in 100 annual probability +35% climate change allowance and a Flood Management and Evacuation Plan' should be prepared to ensure the development is in accordance with the requirements in Section 3.4 of the L2 SFRA. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the					





	Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
6.	It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +35% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 3a 'High Probability';
7.	Residual risk to the development should be investigated against the 1 in 100 annual probability +70% allowance for climate change flood event.





I	BA003 - Part o	of Former E	Battle Hospital, Porti	nan Road (Lo	ocal Plar	n ref: WI	R3i)	
Grid Referend	ce SU 699	40 73880		Post Code		RG30 1AN		
Topography	Superstore		Port Marine Control of		Elevati < 35	on mAOD 36 mAOI 37 mAOI 38 mAOI 39 mAOI 40mAOD 40mAOD bography flat, rang imately 3 AOD.	40 - 4 41 - 4 42 - 4 42 - 4 43 - 4 44 - 4 5 44 - 4 5 45 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD mAOD ite is veen DD and
Flood Zone Map	Superstore 7 Liby	CURZON STR	PORTUGUES ALLONG	Rei Gr EY C STREE	Legen R S F	d liver ite Bound lood Zon	dary e 2	
Flood Zone 1	5%	Flood Zone 2	95%	Flood Zone 3a	0%	Fle Zo	ood one 3b	0%
Surface Water	Superstore	CURZON STIT	LEET CONTRACTOR		Risk o	f Surface River Site Bound ligh - 1 in robability Medium - 1 robability ow - 1 in Probability dery Low - robability	e Water F Jary 30 annual 1 in 100 an 1000 annu > 1 in 100	looding nual al 00 annual

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Develo Propos	opment sal	160 - 240 dwe	ellings	Vulnerability Classification	1	More Vulne	rable
Applica Climate Allowa	able e Change inces	The +25% and to assess a ra provide a bend +35% allowan	d +35% peak river flow clir ange of climate change so chmark flood level against ace used to assess residua	nate change alle cenarios. The +2 which mitigation al risk to the dev	owances : 25% allov n measur velopmen	should theref vance should es should be t.	ore be used be used to set, and the
Climate Change Extents Superstore				ver te Boundary n 100 annual obability +25% nange n 100 annual obability +35% nange	o Climate o Climate		
1 in 10 probab	0 annual bility +25%	5%	1 in 100 annual probability +35%	75%	1 in 100 probabi	annual lity +70%	N/A
Description of Flood Risk	The roo annual probability +25% 5% The roo annual probability +35% 75% The roo annual probability +70% N/A Flood Depth The flood depths in the 1 in 1000 annual probability flood event typically vary between 350mm at 1000mm over the extent of the site. Some an annual 1000mm over the extent of the site. N/A Flood depths in the climate change scenarios are typically 300mm in the +25% scenario where a impact is observed, and 400mm in the +35% scenario. Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained regional-sca rainfall events. The response time – i.e. the period between the rainfall over the catchment and the rising river levels downstream – can be significant, and this ensures there is typically a significant period of advance warning (i.e. a period of days) before flooding occurs in the area. The EA issue flood warnings for the area via their 'Flood Information Service' and considerate advance warning of a flood event can typically be provided to allow the Council, emergency service residents and businesses to take appropriate action. Velocity of Flood Waters The site is occupied by buildings in an urbanised area, a significant distance from the main river, are is impacted in the climate change allowance scenarios. When flooding does occur, the rate of rise are fall in water level is slow and velocities will correspondingly be slow, with the direction of flow from west to east (subject to further interrogation of the EA modelling).						350mm and o where an gional-scale ent and the a significant onsiderable ncy services in river, and e of rise and of flow from





Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 1km north of the site, includes bank protection on its right bank with a design standard of 1 in 5 years. The condition is currently at 3 (moderate), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The SFRA indicates that the site has been subject to historic river flooding in 1947 and 1977, but is not noted to have been impacted by flood events from other sources.

External areas are noted to be severely impacted by surface water flooding, which, if surface water drainage strategy is not sufficiently incorporated into proposed development design, could result in ponding of water following heavy rainfall events. Site drainage must therefore be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding varies between '50% and 75%' and '>75%'. The Thames Water DG5 information indicates that the site is within a postcode (RG301) that has over 101 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The is classified as Flood Zone 2 'Medium Probability' (between 1 in 100 and 1 in 1000 annual probability of river flooding) and has been subject to historic river flooding in 1947 and 1977;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 350mm and 1000mm;
- A small area of the site is impacted by the 1 in 100 annual probability +25% allowance for climate change flood event with general depths between 100mm and 400mm;
- Maximum flood depths for the 1 in 100 annual probability +35% climate change allowance typically vary between 100mm and 800mm;
- The site is largely classified as at Low risk of surface water flooding, with large areas between Medium and High risk, and an area at Very Low risk at the south eastern extent;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- Continuous safe access is currently available during the 1 in 100 annual probability event via Portman Road. The access route remains available in the 1 in 100 annual probability +25% climate change allowance scenario. Although the road on the north side of the site is affected in the +35% scenario, alternative safe access to the south-west may be available.

The site is shown to be at medium risk of fluvial flooding, at a range of very low to high risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources; however, it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

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Spatial Planning

The site lies within Flood Zone 2 'Medium Probability', affected by flooding from the River Thames in the 1 in 1000 annual probability flood event. A minor portion of the site is shown to be impacted by the 1 in 100 annual probability +25% allowance for climate change, and the majority of the site by the +35% allowance for climate change flood events.

A review of flood risk within the site has been carried out, and it is considered feasible to design the site in such a way that it remains safe throughout the lifetime of the development. It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +25%, assuming a 100 year lifetime for residential development;
- Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +25% climate change allowance flood event. The presence of a significant existing building footprint suggest that floodplain storage capacity could be improved through effective design measures;
- 3. Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA';
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 5. Safe access would be available in the current 1 in 100 annual probability flood event and the 1 in 100 annual probability +25% climate change allowance and a Flood Management and Evacuation Plan' should be prepared to ensure the development is in accordance with the requirements in Section 3.4 of the L2 SFRA. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +25% allowance for climate change flood level. Basement dwellings in Flood Zone 2 'Medium Probability' are considered appropriate subject to the Exception Test;



Planning Recommendations



 Residual risk to the development should be investigated against the 1 in 100 annual probability +35% allowance for climate change flood event.





