

26.0 Aspen Way

Site Number:	25
Site Location:	Aspen Way
Grid Reference:	537900, 180620

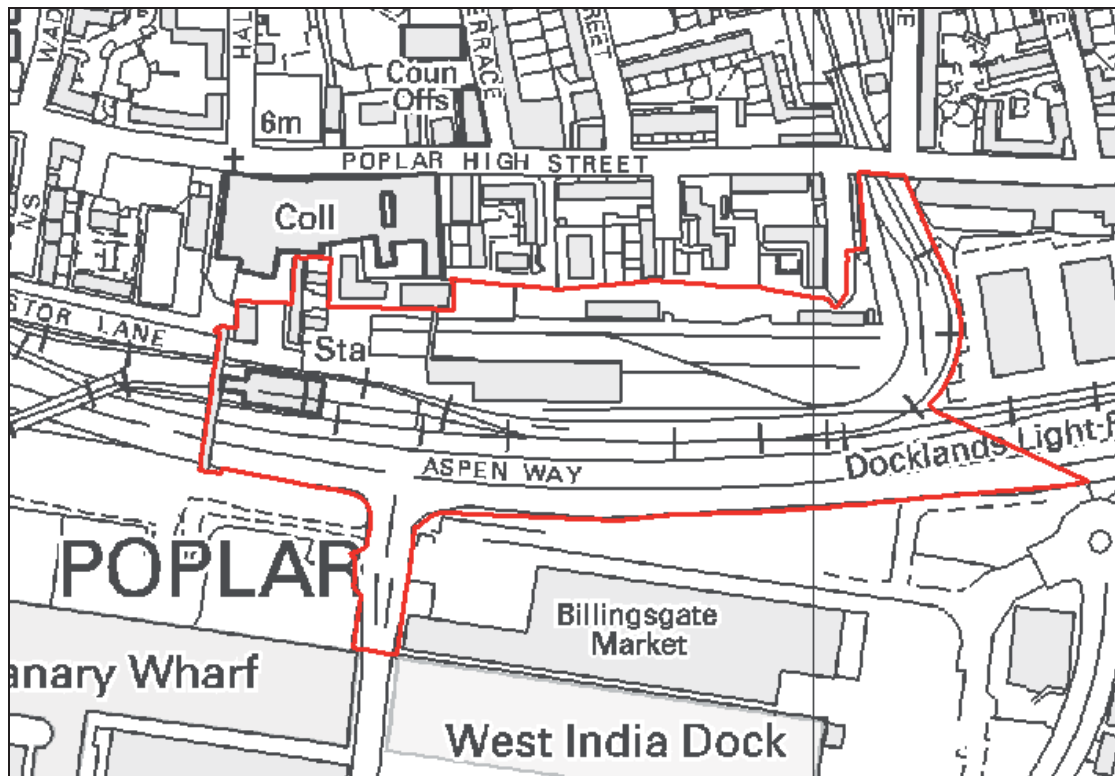


Figure 26-1 Aspen Way Site

26.1 SITE DESCRIPTION

The Aspen Way site occupies 6.1Ha of land and is located just north of the West India Docks in Poplar. The site currently consists of a wholesale market, the Aspen Way dual-carriage way, DLR services and housing. Ground levels on site are generally around 4.3mAOD. The highest levels are close to Billingsgate Market (5.3mAOD) and the lowest along the DLR track (1.5mAOD). The proposed use of the site is as a mixed use development including a large-scale housing development 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
Large scale housing development	More vulnerable
District heating facility	Less vulnerable

26.2 SUMMARY OF FLOOD RISK

26.2.1 FLOOD ZONE MAPS

The site is shown to be located within Flood Zone 3. All propose land uses are permitted within this flood zone however 'more vulnerable' uses are subject to the Sequential and Exception Tests.

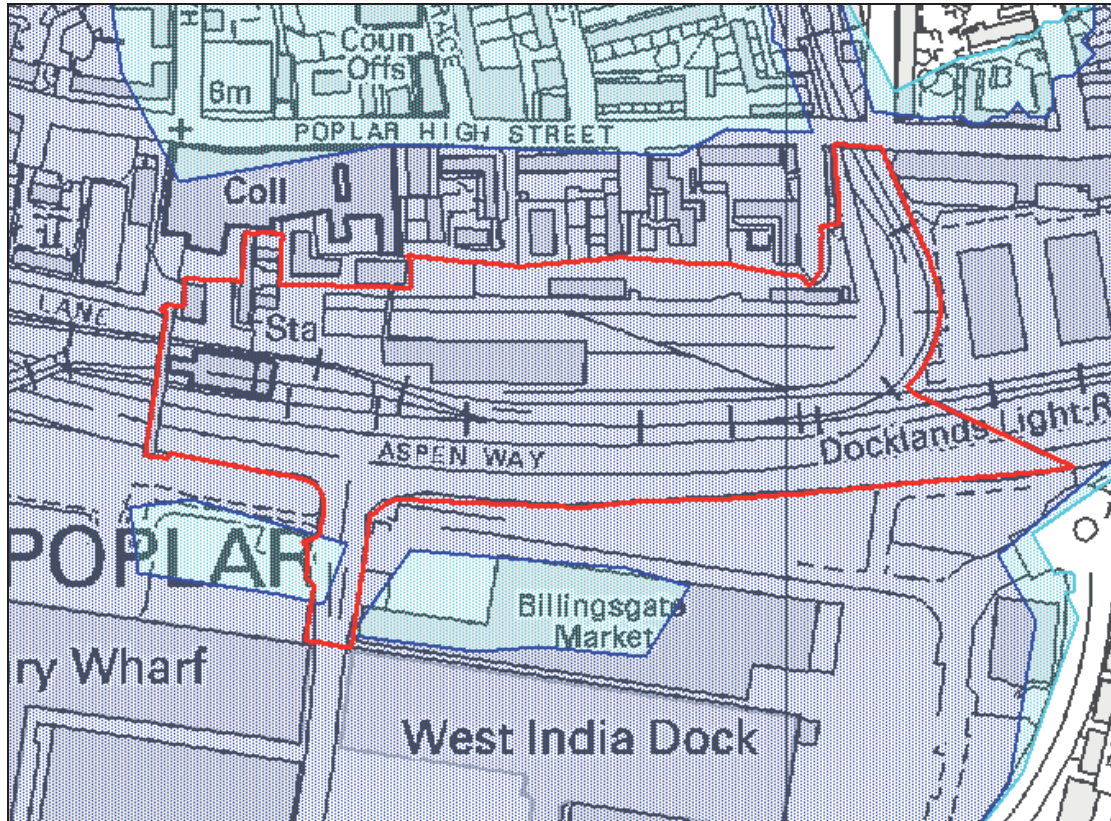


Figure 26-2 PPS25 Flood Zones at the Aspen Way Site

26.3 SOURCES OF FLOODING

26.3.1 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 actual 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.

The assessment of a breach in the defences at Blackwall (Breach 2) carried out as part of the Level 1 SFRA, shows that the eastern part of the site is inundated in a 0.5% AEP tidal event. The resulting hazard is assessed to be 'significant' across the DLR tracks and 'low' to moderate' elsewhere. Depths of water up to 2.5m are predicted across the DLR tracks. Elsewhere on site, depths of water are generally less than 0.2m.

The Environment Agency should be consulted to determine if development requires a site specific breach analysis to determine the worst case scenario.

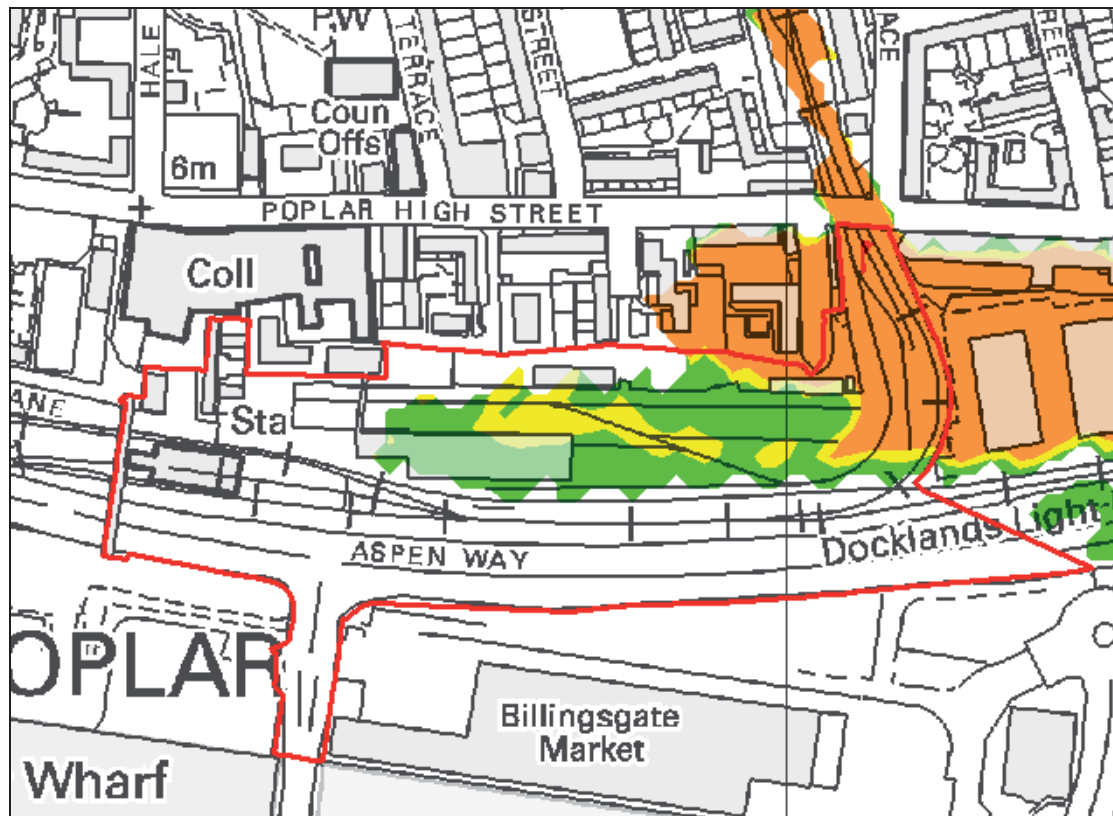


Figure 26-3 Blackwall Breach Extent at the Aspen Way Site

26.3.2 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 having 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 assessment of a breach in the defences at Bromley (Breach 1) carried out as part of the Level 1 SFRA, shows that the majority of the site is inundated in a 0.5% AEP with climate change tidal event. The resulting hazard is assessed to be 'significant' across the DLR tracks and 'low' elsewhere. Depths of water up to 2.5m are predicted across the DLR tracks. Elsewhere on site, depths of water are generally less than 0.2m.

The Environment Agency should be consulted to determine if development requires a site specific breach analysis to determine the worst case scenario.

