19 Victoria Embankment Foreshore

19.1 Introduction

19.1.1 This section of the non-technical summary presents the preliminary environmental assessment for the Thames Tunnel project at Victoria Embankment Foreshore (Figure 19.1).

19.1.2 At this site it is proposed that the Regent Street sewer and the northern Low Level Sewer No.1 would be linked to the proposed main tunnel through a shaft and an underground connection tunnel. Currently, the existing combined sewer overflow discharges approximately 4 times a year. The total volume of this discharge is 22,200m$^3$ each year.

19.1.3 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.

19.1.4 The environmental topics which have been assessed for this site are listed in the ‘Assessment’ section (19.4). Preliminary assessment findings are then presented topic by topic.

19.2 Site context

19.2.1 The site is shown as site number 14 on Figure 28.1. The site is located within the City of Westminster (Figure 19.1). It is also close to the City of London.

Figure 19.1 Victoria Embankment Foreshore site location
19.2.2 The site is located on the foreshore on the River Thames and on a section of the pavement and roadway of Victoria Embankment (A3211). A permanently moored boat, the Tattershall Castle (floating bar and restaurant) is located within the site area. This would be permanently relocated before construction starts. Approximately one hectare is required for the temporary works. This is indicated by the red line shown on Figure 19.2. The area of land required for the permanent works would be substantially smaller than that required for construction.

19.2.3 Vehicular access to the site would be directly off Victoria Embankment (A3211). The Thames Path is a public right of way and runs along the eastern pavement of Victoria Embankment through the western extent of the site.

19.2.4 The River Thames borders the site to the north, east and south. Victoria Embankment (A3211) is to the west and beyond this is Victoria Embankment Gardens. Approximately 15m to the north of the site is the mooring for the restaurant ship Hispaniola.

**Figure 19.2 Aerial photograph of Victoria Embankment Foreshore**

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

19.3 **Proposed development**

19.3.1 The proposal is to intercept the existing combined sewer overflow. 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 main tunnel. For a typical year, this would reduce discharges at the Regent Street combined sewer overflow to zero.
19.3.2 In order for this interception to be achieved, construction works at this site would take approximately four and a half years.

19.3.3 A shaft with an internal diameter of approximately 16m and approximately 50m deep would be constructed.

19.3.4 From the base of this shaft there would be an underground connection tunnel which would join up with the main tunnel. Through an overflow weir constructed on the northern Low Level Sewer No. 1, flows from the existing Regent Street sewer would be diverted into the connection tunnel and into the main tunnel, located deep underneath the River Thames.

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

19.3.6 In order to manage and mitigate the effects on the environment during construction, a Code of Construction Practice has been drafted. This sets out measures to be adhered to during the process of construction works.

19.3.7 Figure 19.3 shows an indicative plan of the construction works.

Figure 19.3 Indicative plan of construction works for Victoria Embankment Foreshore
19.3.8 Once the works at this site have been built, a number of permanent features would remain (Figure 9.4). There would be an area built out onto the foreshore. Periodic access onto this structure would be required to enable access into the shaft and the connection tunnel for inspection and maintenance purposes. Access for maintenance purposes would be required every three to six months. Once every ten years more substantial maintenance work would be required.

19.3.9 There would be two kiosks to control equipment located in the below ground chambers. There would also be two ventilation columns approximately four metres and six metres in height. Most of the time, air would be drawn into the tunnel via these 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 the ventilation columns.

19.3.10 In the case of Victoria Embankment, the control kiosks and the four metre high ventilation column would be located on the new area of land created within the foreshore and the 6m high ventilation column would be located at the edge of the Victoria Embankment south-side pavement.

19.3.11 There would be no fencing around any part of the development once it is built, however the river wall would extend around the edge of the new foreshore structure to maintain flood defences.

**Figure 19.4 Victoria Embankment Foreshore indicative plan of built development**
19.4 Assessment

19.4.1 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

19.4.2 In the following sections, information about the preliminary assessment of each of these topics is presented.

19.4.3 As part of the assessment process, consideration has been given to known major developments that may change future environmental conditions. There are no known developments in the vicinity of this site. Future environmental conditions are therefore not anticipated to change significantly from those which exist today as a result of other developments.

