

**Thames Tideway Tunnel**  
Thames Water Utilities Limited



# Application for Development Consent

Application Reference Number: WWO10001

## Sustainability Statement

Doc Ref: **7.07**

### **Appendix B.4**

#### **Putney Embankment Foreshore**

APFP Regulations 2009: Regulation **5(2)(q)**

Hard copy available in

Box **48** Folder **B**  
January 2013

**Thames  
Tideway Tunnel**



Creating a cleaner, healthier River Thames

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## Appendix B: Site-specific appraisal

### B.4 Putney Embankment Foreshore

<p><b>Type of site:</b></p>	<p>CSO site; short connection tunnel drive site</p>
<p><b>Description of proposals:</b></p>	<p>The site is located within the London Borough of Wandsworth and is situated on the foreshore, north of Lower Richmond Road and to the west of Putney Bridge. It includes a main site and a site for the temporary slipway to the west. The site would intercept the Putney Bridge CSO and serve as a short connection tunnel drive site.</p>
<p><b>Water quality</b> Maintain and enhance river water quality</p>	
<p><b>Appraisal</b> The proposals would support the objective. Particular issues of relevance to the site appraisal include:</p> <ul style="list-style-type: none"> <li>• The drop shaft would penetrate the upper aquifer and no dewatering would be required for construction. No groundwater contamination has been identified at the site. As no efflux from dewatering would need to be discharged into the river, there would be no risk of water deterioration from this source.</li> <li>• A cofferdam would be built on the foreshore which would create a potential pathway for contaminants into the river. Water pumped out behind the cofferdam area would be adequately treated to remove pollutants and contaminants before being released into the river. This would ensure that river quality would be maintained during construction.</li> <li>• Deterioration of water quality through surface water run-off would be mitigated through measures outlined in the <i>CoCP</i> which would ensure appropriate site drainage.</li> <li>• Piling within the foreshore would release 127t (63.5m<sup>3</sup>) of sediments into the river. The River Thames is a high sediment environment with 40,000t (20,000m<sup>3</sup>) of sediment passing the site four times during spring tide. The amount released during construction would be negligible in comparison to natural fluctuation and would not affect water quality.</li> <li>• Presence of the cofferdam could lead to temporary changes in water flow and accumulation of debris. These effects would be local, temporary and of aesthetic nature and would have limited bearing on the objective.</li> <li>• Once operational the interception of the Putney Bridge CSO would lead to a reduction of spill frequency from 33 times to 1 time per year. The yearly discharge volume would be reduced from 68,000m<sup>3</sup> to 1,600m<sup>3</sup> and would lead to a reduction of sewage derived litter from 17t to less than 0,5t per year. The proposals would</li> </ul>	

support the objective in operation by enhancing water quality.

In summary, river water quality would be maintained during construction through measures outlined in the *CoCP* and enhanced in operation through interception of the Putney Bridge CSO.

Further information can be found in the *Environmental Statement* and the *CoCP*.

## Biodiversity

### Maintain and enhance biodiversity

#### Appraisal

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- One tree would need to be removed for construction at the site and would be replaced once the works have been completed. Trees adjacent to the site would be pruned. Protection measures as outlined in the *CoCP* would be in place to protect trees in the proximity of the site. Habitat diversity would be maintained during construction.
- Measures set out in the *CoCP* such as unidirectional lighting would ensure that notable species would not be disturbed by the construction.
- Bat boxes would be provided on trees adjacent to the site. A brown roof would be installed on the electrical and control kiosk in operation. Bat populations would profit from the additional habitat.
- There would be a temporary and permanent loss of foreshore habitat. Breeding and wintering birds would displace to alternative habitat in the surrounding area so that local diversity would not be reduced through the development.
- There would be a temporary loss of 3,435m<sup>2</sup> of mostly intertidal, and some subtidal, habitat during construction. Habitat outside of the cofferdam would be affected by disturbance and consolidation resulting from the construction. This would have a temporary effect on local fish populations as feeding, resting and nursery habitat would be lost. Therefore, the proposals would not support the objective during construction.
- In operation there would be a permanent habitat loss of approximately 1,675m<sup>2</sup> of intertidal and subtidal habitat which would affect local fish populations through the loss of feeding, resting and nursery habitat. The proposals would not support the objective at a site level. However, project-wide habitat compensation, as described in the *Environmental Statement, Volume 3*, would ensure that the objective is met on a project-wide level.
- Interception of the CSO would be beneficial to aquatic diversity as the amount of sewage and sewage derived litter entering the ecosystem would be reduced. This would lead to an improvement in dissolved oxygen concentrations and reduce sediment nutrient levels, consequently enhancing habitat quality and biodiversity.