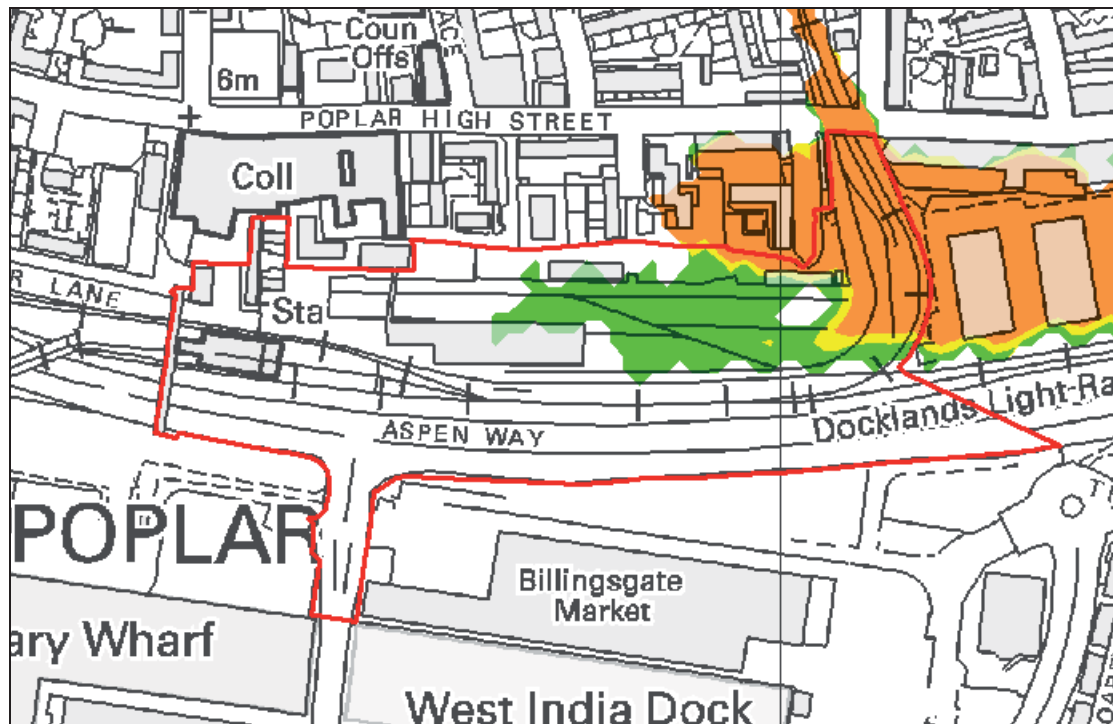


Figure 26-4 Bromley Breach Extent at the Aspen Way Site

26.3.3 SURFACE WATER/SEWER

Surface water is observed to accumulate in the low-lying area of Aspen Way. Depths of water in a 1% AEP rainfall event are predicted to reach 0.4m.

The Tower Hamlets SWMP has identified a Critical Drainage Area (CDA) within the site, 'Group4_014' and 'Group4_071'. CDAs are areas within the borough where the impact of surface water flooding is expected to be greatest. In this case, the extremities of the site have been identified as potentially contributing to the surface water flooding along the DLR track to the north and the entrance to the Limehouse Link Tunnel to the west. 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 be reduced to that of predevelopment Greenfield runoff rates.

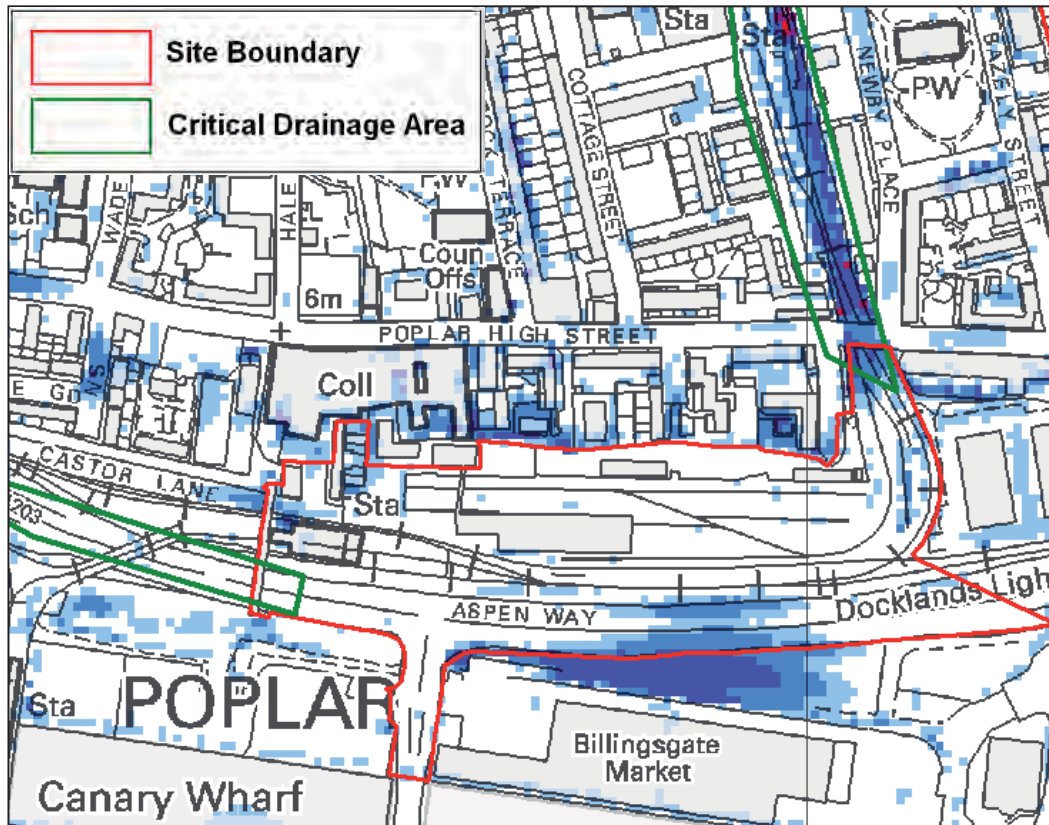


Figure 26-5 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the Aspen Way Site

26.3.4 GROUNDWATER

A small portion of the site area is shown to be at an increased potential of elevated groundwater. . It is recommended that the susceptibility of the site to groundwater flooding is verified via borehole logs. If the site or parts of the site are shown to be at risk, development proposals will need to consider site ground conditions and groundwater levels over the lifetime of the development. In particular the design of any underground structures or services and foundations.

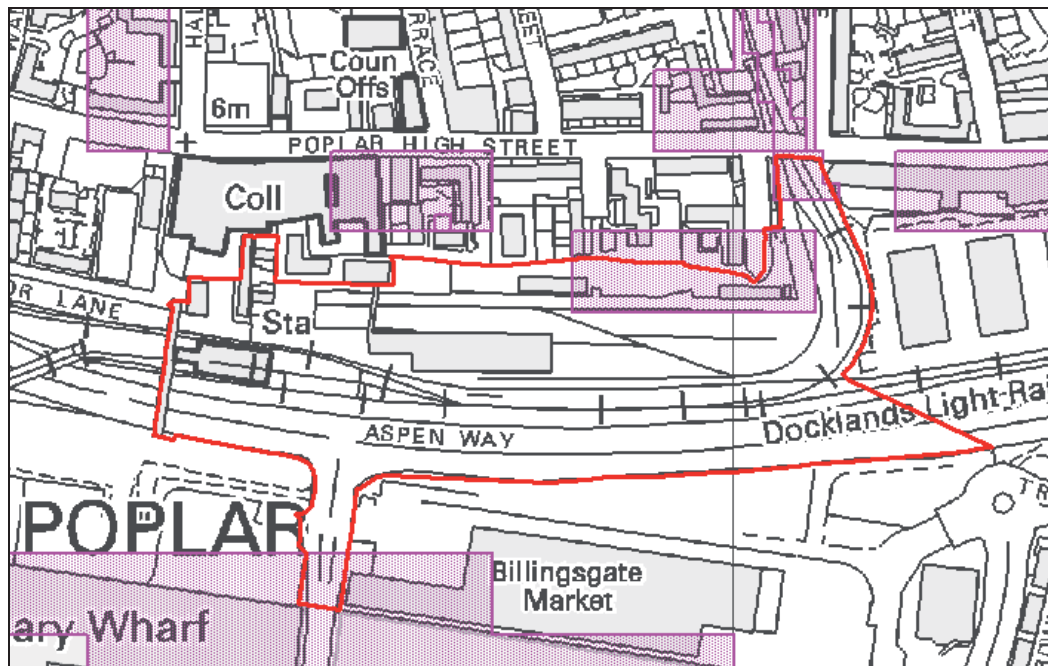


Figure 26-6 Increased Potential of Elevated Groundwater at the Aspen Way Site

26.3.5 ARTIFICIAL SOURCES

The West India Dock lies approximately 100m to the south of the site. The Docks are maintained and managed by British Waterways. British Waterways must be consulted in relation to any development next to or within the docks in the London Docklands.

The water levels within the docks are controlled by a series of lock gates and do not normally fluctuate with the tide level in the River Thames. There is a residual risk that during tidal flood events, the lock gates at the entrances to the docks may fail or be breached. The locks are not single structures and are a series of regularly maintained double gates so the probability of failure is low. The potential hazard of such an event was assessed as part of the LB of Tower Hamlets Level 1 SFRA. The results of the modelled scenario do not show flooding of the Aspen Way site due to the higher elevations of the surrounding land compared to the docks.

The 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 western 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 over 14km 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.

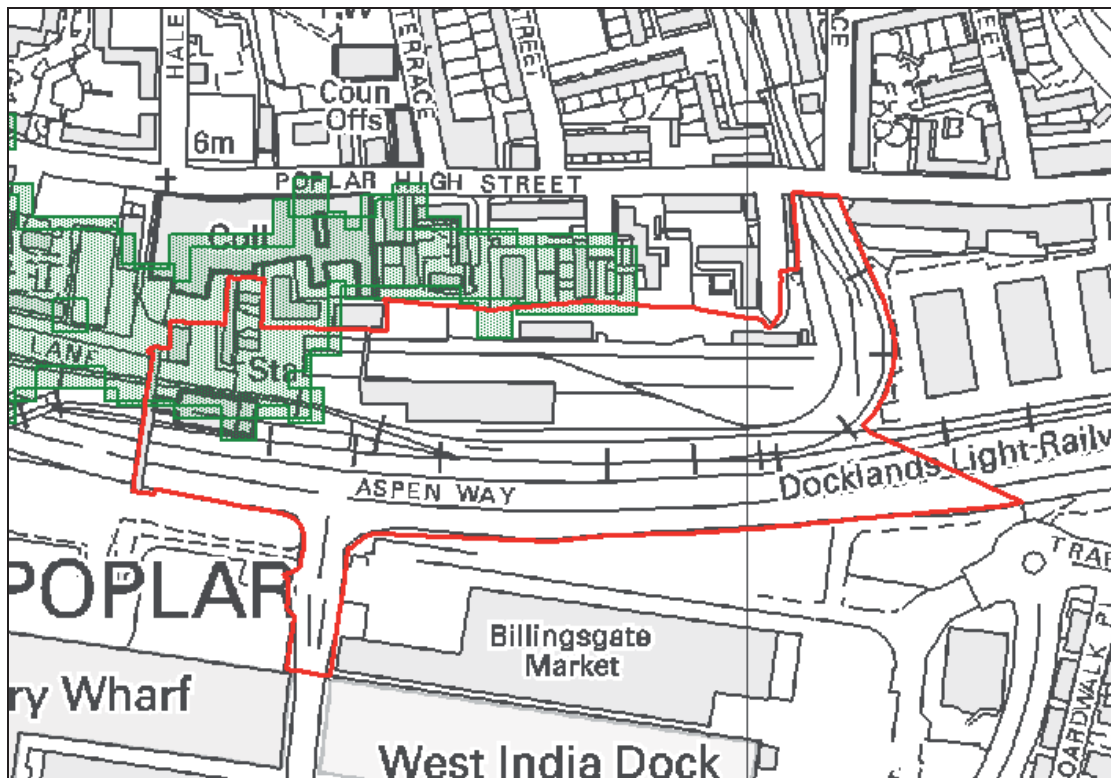


Figure 26-7 Reservoir Inundation Map at the Aspen Way Site

26.4 GENERAL FLOOD RISK MANAGEMENT

The site is shown to be located within Flood Zone 3. All proposed land uses are permitted within this flood zone however 'more vulnerable' uses are subject to the Sequential and Exception Tests.