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

19.5 Air quality and odour

19.5.1 The Victoria Embankment Foreshore site is located within the City of Westminster 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 the nearby residential dwellings (in Whitehall Court), commercial/office premises, two permanently moored vessels (the Hispaniola and relocated Tattershall Castle) and The Royal Horseguards Hotel, and users of the Whitehall Gardens / Victoria Embankment Gardens.

19.5.2 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 the residential properties and negligible at the commercial/office premises, Hispaniola / Tattershall Castle vessels, The Royal Horseguards Hotel and Whitehall / Victoria Embankment Gardens. In terms of construction dust, this is likely to have a negligible effect at all locations, taking account of the dust control measures in the Code of Construction Practice.
Section 19: Victoria Embankment Foreshore

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

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

19.6 Ecology – aquatic

19.6.1 The site is located within the designated River Thames and Tidal Tributaries Site of Metropolitan Importance. There is a thin area of sand and gravel foreshore exposed at low tide. The river in this location is confined by a man-made vertical river wall with no marginal vegetation and limited intertidal habitat. Aquatic ecology surveys have been undertaken at the site (Figure 19.5). Surveys and data searches indicate a low diversity of fish, whilst pollution-sensitive invertebrates are present.

19.6.2 Construction effects would be managed in accordance with the Code of Construction Practice. With the Code in place and based on preliminary assessment findings, during construction there would be a loss of foreshore habitat. This is due to a retaining wall to create a dry working area within the river, termed a cofferdam, 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 site for barges to rest on during low tide. This ensures that barges sit on a stable loading platform and also do not become stuck in the river bed with a potential risk of flooding to the barge during high tide. It is anticipated that the cofferdam and campshed 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. So too would death from landtake for invertebrates. All other effects on mammals, fish and invertebrates would be negligible.

19.6.3 During operation, the permanent loss of river habitat is considered to be a moderate adverse effect on habitats and minor adverse effects on fish and invertebrates. The reduction in nutrient levels entering the river is considered to have a moderate beneficial effect on habitats. It would also have a minor beneficial effect on fish, through reduced fish kills and local improvement in invertebrate diversity and abundance. There would be a minor beneficial increase in pollution tolerant and/or rare fish and invertebrate species In the longer term of operation. Effects on mammals would be negligible.

19.6.4 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.

19.6.5 Measures are included within the Code of Construction Practice to manage construction effects, and no further mitigation during construction is considered to be possible 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.
19.7 Ecology – terrestrial
19.7.1 The site comprises hardstanding and habitat is limited to eight semi-mature trees. No significant adverse effects on terrestrial ecology are anticipated for either construction or operation (aquatic ecology effects are considered in section 19.6).

19.8 Historic environment
19.8.1 The site lies within the locally designated Whitehall Conservation Area and comprises part of the north bank of the Thames and the Victoria Embankment river wall, which is Grade II listed, and a number of Grade II listed cast iron lamp standards (all of high heritage asset significance). The river wall forms part of Sir Joseph Bazalgette’s grand embankment scheme, built in 1864–70. The permanently moored vessel, Tattershall Castle, which is on the National Historic Ships register also lies within the site and is of medium heritage asset significance. There are a number of heritage features in the vicinity, the closest of which are the Grade II listed Bazalgette Memorial of c. 1891 (of high heritage asset significance) 25m to the north and the Victoria Embankment Gardens, a Grade II* registered park and garden (of very high heritage asset significance), 15m to the west, on the opposite side of the carriageway. The World Heritage Site of Palace of Westminster, Westminster Abbey and St Margaret’s Church lies around 450m to the south of the site, and is also of very high asset significance.
19.8.2 Potential for archaeological remains in the channel is considered to be low due to probable dredging; although there is high potential for palaeoenvironmental remains (e.g. organic remains such as pollens and plant fossils) of low heritage asset significance within any surviving channel silt. The main potential in terms of buried heritage assets is on the landward side of the river wall, behind the embankment construction, where there is a moderate potential for post-medieval piled structures, barge beds and jetties, of low heritage asset significance.