	CA002 - 72 George Street (Local Plan ref: Not Identified)							
Grid Referenc	e SU 71900 74440	Post Code	RG4 8DH					
Topography	Pav Christchurch Meadows	Elevation 40 - 41 mAC < 35 mAOD 41 - 42 mAC 35 - 36 mAOD 42 - 43 mAC 36 - 37 mAOD 43 - 44 mAC 37 - 38 mAOD 44 - 45 mAC 38 - 39 mAOD > 45 mAOD 39 - 40mAOD 39 - 40mAOD The topography of the site is relatively flat, ranging from approximately 36.8m AOD to 38.1m AOD.						
Flood Zone Map	Pav Christchurch Meadows Hill's Me	Legend River Site Boundary Flood Zone 2 Flood Zone 3 Flood Zone 3b						
Flood Zone 1	0% Flood 30%	Flood Zone 65%	Flood Zone 3b					
Surface Water	Pav Christchurch Meadows Hill's Me	EXANCE AND	 k of Surface Water Flooding River Site Boundary High - 1 in 30 annual probability Medium - 1 in 100 annual probability Low - 1 in 1000 annual Probability Very Low - > 1 in 1000 annual probability 					

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Develo Propos	pment al	Re	sidential dwo	ellings	Vulnerability Classification	n	More Vuli	nerable
Applica Climate Allowa	able e Change nces	 The site is located within Flood Zone 3a 'High Probability', and the proposed development is classified as More Vulnerable (the extent of Flood Zone 2 'Medium Probability' is limited to the existing building footprints). The +35% and +70% peak river flow climate change allowances should be used to assess a range of climate change scenarios. The +35% allowance should be used to provide a benchmark flood level against which mitigation measures should be set, and the +70% allowance used to assess residual risk to the development. 						
Climate Extents	e Change		Legend Site Boundary 1 in 100 annual probability +35% Climate Change 1 in 100 annual probability +70% Climate Change					
1 in 10 probab	0 annual vility +25%		N/A	1 in 100 annual probability +35%	100%	1 in 100 au probability	nnual y +70%	100%
	Flood Dep The maxim typically va	th um f ry fr	flood depths om 100mm	around the existing bui to 600mm over the site	ldings in the 1 i	n 100 annua	l probability	y flood event
	The flood c site.	lepth	ns in the 1 in	1000 annual probabilit	y flood event va	ary from 300	mm to 900i	mm over the
ood Risk	Flood dept in the +70%	hs in 6 sc	the climate enario.	change scenarios are t	ypically 500mm	n in the +35%	6 scenario,	and 700mm
Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained reg rainfall events. The response time – i.e. the period between the rainfall over the catchme rising river levels downstream – can be significant, and this ensures there is typically a period of advance warning (i.e. a period of days) before flooding occurs in the area. The EA issue flood warnings for the area via their 'Flood Information Service' and co advance warning of a flood event can typically be provided to allow the Council, emergence residents and humpersons to take appropriate action						gional-scale nent and the a significant considerable ncy services		
	Velocity o The site is	f Flo	od Waters upied by buil	dings in an urbanised a	rea, a significa	nt distance f	rom the ma	ain river, and





and fall in water level is slow and velocities will correspondingly be slow, with the direction of flow from west to east (subject to further interrogation of the EA modelling).

Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.3km south of the site, includes bank protection on its left bank with a design standard of 1 in 5 years. The condition is currently at 3 (moderate), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA indicates the site has been subject to historic river flooding in 1947, 1977 and 2013/14, but is not noted to have been impacted by historic flooding from other sources. Gosbrook Road, located north of the site, has previously been impacted by fluvial flooding due to drainage capacity issues. Site drainage must be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding site varies between '25% and 50%'. The Thames Water DG5 information indicates that the site is within a postcode (RG4 8) that has over 101 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 3a 'High Probability' (1 in 100 or greater annual probability of river flooding) and has been subject to historic river flooding in 1947, 1977 and 2013/14;
- The maximum flood depth during the 1 in 100 annual probability event is typically between 100mm and 600mm;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 300mm and 900mm;
- The whole site is impacted by the 1 in 100 annual probability +35% allowance for climate change flood event, with general depths between 200mm and 1000mm;
- Maximum flood depths for the 1 in 100 annual probability +70% climate change allowance are between 400mm and 1200mm;
- The site is classified as at 'Very Low' risk of surface water flooding;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- Pedestrian safe access is potentially available to the site, subject to further analysis of the impacts along George Street and provided the development includes raised access arrangements to the south-eastern corner of the site and onto George Street.

The site is shown to be at medium to high risk of fluvial flooding, at very low risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources; however, it is considered feasible that the site could be developed safely and in accordance with the requirements of the NPPF to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out in the following section.

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Spatial Planning

The site lies within Flood Zone 3a 'High Probability' and is affected by flooding from the River Thames in the 1 in 100 and 1 in 1000 annual probability flood events. The whole site is shown to be impacted by the 1 in 100 annual probability +35% and +70% allowance for climate change flood events.

A review of flood risk within the site has been carried out. The feasibility of designing the site in such a way that it remains safe throughout the lifetime of the development is dependent on a number of factors, and is specifically subject to further assessment of the safe access route. It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +35%, assuming a 100 year lifetime for residential development;
- Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +35% climate change allowance flood event. The presence of a significant existing building footprint suggests that floodplain storage capacity could be improved through effective design measures;
- 3. Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA;
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 5. Safe access would be available in the current 1 in 100 annual probability flood event from the south-east boundary of the site. The impacts on the route should be assessed for the 1 in 100 annual probability +35% climate change allowance and a Flood Management and Evacuation Plan' should be prepared to ensure the development is in accordance with the requirements in Section 3.4 of the L2 SFRA. It is essential that future tenants/residents within the site are made aware of the potential risks of flooding, and are actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +35% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified as Flood Zone 2 'Medium Probability' or Flood Zone 3a 'High Probability';

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Planning Recommendations



7. Residual risk to the development should be considered against the 1 in 100 annual probability +70% allowance for climate change flood event.







