

Woolwich Ferry and Ambulance Station

Summary Information	
Site Reference	P4-W2
Address	Woolwich, London SE18 6DX
Area (ha)	1.62
Current Use	Woolwich Ferry operational use (including offices, depot, open maintenance yard, dockside area, vehicle waiting area and operational car parking), Woolwich Ambulance Station and Energy Charging Station.
Current Vulnerability	Highly Vulnerable
Proposed Use	Mixed use development, incorporating the Woolwich Ferry operational facilities and associated car parking and plant yard. Additional non-residential space for commercial uses and potentially the reprovision of the Ambulance station.
Proposed Vulnerability	Highly Vulnerable

Current Risk Summary					
Fluvial / Tidal			Groundwater		
FZ2	21.61	% of site	Limited potential for flooding to occur	39.09	% of site
FZ3a	33.67	% of site	Potential for flooding of properties below ground level	48.89	% of site
FZ3b	35.53	% of site	Potential for flooding to occur at surface	3.78	% of site
Surface Water			Sewer Flooding		
High	19.05	% of site	Number of incidents within the predominant postcode	30 - 40	
Medium	27.78	% of site	Is the site located within the Thamesmead area?	No	
Low	35.32	% of site			
Flood Defences			Flood Warning Area		
The site is at risk of flooding from rivers taking into account the presence and condition of flood defences according to the EA's RoFRS layer. There is a flood defence running alongside the River Thames in the eastern section of the site,			The EA Flood Warning Service is available at this site.		



which then runs across Ferry Approach and around the car park.	
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See webmap supporting assessment: [Greenwich - Level 1 and 2 SFRA](#)

1.1 Tidal

Description of Flood Mechanism
The site is at risk of tidal breach flooding from the River Thames which is located along the northern boundary of the site. - During the 1 in 200 year (2005) Thames Downriver modelled event, tidal flood risk is concentrated in the eastern section of the site but also covers some of Ferry Approach. - During the 1 in 1000 year (2005) Thames Downriver modelled event, tidal flood risk extends slightly within the eastern area of the site. - During the 1 in 200 (2115) Thames Downriver modelled events, tidal flood risk increases further south within the eastern section of the site. - During the 1 in 1000 year (2115) Thames Downriver modelled events, tidal flood risk extends to cover some of the central area of the site, and covers the majority of the eastern area of the site.
Mitigation / FRA Requirements
- A FRA must be submitted as part of a planning application. - Include appropriate flood resistance or resilience measures to address predicted flood depths. - See SFRA Level 2 Report mitigation requirement numbers 4.3 and 4.4, Policies E2 and E3 of the existing Greenwich Local Plan, and Policy EN6 of the draft Local Plan for further development stipulations. - Site users should be signed up to the EA's Flood Alert and Flood Warning Service. - Sea Level Allowances, provided by the EA, should be considered to inform flood resilient construction and design measures. - Future defence raisings may be required in line with the TE2100 Plan crest levels guidance. They must consider the lifetime of the development and the status of current flood defence crest levels in the site-specific FRA.
Climate Change Considerations
During the Thames Breach Downriver 1 in 200 year events, climate change is expected to increase the extent of tidal flood risk from the eastern section of the site towards the south. The maximum depth increases from 3.51m to 4.34m, the maximum velocity increases from 1.17m/s to 1.79m/s, the maximum flood level increases from 6.35mAOD to 7.18mAOD and the maximum hazard increases from 5.43 to 6.48. During the Thames Breach Downriver 1 in 1000 year events, climate change is expected to increase the extent of tidal flood risk from the eastern section of the site towards the south, and also slightly slightly further into the central areas of the site. The maximum



depth increases from 3.87m to 4.59m, the maximum velocity increases from 1.42m/s to 1.98m/s, the maximum flood level increases from 6.71mAOD to 7.45mAOD and the maximum hazard increases from 6.08 to 6.57.

Risk Assessment (Tidal – Thames Breach Downriver 2018)					
Parameter	2005_0200	2005_1000	2115_0200	2115_1000	Units
Max. Depth	3.51	3.87	4.34	4.59	m
Max. Velocity	1.17	1.42	1.79	1.98	m/s
Max Flood Level	6.35	6.71	7.18	7.45	m AOD
Max Ground Level	10.35	10.35	10.35	10.35	m AOD
Min Ground Level	2.99	2.99	2.99	2.99	m AOD
Max Flood Hazard	5.43	6.08	6.48	6.57	N/A

1.2 Surface Water

Description of Flood Mechanism	
Surface water flood risk is concentrated in the eastern section of the site. There are some smaller areas of risk around the eastern side of the roundabout as well as a small section in the car park. The high risk areas are located within the eastern areas of the site.	
Mitigation – Flood Risk Requirements	Mitigation – Surface Water Drainage
Development should be directed away from the eastern section of the site, and towards the western and southern areas of the site.	See SFRA Level 2 Report mitigation requirement 5.0 for further development stipulations.
Development should comply with SFRA - Level 2 Report Section 4 mitigation requirement numbers 4.3 and 4.9.	Developments should apply the Sustainable Drainage Hierarchy set out in Policy SI 13 of the London Plan as well as Policy E2 of the existing Greenwich Local Plan and Policy EN6 of the draft Local Plan.
	Ground investigations are required to confirm whether infiltration SuDS are suitable.
Climate Change Considerations	
During high risk events, flooding extends across a wider area of the eastern section of the site with a small section of the roundabout becoming high risk, with an increase in the maximum hazard from 1.25 to 2.0.	
During medium risk events, flood extents increase slightly within the eastern area of the site, the northern section of the roundabout, and the small section in the car park, while maximum depth, velocity, and hazard remain unchanged.	