19.8.3 There would be a temporary major adverse effect from temporary removal of the Grade II lamp stands, prior to reinstatement. The parapet of the river wall would be locally dismantled, constituting a moderate adverse effect. There is anticipated to be a negligible effect on the relocation of the Tattershall Castle in terms of the historic environment. Construction works would entail deep excavations which would entirely remove the assets within the footprint of each excavation. If such assets were present, this would comprise a high magnitude of impact and would give rise to a minor adverse effect on palaeoenvironmental remains and post-medieval remains, if present.

19.8.4 To mitigate the effect on the river wall, the structure 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.

19.8.5 Effects on the historic environment arising from the operation of the Thames Tunnel infrastructure at Victoria Embankment Foreshore, on assets including the Whitehall Conservation Area and nearby listed structures and World Heritage Site, will be assessed and presented in the Environmental Statement. This could include effects on the historic setting of heritage assets in the surrounding area 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.

19.9 Land quality

19.9.1 A search of historical and environmental data indicates no contaminative on site uses. The nearest identified potential contamination source relates to the railway land to the north which is not considered to be a significant ongoing pollution source that may affect the site. Previous ground investigations close to the site have recorded no significant soils and groundwater contamination. Part of the ongoing ground investigations includes the assessment of foreshore sediment contamination. Desk based surveys have identified a high risk from unexploded ordnance.
19.9.2 Preliminary assessment findings indicate that 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 is likely to 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.

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

19.10 **Noise and vibration**

19.10.1 A noise survey has been carried out around the site (Figure 19.6). The site is dominated by road traffic and rail noise. The nearest locations to the site which are sensitive to noise and vibration are the residential dwellings at Whitehall Court, located to the west of the site.

19.10.2 Based on the preliminary assessment findings, significant noise effects arising from construction activities are predicted at residential properties at Whitehall Court. No significant effects from vibration (during construction) or during the operation of the site are predicted.

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

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

19.10.5 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.
19.11 **Socio-economics**

19.11.1 The site comprises a stretch of pavement that forms part of the Thames Path and an area of foreshore on the River Thames accommodating a moored vessel containing a pub with bars and meeting rooms – The Tattershall Castle. Open space (Whitehall Garden) and commercial uses, including The Hispaniola restaurant vessel, surround the site, and there are residential dwellings beyond the open space (Whitehall Court). The site and surrounding area is well used for a range of purposes including walking, cycling, sightseeing by tourists and passive recreation.

19.11.2 During construction, there are considered to be minor adverse effects on amenity of users of the restaurant boats and on users of the Thames Path due to disruption to the path. Amenity effects on users of the Thames Path and users of Whitehall Garden and displacement of the Tattershall Castle are considered to be negligible. Once operational, there would be a minor beneficial effect resulting from the gain in publicly accessible space associated with the extension to the pavement comprising the Thames Path.

19.11.3 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.

19.11.4 For the operational phase, there are not expected to be socio-economic effects at Victoria Embankment which require mitigation.
19.12 **Townscape and visual**

19.12.1 The site is located on the north bank of the river within the Whitehall Conservation Area. The townscape character of the site is in a good condition, characterised by Grade II listed lamp standards, an historic riverside stone wall, an avenue of mature London plane trees and two permanently moored vessels, one within the site that would be permanently relocated to the south, and one nearby.

19.12.2 Based on preliminary assessment findings, during the construction phase the intensity of construction activity and the presence of cranes and the site cofferdam is likely to result in a major adverse townscape effect on the character of the site, the River Thames - Victoria Embankment Gardens and Jubilee Gardens Reach and the South Bank Conservation Area. There would be moderate adverse effects on the River Thames - Houses of Parliament Reach, Victoria Embankment Administrative character area and Westminster Abbey and Parliament Square. There would be minor adverse effects on the River Thames – Central London Reach, Temples Conservation Area and Whitefriars Conservation Area due to the presence of cranes and the intensity of construction activity. Once operational, there would be minor to moderate adverse townscape effects including the site and the Victoria Embankment Administrative character area due to the introduction of above ground structures within the river corridor and a new stretch of river wall in front of the existing historic wall. There would be negligible to minor adverse effects on three character areas due to slight changes in their setting. The level of significance is dependent on the design and will be assessed and reported in the Environmental Statement.

