

6.0 Royal London Hospital

Site Number:	5
Site Location:	Whitechapel Road
Grid Reference:	534600, 181660

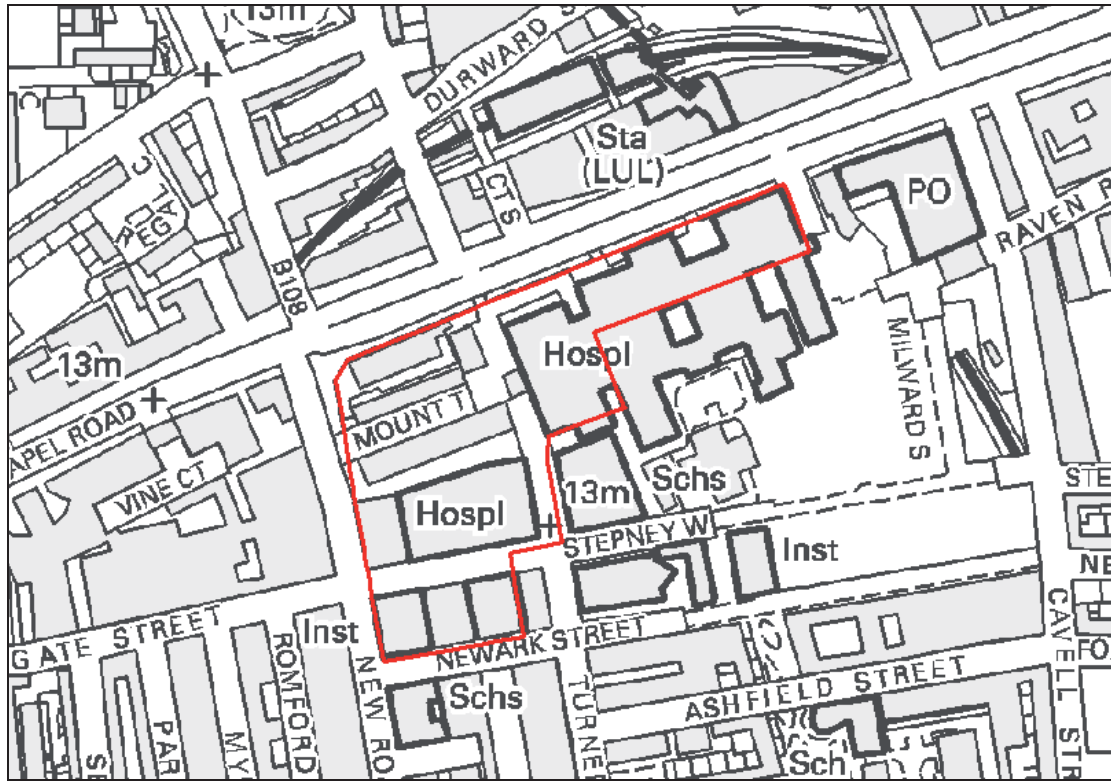


Figure 6-1 Royal London Hospital Site

6.1 SITE DESCRIPTION

The area of the site is 2.28Ha and is currently occupied by the Royal London Hospital. The topography varies between 11mAOD and 14mAOD with higher ground levels located in the western portion of the site. The proposed uses of the site are mixed and include a health facility and a district heating facility. The site has been identified by NHS Tower Hamlets as suitable for continued expansion of the Royal London Hospital to provide health facilities and falls within a focus area for potential district heating facilities.

In accordance with Table D2 of PPS 25, the classifications of the proposed uses are as follows:

Proposed Land Use	Vulnerability Classification
Health Facility	More vulnerable
District heating facility	Less vulnerable

6.2 SUMMARY OF FLOOD RISK

6.2.1 FLOOD ZONE MAPS

The entirety of the site is shown to be located within Flood Zone 1. All of the proposed land uses for this site are compatible with this flood zone.

6.3 SOURCES OF FLOODING

6.3.1 TIDAL

Actual Risk

The site is defended from tidal inundation during the 0.5% AEP tidal event by the existing Thames Tidal Flood Defences (including the Thames Barrier) for the lifetime of the development. The site is considered to be at low risk of tidal flooding.

Residual Risk

There is a residual risk of tidal flooding from an extreme surge event. The site is defended against inundation from the River Thames during a 0.1% AEP tidal event and is considered as having a low probability of the defences overtopping.

A breach of the tidal defences is unlikely to result in flooding of the site as it is located on sufficiently higher ground.

6.3.2 FLUVIAL

Actual Risk

The site is located outside of the 1% AEP event flood extent of the River Lee (with inclusion of climate change). The site is located on ground approximately 5m higher than the floodplain of the River Lee and is located over 2km to the west. The site is concluded as being at a low risk of actual fluvial flooding.

Residual Risk

The site is located outside of the 0.1% AEP event flood extent of the River Lee.

The risk of a breach in the fluvial defences is unlikely to result in inundation of the site due to its distance from the watercourse and its location on much higher ground. The site is concluded as being at a low risk of residual fluvial flooding.

6.3.3 SURFACE WATER/SEWER

Some small, isolated areas of ponding water are observed in a 1% AEP event, located within the confines of the existing hospital. These areas may not necessarily equate to a high risk of surface water flooding and could be a result of inaccuracies in the LiDAR or assumptions made in the model. The site is concluded as being at a low risk of surface water flooding.

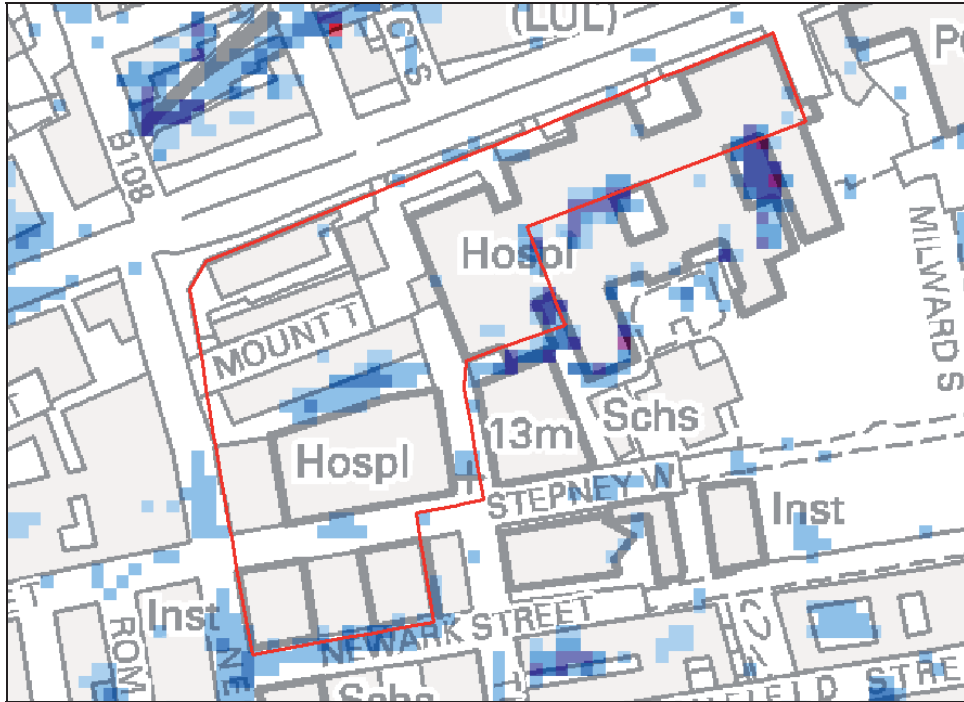


Figure 6-2 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the Royal London Hospital Site

6.3.4 GROUNDWATER

The site is shown to be at increased potential of elevated groundwater. The underlying bedrock geology at the site is London Clay with superficial deposits of sand and gravel. Development proposals will need to consider site ground conditions and groundwater levels in this location over the lifetime of the development. In particular the design of any underground structures or services and foundations.

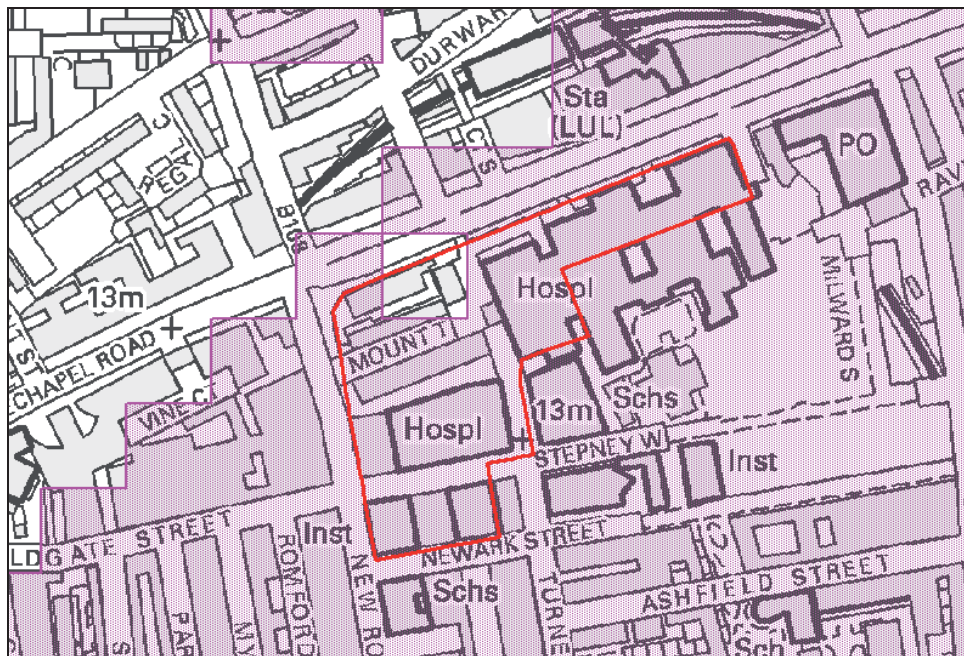


Figure 6-3 Increased Potential of Elevated Groundwater at the Royal London Hospital Site

6.3.5 ARTIFICIAL SOURCES

There are no artificial sources of flood risk near to the site.

6.4 GENERAL FLOOD RISK MANAGEMENT

The site is located within Flood Zone 1. All of the proposed uses are appropriate for this site.

The site has an increased potential of elevated groundwater. It is recommended that groundwater levels are monitored as part of a geo-environmental site investigation to determine the depth to groundwater. Depending on the results of the groundwater monitoring, any underground structures in the development may require mitigation using impermeable materials.

