

**Thames Tideway Tunnel**  
Thames Water Utilities Limited



# Application for Development Consent

Application Reference Number: WWO10001

## Sustainability Statement

Doc Ref: **7.07**

### **Appendix B.14**

#### **Victoria 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.14 Victoria 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 in the foreshore of the River Thames in the City of Westminster. Part of the site extends onto a section of pavement and roadway of Victoria Embankment.</p> <p>The proposed development would intercept the Regent Street 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></p> <p>The proposals would support the objective. Particular issues of relevance to the site appraisal include:</p> <ul style="list-style-type: none"> <li>• The site does not lie within a source protection zone. The CSO drop shaft would penetrate the upper aquifer but not the lower aquifer and contamination has been identified at the site. Settlement of suspended solids and further treatment of effluent as outlined in the <i>CoCP</i> where required would ensure that no pollutants would enter the tidal Thames and river water quality would be maintained.</li> <li>• Construction of the cofferdam into the foreshore would create a potential pathway for pollutant as water would need to be pumped out from behind the cofferdam. The effluent would be treated to remove pollutants prior to discharge into the river.</li> <li>• Appropriate site drainage as set out in the <i>CoCP</i> would ensure that water quality would not be deteriorated through influx of contaminants.</li> <li>• 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. Piling within the foreshore would release 66t (33m<sup>3</sup>) of sediments into the river. The amount released during construction would be negligible in comparison to natural fluctuation.</li> <li>• The presence of the cofferdam could lead to temporary changes in water flow and accumulation in debris. These effects would however be local, temporary and of aesthetic nature and would therefore have limited bearing on the objective.</li> <li>• The Regent Street CSO spills five times per year and a yearly discharge volume of 22,000m<sup>3</sup>. Currently 6t of sewage derived litter enter the river every year. Through interception of the CSO it would be possible to reduce the discharge by 100%, consequently enhancing water quality in operation. The proposals would therefore support the objective.</li> </ul> <p>In summary, water quality of the tidal Thames would be maintained throughout the construction period and enhanced in operation through interception of the CSO.</p>	

Further details 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:

- There are no notable species or habitats or the potential for their presence on site. Terrestrial biodiversity would consequently not be affected by the development during construction or operation. The proposals would therefore have limited bearing on the objective.
- The site is located within the River Thames Intertidal Tributaries SINC. There would be a temporary loss of 3,100m<sup>2</sup> of intertidal habitats. Further habitat would be affected by disturbance and consolidation. However, the site is not considered to be suitable for spawning and is limited as nursery and feeding habitat. The loss of habitat at this site would not affect local aquatic biodiversity.
- In operation there would be a permanent loss of 1,100m<sup>2</sup> of subtidal habitat. This loss of habitat would not affect local aquatic diversity (see above). The loss of habitat would be compensated on a project wide level as described in Volume 3 (see *Environmental Statement*).
- Habitat quality and biodiversity would be enhanced in operation. Interception of the CSO would lead to an improvement of dissolved oxygen concentrations and lower sediment nutrient levels. Consequently the proposals would support the objective.

In summary, the proposals would have limited bearing on terrestrial ecology. Aquatic ecology would be maintained during construction and enhanced through interception of the CSO.

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

## 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 for each site. 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 8,000 tCO<sub>2</sub>e. During the construction phase approximately 380t CO<sub>2</sub>e and 1,258t CO<sub>2</sub>e would result from logistics and construction (TBM, plant and machinery operation, lighting and welfare facilities) respectively.
- The carbon footprint would be reduced at the site level as approximately 90% of materials would be transport to and away from the site via barges. The use of river transport would minimise the need for HGV movements and reduce the carbon footprint by 283t CO<sub>2</sub>e.
- Through the proposed works at this site, in combination with the works at Blackfriars Bridge Foreshore and Chelsea Embankment Foreshore, it would be possible to control ten CSOs at the northern embankment. This would minimise the carbon footprint associated with further construction.
- The site would make use of passive ventilation during operation. Energy requirements for venting would be minimised and efficiency of ventilation points maximised.