19.12.3 In terms of visual amenity, preliminary assessment findings indicate that during the construction phase there are likely to be major adverse effects on a number of viewpoints including from the Thames path, Golden Jubilee footbridge and Jubilee Gardens due to the visibility of construction activity, cranes and hoardings. There are likely to be moderate adverse effects on viewpoints from the Thames path, Waterloo Bridge and Royal Festival Hall due to the visibility of the same elements. Once operational there would be minor to moderate adverse visual effects on viewpoints including from Victoria Embankment, the Golden Jubilee footbridge and Jubilee Gardens due to the visibility of the new river wall and above ground structures. There are likely to be minor and negligible effects on viewpoints from further views, due to filtered visibility of the above elements. The level of significance is dependent on the final design and will be assessed and reported in the Environmental Statement.

19.12.4 Mitigation measures to be employed during the construction phase are being incorporated into the proposals, for example, through protection of trees to British standards. In terms of operation, a process of iterative design and assessment has been employed to reduce adverse effects and promote beneficial effects, which will continue until the design is finalised.
19.13 **Transport**

19.13.1 The Victoria Embankment site has excellent public transport accessibility with Embankment London Underground station within close proximity together with numerous bus routes and Charing Cross National Rail station. The site is located to the south of the Hungerford Bridge and Golden Jubilee footbridges. Vehicle access is proposed from Victoria Embankment (A3211, Figure 19.7).

19.13.2 During construction, the number of heavy goods vehicle movements would be moderate. The nature of the construction site in this location would require highway layout changes and diversion routes which is considered likely to result in a moderate adverse effect on road network operation and delay. Effects on pedestrian facilities are expected to be moderate adverse and on cyclist amenity and safety are expected to be minor adverse. A negligible effect is expected on public transport and 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.

19.13.3 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 involve the provision of safe crossing points for pedestrians and cyclists along the diversion routes, traffic signal optimisation to improve pedestrian crossing time and junction capacity, and measures to ensure the frequency of bus services. Mitigation is not required for the operational phase.

**Figure 19.7 View towards Victoria Embankment Foreshore site**
19.14 **Water resources - ground water**

19.14.1 The proposed shaft would pass through the upper aquifer through the underlying non-aquifer and into the central beds of the Lambeth Group below. The shaft would not penetrate the lower aquifer beneath. Associated interception infrastructure would be founded in the upper aquifer. The main receptors are the upper aquifer, which is defined as being of medium value and the lower aquifer, which is defined as being of high value.

19.14.2 Construction effects on the upper aquifer would be limited to physical obstruction to groundwater flow and this is anticipated to be negligible. Construction effects on the lower aquifer would relate to dewatering which has the potential to affect groundwater resource and induce groundwater movement. This effect is subject to further assessment and is yet to be quantified but has the potential to result in significant adverse effects.

19.14.3 Once operational the potential effects would be obstruction to groundwater flow and the seepage to and from the shaft. These effects are considered to be negligible at this stage due to embedded design measures.

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

19.15 **Water resources – surface water**

19.15.1 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 current classified 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.

19.15.2 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.

19.15.3 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 required will be identified in the environmental statement.
19.15.4 Once operational, the scheme would reduce the number of discharges from the Regents Street combined sewer overflow to a predicted level of no spills for a typical 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 32 days of risk of exposure each year. In addition, the tonnage of sewage derived litter can be expected to be reduced from six tonnes to zero tonnes per year.

19.16 **Flood risk**

19.16.1 Due to its location within the foreshore, the main source of flood risk to the site during construction and operation is the tidal River Thames.

19.16.2 The site may also be at risk of surface water flooding in the future due to runoff generated from land to the west. The presence of structures within the foreshore could impact flow within the River Thames and computer modelling is being completed to assess this impact.

19.16.3 In order to protect the site against flood risk, defences would be constructed during both the construction and operational phases. These defences would provide a level of protection equal to that provided by the current defences along the river frontage adjacent to Victoria Embankment.

19.16.4 The effects of changes in scour and deposition would be reduced through good practice design of the temporary and permanent structures.

19.17 **Further information**

19.17.1 Further information regarding preliminary assessment findings for Victoria Embankment Foreshore can be found in Volume 20 of the Preliminary Environmental Information Report.