18 Albert Embankment Foreshore

18.1 Introduction

18.1.1 This section of the non-technical summary presents the preliminary environmental assessment for the Thames Tunnel proposal at Albert Embankment Foreshore.

18.1.2 At this site it is proposed that the existing Brixton and Clapham Storm Relief sewers would be linked to the proposed Thames Tunnel through a shaft and an underground connection tunnel. Currently, the existing combined sewer overflows discharges approximately 33 times a year. The total volume of this discharge is approximately 277,300m$^3$ each year.

18.1.3 In the following section a description of the existing site is given. This is followed by a description of the development proposed at this site.

18.1.4 The environmental topics which have been assessed for this site are listed in the ‘Assessment’ section. Preliminary assessment findings are then presented topic by topic.

18.2 Site context

18.2.1 The site is shown as site number 13 Figure 28.1.

18.2.2 The site is located within the London Borough of Lambeth (Figure 18.1). It is also close to the London Borough of Wandsworth.

Figure 18.1 Albert Embankment Foreshore site location
18.2.3 The site is located on the foreshore of the River Thames and includes sections of the riverside footpath of Albert Embankment, and Lacks Dock which is a slipway used by a tour operator to launch amphibious vehicles. Approximately two hectares is required for both the temporary construction works as well as the permanent works. This is indicated by the red line shown on Figure 18.2.

18.2.4 Vehicular access to the site would be off Albert Embankment (A3036) onto an access road leading to Lacks Dock slipway. The Thames Path is a public right of way and runs along the river bank and through the site.

18.2.5 The east of the site is bordered by commercial office buildings and the west is bordered by the River Thames. Residential buildings are located north and south of the site.

Figure 18.2 Aerial photograph of Albert Embankment Foreshore*

*Note: The red line boundary is approximate in this image

18.3 Proposed development

18.3.1 The proposal is to intercept the two existing combined sewer overflows. With the Thames Tunnel in place, instead of untreated sewage discharging at current volumes directly into the River Thames, flows would be diverted into the proposed Thames Tunnel. For a typical year, this would reduce discharges from the Clapham Storm Relief Sewer to five times a year at approximately 7,900m$^3$/year and from the Brixton Storm Relief Sewer to once a year at approximately 5,700m$^3$/year.

18.3.2 In order for this interception to be achieved, construction works at this site would take approximately 3½ years.
18.3.3 A shaft with an internal diameter of approximately 16m and approximately 47m deep would be constructed. From the base of this shaft there would be an underground connection tunnel which would join up with the main tunnel. Through an interception chamber, flows from the existing Clapham and Brixton Storm Relief Sewer would be diverted into the connection tunnel and into the main tunnel, located deep underneath the River Thames.

18.3.4 Most of the construction would take place from 8am to 6pm, Monday to Friday. Limited works may be required beyond these hours.

18.3.5 In order to manage and mitigate effects on the environment during construction, a code of construction practice has been drafted. This sets out measures to be adhered to during the construction works.

18.3.6 Figure 18.3 shows an indicative plan of the construction works.

Figure 18.3 Indicative plan of construction works for Albert Embankment Foreshore
18.3.7 Once the works at this site have been built, a number of features would remain (Figure 18.4 and Figure 18.5). There would be two areas built out onto the foreshore. Access to these would be required periodically for the purposes of inspecting and maintaining the shaft and the tunnel. Access for maintenance purposes would be required every three to six months. Once every ten years more substantial maintenance work would be required.

18.3.8 In addition, there would be two kiosks to control equipment located in the below ground chambers. There would also be one larger diameter ventilation column approximately 4m high and two smaller diameter columns 6m in height. Most of the time, air would be drawn into the tunnel via these two larger diameter columns to ensure that the air within the main tunnel is continuously circulated. From time to time when the tunnel is filling up, air may be expelled via filters and out through these two ventilation columns.

18.3.9 In the case of Albert Embankment, one large and one small control kiosk and the two 6m high ventilation column would be located on the new area of land created within the foreshore adjacent to Vauxhall Bridge. The second control kiosk and the 4.5m high ventilation columns would be located on the new area of land created within the foreshore to the north of the Lacks Dock slipway.