Will development increase flood risk elsewhere?
<ul style="list-style-type: none"> Unlikely. Development layout must consider surface water flow routes and manage runoff on site sustainably with a target to achieve Greenfield runoff rates.
How can development reduce flood risk overall?
<ul style="list-style-type: none"> Include 'at source' SUDS control measures to reduce existing site runoff in accordance with London Plan and local policy.
How can the development be made safe?
<ul style="list-style-type: none"> Design of development to consider mitigating the risk of groundwater flooding with use of impermeable materials
Is there a reasonable prospect of compliance with part c of the Exception Test?
N/A

7.0 John Orwell Sports Centre & Vaughan Way

Site Number:	6
Site Location:	Tench Street & Vaughan Way
Grid Reference:	534570, 180220

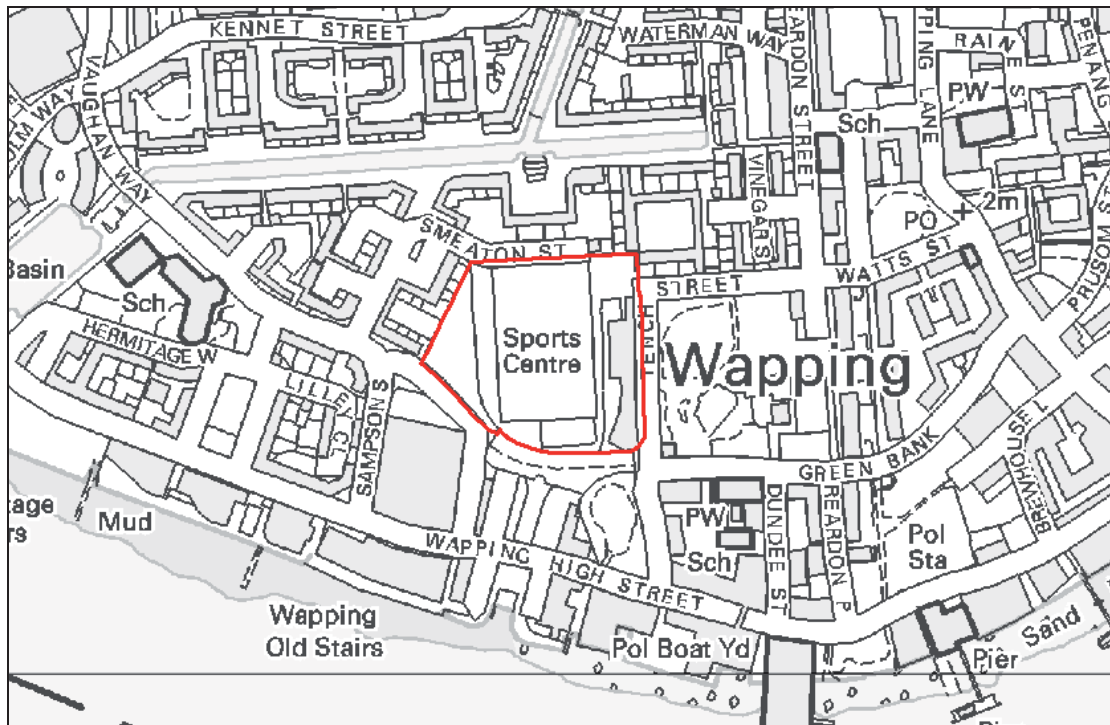


Figure 7-1 John Sports Centre and Vaughan Way Site

7.1 SITE DESCRIPTION

The John Orwell Sports Centre and Vaughan Way site occupies 1.41Ha of land which is currently used as a Sports Centre. The topography varies between 4mAOD and 7mAOD, with lower ground levels located in the east and west of the site, and higher elevations in the central portion of the site. The proposed site use is for a leisure facility and a district heating facility which may be developed independently or as a combined development.

In accordance with Table D2 of PPS 25, the classifications of the proposed uses are as follows:

Proposed Land Use	Vulnerability Classification
Leisure Facility	Less vulnerable
District heating facility	Less vulnerable

7.2 SUMMARY OF FLOOD RISK

7.2.1 FLOOD ZONE MAPS

The majority of the site is located within Flood Zone 1. Areas near the eastern and western boundary are located within Flood Zone 3. All vulnerability classifications are permitted within Flood Zone 1. Within Flood

Zone 3, 'less vulnerable' and 'water compatible' uses are permitted. 'More vulnerable' and 'essential infrastructure' will require the Exception Test to be passed. 'Highly vulnerable' uses are not recommended within Flood Zone 3.

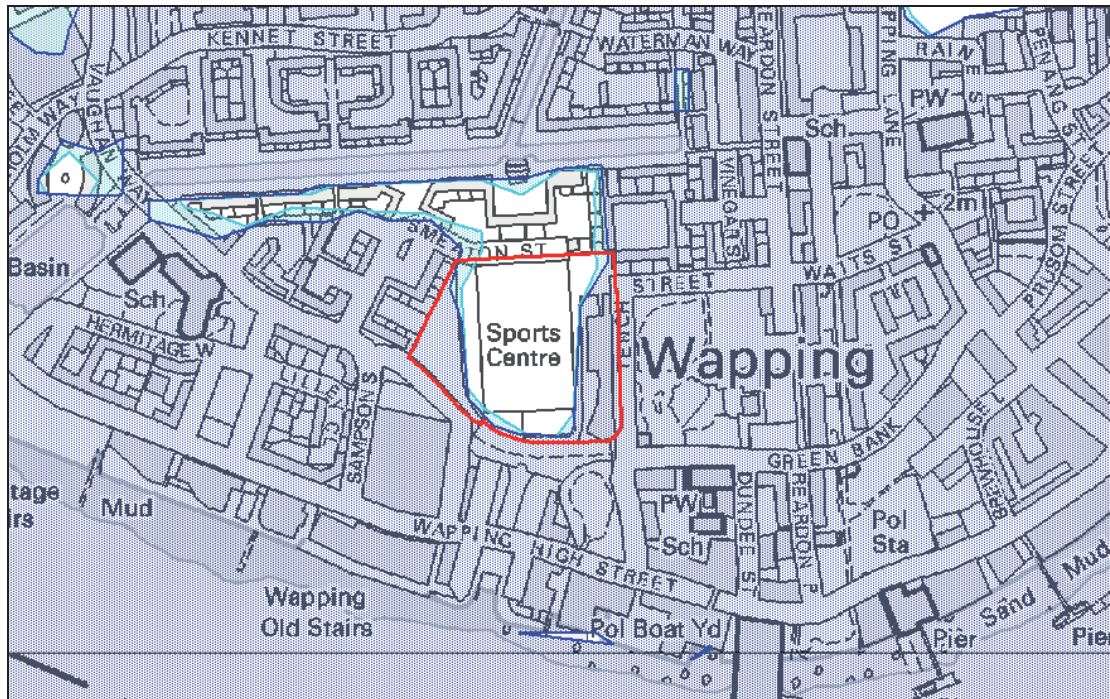


Figure 7-2 PPS25 Flood Zones across the John Sports Centre and Vaughan Way Site

7.3 SOURCES OF FLOODING

7.3.1 TIDAL

Actual Risk

The site is defended from tidal inundation during the 0.5% AEP tidal event by the existing Thames Tidal Flood Defences (including the Thames Barrier) for the lifetime of the development. The site is considered to be at low risk of tidal flooding.

Residual Risk

The site is identified as being at a residual risk of tidal flooding from an extreme surge event. The site is defended against overtopping from the River Thames during a 0.1% AEP tidal event and is considered as having a low probability of the defences overtopping.

Should a breach of the River Thames Tidal Flood Defences occur, there remains a risk that the site may be inundated. Breach analyses were carried out as a part of the Level 1 SFRA. The flood extent for the 0.5% AEP tidal surge breach event at Wapping (Breach 7) shows flooding in the western portion of the site. In this area, the model results indicate hazard ratings ranging from 'moderate' to 'significant', consequently a danger to life is posed for most people.

Future developments on this site may require that a site specific breach analysis is undertaken – the developer should consult with the Environment Agency to determine locations, and breach characteristics.

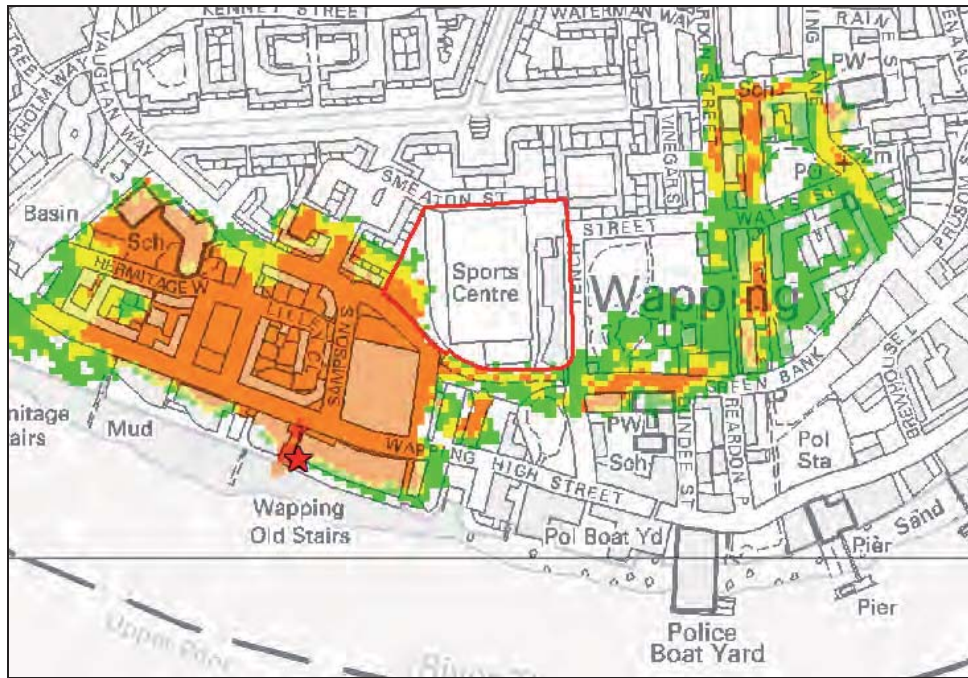


Figure 7-3 Wapping Breach Extent at the John Sports Centre and Vaughan Way Site

7.3.2 FLUVIAL

Actual Risk

The site is located outside of the modelled 1% AEP event flood extent of the River Lee (with inclusion of climate change). The site is located over 4km away to the west. The site is concluded as being at a low risk of actual fluvial flooding.

Residual Risk

The site is located outside of the modelled 0.1% AEP event flood extent of the River Lee. The risk of a breach in the fluvial defences is considered unlikely to result in the inundation of the site due to its distance from the watercourse. The site is concluded as being at a low risk of residual fluvial flooding.

7.3.3 SURFACE WATER/SEWER

The site is shown to be at low risk of surface water flooding. Small, isolated areas of ponding water are observed within the boundary of the site. The predicted depth of water in a 1% AEP rainfall event is identified as being between 0.1m to 0.2m.

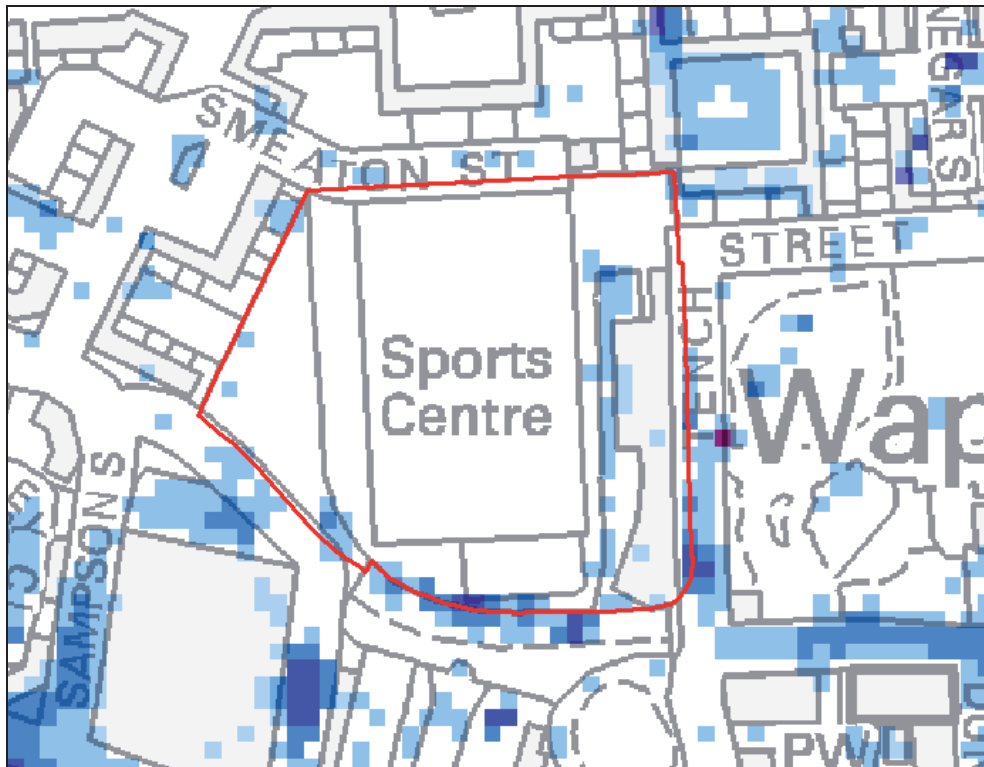


Figure 7-4 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the John Sports Centre and Vaughan Way Site

7.3.4 GROUNDWATER

The site is not shown to be at an increased potential of elevated groundwater.