CA004 - 383 Gosbrook Road (Local Plan ref: Not Identified)									
Grid Referenc	e SU 72	2310 74530			Post Code		RG4 8ED		
Topography	Elevation Solution Solution							 40 - 4 41 - 4 42 - 4 43 - 4 44 - 4 > 45 of the s ing betw 6.9m AC 	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD mAOD ite is veen DD and
Flood Zone Map	Legend River Site Boundary Flood Zone 2 Flood Zone 3 Flood Zone 3 Flood Zone 3b								
Flood Zone 1	0%	Flood Zone 2	2%	Flo 3a	ood Zone	93%	Floo Zone	d 9 3b	5%
Surface Water		PW	PION RI			Risk o	f Surface River ligh - 1 in 3 robability Medium - 1 robability ow - 1 in 1 Probability Yery Low - 2 robability	Water F ary 0 annual in 100 an 000 annu > 1 in 100	looding nual al 00 annual

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Develo Propos	opment sal	Res	idential dwe	llings	Vulnerability Classification	n	More Vu	Inerable	
Applicable Climate Change Allowances				ely located within Floc classified as More Vuln +70% peak river flow clii ge of climate change so mark flood level against	d Zone 3a 'Hig erable. mate change all cenarios. The + which mitigatio	gh Probabil owances sh 35% allowa n measures	ity', and t nould there ance shoul s should be	he proposed efore be used Id be used to e set, and the	
Climate Extent	e Change s	+70	Image: State of the development. Image						
1 in 100 annual probability +25%			N/A	1 in 100 annual probability +35%	100%	1 in 100 a probabili	innual ty +70%	100%	
Description of Flood Risk	bability +25% IV/A probability +35% IV/A probability +35% probability +70% Flood Depth The maximum flood depths around the existing buildings in the 1 in 100 annual probability flood event typically vary from 100mm to 400mm over the site. The flood depths in the 1 in 1000 annual probability flood event typically vary from 500mm to 800mm over the site. Flood depths in the 1 in 1000 annual probability flood event typically vary from 500mm to 800mm over the site. Flood depths in the climate change scenarios are typically 500mm in the +35% scenario, and 700mm in the +70% scenario. Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained regional-scale rainfall events. The response time – i.e. the period between the rainfall over the catchment and the rising river levels downstream – can be significant, and this ensures there is typically a significant period of advance warning (i.e. a period of days) before flooding occurs in the area. The EA issue flood warnings for the area via their 'Flood Information Service' and considerable								
	Advance warning of a flood event can typically be provided to allow the Council, emergency services residents and businesses to take appropriate action. Velocity of Flood Waters The site is occupied by buildings in an urbanised area, a significant distance from the main river, and is impacted in the climate change allowance scenarios. When flooding does occur, the rate of rise and						ain river, and te of rise and		

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fall in water level is slow and velocities will correspondingly be slow with the direction of flow from west to east (subject to further interrogation of the EA modelling).

Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.2km south of the site, includes high ground on its left bank with a design standard of 1 in 2 years. The condition is currently at 3 (moderate), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA indicates that the site has been subject to historic river flooding in 1947 and 1977, but is not noted to have been impacted by flood events from other sources. Site drainage must be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding varies between '50% and 75%'. The Thames Water DG5 information indicates that the site is within a postcode (RG4 8) that has over 101 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 3a 'High Probability' (1 in 100 or greater annual probability of river flooding) and has been subject to historic river flooding in 1947 and 1977;
- The maximum flood depth during the 1 in 100 annual probability event is typically between 100mm and 400mm;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 500mm and 800mm;
- The whole site is impacted by the 1 in 100 annual probability +35% climate change allowance event with general depths between 400mm and 700mm;
- Maximum flood depths for the 1 in 100 annual probability +70% climate change allowance event typically vary between 600mm and 900mm;
- The site is classified as at Very Low risk of surface water flooding;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- The pedestrian access route via Gosbrook Road is impacted by the 1 in 100 annual probability flood event, thereby impacting on pedestrian safe access.

The site is shown to be at high risk of fluvial flooding, at very low risk of surface water flooding, and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources.

Safe access is impacted in a flood event of 1 in 100 annual probability or greater, and the feasibility of new residential development is therefore subject to further assessment of the mitigation strategy based on the approach detailed in the L2 SFRA.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

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Description of Flood Risk



Spatial Planning

The site lies within Flood Zone 3a 'High Probability', affected by flooding from the River Thames in the 1 in 100 annual probability flood event. The entirety of the site is shown to be impacted by the 1 in 100 annual probability +35% and +70% allowances for climate change flood events.

A review of flood risk within the site has been carried out. The feasibility of designing the site in such a way that it remains safe throughout the lifetime of the development is dependent on a number of factors, and is specifically subject to further assessment of the safe access route.

It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +35%, assuming a 100 year lifetime for residential development;
- Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +35% climate change allowance flood event. The presence of existing building footprint suggests that floodplain storage capacity could be improved through effective design measures;
- 3. Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA';
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 5. Safe access is impacted in the current 1 in 100 annual probability flood event. Further analysis is required to assess if a safe route is available in accordance with the requirements in Section 3.4 of the L2 SFRA and, if so, a Flood Management and Evacuation Plan' should be prepared. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +35% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 3a 'Medium Probability';



Planning Recommendations



7. Residual risk to the development should be investigated against the 1 in 100 annual probability +70% allowance for climate change flood event.