In summary, terrestrial biodiversity would be maintained during construction and operation. Installation of bat boxes would lead to local enhancement of habitat. Temporary and permanent loss of intertidal and subtidal habitat would lead to the loss of feeding, resting and nursery habitat for local fish populations. Permanent habitat loss would be compensated on a project wide level. Interception of the CSO would lead to improved habitat quality and enhance biodiversity. The proposals would consequently support the

objective during operation, albeit that there would be permanent loss of habitat at a local level.

Further information can be found in the *Environmental Statement*, the *CoCP* and *Design Principles*.

## Climate change mitigation

Maximise energy efficiency and minimise the carbon footprint of the project

### Appraisal

This objective is most appropriately appraised at the project level, as opposed to the site level. This is because whilst there are variations in energy and CO<sub>2</sub> emissions between sites, in general, these are representative of the different types of site proposed (eg, drive site, CSO interception). The individual sites do not provide an appropriate measure of how far this sustainability objective has been achieved. This is detailed within the *Energy and Carbon Footprint report*.

Procedures to maximise energy efficiency and minimise the carbon footprint of the scheme would be implemented through project-wide initiatives, and not specifically at the site level. Energy Management Plans would be implemented through the *CoCP*, which, alongside Thames Water's proposals to account for carbon emissions throughout the construction process, would assist in the management of emissions arising from the sites.

Energy and emissions are discussed in the thematic appraisal within the climate change mitigation section (see Appendix A). Additional details are also provided within the *Energy and Carbon Footprint report*.

Whilst predominantly addressed at the project-wide level, at the site level it is anticipated that the proposals would broadly support the objective. The following broad issues are anticipated to arise at the site:

- Greenhouse gas emissions resulting from construction materials at the site would be approximately 4,000t CO<sub>2</sub>e. During the construction phase approximately 200t CO<sub>2</sub>e and 1000t CO<sub>2</sub>e would result from logistics and construction (TBM, plant and machinery operation, lighting and welfare facilities).
- The carbon footprint would be reduced by 100t CO<sub>2</sub>e at a site level through the use of barges for the transport of materials to and away from the site. The use of river services would reduce the need for HGV movements that would otherwise be required.
- In operation low level lighting would be provided at the kiosk door. This would be activated by a directional motion control switch which would reduce energy wastage from lighting.
- The site would make use of passive ventilation during operation. Energy requirements for venting would be minimised and efficiency of ventilation points would be maximised. The proposals would consequently support the objective.

In summary, the carbon footprint would be reduced at the site level through the use of river-services for the transport of materials. Energy efficient lighting and ventilation would be in place during operation. Consequently the proposals would support the objective.

Further details can be found in the *Environmental Statement*, *Energy and Carbon Footprint Report* and *Design Principles*.

## Change adaptation and flood risk

Maximise resilience and adaptability to change;  
Take account of flood risk in the design of sites

### Appraisal

The objective on resilience and adaptability to climate is predominantly considered at a project-wide level due to relevant changes in population and climate occurring at regional level rather than specifically at a site level (see Appendix A).