7.3.5 ARTIFICIAL SOURCES

St Katherine Docks is located 0.5km to the west of the site, whilst the Shadwell Basin is located approximately 0.6km to the east. An unnamed canal is located approximately 70m to the north of the site. The Docks, basins, and canals are maintained and managed by British Waterways and are either situated at or below ground level. The risk of flooding from these sources is therefore considered low.

7.4 GENERAL FLOOD RISK MANAGEMENT

The majority of the site is located within Flood Zone 1. Development from any of the vulnerability classifications is appropriate within this zone. The remainder of the site is located within Flood Zone 3. The current proposed 'less vulnerable' uses are appropriate within this flood zone. It is recommended that any proposed development apply the sequential approach to the final development layout.

The low-lying area of the site along the eastern boundary is shown to be at risk of a breach in the tidal defences. Emergency services access may be difficult for the site at this location as the modelled breach results show that Vaughan Way is flooded. A more detailed assessment of flood mechanisms is recommended to determine a preferred safe access route (if any).

Site users located within the Flood Zone 1 area of the site will remain 'safe' in the event of a flood event, however safe refuge for development in Flood Zone 3 must be considered in design.

Habitable ground floor uses are suitable for areas within Flood Zone 1 (or outside of any predicted fluvial and tidal flooding). If necessary, 'less vulnerable' ground floor uses can be included within the areas that are

affected by flooding, with habitable (e.g. sleeping) land uses being located above the identified flood tidal breach levels during a 0.5% AEP event with a freeboard allowance. Any development located within areas that are at risk of tidal breach flooding, should incorporate flood resilience and resistance measures within the buildings design so as to withstand the hydrostatic forces from a breach. A site specific breach analysis may need to be carried out and is likely to be beneficial in developing site specific flood risk management measures – the developer should consult the Environment Agency with regards to the location and characteristics of the breach..

The Environment Agency has indicated that the site is located on a historic landfill. The impacts of the previous land use will need to be considered when assessing the suitability of SUDS measures.

Will development increase flood risk elsewhere?
<ul style="list-style-type: none"> Unlikely. Development layout must consider surface water flow routes and manage runoff on site sustainably with a target of achieving Greenfield runoff rates.
How can development reduce flood risk overall?
<ul style="list-style-type: none"> Include 'at source' SUDS measures to reduce existing site runoff in accordance with London Plan and local policy. The SUDS management train will need to consider the previous landfill use of the site. Incorporation of flood resilience and resistance measures within buildings within the 0.5% AEP event breach extent.
How can the development be made safe?
<ul style="list-style-type: none"> Application of the sequential approach at site level. Floor levels of all sleeping accommodation to be raised 300mm above the 0.5%AEP event tidal breach level. Raised ground floor levels for developments in low-lying areas up to the 0.5%AEP event tidal breach level with ground level 'less' vulnerable landuses incorporating flood resistance / resilience measures. Consideration of safe access / egress from development and safe refuge.
Is there a reasonable prospect of compliance with part c of the Exception Test?
<ul style="list-style-type: none"> Yes, subject to appropriate site layout adopting a sequential approach, raising ground floor levels above the 0.5%AEP event tidal breach level and agreeing emergency access arrangements.

8.0 News International

Site Number:	7
Site Location:	Pennington Street
Grid Reference:	534474, 180580

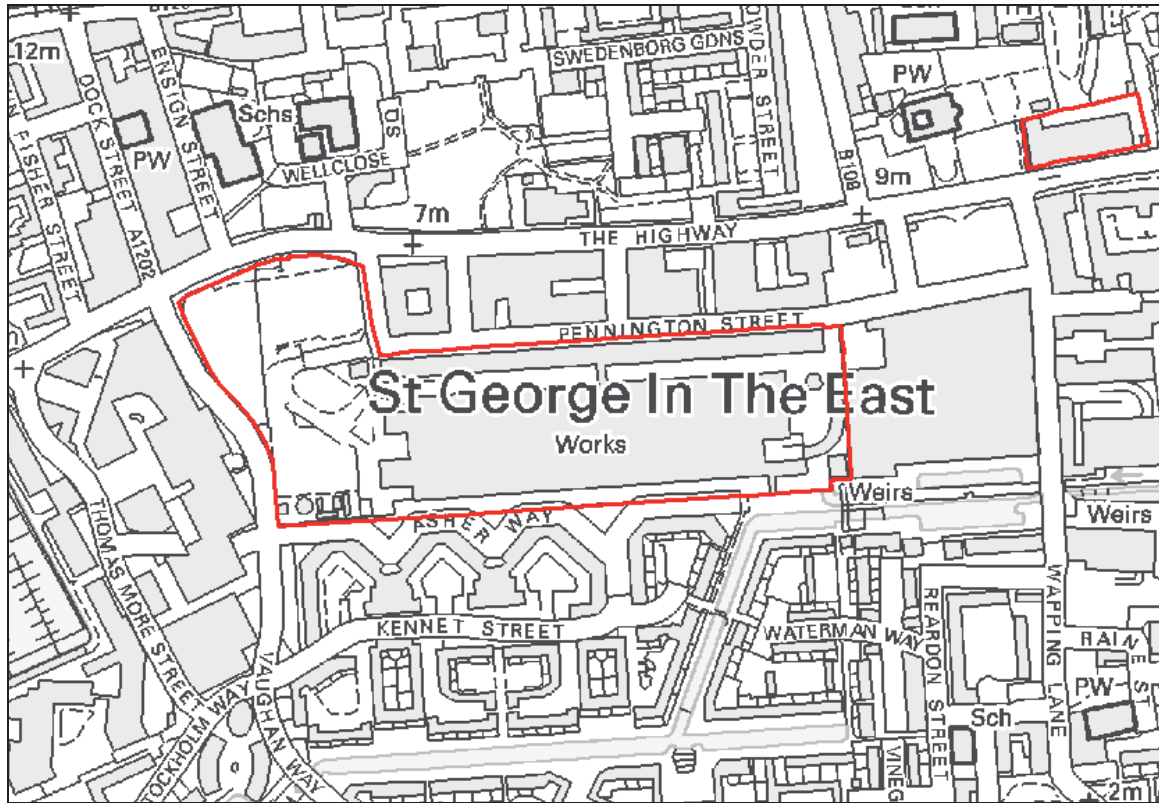


Figure 8-1 News International Site

8.1 SITE DESCRIPTION

The News International site occupies 5.784Ha of land and currently consists of offices and associated car parking. Ground levels are generally 6-7mAOD with northwest parts of the site as low as 5mAOD. The proposed site use includes a large-scale housing development and a district heating facility forming part of a larger mixed use development.

In accordance with Table D2 of PPS 25, the classifications of the proposed uses are as follows:

Proposed Land Use	Vulnerability Classification
Housing development	More vulnerable
District heating facility	Less vulnerable

8.2 SUMMARY OF FLOOD RISK

8.2.1 FLOOD ZONE MAPS

The majority of the site is shown to be located within Flood Zone 1. All of the proposed uses of the site are compatible with this flood zone. A narrow strip along the southern boundary is located within Flood Zone 3. Proposed land uses with vulnerability classifications of 'more vulnerable' and 'essential infrastructure' will require the Sequential and Exception Tests to be passed.

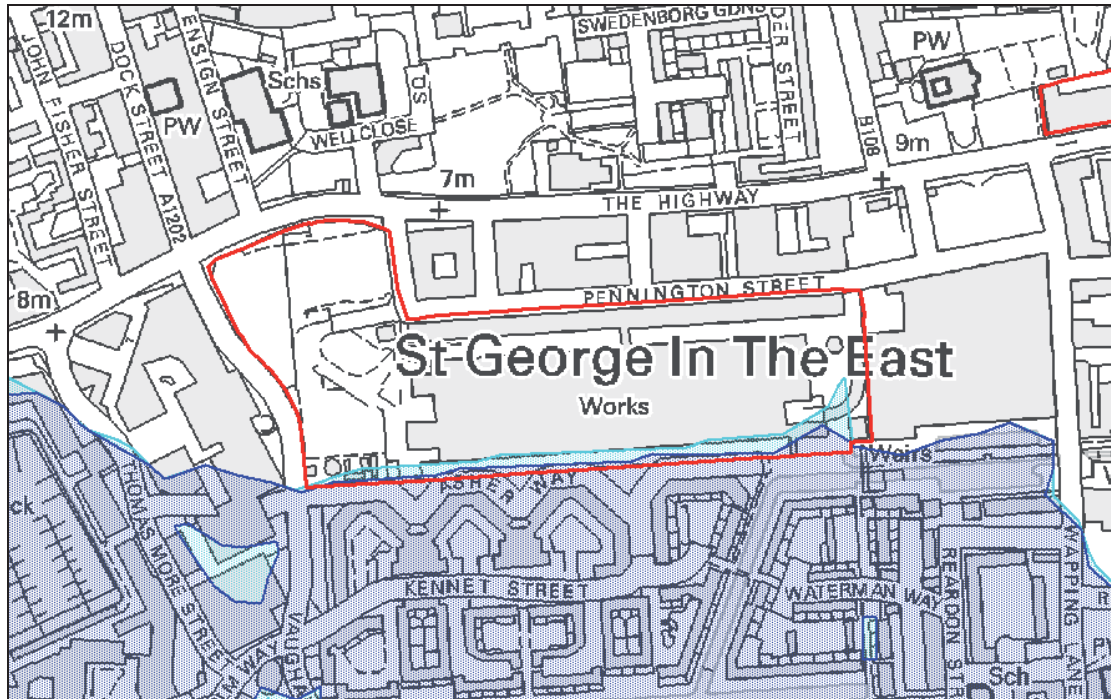


Figure 8-2 PPS25 Flood Zones across the News International Site

8.3 SOURCES OF FLOODING

8.3.1 TIDAL

Actual Risk

The site is defended from tidal inundation during the 0.5% AEP tidal event by the existing Thames Tidal Flood Defences (including the Thames Barrier) for the lifetime of the development. The site is considered to be at low risk of tidal flooding.

Residual Risk

There is a residual risk of tidal flooding from an extreme surge event. The site is defended against inundation from the River Thames during a 0.1% AEP tidal event and is considered as having a low probability of the defences overtopping.

Breach analyses were carried out as a part of the Level 1 SFRA. A breach in the tidal defences at Wapping (Breach 7) is not shown to result in flooding of the site. Examination of the site and surrounding topography compared to the peak tidal levels show that the majority of the site is not at risk of flooding should there be a breach in the defences. The majority of the site is located on ground levels over 6mAOD. This is 1.1m higher than the predicted peak level in a 0.5% AEP tidal event in the year 2107 of 4.9mAOD. Only the south-east

corner of the site has the potential to flood in such an event where ground levels are as low as 4mAOD.