The Sequential Approach should be adopted in the development layout. Ground levels are highest in the centre of the site. Higher vulnerability land uses should be located here with lower vulnerability and water compatible uses located in the western parts of the site.

Breach assessments carried out as part of the Level 1 SFRA show that the site is at risk of a breach in the tidal and fluvial defences. A site specific breach assessment may need to be carried out to determine the worst case scenario for the site and also to aid in the development of site specific flood risk management measures.

Finished floor levels for sleeping accommodation should be 300mm above the 0.5% AEP event breach level. Alternatively, 'less vulnerable' uses to be located on the ground floor with 'more vulnerable' uses located on the first or upper floors. Where appropriate 'less vulnerable' uses on ground floors to incorporate flood resilience or resistance measures and buildings designed to withstand the hydrostatic forces from a breach.

Future development must be made safe by consideration of safe access and egress during a flood event. Suitable evacuation routes could incorporate the use of Upper Bank Street via Aspen Way or Poplar High Street however, suitability should be verified following determination of flooding mechanisms.

It may be difficult to provide safe access/egress to parts of the site, in particular the low-lying areas in the west of the site north of Poplar Station. Consequently, it is vital that floor levels of all habitable residences in these areas are above the 0.5% AEP plus climate change breach level. In addition, safe refuge for all occupants within the development needs to be provided above the 0.5% AEP plus climate change breach 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.

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, 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.

'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.

Development proposals may need to consider site ground conditions and groundwater levels over the lifetime of the development. In particular the design of any underground structures or services and foundations.

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. • Development within the CDA to follow guidance set out in the Tower Hamlets SWMP, namely achieving a target of reducing runoff rates to that of predevelopment 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. • Flood resilience and resistance measures in new buildings where appropriate.
How can the development be made safe?
<ul style="list-style-type: none"> • Application of the sequential approach at site level • Finished floor levels should be 300mm above the 0.5% AEP with climate change breach level for all sleeping accommodation. • 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?
<ul style="list-style-type: none"> • Yes, subject to appropriate design and agreeing emergency access arrangements.

27.0 Wood Wharf

Site Number:	26
Site Location:	Preston's Road
Grid Reference:	538150, 180050

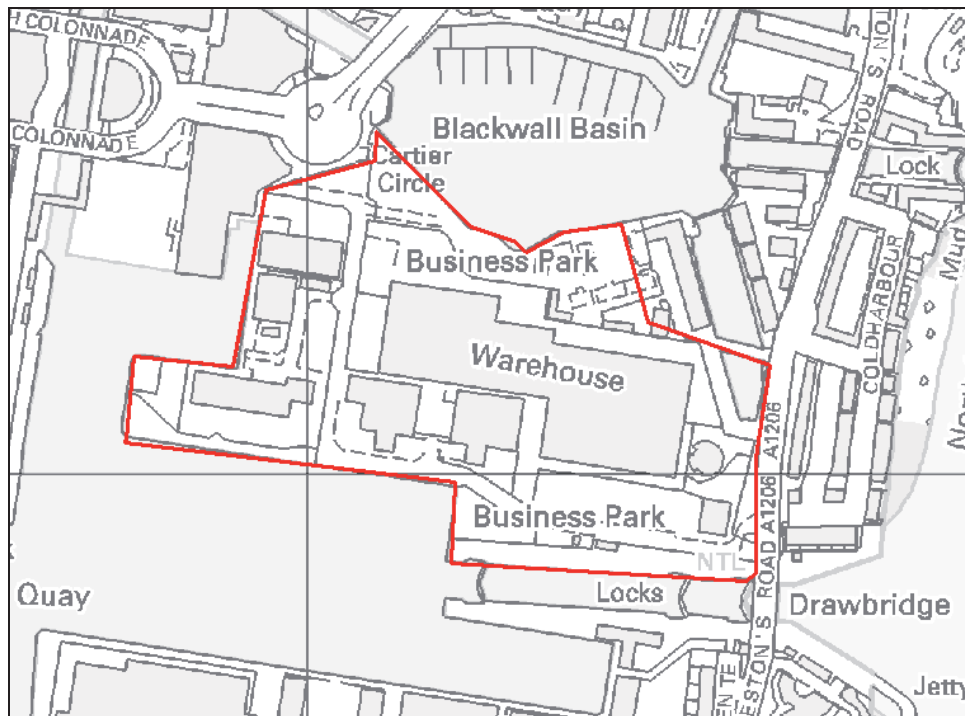


Figure 27-1 Wood Wharf Site

27.1 SITE DESCRIPTION

The Wood Wharf site is situated in the north-east of the Isle of Dogs and has an application area of 7.26Ha. Blackwall Basin defines the northern boundary of the site with the South Dock forming the southern and western boundaries. The east of the site is bounded by Preston's Road and the Coldharbour Conservation Area. The River Thames is located just over 100m to the east of the site. The site is fairly flat with ground levels around 5.4mAOD over most of the site. The site includes a small section of the Blackwall Basin in the east of the site.

The site is currently occupied by a number of vacant low-rise, light industrial, office and warehouse units. The proposed use of the site the following:

- Large-scale housing development;
- Idea Store;
- Health facility; and
- 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
Large-scale housing development	More Vulnerable
Idea Store	More Vulnerable
Health facility	More Vulnerable
District Heating Facility	Less Vulnerable

27.2 SUMMARY OF FLOOD RISK

27.2.1 FLOOD ZONE MAPS

The Wood Wharf site is shown to be located within Flood Zone 3. All proposed uses are permitted within this flood zone, however 'more vulnerable' uses are permitted within this flood zone however are subject to the Sequential and Exception Tests.

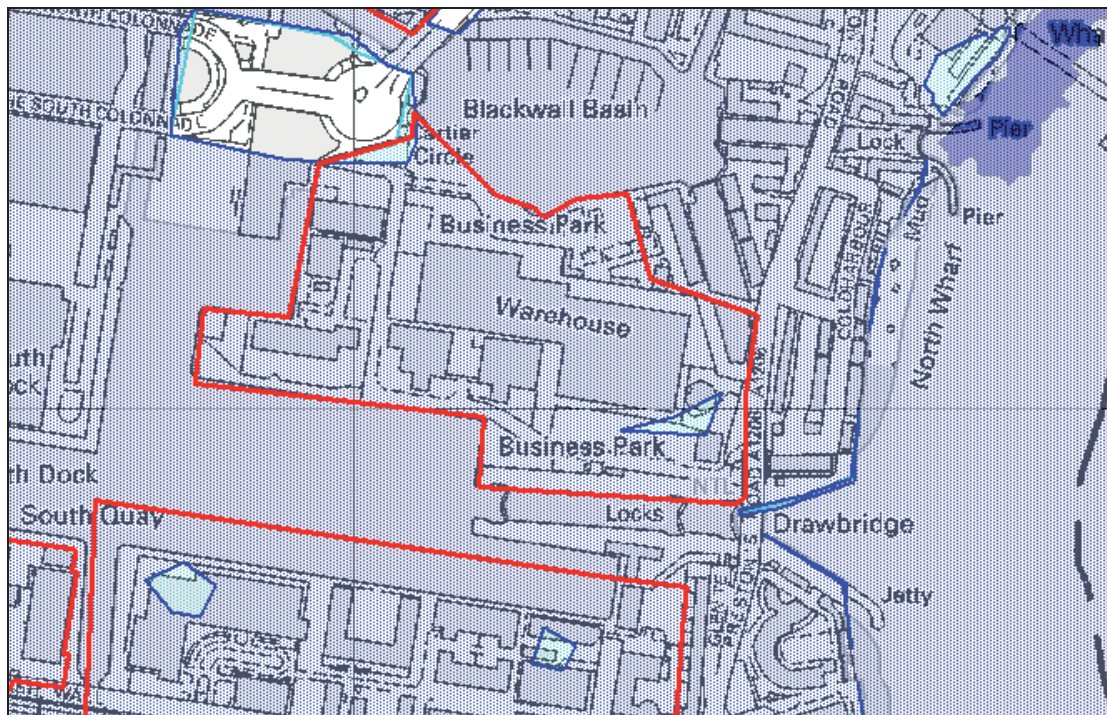


Figure 27-2 PPS25 Flood Zones at the Wood Wharf Site

27.3 SOURCES OF FLOODING

27.3.1 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 actual 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 LB of Tower Hamlets Level 1 SFRA. Of the assessed breach locations, breaches at Blackwall (Breach 2) and South Quay (Breach 3) are the closest to the site. Neither of these breaches assessed for a 0.5% AEP tidal event predict flooding of the site. The Blackwall breach predicts flooding in the Bromley area, 600m north of the site, whilst the South Quay breach predicts flooding in Mudchute south of the site.

Ground levels on site are found to be naturally higher than the 0.5% AEP with tidal peak level for the year 2107 (4.8m AOD). Ground levels on site are generally around 5.4m AOD with the lowest levels on site around 5m AOD (excluding the Blackwall Basin). The risk of inundation of the site as a result of breach is therefore considered low.