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- The site is at high risk of tidal and fluvial flooding from the River Thames. New flood defences would be built around the site. The surface of the foreshore structure would sit at or above current flood defence level. There would be no increase in tidal and fluvial flood risk to the site resulting from the development.
- Sheet piling around the drop shaft would prevent inflow of groundwater from the upper aquifer so that groundwater flood risk would not be increased.
- Measures set out in the *CoCP* such as discharge of surface water into the Tidal Thames would assure that there would be no increase in flood risk from surface water. Installation of a brown roof on the electrical and control kiosk would allow attenuation of surface water in operation maximising resilience and adaptability to change.
- Sewer flood risk would not be increased through the development as the CSO would be maintained during construction. In operation sewage flows would not be restricted and would be diverted to the main tunnel. Consequently the flood risk would remain unchanged throughout the project.
- The site does not lie within the Central Activity Zone or an area deficient of open space. Development on the foreshore would lead to an increase in hard standing. However, the site is located directly adjacent to the River Thames which would reduce the risk of urban heat. Consequently, resilience to future temperature changes would be given.

In summary, the proposals have taken flood risk into account at the site level. Consequently, there would be no increase tidal, fluvial, groundwater, surface water or sewer flooding resulting from the development during construction or operation. Installation of a brown roof would maximise attenuation of surface water during operation. Urban heat effects would be minimised through the location. The proposals have taken flood risk into account and maximise resilience and adaptability to future changes in temperature and rainfall, consequently they would support the objective.

Further information can be found in the *Environmental Statement, Site Selection Report* and *CoCP*.

## Excavated materials and waste management

Minimise waste arisings and its impacts on the environment and communities and to promote re-use, recovery, recycling and beneficial use

### Appraisal

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- A drop shaft with an approximate internal diameter of 6m and 36m depth would be

excavated. The tunnel connecting the CSO drop shaft to the main tunnel would have an approximate internal diameter of 2.2m and a length of 54m. It is estimated that excavation of the shaft and the short connection tunnel would lead to 31,000t of excavated materials mainly consisting of imported fill (25,000t). The materials would be managed in accordance with the *Excavated material and waste strategy* (see *Environmental Statement Vol 3 Appendix A*) that seeks to maximise the beneficial re-use of materials.

- It is estimated that 1,000t of construction waste would arise. Approximately 10t of welfare waste would be generated at the site. This would be managed through measures set out in the CoCP including a site waste management plan to maximise re-use, recovery and recycling in accordance with the waste hierarchy.
- During construction excavated materials would be transported away from the site via barge. This would reduce detrimental impacts relating to the use of HGVs on the environment and communities.
- Operational waste would result from maintenance of the air management unit and would be negligible. The objective would not be affected.

In summary, excavated materials and waste would be diverted from landfill through beneficial re-use, recovery and recycling in accordance with the waste hierarchy. Detrimental impacts on the environment and community relating to waste arisings would be reduced through the use of barges.

Further information can be found in the *Environmental Statement, Excavated material and waste strategy* (see *Environmental Statement Vol 3 Appendix A*) and *CoCP*.

## Resources and raw materials

Promote the sustainable use of resources

### Appraisal

The objective to promote the sustainable use of resources is most appropriately appraised as a project-wide issue, rather than specifically at the site level. Whilst it would be important to work towards the objective through ongoing considerations towards the further design of sites, the major opportunities would arise by taking interventions across the project as a whole.

A significant volume of materials would be required to support construction. The concrete specification required is central to the durability of the tunnel and therefore the scope for promoting the sustainable use of resources is limited by engineering requirements. A range of measures are proposed at the project level which support the objective and which would assist to promote the sustainable use of resources. Further details are available in the project-wide appraisal within the resources and raw materials section (see Appendix A).

The following broad considerations are relevant to the sustainability at the site level.