Future developments on this site may require that a site specific breach analysis is undertaken – the developer should consult with the Environment Agency to determine locations, and breach characteristics.

8.3.2 FLUVIAL

Actual Risk

The site is located outside of the 1% AEP event flood extent of the River Lee (with inclusion of climate change). The site is located over 4km away to the west. The site is concluded as being at a low risk of actual fluvial flooding.

Residual Risk

The site is located outside of the 0.1% AEP event flood extent of the River Lee. The risk of a breach in the fluvial defences is unlikely to result in inundation of the site due to its distance from the watercourse. The site is concluded as being at a low risk of residual fluvial flooding.

8.3.3 SURFACE WATER/SEWER

Surface water is observed to accumulate at a low point in the northwest corner of the site. Depths of water in a 1% AEP rainfall event reach 0.7m correlating to a 'significant' hazard meaning that deep or fast flowing water will be dangerous for most people. Immediately adjacent to the site, Pennington Street is shown to flood to depths over 1m.

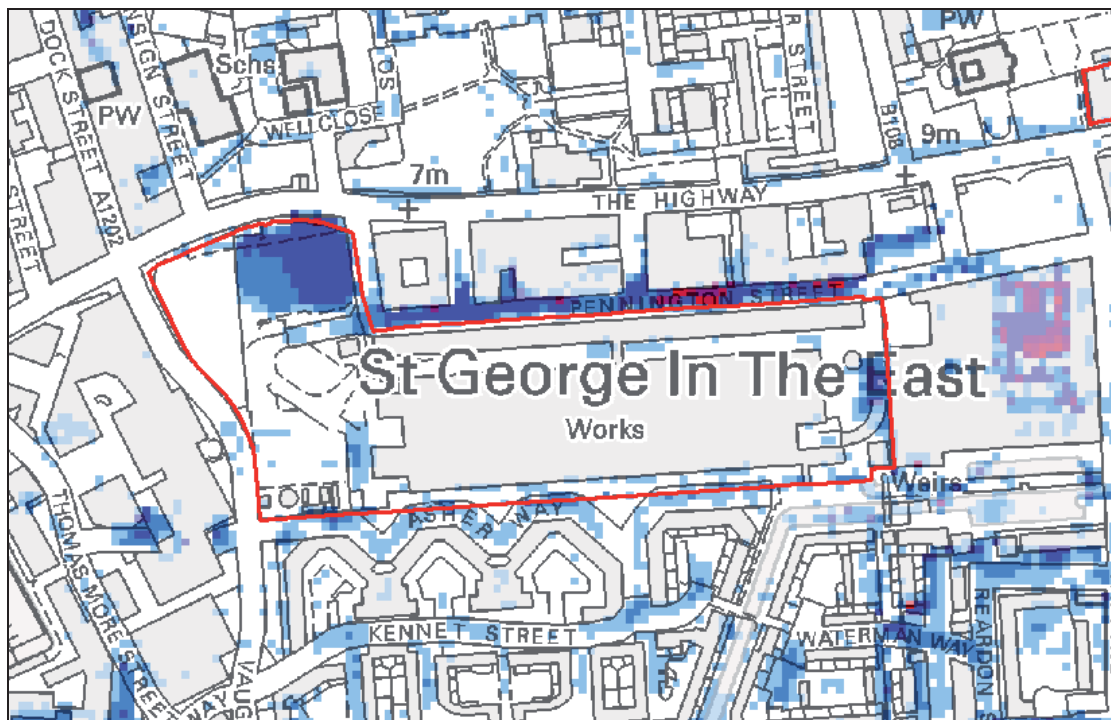


Figure 8-3 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the New International Site

8.3.4 GROUNDWATER

The south of the site is shown to be at increased potential of elevated groundwater. The underlying bedrock geology at the site is London Clay with superficial deposits of sand and gravel.

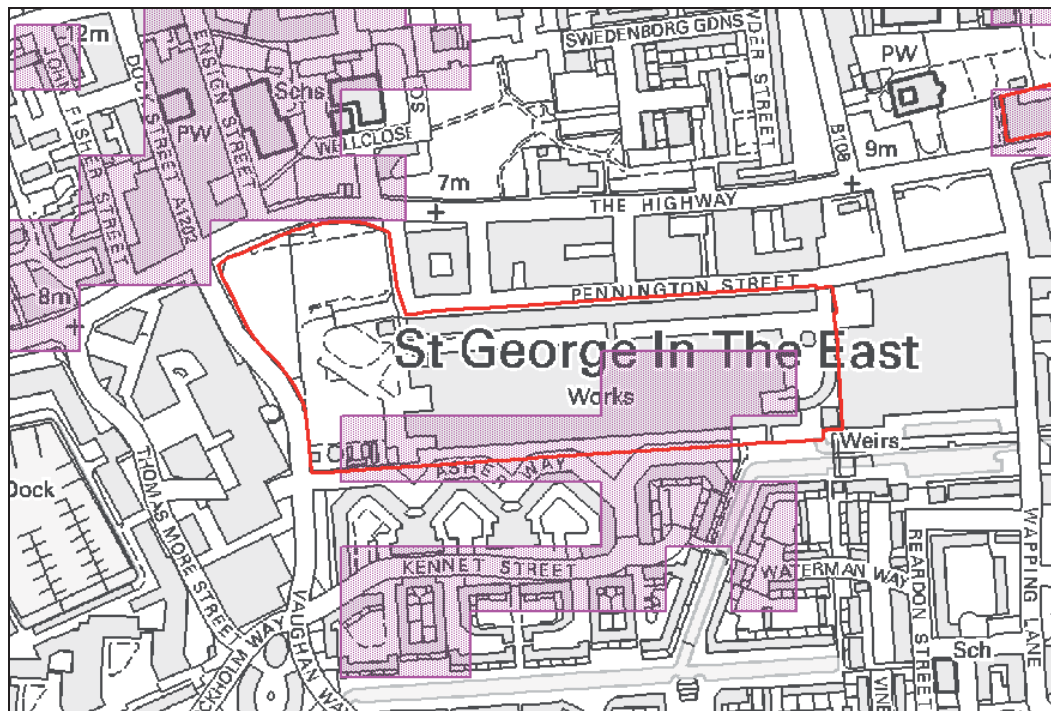


Figure 8-4 Increased Potential of Elevated Groundwater at the New International Site

8.3.5 ARTIFICIAL SOURCES

St Katherine Docks is located 0.2km to the west of the site whilst the Shadwell Basin is located approximately 0.4km to the east. An unnamed canal also lies immediately south of the site. The Docks, basins, and canals are maintained and managed by British Waterways and may need to be consulted due to the close proximity with the development, i.e. a buffer zone may be required. A breach in either the dock, basin, or canal is unlikely to result in flooding of the site as the ground levels on site are at least 2m higher than the surrounding levels.

8.4 GENERAL FLOOD RISK MANAGEMENT

The majority of the site is located within Flood Zone 1. Development from any of the vulnerability classifications is appropriate within this zone. The southern boundary of the site is within Flood Zone 3. The location of 'more vulnerable' land uses within Flood Zone 3 will require the Sequential and Exception Tests. The sequential approach should be adopted when considering development layout, locating higher vulnerability uses away from the southern boundary of the site and the northwest corner, where ground levels are lowest.

Should a breach of the River Thames Tidal Flood Defences occur, there remains a risk that parts of the site may be inundated. A site specific breach analysis may be required to inform site specific flood risk management measures. The finished floor levels of all habitable uses in any areas shown to flood should be set at 300mm above the 0.5% AEP tidal breach level. Consideration should also be given to providing safe access/egress for emergency services and site uses.

The site is shown to be at risk of surface water flooding. It is recommended that flood resistance / resilience measures are incorporated into buildings to reduce the impacts of a flood event. Where possible, electrical fittings and appliances should be raised above the results of the 1% AEP flood level. Due to the deep depths of predicted water, development may need to consider raised floor levels for all habitable ground floor uses.

Surface water is predicted to accumulate in the northwest corner of the site. Emergency services access is not likely to be possible along Pennington Street however access via Vaughan Way / Dock Street may be possible. Development in this area should take into consideration the results of the surface water modelling and carry out more detailed modelling if determined to be necessary. Raised ground levels and/or flood resistance/resilience measures may need to be considered.

The site has an increased potential of elevated groundwater. It is recommended that groundwater levels are monitored as part of a geo-environmental site investigation to determine the depth to groundwater. Depending on the results of the groundwater monitoring, any underground structures in the development may require mitigation using impermeable materials.

Will development increase flood risk elsewhere?
<ul style="list-style-type: none"> Unlikely. Development layout must consider surface water flow routes and manage runoff on site sustainably with a target to achieve Greenfield runoff rates.
How can development reduce flood risk overall?
<ul style="list-style-type: none"> Include 'at source' SUDS control measures to reduce existing site runoff in accordance with London Plan and local policy. Incorporation of flood resistance/resilience measures
How can the development be made safe?
<ul style="list-style-type: none"> Application of the sequential approach at site level. Determine likely impact of breach in defences and raise finished floor levels in flooded areas. Consideration of safe access / egress from development for emergency services and site users Design of development to consider mitigating the risk of groundwater flooding with use of impermeable materials
Is there a reasonable prospect of compliance with part c of the Exception Test?
<ul style="list-style-type: none"> Yes, subject to appropriate site layout adopting a sequential approach, raising ground flood levels above the 0.5%AEP event tidal breach level and agreeing emergency access arrangements.

9.0 St. George's Pools

Site Number:	8
Site Location:	221 The Highway
Grid Reference:	534852, 180788



Figure 9-1 St George's Pools Site

9.1 SITE DESCRIPTION

The site occupies 0.29Ha of land and is currently the location of the St George's swimming pools. The topography of the site is flat with elevations varying from 12mAOD to 12.8mAOD. The proposed use of the site is a leisure facility and a district heating facility.

In accordance with Table D2 of PPS 25, the classifications of the proposed uses are as follows:

Proposed Land Use	Vulnerability Classification
Leisure facility	Less vulnerable
District heating facility	Less vulnerable

9.2 SUMMARY OF FLOOD RISK

9.2.1 FLOOD ZONE MAPS

The entirety of the site is shown to be located within Flood Zone 1. All of the proposed land uses for this site are compatible with this flood zone.

9.3 SOURCES OF FLOODING

9.3.1 TIDAL

Actual Risk

The site is defended from tidal inundation during the 0.5% AEP tidal event by the existing Thames Tidal Flood Defences (including the Thames Barrier) for the lifetime of the development. The site is considered to be at low risk of tidal flooding.

Residual Risk

There is a residual risk of tidal flooding from an extreme surge event. The site is defended against inundation from the River Thames during a 0.1% AEP tidal event and is considered as having a low probability of the defences overtopping.

A breach of the tidal defences is unlikely to result in flooding of the site as it is located on sufficiently higher ground, over 5m above the tidal peak for the 0.5% AEP event with climate change.

9.3.2 FLUVIAL

Actual Risk

The site is located outside of the 1% AEP event with inclusion of climate change flood extent of the River Lee. The site is concluded as being at a low risk of actual fluvial flooding.

Residual Risk

The site is located outside of the 0.1% AEP event flood extent of the River Lee.

The risk of a breach in the fluvial defences is unlikely to result in inundation of the site due to its distance from the watercourse. The site is concluded as being at a low risk of residual fluvial flooding.

9.3.3 SURFACE WATER/SEWER

The site is not shown to be at risk of surface water flooding in a 1% AEP event.