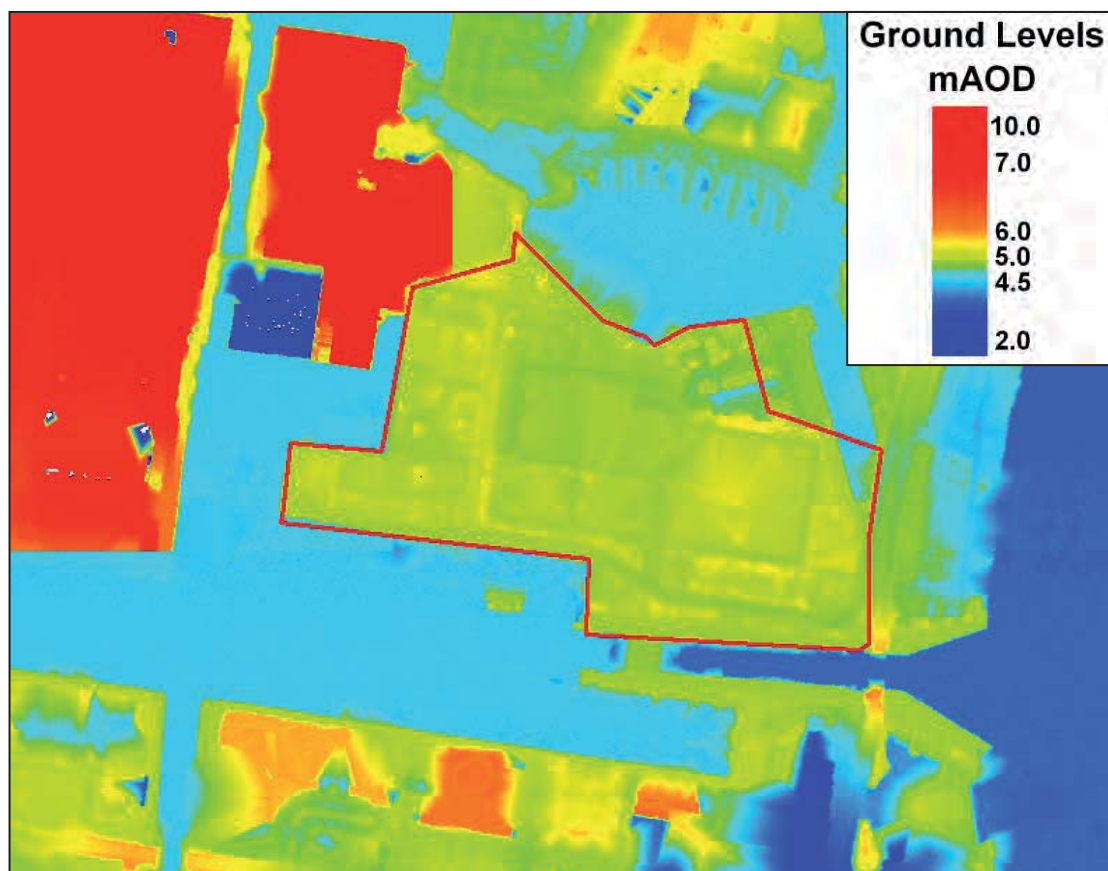


Figure 27-3 Ground Levels at the Wood Wharf Site

27.3.2 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 having a low risk to 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. A breach assessment in the fluvial defences at Bromley (Breach 1) carried out as a part of the Level 1 SFRA, shows that the flood

extent only extends as far as the Poplar Docks and does not flood the site. The site is concluded as having a low risk to residual fluvial flooding.

27.3.3 SURFACE WATER/SEWER

The site is not shown to be at risk of surface water flooding. Some accumulation of surface water is observed in the north of the site, however this area is isolated as is likely to be a result of inaccuracies in the LiDAR or assumptions made in the modelling.

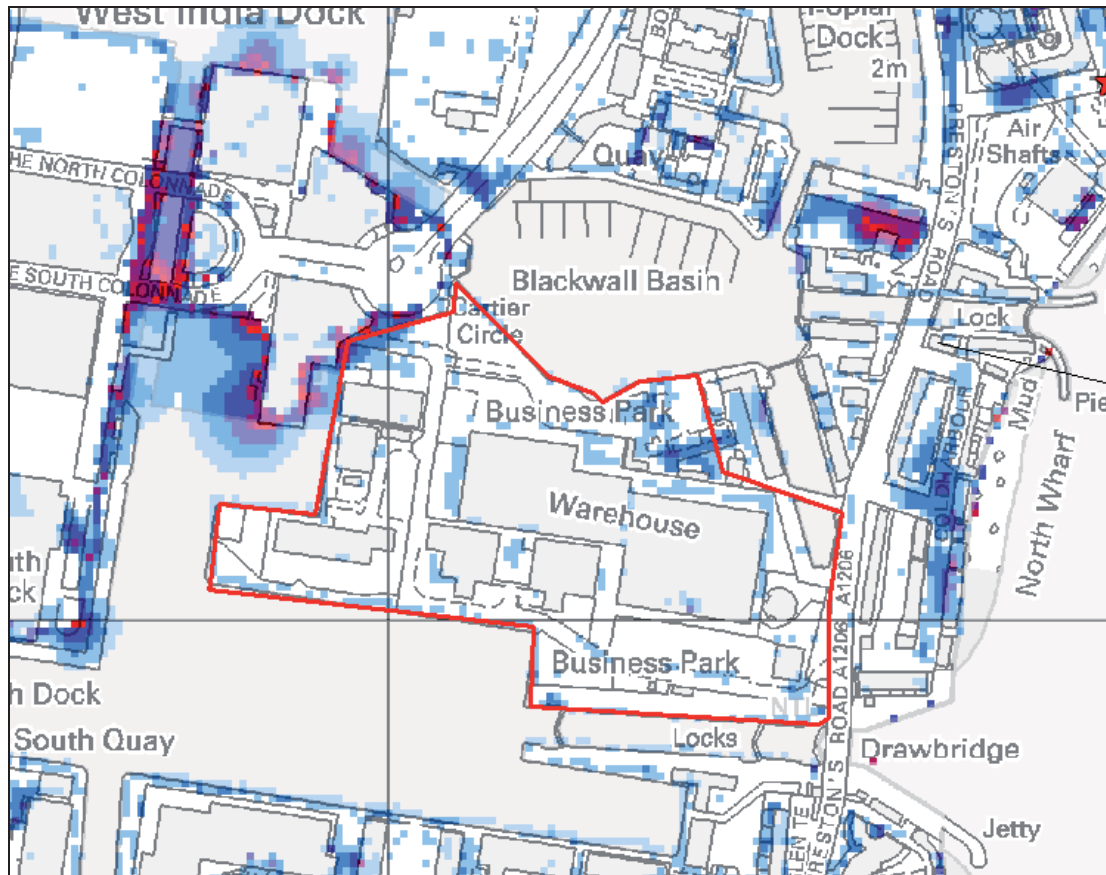


Figure 27-4 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the Wood Wharf Site

27.3.4 GROUNDWATER

The central area of the site is shown to have an increased potential of elevated groundwater. It is recommended that the susceptibility of the site to groundwater flooding is verified via borehole logs. If the site or parts of the site are shown to be at risk, development proposals will need to consider site ground conditions and groundwater levels over the lifetime of the development. In particular the design of any underground structures or services and foundations.

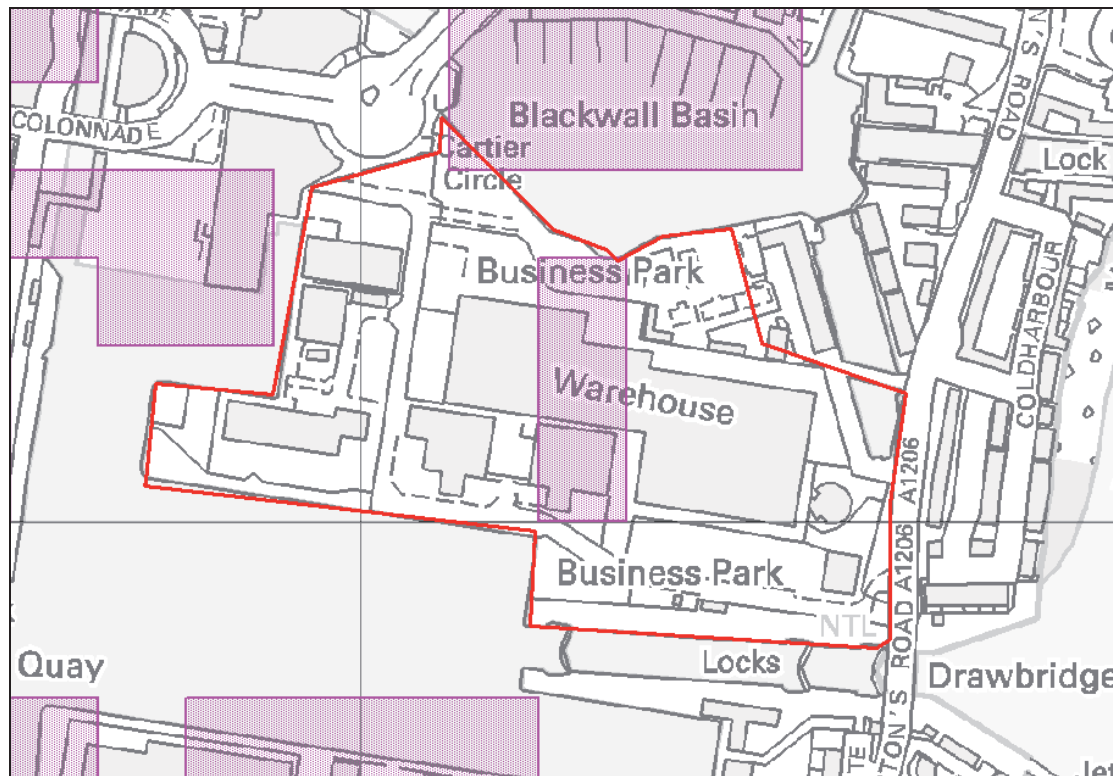


Figure 27-5 Increased Potential of Elevated Groundwater at the Wood Wharf Site

27.3.5 ARTIFICIAL SOURCES

The Blackwall Basin, West India and South Quay Docks lie along the northern, western, and southern boundaries of the site. The Docks are maintained and managed by British Waterways. British Waterways must be consulted in relation to any development next to or within the docks in the London Docklands.

The area surrounding the docks has been built up and is generally higher than the level of the docks at above 5mAOD. This is at or above the level of the dock walls and therefore there is a low risk of flooding from the docks to the surrounding area.

The water levels within the docks are controlled by a series of lock gates and do not normally fluctuate with the tide level in the River Thames. There is a residual risk that during tidal flood events, the lock gates at the entrances to the docks may fail or be breached. This scenario was assessed as part of the Level 1 SFRA (Breach 3a). A breach in the lock gates at South Quay predicts that flood waters will remain within the Docks. The site is not shown to be flooded. Consequently, flooding of the site from the Docks is considered a low risk.

Flooding from the Blackwall Basin is considered a low risk as the site is raised above the level of the basin.

27.4 GENERAL FLOOD RISK MANAGEMENT

The Wood Wharf site is shown to be located within Flood Zone 3. All proposed uses are permitted within this flood zone, however 'more vulnerable' uses are permitted within this flood zone however are subject to the Sequential and Exception Tests.

The site is shown to be defended from actual risk of tidal or fluvial flooding. The existing ground levels on site have been found to be above the 0.5% AEP with climate change tidal peak hence, a breach in the tidal defences is unlikely to result in inundation of the site.

The sequential approach should be adopted when considering development layout, locating higher vulnerability uses where ground levels are highest and lower vulnerability uses elsewhere on site.

'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 car parking and hard landscape areas.

The site may be at risk of groundwater flooding. It is recommended that the susceptibility of the site to groundwater flooding is verified. If the site or parts of the site are shown to be at risk, development proposals will need to consider site ground conditions and groundwater levels over the lifetime of the development. In particular the design of any underground structures or services and foundations.

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?
<ul style="list-style-type: none">Yes for reasons above.