CA006 - Reading University Boat Club, Thames Promenade (Local Plan ref: CA1a)								
Grid Reference	ce SU 71	320 74620		Post Co	de	RG4 8BD		
Topography	ham	Elevation 40 - 41 < 35 mAOD 41 - 42 35 - 36 mAOD 42 - 42 36 - 37 mAOD 43 - 44 37 - 38 mAOD 44 - 44 38 - 39 mAOD > 45 m 39 - 40mAOD > 45 m 39 - 40mAOD > 45 m 38.6m AOD. > 45 m						
Flood Zone Map	0.44155	College Car Park College Car Park Car P						
Flood Zone 1	0%	Flood Zone 2	25%	Flood Zone 3a	60%	Flo Zo	ood one 3b	15%
Surface Water	O MATES	TERD	College ABEC AT ABEC ALL AND A		Risk of Riverse Riverse Rivers	Surface V er e Boundar gh - 1 in 30 obability edium - 1 in obability w - 1 in 10 obability ry Low - > obability	Water Flo Dannual n 100 annu 100 annual 1 in 1000	ual annual

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Develo Propos	opment sal	16 – 25 resider	ntial dwellings	Vulnerability Classification	y on	More Vulnerable		
		The site is loca Probability', an portion of the s be utilised for r	ated within Flood Zone 2 Id the proposed develop site lies within Flood Zon esidential dwellings and	'Medium Pro ment is classi e 3b 'functiona development s	bability', an ified as Mo al floodplain should be a	d Flood Zor re Vulnerab ı'. This area voided.	ne 3a 'High le. A small should not	
Applic Climat Allowa	able e Change Inces	The areas clas Zone 3a 'High developable, si	sified as Flood Zone 2 a Probability', the worst ca ubject to a number of co	and Flood Zon ase flood zone nditions.	nd Flood Zone 3a will both be treated as Flood se flood zone on site that could be considered ditions.			
		The +35% and used to assess used to provide set, and the +7	The +35% and +70% peak river flow climate change allowances should therefore be used to assess a range of climate change scenarios. The +35% allowance should be used to provide a benchmark flood level against which mitigation measures should be set, and the +70% allowance used to assess residual risk to the development.					
Climat Extent	Climate Change Extents Change						limate limate	
1 in 10 probat	0 annual pility +25%	90%	1 in 100 annual probability +35%	95%	1 in 100 a probabilit	innual ty +70%	100%	
isk	Flood Dep The maxim typically va	th um flood depths ry from 50mm to	around the existing build 5 150mm over the site.	ings in the 1 in	100 annua	l probability	flood event	
ood R	The flood d over the sit	flood depths in the 1 in 1000 annual probability flood event typically vary from 400mm to 600mm the site.						
ion of Fl	Flood deptl in the +70%	hs in the climate 6 scenario.	change scenarios are typ	bically 400mm	in the +35%	6 scenario, a	and 600mm	
Descript	Flood War The River rainfall eve rising river period of a	Flood Warning and Period of Inundation The River Thames is a large catchment with flooding typically the result of sustained regional-scale ainfall events. The response time – i.e. the period between the rainfall over the catchment and the ising river levels downstream – can be significant, and this ensures there is typically a significant period of advance warning (i.e. a period of days) before flooding occurs in the area.						





The EA issue flood warnings for the area via their 'Flood Information Service' and considerable advance warning of a flood event can typically be provided to allow the Council, emergency services residents and businesses to take appropriate action.

Velocity of Flood Waters

The site is occupied by buildings in an urbanised area, and is impacted in the climate change allowance scenarios. When flooding does occur, the rate of rise and fall in water level is slow and velocities will correspondingly be slow, with the direction of flow from west to east (subject to further interrogation of the EA modelling).

Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.05km south of the site, includes bank protection on its left bank with a design standard of 1 in 5 years. The condition is currently at 3 (moderate), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA indicates the site has been subject to historic river flooding in 1947, 1977, 2003 and 2013/14, but is not noted to have been impacted by flood events from other sources. External areas are noted to be impacted by surface water flooding, which, if surface water drainage strategy is not sufficiently incorporated into proposed development design, could result in ponding of water following heavy rainfall events. Site drainage must therefore be considered accordingly and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

According to the Level 1 SFRA, the susceptibility to groundwater flooding varies between '25%' and 50%'. The Thames Water DG5 information indicates that the site is within a postcode (RG4 8) that has over 101 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The southern part of the site is classified as Flood Zone 3a 'High Probability', with a 1 in 100 annual probability of river flooding;
 - The maximum flood depth during the 1 in 100 annual probability event is approximately 750mm;
- The maximum flood depth during the 1 in 1000 annual probability event is approximately 1200mm, with the remainder of the site experiencing depths typically between 400mm and 600mm;
- The majority of the site is impacted by the 1 in 100 annual probability +35% climate change allowance event, with maximum flood depths of 1100 mm, and general depths between 300mm and 500mm;
- Maximum flood depths for the 1 in 100 annual probability +70% climate change allowance increase to 1300mm, with general depths between 500mm and 700mm;
- The site is largely classified as at 'Very Low' risk of surface water flooding, with localised areas between Low and Medium risk;
- The site is at negligible risk of flooding in the event of a reservoir breach;



Description of Flood Risk



• Pedestrian safe access is potentially available to the site, subject to further analysis of the impacts along Abbotsmead Place, north of the site, provided the development includes raised access arrangements to the north western corner of the site

The site is shown to be at high/medium risk of fluvial flooding, is mainly 'very low' risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources; however, it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

suc	Spatia The sit Thame by the A revie site in s the follo stage. plannin 1 SFR/	Planning e lies partly within Flood Zone 3a 'Medium Probability', affected by flooding from the River s in the 1 in 100 annual probability flood event. The majority of the site is shown to be impacted 1 in 100 annual probability +35% and +70% allowances for climate change flood events. w of flood risk within the site has been carried out, and it is considered feasible to design the such a way that it remains safe throughout the lifetime of the development. It is essential that by by design recommendations are incorporated into the design process from the conceptual A detailed site-based Flood Risk Assessment will be required as an integral part of the g application stage, which should be carried out in accordance with Section 10.4 of the Level A.
mmendatio	Desigr 1.	Recommendations All 'More Vulnerable' uses should be steered towards areas within the site that are at lowest risk. If at all possible, residential uses should be restricted to those areas within the site that fall within Flood Zone 2 'Medium Probability';
ning Reco	2.	No development, excepting water compatible or essential infrastructure, should be proposed for the area of the site classified as Flood Zone 3b 'functional floodplain'. The Exception Test must be passed for essential infrastructure;
Plan	3.	Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +35%, assuming a 100 year lifetime for residential development;
	4.	Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +35% climate change allowance flood event;
	5.	Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood





Performance of New Buildings – Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA';

- 6. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 7. Safe access would be available in the current 1 in 100 annual probability flood event from the northern boundary of the site. The impacts on the route should be assessed for the 1 in 100 annual probability +35% climate change allowance and a Flood Management and Evacuation Plan' should be prepared to ensure the development is in accordance with the requirements in Section 3.4 of the L2 SFRA. Future tenants/residents within the site should be made aware of the potential risks of flooding, and be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 8. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +35% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 2 'Medium Probability' or Flood Zone 3a 'High Probability';
- 9. Residual risk to the development should be considered against the 1 in 100 annual probability +70% allowance for climate change flood event.







CA007 - Cantay House, Ardler Road (Local Plan ref: Not Identified)									
Grid Reference	се	SU 72120 74750			Post Code		RG4 5A	ЧΗ	
Topography		ARDLER ROAD	- Contraction of the second se	ST JOHN'S ROAD		Elevati < 35 35 - 36 - 37 - 38 - 39 - The top largely approx 37.8m	on mAOD 36 mAOE 37 mAOE 38 mAOE 39 mAOE 40mAOD 40mAOD bography flat, rang imately 3 AOD.	 40 - 41 - 42 - 43 - 44 - 44 - 45 of the s ging betw 7.2m A0 	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD ite is veen OD and
Flood Zone Map		ARDLER ROAD		ST JOHN'S ROAD	NEL	Legen R S F F	d ite Bound lood Zone lood Zone	lary e 2 e 3	
Flood Zone 1	0%	Flood Zone 2	0%	Flo 3a	ood Zone	100%	Flo	ood ne 3b	0%
Surface Water			A CILC	ST JOHN'S ROAD	O ARSA NEL	Risk o	f Surface lite Bound ligh - 1 in 3 robability fedium - 1 robability ow - 1 in 1 Probability (ery Low - robability	Water F ary 30 annual in 100 ar 1000 annu > 1 in 100	nual al 00 annual

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Develo Propos	pment sal	Residential dwellings	Vulnerability Classification		More Vuln	erable			
Applica Climate Allowa	The +35% and +70% peak river flow climate change allowances should be used to a a range of climate change scenarios. The +35% allowance should be used to probe benchmark flood level against which mitigation measures should be set, and the allowance used to assess residual risk to the development.								
Climate Extents	e Change s	ARDLER ROAD	C MARSA	Legend Situ pro Ch 1 ir pro Ch	e Boundary n 100 annual bability +35% ange n 100 annual bability +70% ange	ó Climate ó Climate			
1 in 10 probab	0 annual oility +25%	N/A 1 in 100 annua probability +3	al 100%	1 in 100 probabi	annual lity +70%	100%			
l Risk	Flood Dep The maxim typically va The flood c over the sit Flood dept in the +70%	th um flood depths around the exist ry from 50mm to 200mm over the lepths in the 1 in 1000 annual pro e. ns in the climate change scenario 6 scenario.	ing buildings in the 1 in the site. bbability flood event typic s are typically 400mm in	100 annu cally vary n the +35	al probabili v from 400m % scenario	ty flood event nm to 600mm , and 600mm			
Description of Flood	Flood War The River rainfall eve rising river period of a The EA is advance w residents a	 od Warning and Period of Inundation River Thames is a large catchment with flooding typically the result of sustained regional-scale if all events. The response time – i.e. the period between the rainfall over the catchment and the ng river levels downstream – can be significant, and this ensures there is typically a significant iod of advance warning (i.e. a period of days) before flooding occurs in the area. EA issue flood warnings for the area via their 'Flood Information Service' and considerable vance warning of a flood event can typically be provided to allow the Council, emergency services idents and businesses to take appropriate action. 							
	Velocity of Flood Waters The site is occupied by buildings in an urbanised area, a significant distance from the main river, and is impacted by the climate change allowance scenarios. When flooding does occur, the rate of rise and fall in water level is slow and velocities will correspondingly be slow, with the direction of flow from west to east (subject to further interrogation of the EA modelling).								





Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.5km south of the site, includes high natural banks on its left bank with a design standard of 1 in 2 years. The condition is currently at 3 (moderate), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA indicates that the site has been subject to historic river flooding in 1947 and 1977, but is not noted to have been impacted by flood events from other sources. Ardler Road, located west of the site, has records of highways flooding (RBC Highways) and a recorded flood incident (Reading Borough Fire and Rescue Service - RBFRS). A record of groundwater flooding (2000/01) exists north west of the site. Site drainage must be considered accordingly, and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

According to the Level 1 SFRA, the susceptibility to groundwater flooding varies between '50% and 75%'. The Thames Water DG5 information indicates that the site is within a postcode (RG4 5) that has 51-100 recorded sewer flood incidents.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk A summary of the flood risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 3a 'High Probability', with a 1 in 100 annual probability of river flooding;
- The maximum flood depths during the 1 in 100 annual probability event are typically between 50mm and 200mm;
- The maximum flood depths during the 1 in 1000 annual probability event are typically between 600mm and 800mm;
- The site is impacted by the 1 in 100 annual probability +35% climate change allowance event, with maximum flood depths typically between 200mm and 400mm;
- Maximum flood depths for the 1 in 100 annual probability +70% climate change allowance scenario are typically between 400mm and 600mm;
- The site is largely classified as at Very Low risk of surface water flooding, and is at negligible risk of flooding in the event of a reservoir breach;
- The surrounding area is impacted at the peak of the 1 in 100 annual probability flood event, thereby impacting on pedestrian safe access.