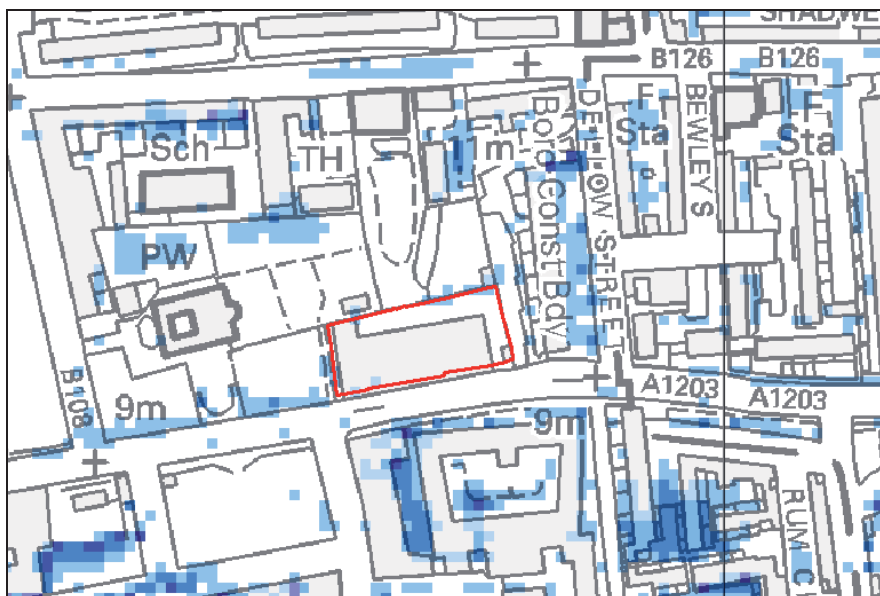


Figure 9-2 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the St George's Pools Site

9.3.4 GROUNDWATER

The site is located in an area shown to have an increased potential of elevated groundwater. Development proposals will need to consider site ground conditions and groundwater levels in this location over the lifetime of the development. In particular the design of any underground structures or services and foundations.

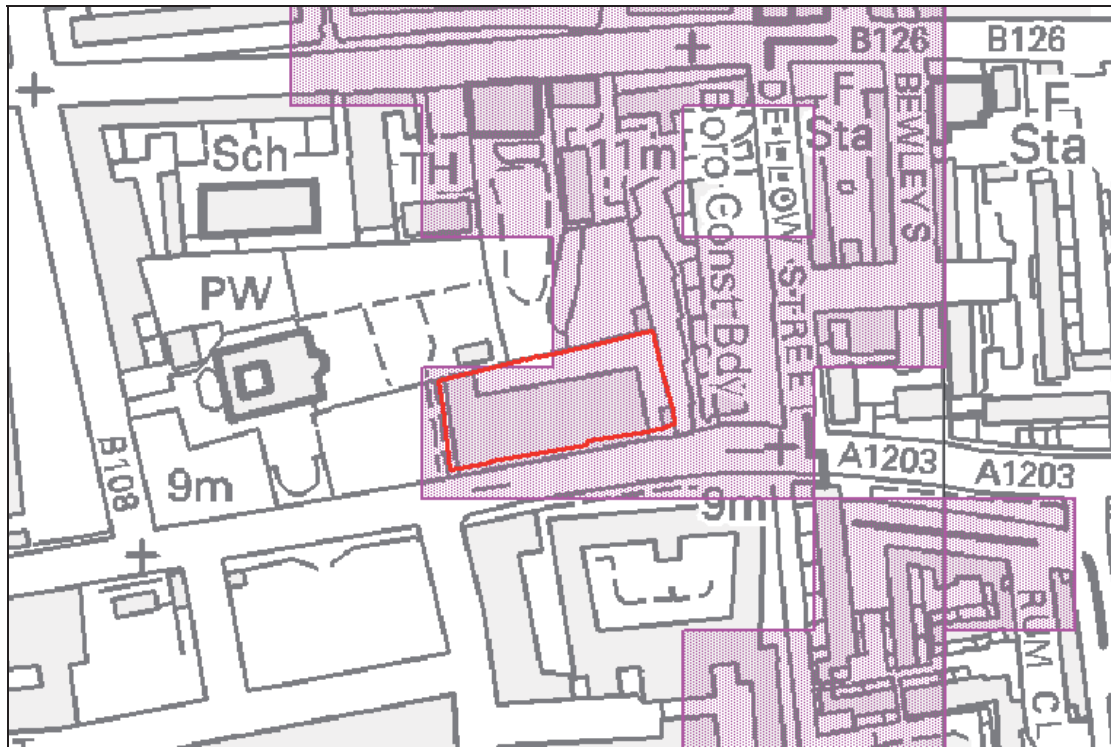


Figure 9-3 Increased Potential of Elevated Groundwater at the St George's Pools Site

9.3.5 ARTIFICIAL SOURCES

The site is located 200m to the west of Shadwell Basin. An unnamed canal also lies to the south of the site approximately 200m away. The Docks, basins, and canals are maintained and managed by British Waterways and are either situated at or below ground level. The risk of flooding from these sources is therefore considered low.

9.4 GENERAL FLOOD RISK MANAGEMENT

The site is located within Flood Zone 1. All of the proposed uses are appropriate for this site.

The site has an increased potential of elevated groundwater. It is recommended that groundwater levels are monitored as part of a geo-environmental site investigation to determine the depth to groundwater. Depending on the results of the groundwater monitoring, any underground structures in the development may require mitigation using impermeable materials.

Will development increase flood risk elsewhere?
<ul style="list-style-type: none">Unlikely. Development layout must consider surface water flow routes and manage runoff on site sustainably with a target to achieve Greenfield runoff rates.
How can development reduce flood risk overall?
<ul style="list-style-type: none">Include 'at source' SUDS control measures to reduce existing site runoff in accordance with London Plan and local policy.
How can the development be made safe?
<ul style="list-style-type: none">Design of development to consider mitigating the risk of groundwater flooding with use of impermeable materials
Is there a reasonable prospect of compliance with part c of the Exception Test?
N/A

10.0 Fish Island Area Action Plan

Site Number:	9
Site Location:	Wick Lane, Wansbeck Road, Wyke Road, Hepscott Road
Grid Reference:	537265, 183963

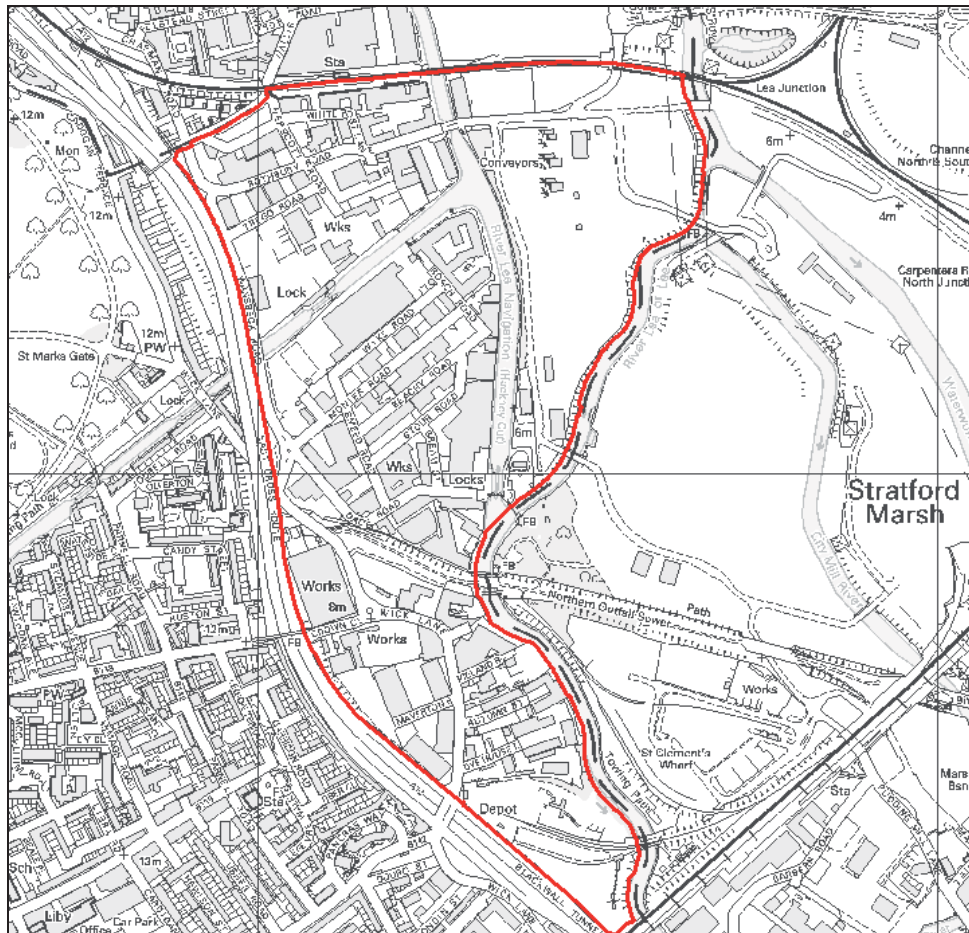


Figure 10-1 Fish Island AAP Site

10.1 SITE DESCRIPTION

The Fish Island Area Action Plan occupies an area of 53.86Ha. The site is located in the north-eastern corner of the borough and is bounded by the River Lee along the eastern boundary and the East Cross Route along the western boundary. The northern boundary of the site borders the London Borough of Hackney and the Hackney Wick Area Action Plan.

The site currently contains a mixture of industrial and residential units, along with Hackney Wick London Overground station and waterspaces. The proposed use of the site is mixed use, containing a large-scale housing development, schools, open spaces, a health facility and a waste management / district heating facility. Figure 10-2 below shows the proposed layout of the site as outlined in the Fish Island Area Action Plan Development Plan Document (May 2011).