28.0 Billingsgate Market

Site Number:	27
Site Location:	Trafalgar Way, E14
Grid Reference:	538000, 180480

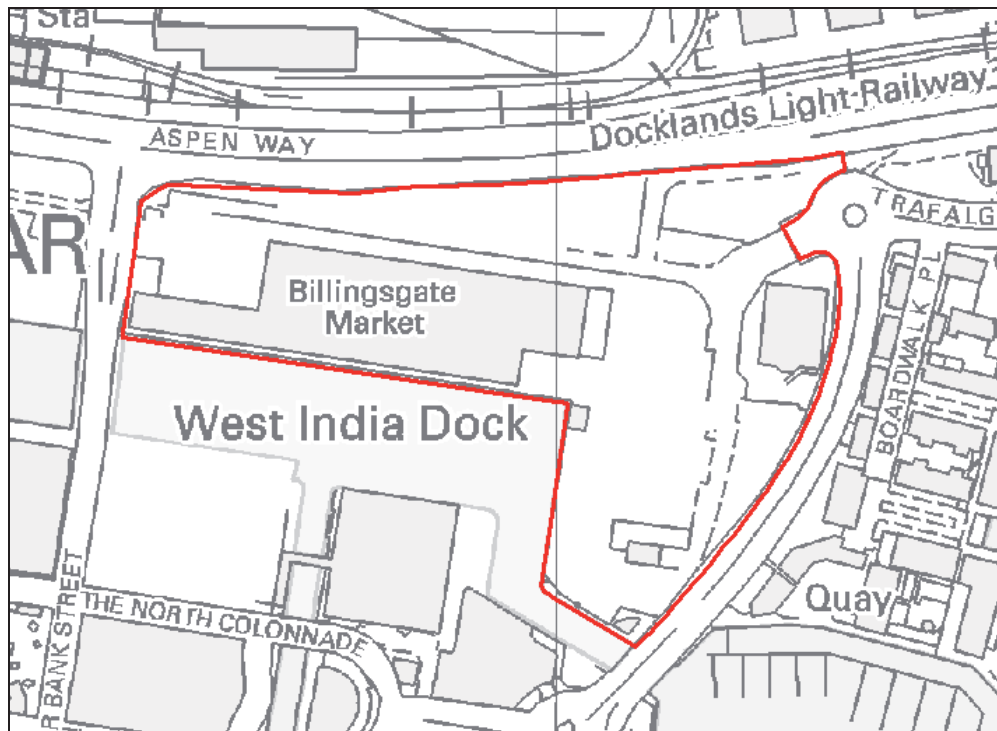


Figure 28-1 Billingsgate Market Site

28.1 SITE DESCRIPTION

The Billingsgate Market site occupies 5.74Ha of land and is located along the northern boundary of West India Dock. Ground levels are approximately 5.4mAOD around the south western site boundary where the market is currently located. To the north of the site, adjacent to Aspen Way, ground levels vary between 2.8 and 4.5mAOD.

The site is currently occupied by Billingsgate Market and its associated car parking area. The proposed use of the site is as a mixed use development including a large-scale housing development 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
Large scale housing development	More vulnerable
District heating facility	Less vulnerable

28.2 SUMMARY OF FLOOD RISK

28.2.1 FLOOD ZONE MAPS

The majority of the site is shown to be located within Flood Zone 3. There is a small area of the site in the west located within Flood Zone 2. All proposed land uses are permitted within both flood zones. 'More vulnerable' uses will be subject to the Sequential and Exception Tests if located within Flood Zone 3.

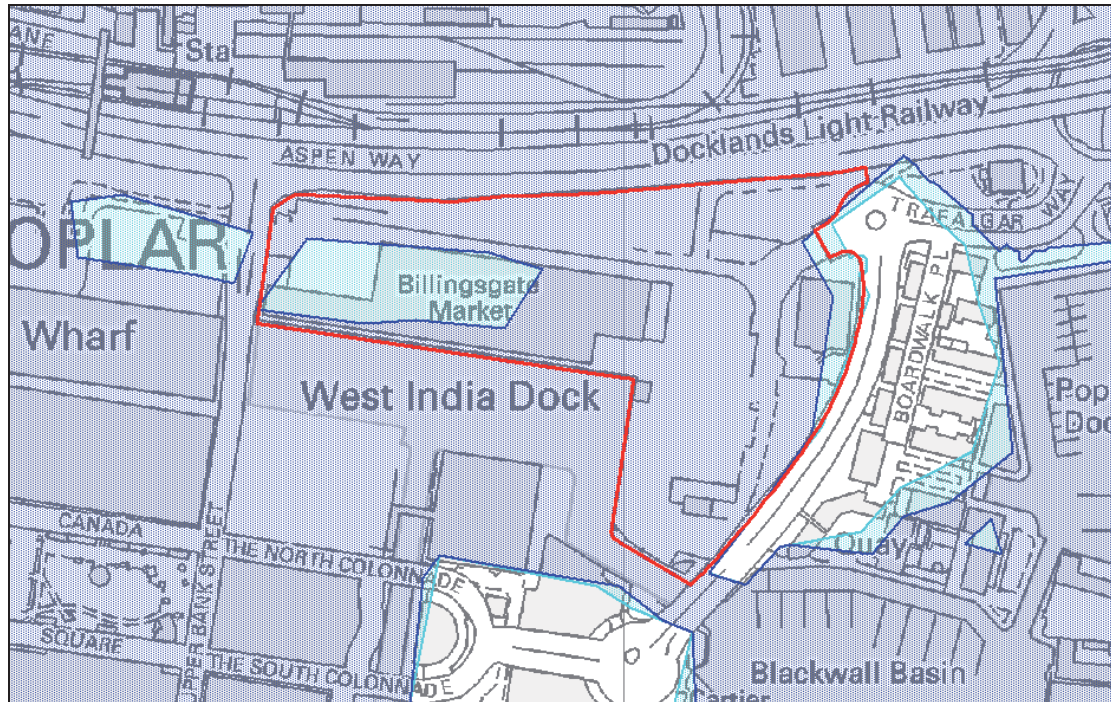


Figure 28-2 PPS25 Flood Zones at the Billingsgate Market Site

28.3 SOURCES OF FLOODING

28.3.1 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 actual 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 undertaken as a part of the LB of Tower Hamlets Level 1 SFRA. Breaches at Blackwall (Breach 2) and South Quay (Breach 3) are the closest to the site. Neither of these breaches assessed for a 0.5% AEP tidal event predict flooding of the site. The Blackwall breach predicts flooding in the Bromley area whilst the South Quay breach predicts flooding in Mudchute.

A site specific breach assessment may be required to determine the worst case scenario for the site. The results of the assessment will be used to determine site specific flood risk management measures. The

developer should consult the Environment Agency as to the benefits of a specific breach assessment.

28.3.2 FLUVIAL

Actual Risk

The site is located outside of the 1% AEP event with inclusion of climate change flood extent of the River Lee and is considered to be 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.

A breach assessment in the fluvial defences at Bromley (Breach 1) carried out as a part of the Level 1 SFRA, shows that the flood extent only extends as far as the Poplar Docks and does not flood the site. A site specific breach assessment may be required to determine the worst case scenario for the site and should be determined in consultation with the Environment Agency. The results of the assessment will be used to determine site specific flood risk management measures.

28.3.3 SURFACE WATER/SEWER

Surface water is shown to accumulate in the topographical low-lying area of the site adjacent to Aspen Way. Depths of water are predicted to reach 0.8m in a 1% AEP event, correlating to a 'significant' hazard rating. The remainder of the site is predicted to have a low risk of surface water flooding.

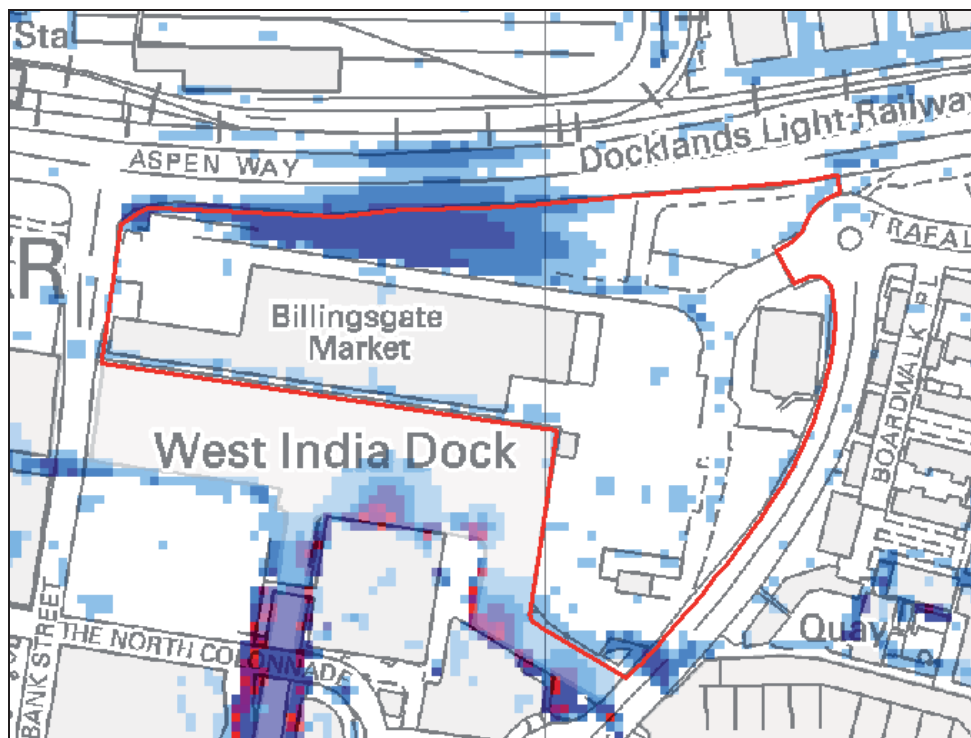


Figure 28-3 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the Billingsgate Market Site

28.3.4 GROUNDWATER

Some of the western and southern parts of the site are shown to have an increased potential of elevated groundwater. It is recommended that the susceptibility of the site to groundwater flooding is verified via borehole logs and groundwater monitoring. If the site (or parts of the site) are shown to be at risk,

development proposals will need to consider site ground conditions and groundwater levels over the lifetime of the development. In particular the design of any underground structures or services and foundations.