The site is shown to be at high risk of fluvial flooding, at a very low/low risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources.

Safe access is impacted in a flood event of 1 in 100 annual probability or greater, and the feasibility of new residential development is subject to further assessment of the mitigation strategy based on the approach detailed in the L2 SFRA.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

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Description of Flood Risk



Spatial Planning

The site lies within Flood Zone 3a 'High Probability', affected by flooding from the River Thames in the 1 in 100 annual probability flood event. The entirety of the site is shown to be impacted by the 1 in 100 annual probability +35% and +70% allowances for climate change flood events.

A review of flood risk within the site has been carried out. The feasibility of designing the site in such a way that it remains safe throughout the lifetime of the development is dependent on a number of factors, and is specifically subject to further assessment of the safe access route.

It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +35%, assuming a 100 year lifetime for residential development;
- 2. Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +35% climate change allowance flood event. The presence of a significant existing building footprint suggests that floodplain storage capacity could be improved through effective design measures;
- 3. Where appropriate, buildings within the site should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA;
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
- 5. Safe access is impacted in the current 1 in 100 annual probability flood event. Further analysis is required to assess if a safe route is available in accordance with the requirements in Section 3.4 of the L2 SFRA and, if so, a Flood Management and Evacuation Plan' should be prepared. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +35%

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Planning Recommendations



allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 3a 'High Probability';

7. Residual risk to the development should be investigated against the 1 in 100 annual probability +70% allowance for climate change flood event.







CA009 - 4-6 Send Road (Local Plan ref: Not Identified)										
Grid Reference	ce	SU 7239	90 74480			Post Code		RG4 8	BEH	
Topography		APIO ASIT	N RD	SEND RO			Elevati < 35 35 - 36 - 37 - 38 - 39 - The top largely approx 37.5m 	ion mAOD 36 mAC 37 mAC 38 mAC 39 mAC 40mAO 40mAO pograph flat, ran imately AOD.	 40 41 42 42 43 44 44 45 45 46 47 48 49 49 40 41 41 41 41 42 43 44 44 45 46 47 48 49 44 44 45 46 47 47 48 49 49 40 41 41	41 mAOD 42 mAOD 43 mAOD 44 mAOD 45 mAOD mAOD ite is /een DD and
Flood Zone Map		APIO					Legen F S F F F	d River Site Bour Tood Zo Tood Zo	ndary ne 2 ne 3 ne 3b	
Flood Zone 1	0%		Flood Zone 2	0%		Flood Zone 3a	95%	F	lood one 3b	5%
Surface Water						O	Risk o	f Surfac River Site Bour ligh - 1 ii robabilit Aedium - robabilit Probabilit /ery Low robabilit	ce Water F ndary n 30 annual y - 1 in 100 an y n 1000 annu ty - > 1 in 100 y	looding nual al)0 annual

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Develo Propos	opment sal	Reside	ential dwe	ellings	Vulnerability Classification	ı	More Vulne	rable	
Applica Climate Allowa	able e Change Inces	The sir is clas The +3 to ass provid +70%	te is locat sified as 35% and ess a rar e a bench allowanc	ed within Flood Zone 3a More Vulnerable. +70% peak river flow clin nge of climate change so nmark flood level against e used to assess residu	'High Probabili nate change all cenarios. The + which mitigatio al risk to the dev	ty', and the owances s 35% allov n measure velopment	e proposed de should therefo vance should es should be s t.	evelopment ore be used be used to set, and the	
Climate Extent	e Change s	P. dy S.LI	ON I	SEND R		Legend Sit 1 ir pro Ch 1 ir pro Ch	e Boundary n 100 annual obability +35% (ange n 100 annual obability +70% (ange	Climate Climate	
1 in 10 probab	0 annual bility +25%		N/A	1 in 100 annual probability +35%	100%	1 in 100 probabi	annual lity +70%	100%	
rlood Risk	Flood Dep The maxim typically va The flood c over the ex Flood deptl in the +70%	th um floo ry from epths in tent of t ins in the scena	d depths 10mm to n the 1 in the site. e climate rio.	around the existing build 300mm over the site. 1000 annual probability change scenarios are ty	dings in the 1 in flood event typ pically 500mm	100 annu ically vary in the +35	al probability / from 500mm % scenario, a	flood event n to 800mm and 800mm	
Description of F	Flood War The River rainfall eve rising river period of ad The EA is advance wa	Thames is a large catchment with flooding typically the result of sustained regional-scale ents. The response time – i.e. the period between the rainfall over the catchment and the er levels downstream – can be significant, and this ensures there is typically a significant advance warning (i.e. a period of days) before flooding occurs in the area. ssue flood warnings for the area via their 'Flood Information Service' and considerable warning of a flood event can typically be provided to allow the Council, emergency services and businesses to take appropriate action.							
		nd busi	nesses to	b take appropriate action					

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of rise and fall in water level is slow and velocities will correspondingly be slow with the direction of flow from west to east (subject to further interrogation of the EA modelling).

Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.2km south of the site, includes bank protection on its left bank with a design standard of 1 in 5 years. The condition is currently at 3 (moderate), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA indicates the site was impacted by 1947 and 1977 river flood events, and Send Road, adjacent to the site, was impacted by the 2003 river flood event. It is not noted to have been impacted by flood events from other sources.

There are a number of records of flooding provided by RBC in the close vicinity of the site, including the southern extent of Send Road, and on Gosbrook Road, located north of the site. Site drainage must be considered accordingly with respect to future development, and must be assessed in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding varies between '50% and 75%'. The Thames Water DG5 information indicates that the site is within a postcode (RG4 8) that has over 101 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The site is classified as Flood Zone 3a 'High Probability' (1 in 100 or greater annual probability of river flooding) and has been subject to historic river flooding in 1947 and 1977;
- The maximum flood depth during the 1 in 100 annual probability event typically between 10mm and 300mm;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 500mm and 800mm;
- The entirety of the site is impacted by the 1 in 100 annual probability +35% climate change allowance flood event, with general depths between 300mm and 600mm;
- Maximum flood depths for the 1 in 100 annual probability +70% climate change allowance typically vary between 600mm and 900mm;
- The site is largely classified as at Very Low risk of surface water flooding;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- The pedestrian access route via Send Road is impacted by the 1 in 20 annual probability floodplain, although a lower hazard route may be available to the north-east, although this is within the current 1 in 100 annual probability floodplain.