18.3.10 The existing river wall would be extended around the edge of the new foreshore structures to maintain river defences.

Figure 18.4 Albert Embankment Foreshore indicative plan of built development – image 1 of 2
18.4 **Assessment**

18.4.1 Based on the existing site and the works proposed, the following environmental topics have been included in the scope of this preliminary environmental assessment:

a. Air quality and odour
b. Ecology – aquatic and terrestrial
c. Historic environment
d. Land quality
e. Noise and vibration
f. Socio-economics
g. Townscape and visual
h. Transport
i. Water resources (ground and surface)
j. Flood risk

18.4.2 In the following sections, information about the preliminary assessment of each of these topics is presented.
18.4.3 As part of the assessment process, consideration has been given to known major developments that may change future environmental conditions. There are a number of developments around the site that have been taken into consideration. These include: the final phase of the St George Wharf residential development to the south of the site; a commuter pier associated with St George’s Wharf; a residential and hotel development at Hampton House to the north of the site; and a residential and hotel development near Vauxhall bus station.

18.4.4 Further information on the topic specific methodology for conducting the assessment is given in section 4 of this non-technical summary.

18.5 **Air quality and odour**

18.5.1 The Albert Embankment Foreshore site is located within the London Borough of Lambeth Air Quality Management Area. Local monitoring data indicates that there are currently exceedences of the air quality standards in the vicinity of the site. The nearest people who may be sensitive to the development are occupiers of nearby residential dwellings (the closest are located in Bridge House to the south east of the site), commercial/office premises (including the SIS building, Camelford House and Tintagel House) and users of Albert Embankment Gardens and Spring Gardens Park.

18.5.2 Based on this preliminary assessment, it is considered that the overall effect on local air quality from construction road traffic, river barges and construction plant is likely to be minor adverse at residential properties and negligible at the commercial/offices premises and at the parks (Albert Embankment Gardens and Spring Gardens Park). In terms of construction dust, this is likely to have a minor adverse effect on the closest residential properties and commercial/office premises and a negligible effect at the parks, taking account of the dust control measures in the Code of Construction Practice.

18.5.3 Preliminary assessment findings indicate that the effects of odours released from the ventilation columns is likely to be negligible.

18.5.4 Based on this assessment, it is considered that mitigation measures are not required.

18.6 **Ecology – aquatic**

18.6.1 The site is located within the designated River Thames and Tidal Tributaries Site of Metropolitan Importance. It comprises an area of foreshore dominated by pebbles, with some sand, shingle and large stones. The river in this location is confined by a constructed vertical river wall with no marginal vegetation and limited intertidal habitat, and it is on the boundary of the freshwater and brackish zones. Surveys and data searches indicate low diversity of fish and invertebrates present (Figure 18.6).

18.6.2 Based on preliminary assessment findings, during construction there would be a loss of habitat due to the presence of a retaining wall to create a dry working area within the river and also a levelled and filled river bed area, termed a campshed. The purpose of a campshed is to provide an
area on the river bed adjacent to the land for barges to rest on during low tide. This ensures that barges do not get stuck to the river bed with a potential risk of flooding to the barge during high tide. It is anticipated that these works would have a moderate adverse effect on habitats whilst disturbance and compaction would have a minor adverse effect on habitats. For fish and invertebrates the loss of habitat from landtake would be minor adverse. All other effects on mammals, fish and invertebrates would be negligible.

18.6.3 During operation, the permanent loss of inter-tidal habitat would have a moderate adverse effect on habitats, and minor adverse effects on fish and invertebrate species. The reduction in nutrient levels entering the river would have a minor beneficial effect on fish. Improved local invertebrate diversity and abundance would also be of minor beneficial effect. In the longer term, an increase in pollution sensitive fish and invertebrates would be of minor beneficial effect. Other effects on invertebrates and mammals are considered to be negligible.

18.6.4 The presence of structures, both during construction and operation, within the river may have an effect on migrating fish through altered river flows. This will be assessed and reported in the Environmental Statement.

18.6.5 Measures are included within the Code of Construction practice to manage construction effects, and no further mitigation during construction is considered to be possible at this stage as the extent of the physical works in the river have been reduced as far as practicable. For the operational phase consideration will be given to providing compensation for the loss of habitat, for example through creating habitat elsewhere, and reported in the Environmental Statement.