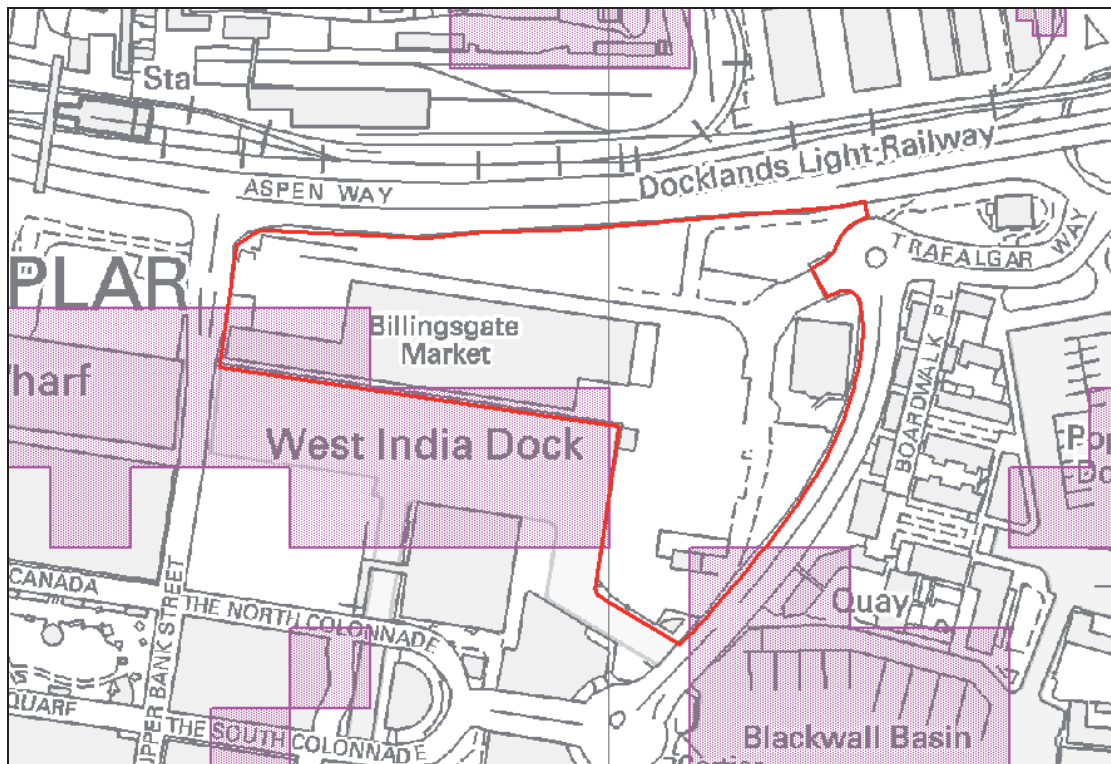


Figure 28-4 Increased Potential of Elevated Groundwater at the Billingsgate Market Site

28.3.5 ARTIFICIAL SOURCES

The West India Dock forms the south/ south western boundary of the site. The Docks are maintained and managed by British Waterways. British Waterways must be consulted in relation to any development next to or within the docks in the London Docklands.

The water levels within the docks are controlled by a series of lock gates that provide a maintained water level within the docks (and do not normally fluctuate with the tide level in the River Thames). There is a residual risk that during tidal flood events, the lock gates at the entrances to the docks may fail or be breached. This scenario was assessed as part of the Level 1 SFRA (Breach 3a). A breach in the lock gates at South Quay predicts that flood waters will remain within the Docks and therefore the site is not shown to be flooded. It can be concluded that flooding of the site from the Docks (artificial sources) is considered a low risk.

It is unlikely that the area to the north of the site would be affected by a breach of the adjacent West India Dock or the nearby Blackwell Basin, Poplar Dock or Canary Wharf due to higher ground levels (>5m) between the dock areas and low ground.

28.4 GENERAL FLOOD RISK MANAGEMENT

The majority of the site is shown to be located within Flood Zone 3. There is a small area of the site in the west located within Flood Zone 2. 'More vulnerable' uses whilst permitted in both Flood Zone 2 and 3 will be subject to the Sequential and Exception Test if located within Flood Zone 3.

The Sequential Approach should be adopted in the development layout to limit the flood risk to users of the site. Ground levels are highest in the western parts of the site. Higher vulnerability land uses should be

located here with lower vulnerability and water compatible uses located in the northern parts of the site.

The site is shown to be defended from actual risk of tidal or fluvial flooding. Breach assessments carried out as part of the Level 1 SFRA show that the site is not inundated from tidal or fluvial breaches. A site specific breach assessment may still be required to determine the worst case scenario for the site, and to aid in the development of site specific flood risk management measures.

If a site specific breach assessment indicates that the site is at risk of tidal flooding, then the finished floor levels for sleeping accommodation should be set 300mm above the 0.5% AEP breach level. The need for any additional breach modelling should be confirmed with the Environment Agency prior to undertaking the work. In addition, development may need to consider safe access and egress for site users and emergency services.

The site is shown to be at risk of surface water flooding. It is recommended that further analysis of the risk of surface water flooding is undertaken to verify the results of the hydraulic modelling. '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 car parking and hard landscape areas. Small wetland/pond and bioretention devices could be included within the development to assist in managing runoff whilst increase the water quality discharging from the site and enhancing the biodiversity of the area.

Development proposals will need to consider site ground conditions and groundwater levels over the lifetime of the development. In particular the design of any underground structures or services and foundations.

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 a suitable SUDS management rain that as a minimum uses '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"> Sequential Approach to development layout. Finished floor levels for sleeping accommodation to be set above the design 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?
<ul style="list-style-type: none"> Yes, subject to the adoption of the Sequential Approach to development layout.

29.0 Millennium Quarter

Site Number:	28
Site Location:	Millharbour, Marshwall
Grid Reference:	537540, 179537

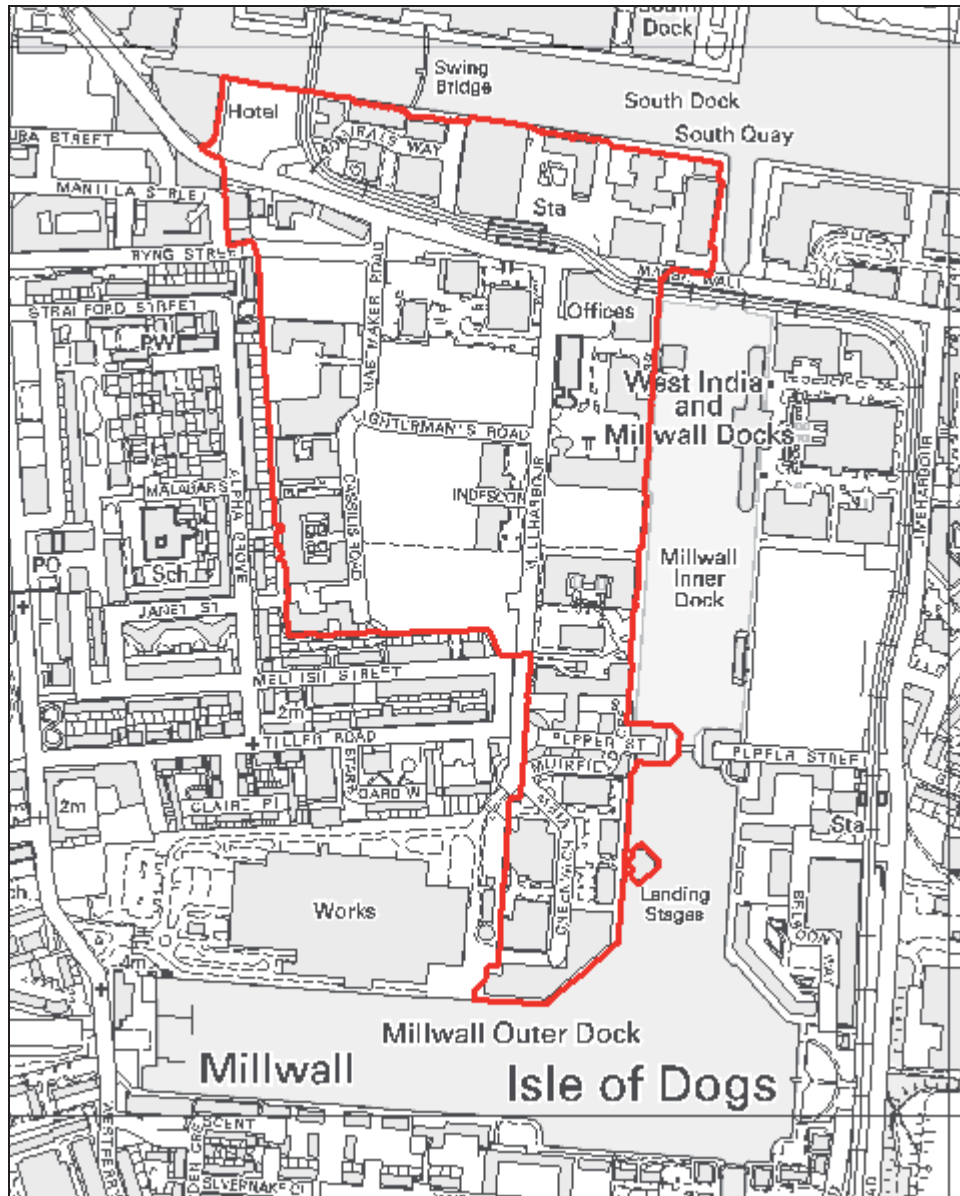


Figure 29-1 Millennium Quarter Site

29.1 SITE DESCRIPTION

The Millennium Quarter site occupies 22.29Ha of land and is located on the Isle of Dogs adjacent to the West India and Millwall Docks. The site currently contains a mixture of residential and commercial uses, as well as open space. The proposed use of the site is as a mixed use development including a large-scale housing development 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
Housing development	More vulnerable
District heating facility	Less vulnerable

29.2 SUMMARY OF FLOOD RISK

29.2.1 FLOOD ZONE MAPS

The entirety of the site is shown to be located within Flood Zone 3. All proposed land uses are permitted within this flood zone however 'more vulnerable' uses are subject to the Sequential and Exception Tests.

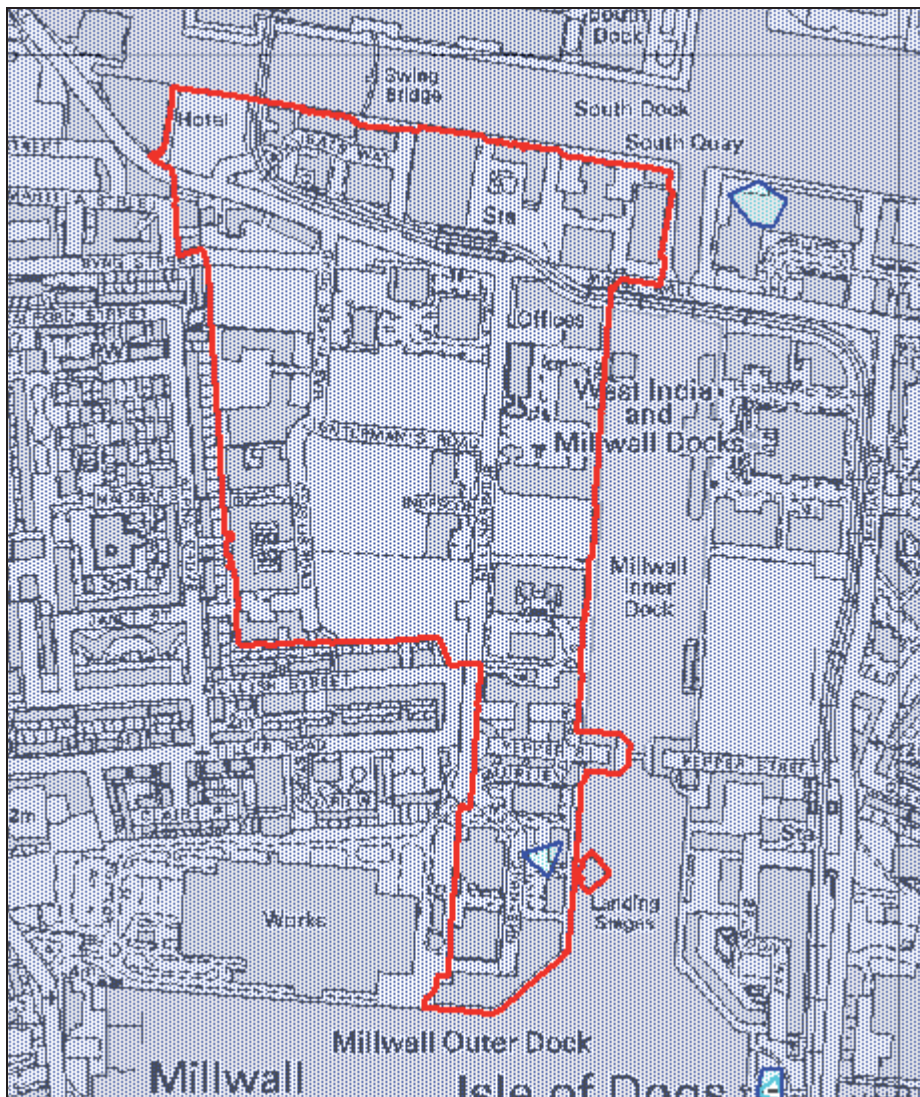


Figure 29-2 PPS25 Flood Zones at the Millennium Quarter Site

29.3 SOURCES OF FLOODING

29.3.1 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 actual 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.