The site is shown to be at high risk of fluvial flooding, at very low risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources.

Further analysis is required to assess if a safe route is available in accordance with the requirements in Section 3.4 of the L2 SFRA and, if so, a Flood Management and Evacuation Plan' should be

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Description of Flood Risk



prepared. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;

Subject to further analysis of the safe access arrangements, it is considered feasible that the site can be developed safely and in accordance with the requirements of the NPPF, to mitigate the potential risks of these sources of flooding.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

	Spatia The sit 1 in 10 annual site lies dwellin A revie a way factors proces an inte Sectior	 I Planning e lies within Flood Zone 3a 'High Probability', affected by flooding from the River Thames in the 0 annual probability flood event. The entirety of the site is shown to be impacted by the 1 in 100 probability +35% and +70% allowances for climate change flood events. A small portion of the s within Flood Zone 3b 'functional floodplain'. This area should not be utilised for residential gs and development should be avoided. w of flood risk within the site has been carried out. The feasibility of designing the site in such that it remains safe throughout the lifetime of the development is dependent on a number of . It is essential that the following design recommendations are incorporated into the design s from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as gral part of the planning application stage, which should be carried out in accordance with n 10.4 of the Level 1 SFRA.
ion		
Planning Recommendati	Desigr 1.	Recommendations Development should be avoided within the area defined as Flood Zone 3b 'functional floodplain';
	2.	Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +35%, assuming a 100 year lifetime for residential development;
	3.	Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +35% climate change allowance flood event. The presence of a significant existing building footprint suggests that floodplain storage capacity could be improved through effective design measures;
	4.	Where appropriate, buildings should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings – Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA';
	5.	Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1





SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;
6. Safe access is impacted in the current 1 in 100 annual probability flood event. Further analysis is required to assess if a safe route is available in accordance with the requirements in Section

- is required to assess if a safe route is available in accordance with the requirements in Section 3.4 of the L2 SFRA and, if so, a Flood Management and Evacuation Plan' should be prepared. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 7. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +35% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 3a 'High Probability';
- 8. Residual risk to the development should be investigated against the 1 in 100 annual probability +70% allowance for climate change flood event.





CA011 - Former Caversham Nursery (Local Plan ref: Not Identified)										
Grid Reference	e SU 71770 7	4730	Pos	t Code	RG4 8BH					
Topography	Recrea	ation D	 Elevat < 35 35 - 36 - 37 - 38 - 39 - The sit rising f approx 38.3m 	Elevation 40 - 41 mAOD < 35 mAOD 41 - 42 mAOD 35 - 36 mAOD 42 - 43 mAOD 36 - 37 mAOD 43 - 44 mAOD 37 - 38 mAOD 44 - 45 mAOD 38 - 39 mAOD 44 - 45 mAOD 39 - 40mAOD > 45 mAOD The site exists on a gradient, rising from south to north from approximately 37.2m AOD to 38.3m AOD.						
Flood Zone Map	Recrea	ation D	PW Sch Hall	Legen	id River Site Boundary Flood Zone 2 Flood Zone 3 Flood Zone 3b					
Flood Zone 1	0% Flo	bod 10%	Flood 2 3a	Zone 90%	Flood Zone 3b 0%					
Surface Water	Recre	ation	PW Sch	Risk c	of Surface Water Flooding River Site Boundary High - 1 in 30 annual probability Medium - 1 in 100 annual probability Low - 1 in 1000 annual Probability Very Low - > 1 in 1000 annual probability					

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Develo Propos	opment sal	Residenti	ial dwe	llings	Vulnerability Classification	n	More Vulne	rable	
Applica Climato Allowa	Applicable Climate Change AllowancesThe site is located within Flood Zone 2 'Medium Probability', and Flood Zone 3a 'H Probability', and the proposed development is classified as More Vulnerable.The +35% and +70% peak river flow climate change allowances should therefore be used to assess a range of climate change scenarios. The +35% allowance should be used provide a benchmark flood level against which mitigation measures should be set, and +70% allowance used to assess residual risk to the development.								
Climate Extents	e Change s	MESTFI	creat	nion D	Good Sch	Legend Sit 1 ir pro Ch 1 ir pro Ch	e Boundary n 100 annual obability +35% (ange n 100 annual obability +70% (ange	Climate Climate	
1 in 10 probab	0 annual bility +25%	N/	/A	1 in 100 annual probability +35%	100%	1 in 100 probabi	annual lity +70%	100%	
ood Risk	Flood Dep The maxim typically va The flood c over the sit Flood deptl in the +70%	th um flood d ry from 10i lepths in th e. hs in the cl 6 scenario.	lepths a mm to ne 1 in limate o	around the existing build 400 mm over the site. 1000 annual probability change scenarios are ty	lings in the 1 in flood event typ pically 500mm i	100 annu ically vary in the +35	al probability / from 500mm % scenario, a	flood event 1 to 900mm and 800mm	
Description of Flo	Flood War The River rainfall eve rising river period of ad The EA is advance w residents a	Varning and Period of Inundation er Thames is a large catchment with flooding typically the result of sustained regional-scale events. The response time – i.e. the period between the rainfall over the catchment and the ver levels downstream – can be significant, and this ensures there is typically a significant if advance warning (i.e. a period of days) before flooding occurs in the area. issue flood warnings for the area via their 'Flood Information Service' and considerable e warning of a flood event can typically be provided to allow the Council, emergency services s and businesses to take appropriate action.							
	Velocity of Flood Waters The site is occupied by buildings in an urbanised area, a significant distance from the main river is impacted in the climate change allowance scenarios. When flooding does occur, the rate of rise								




Reading Borough Council Level 2 Strategic Flood Risk Assessment

fall in water level is slow and velocities will correspondingly be slow, with the direction of flow from west to east (subject to further interrogation of the EA modelling).