In summary, the carbon footprint would be reduced at the site through the use of river services. Further, the site selection allows for the minimisation of the carbon footprint associated with further construction. Energy efficient ventilation would be in place.

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

### **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).

However, at the site level, the proposals would support the objectives to maximise resilience and adaptability to change, and take account of flood risk in design. Particular issues of relevance to the site appraisal include:

- The site is located within a high probability flood zone and is at risk of tidal and fluvial flooding from the River Thames. New flood defences to statutory level would be build to protect the site from fluvial flooding. There would be no increase in tidal or fluvial flood risk resulting from the development during construction or operation.
- No increase in flood risk from groundwater is anticipated to arise from the development. Groundwater would be monitored during construction in operation.
- Site drainage as outlined in the *CoCP* would ensure that there would be no increase in flood risk from surface water.
- Sewers would remain operational during construction and sewage flow would be diverted to the main tunnel during operation. Therefore there would be no increase in surface water or sewer flood risk.
- The site is situated within the Central Activity Zone but not within an area deficient of

open space. The development would not lead to an increase in the urban heat effect as the site is located adjacent to the river. Therefore resilience to future changes in temperature would be given and the proposals would consequently support the objective.

In summary, there would be no increase in tidal, fluvial, groundwater, surface water or sewer flood risk resulting from the development as the proposals have taken flood risk into account. Resilience to future changes of temperature would be given as the site would be located adjacent to the river.

Further information can be found in the *Environmental Statement*, the *Site Selection Report* and the *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 13m and a depth of 50m would be excavated along with the short connection tunnel. This would lead to an estimated 62,300t of excavated material consisting mainly of imported fill (43,200t) and London clay (13,600t). The material would be managed in accordance with the *Excavated material and waste strategy* (see *Environmental Statement Vol 3 Appendix A*) which seeks to maximise the beneficial use of materials.
- It is estimated that 1,800t of construction waste would arise. Approximately 13t of welfare waste would arise per year. This would be managed through measures in the *CoCP* including a site waste management plan to maximise re-use, recovery, recycling and beneficial use in accordance with the waste hierarchy.
- Excavated materials and waste would be transported away from the site via barge during construction. This would reduce detrimental impacts on the environment and on communities relating to increased HGV traffic.
- 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 re-use, recovery, recycling and beneficial use. Detrimental impacts on the environment and community relating to the transport of waste would be minimised through the use of river services.

Further information can be found in the *Environmental Statement*, *Excavated material and waste strategy* (see *Environmental Statement Vol 3 Appendix A*) and the *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 will be important to work towards the objective through ongoing considerations towards the further design of sites, the major opportunities will 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 30,000L of water would be used every 24 hours during the peak construction period (2018-2019). This is largely accounted for by water required for shaft and tunnel grout/concreted (20,000L/d) and mitigation measures such as dust suppression and washdown (7,000L/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.
- Through the construction at this site, along with construction at Blackfriars Bridge Foreshore and Chelsea Embankment Foreshore, it would be possible to control 10 CSO along the northern embankment without further construction. This would eliminate the need for additional resources and raw materials.
- The operation of the site is not anticipated to present a large demand for materials, with the exception of those required in routine maintenance.

In summary, the proposals would make sustainable use of water and would minimise the need for resources and raw materials.

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

### **Population, human health and equality**

**Ensure health and 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, albeit there would be some restrictions relating to noise. Particular issues of relevance to the site appraisal include:

- Construction would last approximately 4.5 years with standard working hours and continuous working hours. The *CoCP* includes measures to ensure safety, health and well-being.
- The site is located within the City of Westminster AQMA. Mitigation measures as set out in the *CoCP* and the use of river services would minimise impacts arising on air quality and would help to ensure health and safety.
- Various mitigations and controls would be in place to reduce the effects of noise and vibration; however one receptor would still be affected by noise during construction. Measures such as double glazing and compensation would be applied where applicable. Whilst health and safety would be ensured at all times, the well-being of the receptor could be compromised.
- Safety, health and well-being would not be affected through vibration resulting from construction.
- The associated reduction of pathogens in river would support health, safety and

well-being of river users during operation.