There remains a risk to the site of flooding should a breach of the Thames Tidal Flood Defences occur. Breach analyses were carried out as a part of the LB of Tower Hamlets Level 1 SFRA. The flood extent for Breach 5 (Millwall) encroaches onto the western parts of the site around Cassilis Road. A 'significant' hazard rating is observed at this location meaning there is a risk to life as a result of deep and/or fast flowing water.

Development may require a site specific breach analysis to determine the worst case scenario for the site. The developer should consult the Environment Agency as to the benefits of a specific breach assessment.

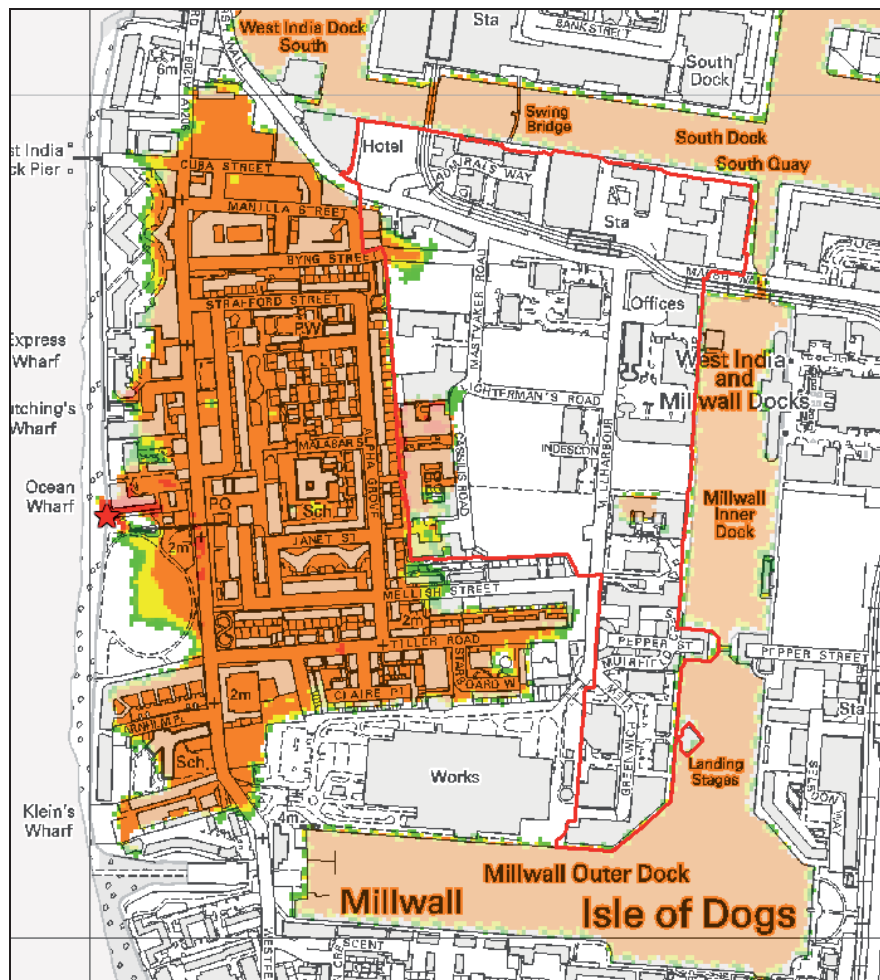


Figure 29-3 Millwall Breach Extent at the Millennium Quarter Site

29.3.2 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 having a low risk to 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 having a low risk to residual fluvial flooding.

29.3.3 SURFACE WATER/SEWER

Surface water is predicted to accumulate in localised low-lying areas within the site. Depths of water are generally less than 0.3m across the site in a 1% AEP rainfall event apart from two areas. The area to the west of Mastmaker Road is predicted to flood to depths of 1.2m. The northwest corner of the site is predicted to flood to depths of over 3m. The high depths of water at these locations may be due to inaccuracies in the LiDAR. It is recommended that the results of the modelling are verified.

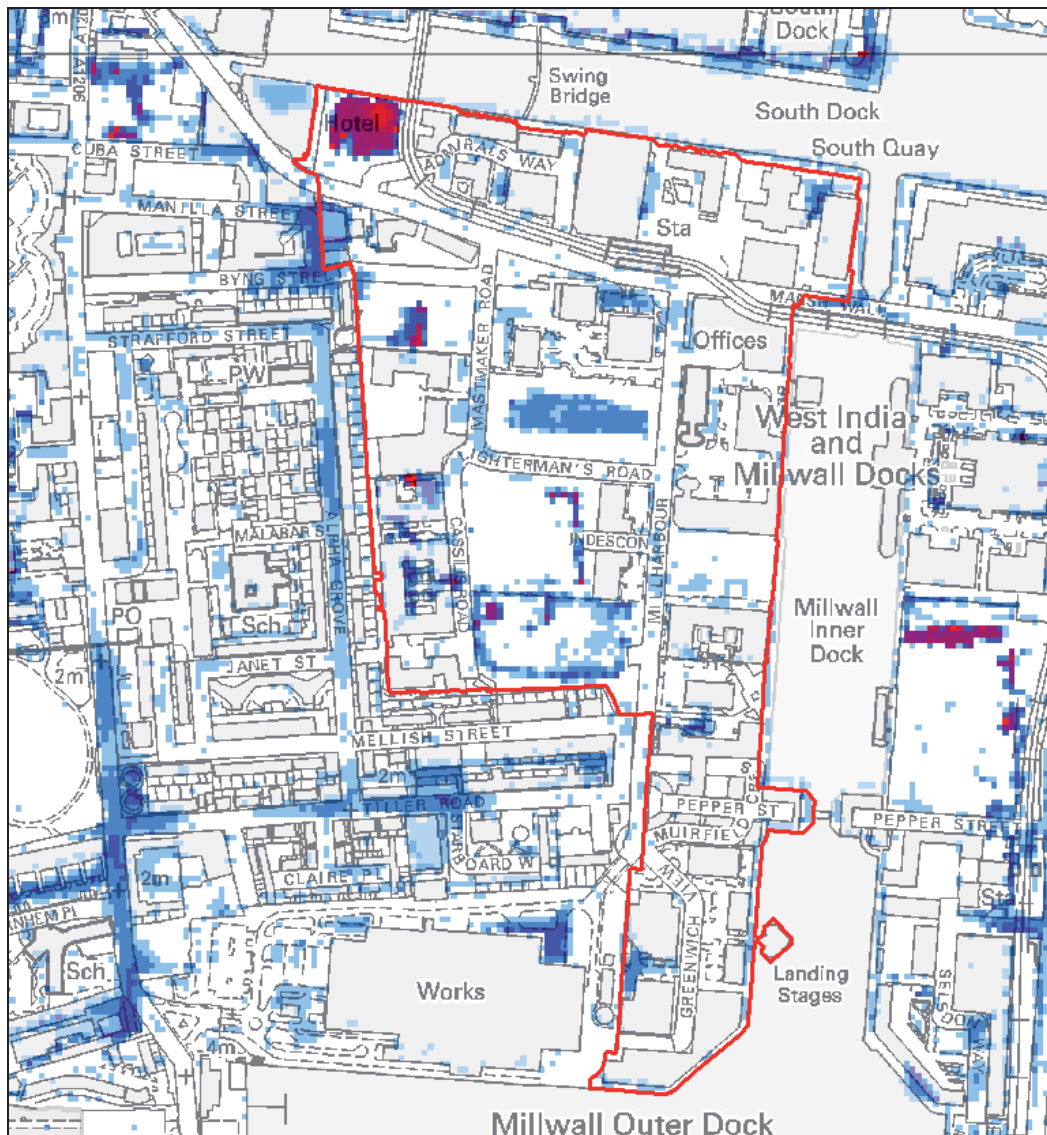


Figure 29-4 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the Millennium Quarter Site

29.3.4 GROUNDWATER

The Millennium Quarter site is not shown to be susceptible to groundwater flooding.

29.3.5 ARTIFICIAL SOURCES

The West India and Millwall Docks lie directly to the east of the site. The Docks are maintained and managed by British Waterways and must be consulted in relation to any development next to or within the docks in the London Docklands. The area surrounding the docks has been built up and is generally higher than the level of the docks at above 5mAOD. This is at or above the level of the dock walls and therefore there is a low risk of flooding from the docks to the surrounding area.

The water levels within the docks are controlled by a series of lock gates and do not normally fluctuate with the tide level in the River Thames. There is a residual risk that during tidal flood events, the lock gates at the entrances to the docks may fail or be breached. The locks are not single structures and are a series of regularly maintained double gates so the probability of failure is low. The potential hazard of such an event

was assessed as part of the LB of Tower Hamlets Level 1 SFRA. The results of the modelled scenario do not show flooding of the Millennium Quarter site due to the higher elevations of the surrounding land compared to the docks.

29.4 GENERAL FLOOD RISK MANAGEMENT

The entirety of the site is shown to be located within Flood Zone 3. All proposed land uses are permitted within this flood zone however 'more vulnerable' uses are subject to the Sequential and Exception Tests.

The Sequential Approach should be adopted in the development layout. Ground levels are highest along the northern and eastern perimeters of the site. Higher vulnerability land uses should be located here with lower vulnerability and water compatible uses located elsewhere in the site.

The site is shown to be defended from actual risk of tidal or fluvial flooding. A breach in the Thames tidal defences is shown to pose a potential risk of flooding to low-lying areas within the site. A site specific breach assessment may be required to inform finished floor levels. The finished floor levels of all sleeping accommodation in these areas should be above the 0.5% AEP breach level. Where possible, 'less vulnerable' uses to be located on the ground floor with 'more vulnerable' uses located on the first or upper floors. 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 flood level.

Development should consider safe access and egress for site users and emergency services. Potential evacuation routes could include Marsh Wall and Millharbour, however this should be verified following confirmation of flooding mechanisms. 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.

Safe access / egress may be difficult or not be possible for some parts of the site, particularly the low-lying area around Cassilis Road. Development must therefore provide safe refuge for all occupants within the development.