Flood Defences

While not a 'formal' flood defence, the EA asset register does identify that the River Thames, located approximately 0.3km south of the site, includes natural high ground on its left bank with a design standard of 1 in 2 years. The condition is currently at 3 (moderate), on a scale of 1 (very good) to 5 (very poor).

Historic Records and Other Sources of Flooding

The Level 1 SFRA indicates that the site has been subject to river flooding in 1947 and 1977, but is not noted to have been impacted by flood events from other sources. Gosbrook Road, located south of the site, has previously been impacted by fluvial flooding.

External areas are noted to be at risk of surface water flooding, which emphasises the importance of an effective surface water drainage strategy as part of any proposed development, to prevent ponding of water following heavy rainfall events, in accordance with Sections 13.4 and 13.5 of the Level 1 SFRA.

The susceptibility to groundwater flooding varies between '25% and 50%'. The Thames Water DG5 information indicates that the site is within a postcode (RG4 8) that has over 101 recorded sewer flood incidents, both internal and external.

The site is not located within a maximum modelled breach extent of reservoir flooding and is therefore at negligible risk of flooding in the event of a reservoir breach.

Overview of Flood Risk

A summary of the flood risk to the site is provided below:

- The majority of the site is classified as Flood Zone 3a 'Medium Probability', with a 1 in 100 annual probability of river flooding;
- The maximum flood depth during the 1 in 100 annual probability event typically between 10mm and 400mm;
- The maximum flood depth during the 1 in 1000 annual probability event is typically between 500mm and 900mm;
- The whole site is impacted by the 1 in 100 annual probability +35% climate change allowance flood event, with general depths between 300mm and 700mm;
- Maximum flood depths for the 1 in 100 annual probability +70% climate change allowance typically vary between 600mm and 1000mm;
- The site is largely classified as at High risk of surface water flooding, with areas to the north at Very Low risk;
- The site is at negligible risk of flooding in the event of a reservoir breach;
- The access route via the adjacent road and Gosbrook Road to the south is impacted in the 1 in 100 annual probability flood event.

The site is shown to be at high risk of fluvial flooding, at a range of very low to high risk of surface water flooding and may be susceptible to groundwater and sewer flooding. The site is therefore potentially at risk of flooding from a number of sources.

Safe access via the access road/Gosbrook Road is impacted in a flood event of 1 in 100 annual probability or greater, although a pedestrian route at lower probability of flooding (outside the current 1 in 100 annual probability floodplain) may be available to the north-west via the adjacent recreation

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Description of Flood Risk



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ground. The feasibility of new residential development is subject to further assessment of the mitigation strategy based on the approach detailed in the L2 SFRA.

It is important that the design process considers the risk of flooding at the earliest conceptual stage, encompassing measures that will ensure the safety of future tenants/residents during a flood event.

A number of important design recommendations are set out below.

Spatial Planning

The site largely lies within Flood Zone 3a 'High Probability', affected by flooding from the River Thames in the 1 in 100 annual probability flood event. The entirety of the site is shown to be impacted by the 1 in 100 annual probability +35% and +70% allowances for climate change flood events.

A review of flood risk within the site has been carried out. The feasibility of designing the site in such a way that it remains safe throughout the lifetime of the development is dependent on a number of factors, and is specifically subject to further assessment of the safe access route.

It is essential that the following design recommendations are incorporated into the design process from the conceptual stage. A detailed site-based Flood Risk Assessment will be required as an integral part of the planning application stage, which should be carried out in accordance with Section 10.4 of the Level 1 SFRA.

Design Recommendations

- 1. Floor levels within the site should be situated a minimum of 300mm above the 1 in 100 annual probability plus allowance for climate change, in this instance +35%, assuming a 100 year lifetime for residential development;
- 2. Flood storage should be analysed to show that the proposed building footprint of the development will not cause a detriment to the available storage during the 1 in 100 annual probability +35% climate change allowance flood event. The presence of a significant existing building footprint suggests that floodplain storage capacity could be improved through effective design measures;
- 3. Where appropriate, buildings within the site should adopt resilient design techniques to minimise the damage and disruption sustained by businesses and/or residents following a flooding event. Further guidance can be found in BRE Digest DG523 'Flood Resilient Building', the Department for Communities and Local Government document 'Improving the Flood Performance of New Buildings Flood Resilient Construction', and Section 12.4 of the Level 1 SFRA;
- 4. Sustainable Drainage Systems (SuDS) should be incorporated into the site design, aiming to achieve greenfield runoff rates, if feasible, in accordance with Section 13.4 of the Level 1 SFRA. It is important that SUDS are designed with due consideration to soil and groundwater conditions. Infiltration techniques should be sought wherever possible, however are likely to be unsuitable in areas of shallow groundwater and/or impermeable soils. Further guidance on designing for groundwater is provided in Section 6.5 of the Level 1 SFRA. Buildings and landscaping should be designed within the site to avoid locking overland flow routes;



Planning Recommendations



Reading Borough Council Level 2 Strategic Flood Risk Assessment

- 5. Safe access via the access road is impacted in the current 1 in 100 annual probability flood event. Further analysis is required to assess if a safe route is available in accordance with the requirements in Section 3.4 of the L2 SFRA and, if so, a Flood Management and Evacuation Plan' should be prepared. Future tenants/residents within the site should be made aware of the potential risks of flooding, and should be actively encouraged to sign up to the Environment Agency's Flood Information Service to receive flood alerts, flood warnings and severe flood warnings well in advance of an event;
- 6. It is essential to ensure that all basement areas within flood affected areas of the site are watertight, and the entrance point is situated above the 1 in 100 annual probability +35% allowance for climate change flood level. Basements should not be used to provide habitable areas in locations classified at Flood Zone 2 'Medium Probability';
- 7. Residual risk to the development should be investigated against the 1 in 100 annual probability +70% allowance for climate change flood event.