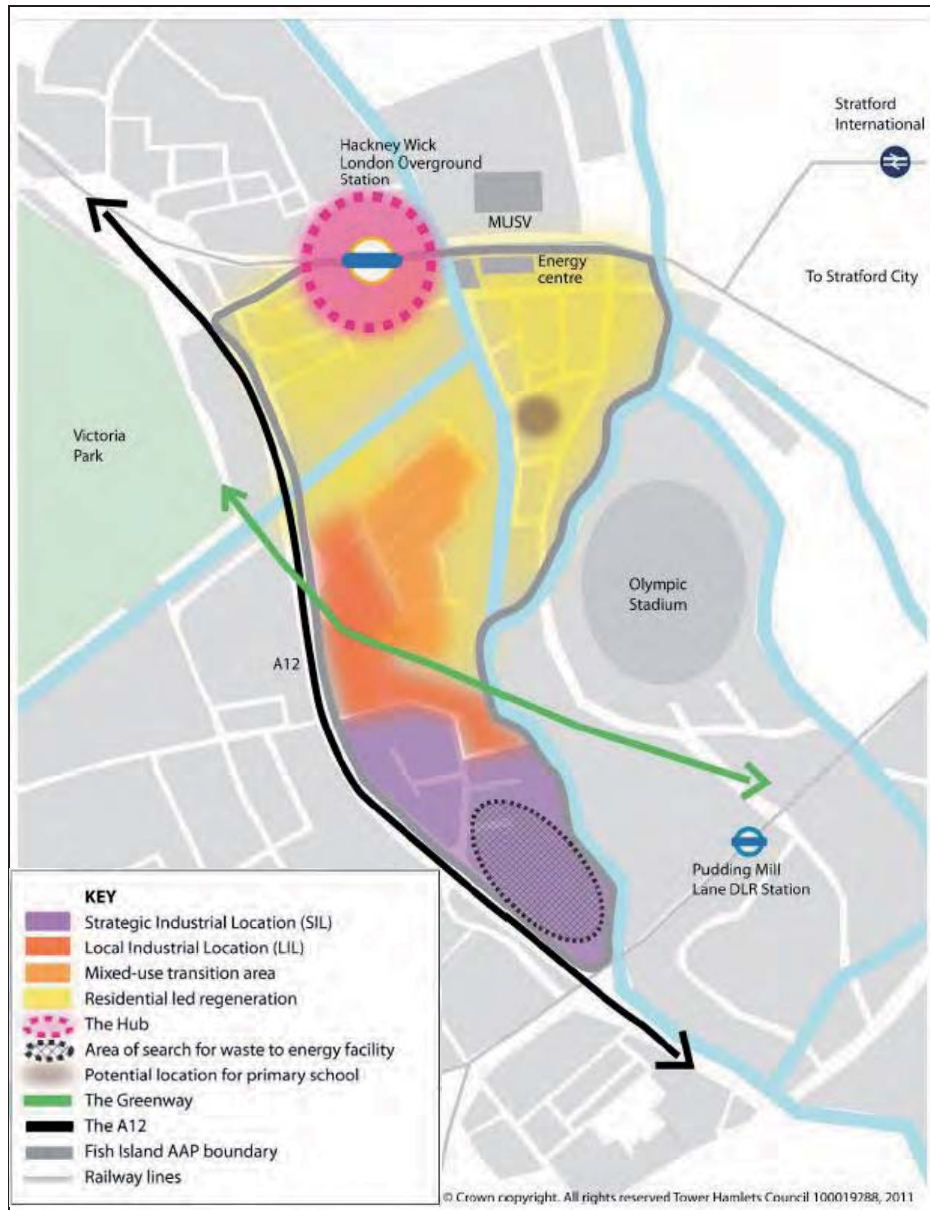


Figure 10-2 Proposed Layout of the Fish Island AAP Site

In accordance with Table D2 of PPS 25, the classifications of the proposed uses are as follows:

Proposed Land Use	Vulnerability Classification
Housing development	More vulnerable
Primary / Secondary Schools	More vulnerable
Open Space	Water-compatible development
Health facility	More vulnerable
Waste management / District heating facility	Less vulnerable

10.2 SUMMARY OF FLOOD RISK

10.2.1 FLOOD ZONE MAPS

A large portion of the site is located within Flood Zone 1. Northern and central portions of the site are shown to fall within Flood Zone 2 and 3.

All proposed land uses are permitted within all three flood zones. 'More vulnerable' uses located within Flood Zone 3 will be subject to the Sequential and Exception Tests.

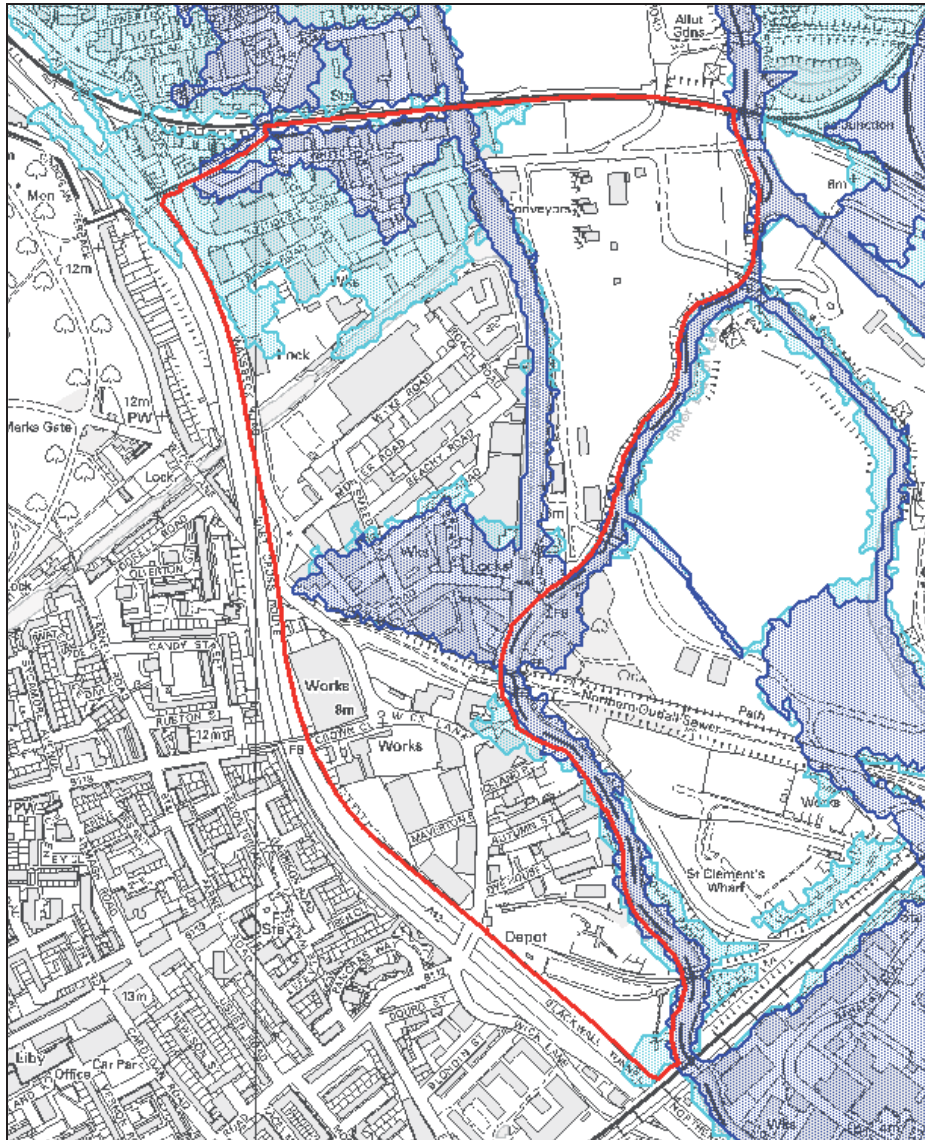


Figure 10-3 PPS25 Flood Zones across the Fish Island AAP Site

10.3 SOURCES OF FLOODING

10.3.1 TIDAL

Actual Risk

The site is defended from tidal inundation during the 0.5% AEP tidal event by the existing Thames Tidal Flood Defences (including the Thames Barrier) for the lifetime of the development. The site is considered to

be at low risk of tidal flooding.

Residual Risk

There is a residual risk of tidal flooding from an extreme surge event. The site is defended against inundation from the River Thames during a 0.1% AEP tidal event and is considered as having a low probability of the defences overtopping.

A breach of the tidal defences is unlikely to result in flooding of the site as it is located sufficiently inland.

10.3.2 FLUVIAL

Actual Risk

Parts of the site are shown to fall within the 1% AEP event with inclusion of climate change flood extent for the River Lee. These include the low-lying areas around Bream Street in the centre of the site, and Hepscott Road in the north of the site. The source of the flooding appears to be from the River Lee Navigation Canal. The flooding around Bream Street may be exacerbated by the Northern Outfall Sewer embankment.

The flood hazard classifications across the Fish Island site for the same flood event are shown in Figure 10-4 below. The Sequential Approach should be adopted, locating higher vulnerability uses in areas of lowest flood risk and lower vulnerability uses in the remaining areas of the site.

The proposed layout for the Fish Island AAP shows that residential accommodation is primarily located in areas outside of the 1% AEP event with of climate change flood extent. Within the flood extent, the Environment Agency is unlikely to accept basements or ground floor residential uses particularly in areas shown to have a hazard classification greater than 'moderate'.

The area in the vicinity of Dace Road is shown to flood in a 5% AEP event. The Level 1 SFRA has determined (in consultation with the Environment Agency) that this area is not classified as Flood Zone 3b as the area is prevented from flooding due to solid brick buildings at this location.

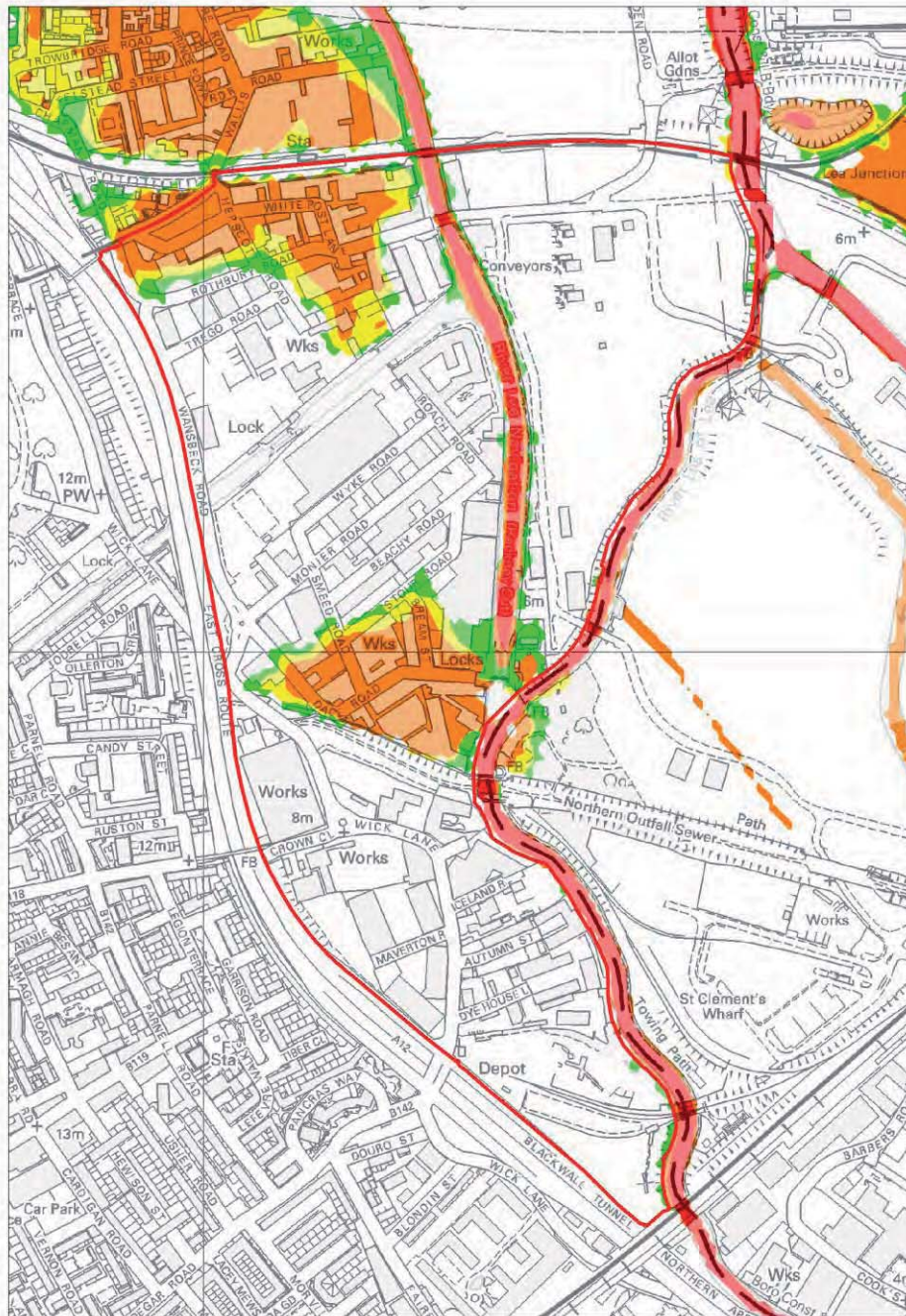


Figure 10-4 Flood Hazard in a 1% AEP Fluvial Event at the Fish Island AAP Site

Residual Risk

The extent of the 0.1% AEP event is similar to the 1% AEP event with climate change. The same low-lying areas are shown to be at risk of flooding. The hazard for much of the flooded areas is 'significant' with depths of water predicted to reach between 1 to 2m on site. Refer to Figure 10-5 below.