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, appropriate emergency contact details.

The site is shown to be at risk of surface water flooding. It is recommended that further analysis of the risk of surface water flooding is undertaken to verify the results of the hydraulic modelling. '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 car parking and hard landscape areas.

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"> Adoption of the Sequential Approach in development layout. Floor levels of all sleeping accommodation to be raised 300mm above flood level or located on the

first or upper floors.

- 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.

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

Yes, for reasons above.

30.0 Westferry Printworks

Site Number:	29
Site Location:	Westferry Road
Grid Reference:	537420, 179200

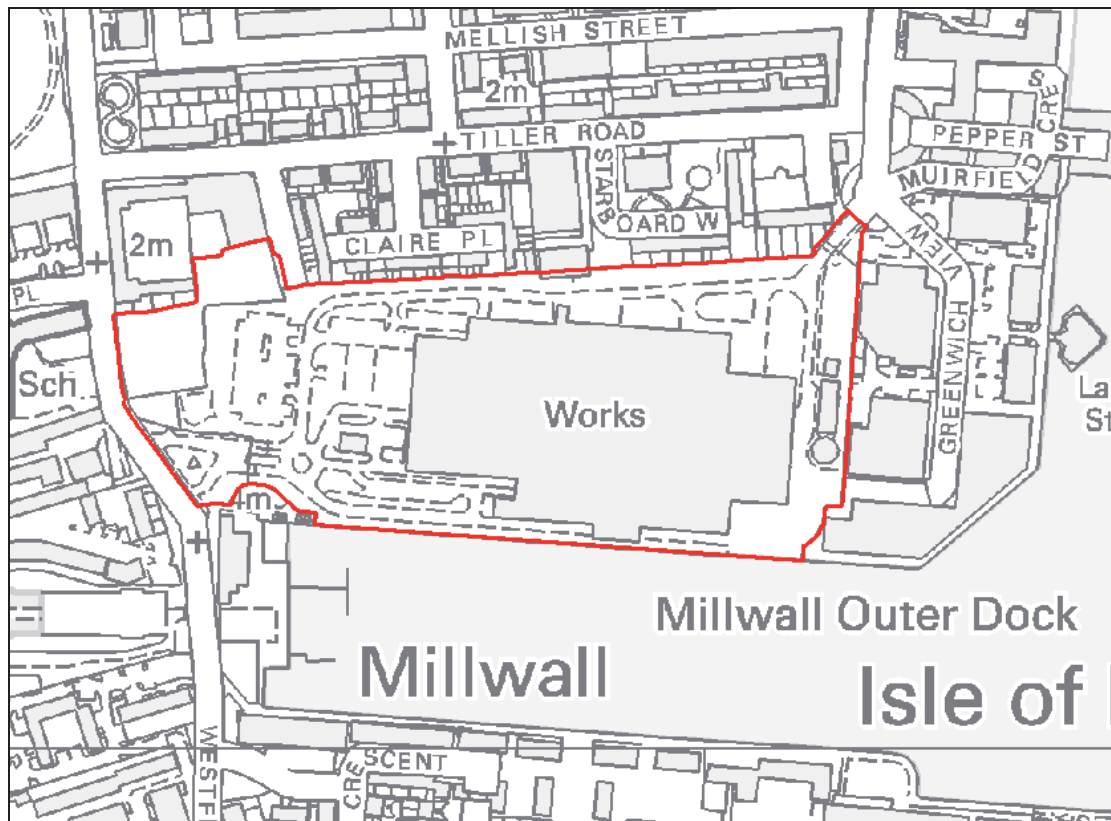


Figure 30-1 Westferry Printworks Site

30.1 SITE DESCRIPTION

The Westferry Printworks site occupies 6.16Ha of land and is located on the Isle of Dogs with the Millwall Outer Dock forming the sites southern boundary. Ground levels on site are generally between 4.2mAOD and 5.5mAOD with elevations dipping to 1.7mAOD in the west/ north-west of the site.

The site currently accommodates offices, a printworks and car parking facilities. The proposed site use includes:

- A large-scale housing development;
- Primary school;
- Secondary school;
- Combined primary and secondary school; and
- District heating facility.

The proposed uses are to form part of a larger mixed use development to also include publicly accessible open space and commercial floorspace.

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 School	More vulnerable
Secondary School	More vulnerable
Combined Primary School and Secondary School	More vulnerable
District heating facility	Less Vulnerable

30.2 SUMMARY OF FLOOD RISK

30.2.1 FLOOD ZONE MAPS

The entirety of the site is shown to be located within Flood Zone 3. All proposed land uses are compatible within this flood zone however 'more vulnerable' uses will be subject to the Sequential and Exception Tests.



Figure 30-2 PPS25 Flood Zones at the Westferry Printworks Site

30.3 SOURCES OF FLOODING

30.3.1 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 actual 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.

There remains a risk to the site of flooding should a breach of the Thames Tidal Flood Defences occur. Breach analyses were carried out as a part of the LB of Tower Hamlets Level 1 SFRA. The flood extent for the 0.5% AEP tidal breach event (Breach 5 - Millwall) encroaches onto the western parts of the site adjacent to Westferry Road. A 'significant' hazard rating is observed at this location meaning there is a risk to life as a result of deep and/or fast flowing water.

Development may require a site specific breach analysis to determine the worst case scenario for the site. The developer should consult the Environment Agency as to the benefits of a specific breach assessment.

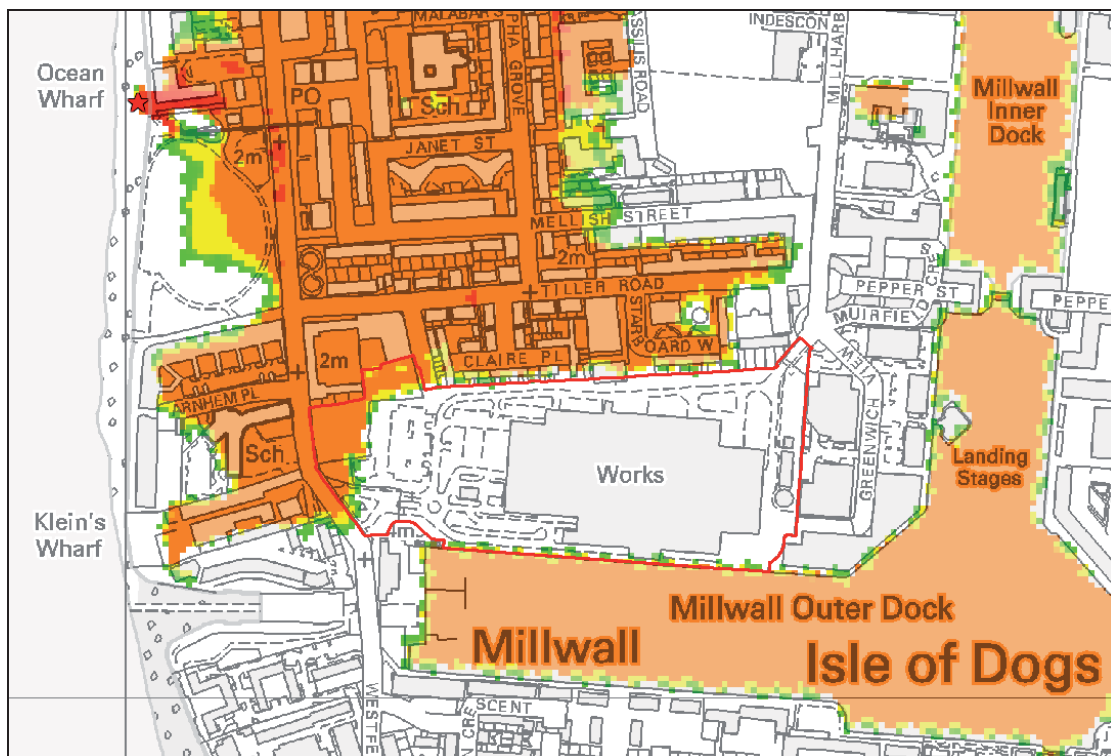


Figure 30-3 Millwall Breach Extent at the Westferry Printworks Site

30.3.2 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 having 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 having a low risk of residual fluvial flooding.

30.3.3 SURFACE WATER/SEWER

The site is shown to have a low risk of surface water flooding. Some accumulation of water is predicted at

the northeast corner of the existing printworks building. This is likely to be a result of inaccuracies in the LiDAR data which shows this area of having lower ground levels of about 3.5mAOD. It is recommended that the results of the surface water modelling are verified.



Figure 30-4 Maximum Depth of Surface Water in a 1% AEP Rainfall Event at the Westferry Printworks Site

30.3.4 GROUNDWATER

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

30.3.5 ARTIFICIAL SOURCES

The Millwall Outer Dock lies directly south of the site and extends to the east of the site. The Docks are maintained and managed by British Waterways. British Waterways must be consulted in relation to any development next to or within the docks in the London Docklands.

The area surrounding the docks has been built up and is generally higher than the level of the docks at above 5mAOD. This is at or above the level of the dock walls and therefore there is a low risk of flooding from the docks to the surrounding area.

The water levels within the docks are controlled by a series of lock gates and do not normally fluctuate with the tide level in the River Thames. There is a residual risk that during tidal flood events, the lock gates at the entrances to the docks may fail or be breached. The locks are not single structures and are a series of regularly maintained double gates so the probability of failure is low. The potential hazard of such an event was assessed as part of the LB of Tower Hamlets Level 1 SFRA (South Quay – Breach 3). The results of the modelled scenario do not show flooding of the Westferry Printworks site due to the higher elevations of the surrounding land compared to the docks.

30.4 GENERAL FLOOD RISK MANAGEMENT

The entirety of the site is shown to be located within Flood Zone 3. All proposed land uses are compatible within this flood zone however 'more vulnerable' uses will be subject to the Sequential and Exception Tests.

The Sequential Approach should be adopted in the development layout. Ground levels are highest across the centre and eastern parts of the site. Higher vulnerability land uses should be located here with lower vulnerability and water compatible uses located in the low-lying area in the west of the site.

The site is shown to be defended from actual risk of tidal or fluvial flooding. A breach in the Thames tidal defences is shown to pose a potential risk of flooding to low-lying areas within the site. A site specific breach assessment may be required to inform finished floor levels. The finished floor levels of all sleeping accommodation in these areas should be above the 0.5% AEP breach level. Where possible, 'less vulnerable' uses to be located on the ground floor with 'more vulnerable' uses located on the first or upper floors. 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 flood level.

Development should consider safe access and egress for site users and emergency services. Potential evacuation routes could include heading north along Millharbour, however this should be verified following confirmation of flooding mechanisms. 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.

Safe access / egress may be difficult or not be possible for some parts of the site, particularly the low-lying area in the west of the site. Development must therefore provide safe refuge for all occupants within the development.

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, appropriate emergency contact details.

The site is shown to be at risk of surface water flooding. It is recommended that further analysis of the risk of surface water flooding is undertaken to verify the results of the hydraulic modelling. '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 car parking and hard landscape areas.

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"> Adoption of the Sequential Approach in development layout. Floor levels of all sleeping accommodation to be raised 300mm above flood level or located on the first or upper floors. 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.

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

Yes, for reasons above.