- It is estimated that 26,000L of water would be used every 24 hours during the peak construction period in 2018. This is largely accounted for by water required for shaft and tunnel grout/concrete (15,000L/d) and mitigation measures such as washdown and dust suppression (8,000L/d). The water requirements are within the available water for London as estimated in Thames Water's Resource Management Plan. Consequently, the volume of water used is considered to be

sustainable and would support the objective.

- The operation of the site is not anticipated to present a large demand for materials, with the exception of those required in routine maintenance.

Further information can be found in the *Environmental Statement* and the *CoCP*.

## Population, human health and equality

Ensure health and the safety, and support the well-being of communities in which the project operates;

Encourage equality and sustainable communities

### Appraisal

The proposals would support the objective of ensuring health and safety within the community, however, the well-being of some receptors may be affected. The proposals would encourage equality and sustainable communities. Particular issues of relevance to the site appraisal include:

- Construction at the site is estimated to last 3.5 years. Standard working hours would be in place with continuous working hours required during construction of the connection tunnel. The *CoCP* includes measures to ensure health and safety within the community and to support well-being.
- Noise and vibration would be minimised through measures set out in the *CoCP*. However, some receptors would be affected by noise during the construction of the development. Measures such as double glazing and other compensation would be in place for affected receptors where applicable. This would consequently ensure health and safety, however, the well-being of some receptors may be affected.
- The site lies within the London Borough of Wandsworth AQMA. Several receptors would be affected by construction dust and emissions relating to additional road traffic. However, mitigation measures in the *CoCP* would ensure that this would not affect health and safety within the community.
- Interception of the CSO would reduce the amount of days recreational river users are exposed to pathogens to 4 days per year, a reduction of up to 132 days. Consequently health, safety, and well-being of river users would be improved during operation.
- In operation there would be a permanent gain of public amenity space which would be beneficial to the community and would consequently support the objective.
- Encouraging equality and sustainable communities is predominantly addressed at the project-wide level. However, extensive public consultation has been undertaken to take into account the community's views on the proposals at the site. This has been considered in conjunction with engineering, environmental, planning and cost issues to achieve a balance between vying interests. Consequently, it is considered that the proposals support the objective of equality and sustainable communities.

In summary, the well-being of some receptors would be affected by noise relating to the construction. However, the proposals would ensure that health and safety would not be compromised by noise, vibration or air quality. Once operational there would be an increase in public realm. Further, the number of days that recreational users of the river would be exposed to pathogens would be reduced through interception of the CSO. Extensive public consultation has helped to encourage equality and sustainable communities.

Further information can be found in the *Environmental Statement* and the *CoCP*.

## Economy

Promote a strong and stable economy

### Appraisal

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- A maximum of 50 workers would be employed at any one time at this site during construction. This employment opportunity would support the objective for a strong and stable economy.
- Compensation measures would be available should surrounding businesses (which include restaurants and cafés) experience financial losses relating to the presence of construction activity.

Further information can be found in the *Environmental Statement*.

## Environmental protection and enhancement

Minimise significant adverse environmental effects relating to air quality, noise and vibration, and lighting from construction and operation of the Thames Tideway Tunnel;

Protect and enhance the character of landscapes and townscapes;

Protect and conserve the historic environment.

### Appraisal

The proposals would support the objective relating to environmental effects, albeit with some restriction relating to noise. The proposals would not fully support the objectives relating to townscape and historic environment as some permanent changes would result from the development. Particular issues of relevance to the site appraisal include:

#### **Environmental effects**

- Significant adverse environmental effects relating to noise would be mitigated at most receptors. However, some receptors would be significantly affected through the construction, as no further mitigation on-site would be possible. Compensation would be implemented to offset these effects where appropriate.
- There would be no significant adverse environmental effects relating to vibration, air quality or lighting resulting from the development. The proposals seek to minimise adverse environmental effects through mitigation measures set out in the *CoCP*.
- In addition, the proposals would minimise air quality effects relating to road traffic through the use of river services.