**Figure 18.6 Measuring and recording fish species near Albert Embankment Foreshore**
18.7 Ecology – terrestrial

18.7.1 The site comprises hardstanding, semi-mature and ornamental scattered trees and foreshore habitat. A small number of common bats are known to pass through the site along the River Thames. The foreshore habitat has the potential to support wintering bird species and surveys are ongoing. The trees support small numbers of common nesting birds.

18.7.2 No significant terrestrial ecology effects on designated sites are anticipated during construction (aquatic ecology effects are considered in section 18.6). The site lies within the River Thames Tidal Tributaries Site of Nature Conservation which is considered under the assessment of aquatic ecology.

18.7.3 Based on the preliminary assessment, site clearance would result in the loss of a small number of trees. This would have a site level adverse effect. Foraging and commuting bats are likely to be displaced from the site during construction resulting in a local adverse effect. Disturbance to bats passing through the site from lighting, noise and vibration would result in a site level adverse effect. Such disturbance to bats adjacent to the site is unlikely to be significant. Tree loss is likely to reduce the resource for nesting and breeding birds at the site, which would result in a site level adverse effect. Disturbance during construction to breeding birds on site or adjacent to the site is likely to be negligible.

18.7.4 The significance of the loss of foreshore habitat and disturbance on wintering birds will be assessed and reported in the Environmental Statement.

18.7.5 It is anticipated that operational activity would be limited to occasional maintenance visits, which would be unlikely to have significant effects on terrestrial ecology.

18.7.6 In addition to measures in the Code of Construction Practice, measures to address adverse effects during construction on bats and birds may include reinstatement and replacement of habitat. Subject to survey results, mitigation for the loss of foreshore habitat and potential effects on wintering birds may be required and will be assessed and reported in the Environmental Statement.

18.8 Historic environment

18.8.1 The southern part of the site is located beneath the Grade II* listed Vauxhall Bridge (of very high heritage asset significance - Figure 18.7). There are no further nationally designated assets within the site or its immediate vicinity. The majority of the site is located within the locally designated Albert Embankment Conservation Area (of high heritage asset significance). The site includes the 19th century embankment river wall and Lacks Dock slipway (both of medium heritage asset significance).
18.8.2 The eastern part of the site lies within the North Lambeth and Lambeth Palace Archaeological Priority Area. The main potential for the site in terms of buried heritage is for prehistoric remains on the foreshore. A prehistoric Mesolithic timber structure (of high heritage asset significance) was recently exposed by river scour. There is also potential for remains associated with a medieval jetty or wharf (of low or medium heritage asset significance), and for post-medieval industrial remains, which may include waste material, jetties or anchor points (of low heritage asset significance).

Figure 18.7 One of the sculptures on Vauxhall Bridge

18.8.3 Based on preliminary assessment findings, removal of part of the river wall and the slipway is likely to have a high magnitude of impact and give rise to a moderate adverse effect. Construction works would entail deep excavations which would entirely remove the assets within the footprint of each excavation. If heritage assets are present, this would comprise a high magnitude of impact and would give rise to a potentially major adverse effect on any prehistoric structures (minor or moderate adverse on isolated artefacts). A minor or moderate adverse effect would be anticipated for medieval and post-medieval structural remains.

18.8.4 To mitigate the effect on the river wall and slipway, the structures would be recorded and photographed in line with accepted standards to form preservation by record. The desk-based study of the site suggests that no buried heritage assets of very high significance are anticipated that might merit a mitigation strategy of permanent preservation in situ. The adverse effects could be successfully mitigated by a suitable programme of archaeological investigation before and/or during construction, drawing on a range of techniques. This would include subsequent dissemination of the
results and so achieve preservation by record (through advancing public understanding and appreciation of the assets).

18.8.5 Effects on the historic environment arising from the operation of the Thames Tunnel infrastructure at Albert Embankment Foreshore will be assessed and presented in the Environmental Statement. Effects could include effects on the historic setting of heritage assets in the surrounding area such as the Albert Embankment Conservation Area and nearby listed structures, and effects on buried heritage assets in the foreshore from scouring due to changes in river flows due to new infrastructure in the channel. Any mitigation requirements for operational effects will also be presented.