- 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 proposals would support the objective as they ensure health and safety within the community. Recreational river user would profit from the interception of the CSO as pathogen exposure would be reduced.

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 65 workers would be employed at any one time at this site. This employment opportunity would support the objective for a strong and stable economy.
- Several businesses would have to be displaced during construction. However, compensation measures would support successful relocation. The proposals would support the objective assuming that the business would successfully relocate.

Further details 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 some restrictions relating to noise. The proposals would not support the objective relating to the townscape and historic environment. Particular issues of relevance to the site appraisal include:

#### **Environmental effects**

- Measures in the *CoCP* along with the use of river services would minimise adverse environmental effects to a non-significant level.
- Significant adverse effects relating to noise and vibration would be mitigated through measures set out in the *CoCP*. However, there would be significant adverse effects relating to noise at one receptor during construction. As no further on-site mitigation would be possible, compensation would be in place to offset these effects, where applicable.
- No significant adverse environmental effects would result from lighting during the construction.

- The proposals seek to reduce significant adverse environmental effects and would therefore support the objective.

### ***Landscape and townscape***

- The current setting of the site and the surrounding townscape would be affected through the presence of construction activity and equipment. These effects would be of temporary nature.
- The introduction of a new area of public realm and above ground structures would change the current character of the site but would be sympathetic to the wider townscape area. The townscape would be altered from its current state and therefore the proposals would not support the objective.

### ***Historic environment***

- The site is located within the locally designated Whitehall Conservation Area and comprises parts of the Grade II listed Victoria Embankment River Wall. Several Grade II listed cast iron lamp standards are located on site. There are Grade II listed heritage assets in the surrounding area.
- The Whitehall Conservation Area and associated heritage assets would temporarily be affected by the presence of construction activity and equipment.
- A section of parapet of the river wall would be permanently removed. However, standing structure recording during construction and operation would form preservation by record.
- Lamp standards and benches would be removed from the site during construction. Standing structure recording would be in place and the lamps would be reinstated after the construction has been completed.
- Mitigation measures would be in place to protect and conserve potentially buried assets. These include environmental sampling targeted archaeological investigation and recording.
- There would be changes to the Whitehall Conservation Area and associated heritage assets during operation as the historic environment would be slightly changed and operational structures would be present. Changes in the character of several surrounding conservation areas and assets would result from the development. The proposals seek to minimise these changes, however, changes could not be avoided and therefore the proposals would not support the objective.
- Seating would be positioned to maximise the view over the river towards the Palace of Westminster World Heritage Site during construction.

In summary, the proposals would minimise adverse environmental impacts relating to air quality, noise and vibration, however significant adverse environmental effects relating to noise would remain at one receptor during construction. There would be changes to the townscape and historic environment during construction and operation. Consequently, the proposals would not support the objective regarding townscape and historic environment.

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

## 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 but would extend into the foreshore. Through the site selection and design it has been possible to make efficient use of the site. 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:

- River services would be used to transport materials to and away from the site. This would reduce detrimental impacts on the environment and communities associated with road transport.
- Approximately 14 HGV movements per day would be required at the site during peak construction which would last 3 months. It has been estimated that 5 HGV movements would necessary average over the entire construction period. Measures set out in the *CoCP* such as provision of a traffic management plan would minimise detrimental effects associated with additional road traffic on communities and the environment.
- The PTAL for the site has been classified as 6b, indicating an excellent level of accessibility via public transport. Measures in the *CoCP* such as only allowing vehicles necessary for the construction on site would discourage workers to travel to site by car and would consequently minimise additional road traffic. The proposals encourage the use of sustainable transport and consequently support the objective.

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.

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

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DCO-DT-000-ZZZZ-070700