During low risk events, flooding extends around the eastern side of the roundabout and across the eastern area of the site, including the small area within the car park. Maximum depth, velocity, and hazard remain unchanged.

Risk Assessment				
Parameter	High	Medium	Low	Units
Max. Depth	1.2	1.2	1.2	m
Max. Velocity	2.0	2.0	2.0	m/s
Max. Hazard	1.25	2.0	2.0	N/A

Risk Assessment – with Climate Change				
Parameter	High	Medium	Low	Units
Max. Depth	1.2	1.2	1.2	m
Max. Velocity	2.0	2.0	2.0	m/s
Max. Hazard	2.0	2.0	2.0	N/A

1.3 Sewer

Risk Assessment	Mitigation Requirements
The site falls within a postcode area where there are 30 – 40 reported flood incidents from sewer flooding in the eastern and central areas of the site. In the western area of the site, the site falls within a postcode area where there are 40+ reported flood incidents from sewer flooding. The site is assumed to be served by separate combined, surface water, and foul sewer networks, given their proximity to the site.	The applicant must consult with TWUL to confirm if the development site has historically flooded. TWUL must agree to any proposed sewer connections. If historic flooding has occurred, the applicant must demonstrate how this risk will be managed throughout the development's lifetime.

1.4 Groundwater

Risk Assessment	Mitigation Requirements
The southern section of the site has limited potential for groundwater flooding to occur. The majority of the northern section has potential for groundwater flooding of property situated below ground level, and the northeastern corner	For new developments that involve groundworks, especially if basements are planned, the applicant should carry out a screening study (as a minimum) to establish if there are any subterranean flood risk issues that may require further investigation.



of the site has potential for groundwater flooding to occur at the surface. The southern section of the site is underlain by Thanet Sand Formation bedrock geology, whilst there is no information regarding superficial deposits.	If there is a potential level of impact, mitigation actions must be proposed. This must be prepared by a chartered professional or specialist.
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1.5 Artificial

Risk Assessment	Mitigation Requirements
This site is at risk of flooding from the William Girling reservoir on a dry day. On a wet day, the site is at risk of flooding from the King George V, Lockwood, Queen Mary, Walthamstow No.4, Walthamstow No.5, and William Girling reservoirs. The reservoir extent map predicts that if any of these reservoirs breach on a wet day (or a dry day for the William Girling reservoir), the site will be at risk of flooding.	Propose appropriate and proportionate risk management measures. A suitable emergency response plan should be put in place, including an emergency warning system in the event of a reservoir flooding incident. Local Authority Emergency Planning Officers must be consulted to create a reservoir failure emergency and evacuation plan.

1.6 Planning Considerations – Safety of Development

A. Can the development be future proofed for climate change considerations? • Surface water flood risk extent is expected to increase in the high, medium and low risk events due to climate change. The maximum hazard increases in the high risk event. • Climate change is expected to increase the extent of tidal flood risk in the Downriver modelled scenarios. The maximum depth, velocity, flood level and hazard increase in a climate change scenario. • See SFRA - Level 2 Report Section 4 mitigation requirement number 4.4 for the required flood resistant / resilient building stipulations.
B. Can the development be designed safe throughout its lifetime without increasing flood risk elsewhere? • The development must use surface water drainage techniques to manage surface water runoff onsite through above ground SuDS and / or below ground attenuation. • Green drainage infrastructure should be prioritised to provide wider ecological / biodiversity benefits as per London Plan Policy SI 13. • See SFRA Level 2 Report mitigation requirement numbers 4.1, 4.3, 4.5, 4.7, 4.8 and 4.9 and Policies E2, E3 of the Greenwich Local Plan and Policy EN6 of the draft Local Plan for further development stipulations.



C.	What is the cumulative impact of the development land use change and will flood risk increase?
	- The development land use is not changing from 'Highly Vulnerable'. - The site is largely impermeable, with permeable areas located in the centre of the existing roundabout and in the southeastern area of the site. - Development must mitigate any increase in impermeable area to the site with runoff storage to prevent any increase in flood risk. An increase in impermeable area coverage on site will increase surface water runoff and flood risk if not managed properly.
D.	How can the development reduce risk overall?
	- Direct development away from the eastern area of the site and towards the southern areas of the site, where there is lower risk of tidal and surface water flooding. - By complying with Policy E2 of the Greenwich Local Plan and Policy EN6 of the draft Local Plan through demonstrating that the development will avoid or minimise all sources of flood risk to people and property taking climate change into account, and incorporating SuDS measures in order to manage surface water runoff as close to its source as possible and to meet the required SuDS performance standards. - By complying with SFRA - Level 2 Report Section 4 mitigation requirement 4.4.
E.	Which safe access and egress routes are recommended?
	Safe access and egress routes should be directed towards Ferry Approach and John Wilson Street where there is less risk of tidal and surface water flooding.
F.	Will development require a flood risk permit / watercourse consent?
	Yes , the site is within 16m of a Tidal River.
G.	Can the site pass the Exception Test?
	- The site is located within Flood Zones 2, 3a and 3b and the proposed vulnerability classification of the Ambulance Station is 'Highly Vulnerable', which is not permitted within Flood Zones 3a or 3b. The Exception Test would be required if the Ambulance Station is proposed within the area of Flood Zone 2. 'Less Vulnerable' uses are not permitted within Flood Zone 3b, only 'Essential infrastructure' or 'Water compatible' uses are permitted within Flood Zone 3b, which covers the majority of the western section of the site, part of Ferry Approach, and the northern boundary in the eastern section of the site.