#### **Landscape and townscape**

- The townscape character of the site and the surrounding area, and views within the surrounding area, would be altered during construction through the presence of construction activity and equipment such as site hoarding and welfare facilities. These changes would be temporary.
- In operation the townscape character of the site and the surrounding area, and views within the surrounding area, would be altered due to the presence of above ground structures. Measures embedded in the design principles would minimise the effects of these changes, however, the proposals would not fully support the

objective as permanent changes giving rise to adverse effects would remain.

**Historic environment**

- The site is located within the Putney Embankment Conservation Area and within the Wandsworth Thames Riverside Archaeological Priority Area. A number of historic assets and buildings such as Putney Bridge (Grade II listed) and St Mary's Church (Grade II\* listed) are located on and adjacent to the site. The historic environment and setting of these assets would be altered during the construction and operation as new structures would be added to their settings. Measures embedded in the *CoCP* and *Design Principles* would ensure that these changes are minimised.
- The existing Bazalgette sewer outfalls and apron associated with the Grade II listed Putney Bridge would be removed. English Heritage level 3 standing structure recording and photographic survey would conserve these historic assets by providing a permanent record.
- Grade II listed bollards and 19th century cobbled slipway would need to be removed temporarily but would be reinstated once the construction has been completed. English Heritage level 2 standing structure recording and photographic survey would mitigate impacts associated with the removal. The proposals would therefore support the objective.
- Grade II listed Putney Bridge could be impacted by ground movements from construction. The bridge would be monitored throughout the works to ensure that any damage is identified, and repaired using standard conservation techniques.
- There is a low likelihood that the site contains early buried heritage assets dating to the early medieval period or earlier. However there is potential for medieval and later medieval remains. Mitigation measures outlined in the *CoCP* would be implemented should assets be found during construction. These include targeted archaeological investigation and recording. Historic assets would be preserved by record. Consequently the proposals would support the objective.

In summary, there would be no significant adverse environmental effects relating to air quality, vibration or lighting. Significant effects relating to noise would be mitigated at most receptors. However some receptors would be affected during construction, as no further on-site mitigation would be possible. The site and surrounding townscape as well as the historic environment would be altered during construction. Some permanent changes would remain after construction. Buried heritage assets would be preserved by record through measures outlined in the *CoCP*.

Further details can be found in the *Environmental Statement*, the *CoCP* and *Design Principles*.

**Land use**

**Efficient and sustainable use of land and buildings**

**Appraisal**

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- The site is partly located on previously developed land and would extend into the foreshore. Through the site selection and design it has been possible to make efficient use of the site, for example by reducing the size of the permanent

foreshore structure. Consequently the proposals would support the objective.

Further information can be found in the *Environmental Statement* and the *Site Selection Report*.

### **Sustainable transport**

**Minimise the detrimental impacts associated with the transport of construction materials and waste on communities and the environment, by prioritising the use of sustainable transport**

#### **Appraisal**

The proposals would support the objective. Particular issues of relevance to the site appraisal include:

- Barges would be used to transport materials to and away from the site. This would reduce detrimental impacts on communities and the environment associated with road transport.
- Approximately 10 HGV movements per day would be required on average during the construction period. It is estimated that on average 42 daily HGV movements would be required during the peak construction period, over a one month period. Measures set out in the *CoCP* such as provision of a traffic management plan would minimise detrimental impacts associated with additional road traffic.
- The PTAL for the site has been classified as 6a, indicating an excellent level of accessibility via public transport. Measures in the *CoCP*, such as only allowing vehicles necessary to undertaking works on site, would discourage workers from travelling to site by car and would consequently discourage additional road traffic.

In summary, the proposals would promote sustainable transport by making use of river services and encouraging the use of public transport. This would minimise detrimental effects arising on communities and the environment relating to additional road traffic.

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DCO-DT-000-ZZZZ-070700