18.9 **Land quality**

18.9.1 A search of historical and environmental data indicates a number of contaminative industrial on site uses. Uses include gas works, wharves and the Lacks Dock which has been situated within the site boundary from 1896 to present day. Historically the area around the site has been used for the location of a number of industrial activities, particularly oil and gas works located to the south and south west of the site and a current fuel filling station to the north east. There is the potential for these activities to have impacted upon the foreshore, however given the time since most of these processes were active and processes associated with the river flow, these risks are considered to be low. Part of the ongoing ground investigations includes the assessment of foreshore sediment contamination. Desk based surveys have identified a high risk from unexploded ordnance.

18.9.2 Based on preliminary assessment findings, there may be a slight adverse effect on construction workers due to the potential for exposure to contaminated soils or other materials if they are present, although any exposure risk would be short-term. There would be a negligible effect on the built environment as it is considered unlikely that contaminants contained in subsurface materials would affect buried structures. This preliminary assessment therefore identified no need for mitigation during the construction phase although this will be clarified subject to further investigations and reported in the Environmental Statement.

18.9.3 During operation there would be negligible effect on future users and the built environment. The assessment identified no need for mitigation during the operation phase.

18.10 **Noise and vibration**

18.10.1 A noise survey has been carried out around the site (Figure 18.8). The site is dominated by road and rail traffic noise. The nearest locations to the site which are sensitive to noise and vibration are the residential dwellings at Peninsula Heights (north east of the site) and Bridge House (south east of the site) and offices at Camelford House and the Secret Intelligence Service headquarters (east of the site).
18.10.2 Preliminary assessment findings indicate that significant noise effects arising from construction activities are predicted at residential properties at Peninsula Heights and Bridge House, and offices at Camelford House and the Secret Intelligence Service headquarters. Significant vibration effects arising from construction are predicted at residential properties at Bridge House and offices at Camelford House and the Secret Intelligence Service headquarters. No significant noise or vibration effects as a result of the operation of the site are predicted.

18.10.3 During construction, the contractor would be required to follow best practice (as described in the Code of Construction Practice) at all times to reduce the noise and vibration effects upon the local community for example through suitable siting of equipment on site.

18.10.4 Beyond best practice measures it is anticipated that additional mitigation would be required to address significant noise and vibration effects during construction. This could include the use of localised screens and enclosures to reduce noise from particularly noisy, static operations.

18.10.5 The next stage of the assessment will profile the variation in construction noise levels across the programme of work with the aim of refining mitigation design and seeking to reduce the significant effects of construction noise and vibration. Further details of mitigation measures will be provided in the Environmental Statement including the significance of residual effects once mitigation has been taken into account.

Figure 18.8 Noise measurements being taken at Albert Embankment
18.11 **Socio-economics**

18.11.1 The site comprises a privately used slipway (Lacks Dock), a stretch of pavement that forms part of the Thames Path, and an area of foreshore on the River Thames. Residential and commercial uses, including offices, surround the site. The site and surrounding area is moderately well used for a range of purposes including walking, cycling and passive recreation, and a tour operator launches and recovers amphibious vehicles from Lacks Dock all year round (Figure 18.9).

18.11.2 During construction, there are considered to be moderate adverse effects on the amenity of nearby residents and minor adverse effects arising from disturbance to the tour operator and disruption to a section of the Thames Path. Amenity impacts on users of the Thames Path and offices are also considered to be minor adverse. Once operational, there would be a minor beneficial effect on recreational opportunities resulting from the gain in publicly accessible space associated with the extension to the pavement comprising the Thames Path.

18.11.3 In completing the assessment, there is scope for further construction phase mitigation measures to be incorporated in the design with the aim of seeking to reduce significant adverse amenity effects which have been identified in this preliminary assessment.

18.11.4 For the operational phase, there are not expected to be any socio-economic effects at Albert Embankment which require mitigation.