The Environment Agency has confirmed there are no obvious defences along the River Lee Navigation in the form of embankments or vertical defences. For this reason, the occurrence of a breach is unlikely even though the watercourse is raised above ground level in some parts of the site.

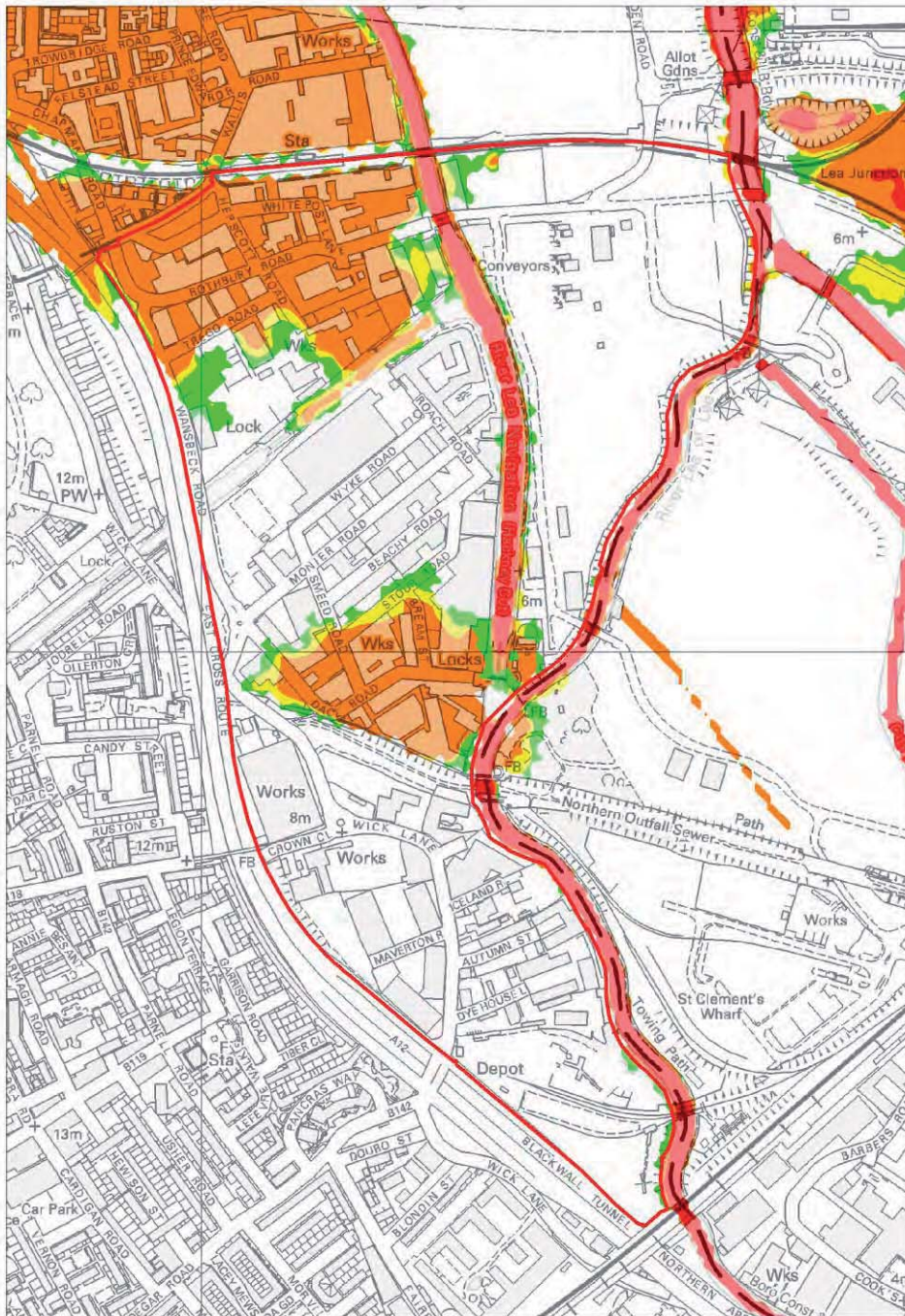


Figure 10-5 Flood Hazard in a 0.1% AEP Fluvial Event at the Fish Island AAP Site

10.3.3 SURFACE WATER/SEWER

In a 1% AEP event, the majority of the Fish Island site is not shown to be at risk of surface water flooding. Water depths up to 0.5m are observed along Dace Road and 0.7m along White Post Lane, both correlating to a 'significant' hazard. Flooding is generally confined to the roads which are located within local low points in the topography.

The Tower Hamlets SWMP has identified a Critical Drainage Area (CDA) within the site, 'Group4_012'. CDAs are areas within the borough where the impact of surface water flooding is expected to be greatest.

The SWMP contains high level options assessments for each CDA, detailing measures designed to mitigate and manage the impacts of surface water flooding. In addition, for developments located within CDAs, the SWMP recommends runoff rates are reduced to that of predevelopment Greenfield runoff rates. For more information, refer to the LB of Tower Hamlets SWMP (2011).

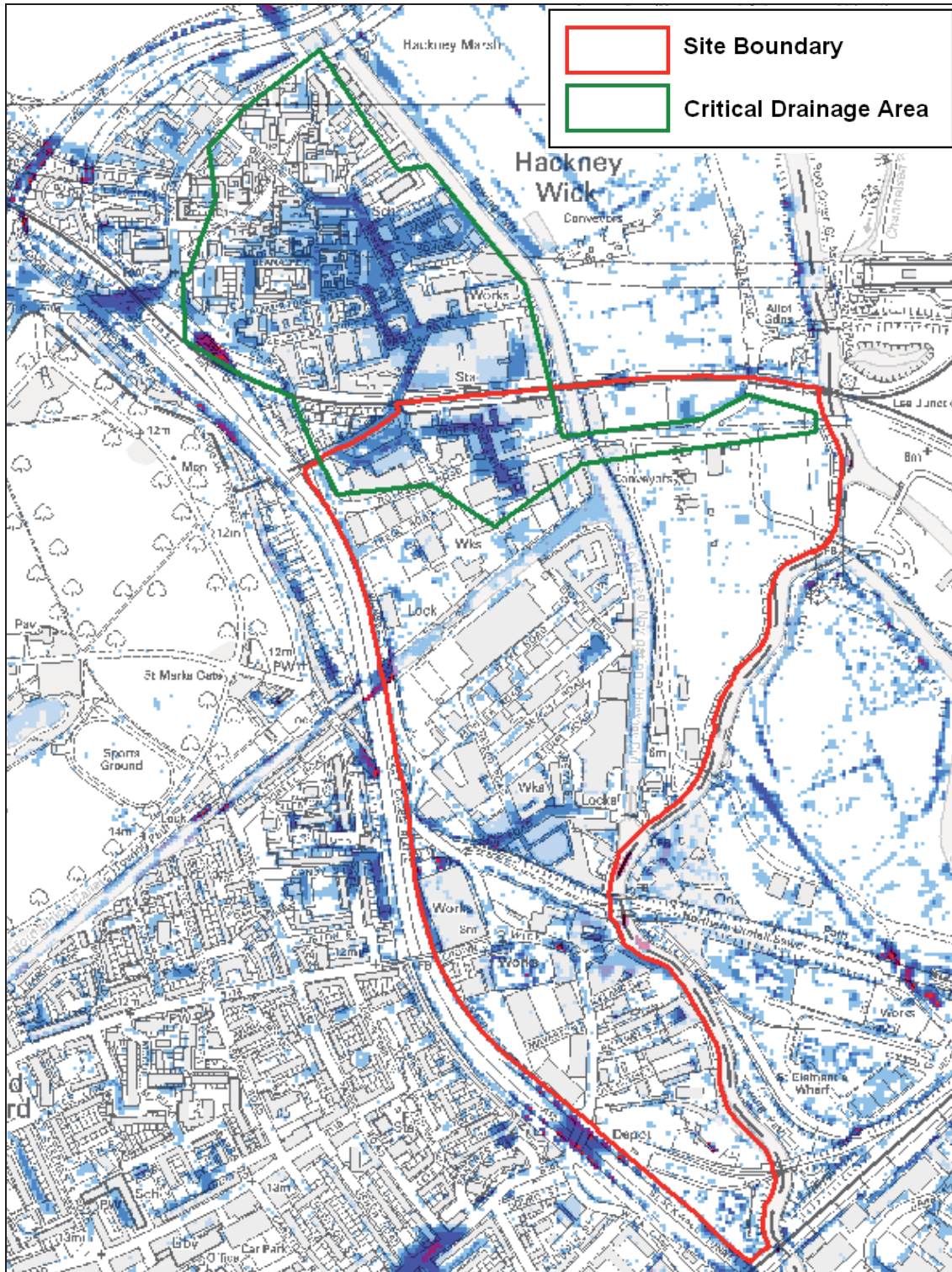


Figure 10-6 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the Fish Island AAP Site

10.3.4 GROUNDWATER

The southern portion of the site, generally south of Dace Road is shown to have an increased potential for elevated groundwater to rise. Development proposals will need to consider site ground conditions and groundwater levels in this location over the lifetime of the development. In particular the design of any underground structures or services and foundations.