*Figure 18.9 The London Duck Tours amphibious vehicle using the Lacks Dock access road*
18.12 **Townscape and visual**

18.12.1 The site is located within the Albert Embankment Conservation Area and partly beneath the Grade II* listed Vauxhall Bridge. The townscape within the site is poor with good potential for enhancement. It comprises a stretch of pavement, an area of foreshore, several trees and a stretch of river wall. The site is located within a regionally valued stretch of the River Thames and provides the setting to a number of conservation areas. The surrounding townscape combines historic and contemporary styles, comprising commercial, administrative and residential premises (Figure 18.10).

18.12.2 Based on preliminary assessment findings, during the construction phase, the presence of construction activity and the cofferdam would have a major adverse effect on six townscape character areas (from a total of 15), including the site, the River Thames - Vauxhall and Pimlico Reach and St. George’s Wharf. There would be a moderate adverse effect on the River Thames - Nine Elms Reach and Westminster Residential, due to the presence of cranes and construction activity. There would be a minor adverse effect on two character areas. Once the scheme is operational, it is anticipated that there would be minor to moderate adverse townscape effects on the River Thames - Vauxhall and Pimlico Reach, Residential Waterfront - West and Millbank Conservation Area, due to the introduction of built elements into a stretch of the river and in close proximity to the Grade II* listed Vauxhall Bridge. There would be minor adverse effects on the River Thames - Nine Elms Reach and St. George’s Wharf, and negligible to minor adverse effects on Westminster Residential. There would be minor to moderate beneficial effects on the character of the site itself and Albert Embankment Commercial due to the creation of an area of high quality public realm. The level of significance is dependent on the design.

**Figure 18.10 View northeast from southern end of Vauxhall Bridge**

18.12.3 In terms of visual amenity, it is likely that during the construction phase there would be major adverse effects on five viewpoints (from a total of 13) including the view from the Thames Path, Vauxhall Bridge and entrance to Tate Britain due to the visibility of the cofferdam and construction activity. There would be moderate adverse effects on four viewpoints including
Lambeth Bridge, the Thames Path and Vauxhall Bridge and minor adverse effects on three viewpoints. Once operational there would be minor to moderate adverse visual effects on views from Vauxhall Bridge, Thames Path and Tate Britain due to the visibility of a new river wall, above ground structures and interception works under Vauxhall Bridge. There would be minor adverse effects on views from Nine Elms Lane and the Thames Path due to the visibility of interception works under Vauxhall Bridge and negligible to minor adverse effects on four viewpoints including from Lambeth Bridge and the Thames Path. There would be minor to moderate beneficial effects on views from the Thames path outside Peninsula Heights and from the southern end of Vauxhall Bridge due to the visibility of the newly created high quality public realm. The level of significance is dependent on the design and will be refined for the Environmental Statement.

18.12.4 Mitigation measures to be employed during the construction phase are being incorporated into the proposals, for example, through use of capped and directional lighting when required. In terms of operation, a process of iterative design and assessment has been employed to reduce adverse effects and improve beneficial effects, which will continue until the design is finalised. This will be assessed and reported in the Environmental Statement.

18.13 Transport

18.13.1 The Albert Embankment Foreshore site has excellent public transport accessibility being located within close proximity of Vauxhall Rail, Underground and Bus station. The site is on the west side of Albert Embankment (A3036), adjacent to Vauxhall Bridge Road and construction vehicle access is proposed via the A202 and A3036 via Vauxhall Cross.

18.13.2 During construction, the number of heavy goods vehicle movements would be moderate. The nature of the construction site layout at this location is considered likely to result in a minor adverse effect on road network operation and delay. Effects on pedestrian and cyclist amenity and safety are expected to be moderate adverse due to local diversions and possible conflicts at the site access on Lacks Dock. A negligible effect is expected on public transport and a minor adverse effect on river passenger services. During the operational phase there would be very occasional vehicle trips to and from the site for maintenance activities but these would have a negligible effect on the surrounding transport networks.