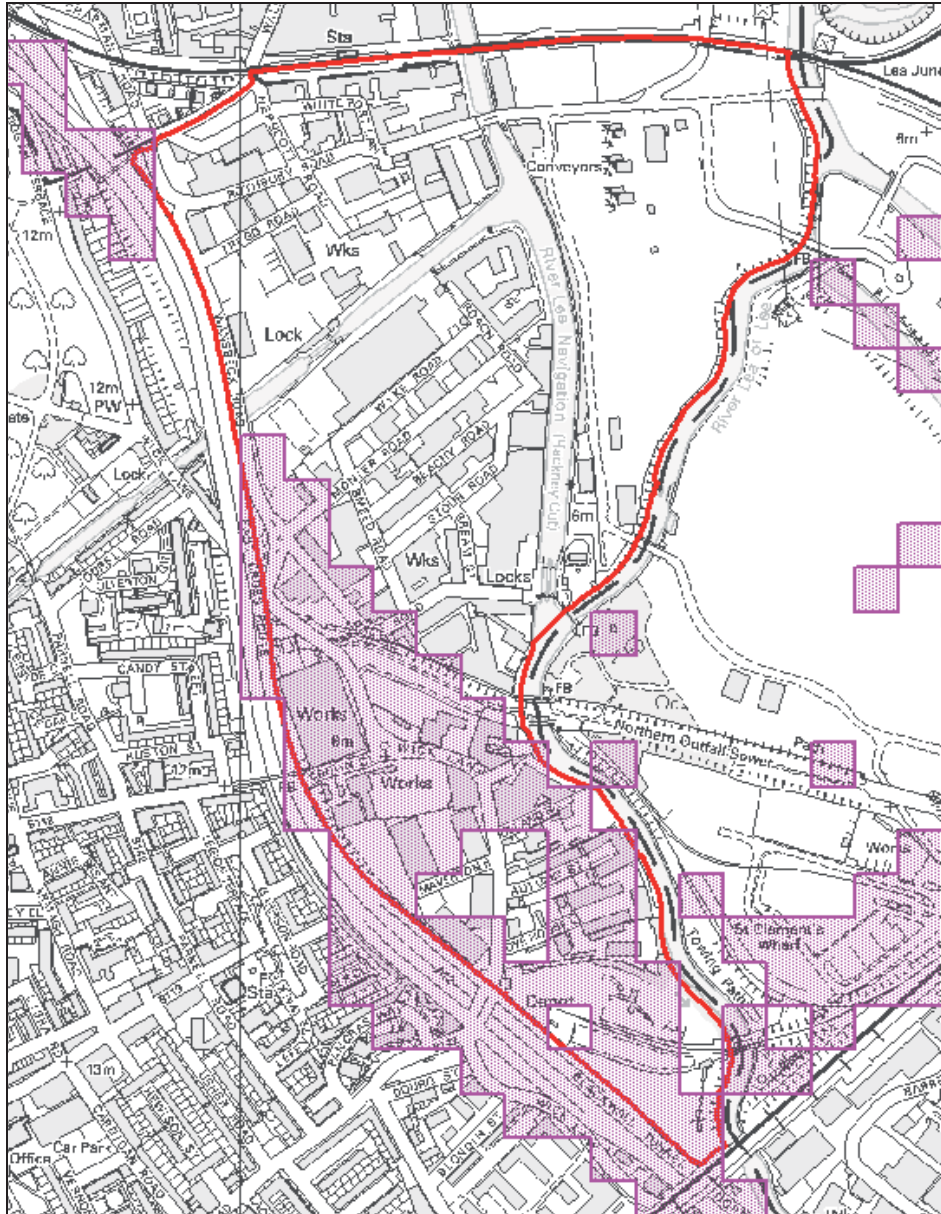


Figure 10-7 Increased Potential of Elevated Groundwater at the Fish Island AAP Site

10.3.5 ARTIFICIAL SOURCES

The River Lee Navigation and the Hertford Union Canals cross through the Fish Island site. Out of bank flooding or breaching from the Hertford Union Canal is considered a low risk as the canal is lower than the surrounding ground and only receives discharges from local drainage. The River Lee Navigation is raised in parts above the surrounding ground levels, however a breach is unlikely as there are no obvious defences along the watercourse in the form of embankments or vertical defences.

The Fish Island AAP site is shown to be at risk of flooding from reservoir breach. A breach in either of the William Girling or King George V reservoirs located in the LB of Enfield is predicted to affect the northern portion of the site. No information was provided from the Environment Agency on the rate of onset of flooding nor the hazard associated with the event, however a breach of either of these large reservoirs is likely to result in catastrophic consequences due to fast, deep flowing water. The site is located 11km away from the closest reservoir, hence it is likely that adequate warning could be provided to site users in the event of a breach. Development should consider the impacts for a reservoir breach and consult the Environment Agency to determine the most appropriate response.

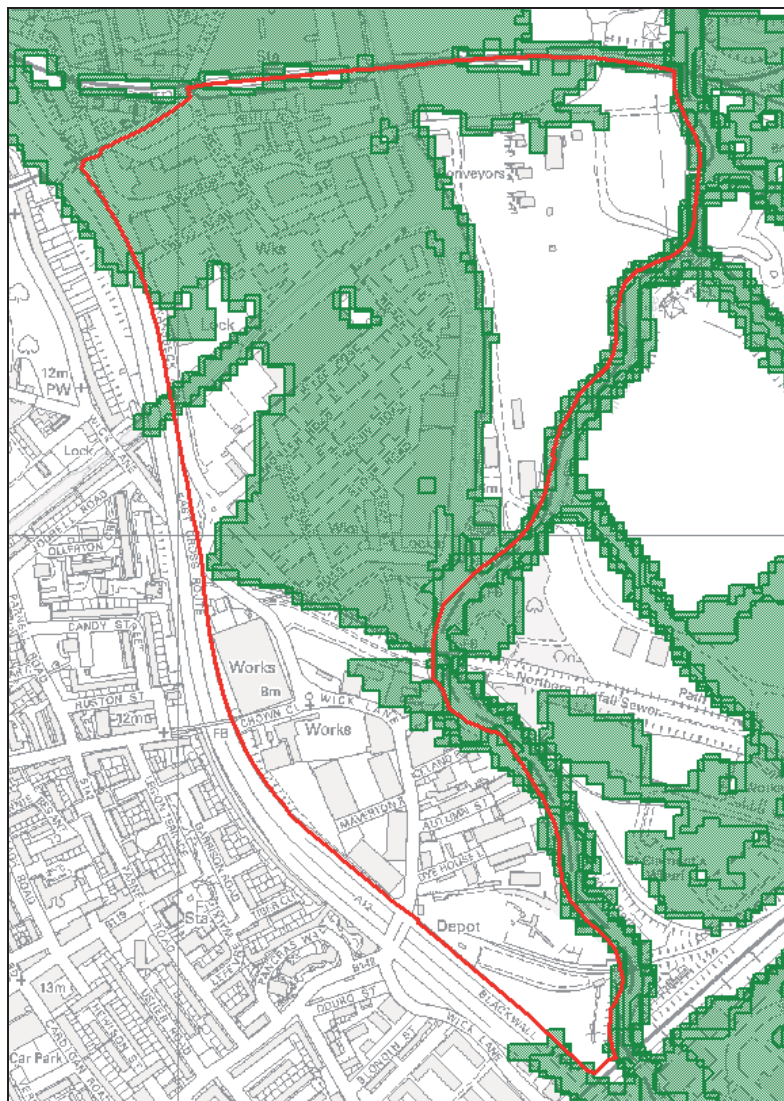


Figure 10-8 Reservoir Inundation Map at the Fish Island AAP Site

10.4 GENERAL FLOOD RISK MANAGEMENT

Proposed Land Use Compatibility

The Fish Island AAP site lies within a combination of Flood Zones 1, 2 and 3. There is the opportunity to adopt the sequential approach to development layout by locating 'more vulnerable' uses within the Flood Zone 1 and 2 areas on site and 'less vulnerable' and 'water compatible' uses located within Flood Zone 3. The location of 'more vulnerable' uses within Flood Zone 3 will require the Sequential and Exception Tests.

Development adjacent to the River Lee may require a 16m buffer set back from the watercourse.

Finished Floor Levels

The 1% AEP plus climate change fluvial flood level is 6.45mAOD and 5.65mAOD in the vicinity of White Post Lane and Dace Road respectively. This equates to depths of water between 1-2m above ground level. Finished floor levels should be 300mm above these levels and all residential accommodation should be located on the first floor or above. Basement dwellings within the 1% AEP plus climate change flood extent are unlikely to be permitted as they are particularly vulnerable to flooding, posing a significant risk to life.

Safe Access/Egress and Refuge

The Fish Island AAP site is at actual risk of flooding during both the 1% AEP plus climate change event and the 0.1% AEP event. Future development must be made safe by consideration of safe access and egress during a flood event. Where possible, safe access routes into areas within Flood Zone 1 should be established. These could include Rothbury Road, providing access to high ground in Victoria Park or to the east of the River Lee Navigation, or Smeed Road. A number of schools are proposed for the site, some of which appear to be located in Flood Zone 1. These schools could potentially be suitable as refuge centres.

It may not be possible to provide safe access/egress to parts of the site, in particular the low-lying areas around White Post Lane and Dace Road. Consequently, it is vital that no residential accommodation is permitted on ground or basement floors. In addition, safe refuge for all occupants within the development needs to be provided above the 1% AEP plus climate change flood level. Consideration should also be given to the duration at which these areas are inundated, as this could be significant given the nature of the topography. This could have a considerable impact on the provision of safe refuge, evacuation routes, and safe access / egress. The provision of safe access/egress, and/or refuge must be agreed with the Emergency Planners at the LB of Tower Hamlets.

Safe access / egress and refuge should also be considered for existing developments. It is recommended that an assessment of existing residential developments is carried out and the retrofitting of resistance / resilience measures considered where appropriate to reduce the impact of flood events.

All site users are to receive an 'information pack' from developers identifying, as a minimum, the risk of flooding, how this is being managed on site, actions site users should take in the event of a flood, responsibilities of the site user, appropriate emergency contact details.

A site specific flood emergency plan should be prepared, in consultation with Council emergency planners, emergency services, and with reference to Multi Agency Flood Plan to evacuate site users out of the floodplain in an 'emergency' flood event.

Resistance / Resilience Measures

Depths of water in a 1% AEP plus climate change event are predicted to exceed 0.6m and reach up to 2m in some areas of the site. It is recommended that flood resilience measures are incorporated into buildings to withstand the hydrostatic forces associated with deep water. Where possible, electrical fittings and appliances should be raised above the design flood event. Further guidance can be found in the CLG

guidance document - Improving the Flood Performance of New Buildings - Flood Resilient Construction (CIRIA, 2007 – available from [http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf])

The site has an increased potential of elevated groundwater. It is recommended that groundwater levels are monitored as part of a geo-environmental site investigation to determine the depth to groundwater. Depending on the results of the groundwater monitoring, any underground structures in the development may require mitigation using impermeable materials.

Surface Water Management

'At source' control measures such as green roofs, rainwater harvesting and water butts should be included in the design. Permeable paving should be incorporated within carparking and hard landscape areas. Public gardens and open space should consider benefits of including swales, wetlands, ponds and 'rain gardens' for both the management of surface water and enhancing the biodiversity of the area.

The site also partially overlaps with a Critical Drainage Area (CDA) that covers part of Hackney Wick AAP in Hackney (CDA ID = Group4_012). The Hackney Surface Water Management Plan recommends separation of combined drainage and inclusion of under road storage to mitigate surface water flooding issues in the area. Developments at this site should accommodate these recommended solutions where practical.

Thames River Basin Management Plan

The current site frontage with the River Lee Navigation predominantly consists of concrete and sheet pile hard edge. As part of development in this area, an assessment of the existing defences and their current condition should be made as part of the FRA. Any vulnerable points should be identified and proposals made to improve these to a standard agreed with the Environment Agency as part of the development process.

The Thames River Basin Management Plan has identified mitigation measures for the watercourse to help achieve a 'good' ecological potential. Development provides the opportunity to re-naturalise the river frontage encouraging both habitat creation and public access to the water whilst also acting to prevent erosion and provide flood protection to the area.

<p>Will development increase flood risk elsewhere?</p> <ul style="list-style-type: none"> • Development within areas shown to be at 'actual' risk of flooding may require compensatory storage to demonstrate there will be no loss of floodplain storage (Note that it might not be possible to increase building footprint size in some areas due to lack of land for flood storage compensation within the overall development area) • Development layout must consider surface water flow routes and manage runoff on site sustainably with a target to achieve Greenfield runoff rates.
<p>How can development reduce flood risk overall?</p> <ul style="list-style-type: none"> • Include 'at source' SUDS control measures to reduce existing site runoff in accordance with London Plan and local policy. • Open up river corridors and provide more floodplain storage • Incorporation of flood resistance / resilience measures up to the flood level.
<p>How can the development be made safe?</p> <ul style="list-style-type: none"> • Application of the sequential approach at site level to be carried out to ensure 'more vulnerable' land uses are located within Flood Zones 1 and 2. • All residential accommodation to be located on first flood or above. • Consideration of safe access / egress from the site and safe refuge.

- Implementation of a flood emergency plan.
- Incorporation of flood resistance / resilience measures up to the flood level.
- Design of development to consider mitigating the risk of groundwater flooding with use of impermeable materials

Is there a reasonable prospect of compliance with part c of the Exception Test?

Yes, for reasons above.