18.13.3 The project is being designed to limit the effects on the transport networks as far as possible. At this location, mitigation measures during the construction phase are likely to be required and would take the form of having a traffic marshal stationed at the site access entrance to manage potential conflicts between construction vehicles and Duck Tour vehicles as well as those vehicles accessing Camelford House. Mitigation is not required for the operational phase.
18.14 Water resources - ground water

18.14.1 The proposed shaft would pass through the upper aquifer with the base of the shaft founded in the lower aquifer. Associated interception infrastructure would penetrate the upper aquifer. Both the upper and lower aquifers are sensitive environmental receptors. The lower aquifer is of high value and abstractions from it of very high value, while the upper aquifer is considered to be of medium value.

18.14.2 Construction effects on the upper aquifer would be limited to physical obstruction to groundwater flow and these are anticipated to be negligible. Construction effects on the lower aquifer could impact groundwater resources and induce groundwater movement. Due to the sensitivity of the lower aquifer effects have been assessed as moderate adverse on groundwater resources but major adverse on groundwater quality (as a result of induced groundwater flow). The effects of construction on groundwater quality require further assessment. The results of further assessment would inform the development of further design and mitigation measures.

18.14.3 Once operational the potential effects would be obstruction to groundwater flow and the seepage to and from the shaft. These potential effects are considered to be negligible at this stage.

18.14.4 Monitoring of groundwater levels and quality would continue throughout construction and operation.

18.15 Water resources – surface water

18.15.1 The site is located in the River Thames foreshore within the Thames Middle waterbody, as classified under the Thames River Basin Management Plan. The Thames Middle waterbody is currently classified under the Water Framework Directive as being at moderate potential status, with a status objective of good potential by 2027. There are no nationally or locally designated water-dependent conservation sites within 2 kilometres of the site.

18.15.2 There is the potential for effects on surface water resources from the proposed construction works through surface water runoff and exposure of the drainage system to contaminants. After taking into account the measures incorporated into the design and code of construction practice, such effects are expected to be manageable and not significant. No mitigation would therefore be required.

18.15.3 There is also potential for the loss in river bed from the construction to change the river flows, which could lead to scour at the flood defences. The effects would be largely temporary during construction as some natural foreshore restoration would occur after temporary construction structures are removed. Some additional mitigation may be required for the effects of the permanent works within the foreshore. Any mitigation that is required will be identified in the Environmental Statement.
18.15.4 Currently the Clapham Storm Relief and Brixton Storm Relief combined sewer overflows both discharge into the Thames at the site (Figure 18.11 and Figure 18.12). For the purposes of this assessment, they have been considered to operate as a single outfall. Once operational, the scheme would reduce the number to a predicted level of one spill a year once the tunnel is in place. This reduction would be a beneficial effect on water quality. The number of risk days for river users being exposed to pathogens would be reduced by up to 112 days of risk of exposure annually. In addition, the tonnage of sewage derived litter can be expected to be reduced from 70 tonnes to less than four tonnes per year.

**Figure 18.11 Clapham Storm Relief combined sewer overflow outlet**

![Figure 18.11 Clapham Storm Relief combined sewer overflow outlet](image)

**Figure 18.12 Brixton Storm Relief combined sewer overflow outlet**

![Figure 18.12 Brixton Storm Relief combined sewer overflow outlet](image)
18.16 Flood risk

18.16.1 Due to its location within the foreshore (Figure 18.13), the main source of flood risk to the site during construction and operation is the tidal River Thames.

18.16.2 The proposed site may also be at risk of surface water flooding in the future due to runoff generated from land to the south and east. The presence of structures within the foreshore could impact flow within the River Thames and the work required to construct the tunnel beneath the site could potentially affect the local flood defences; further studies are being completed to assess these potential impacts.

18.16.3 During construction, a temporary structure would be built to provide the equivalent level of flood protection as that provided by the current flood defences. During operation, the ground level at the northern part of the site would be set above the design flood level. In the southern part of the site, new flood defences would be constructed to provide the equivalent protection level as the existing defences.

18.16.4 The effects of changes in scour and the rate sediments are deposited would be reduced through good practice design of the temporary and permanent structures. The terracing design of the southern section of the site has been designed to ensure stable tidal water flows.

Figure 18.13 Foreshore at Albert Embankment

18.17 Further information

18.17.1 Further information regarding preliminary assessment findings for Albert Embankment Foreshore can be found in Volume 19 of the Preliminary Environmental Information Report.