

**Thames Tideway Tunnel**  
Thames Water Utilities Limited



# Application for Development Consent

Application Reference Number: WWO10001

## Sustainability Statement

Doc Ref: **7.07**

### **Appendix B.10**

#### **Chelsea 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.10 Chelsea Embankment Foreshore

<b>Type of site:</b>	CSO site, short connection tunnel drive site
<b>Description of proposals:</b>	The site is located in the Royal Borough of Kensington and Chelsea, comprising parts of the River Thames foreshore, sections of the Chelsea Embankment roadway and pavement as well as a small section of Ranelagh Gardens.
<b>Water quality</b> Maintain and enhance river water quality	
<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 shaft would pass through the upper aquifer, and it is not anticipated that dewatering would be required. Consequently no efflux from dewatering would be discharged into the tidal Thames.</li> <li>• The river is a high sediment environment with up to approximately 40,000t (20,000m<sup>3</sup>) of sediment passing the site four times a tide during spring tides. Piling activity would release 84t (41m<sup>3</sup>) of sediment into the river. These changes are negligible when compared to natural fluctuation and would not result in changes of river water quality.</li> <li>• Pollutant runoff from the site would be mitigated through appropriate site drainage in accordance with the <i>CoCP</i>. Consequently this contamination pathway would be eliminated.</li> <li>• A cofferdam would need to be built on the foreshore. Water pumped out from behind the cofferdam would be subjected to measures set out in the <i>CoCP</i> to ensure that pollutants are removed prior to discharge into the river. Water quality would be maintained during the construction period.</li> <li>• Presence of the cofferdam would lead to changes in water flow and debris accumulation. These changes would be local and of aesthetic nature and would consequently have limited bearing on the objective.</li> <li>• Once operational the interception of the Ranelagh CSO would lead to a reduction of spill frequency from 26 to 2 times per annum. The yearly discharge volume would be reduced from 283,000m<sup>3</sup> to 18,500m<sup>3</sup> consequently leading to a reduction in sewage derived litter from 71t to 4.6t. Water quality of the tidal Thames would be enhanced during operation.</li> </ul> <p>In summary, mitigation measures set out in the <i>CoCP</i> would ensure that water quality of the tidal Thames would be maintained during construction. River water quality would be enhanced through interception of the CSO in operation.</p> <p>Further details can be found in the <i>Environmental Statement</i> and the <i>CoCP</i>.</p>	

## Biodiversity

### Maintain and enhance biodiversity

#### Appraisal

The proposals would support the objective, albeit there would be some restrictions due to temporary and permanent loss of intertidal and subtidal habitat. Particular issues of relevance to the site appraisal include:

- There would be a small loss of habitats from the Ranelagh Garden SINC resulting from clearance of trees, shrubs and amenity grass land from the site. The integrity of the ecosystem would not be lost and habitat loss would be short-term, as reinstatement of Ranelagh Garden habitat and replacement tree planting would be in place once the construction has been completed.
- Notable species would not experience disturbance from noise and vibration or lighting as measures set out in the *CoCP* would minimise these.
- The site is located within the River Thames and Tidal Tributaries SINC. There would be a temporary landtake of approximately 3735m<sup>2</sup> intertidal (3250m<sup>2</sup>) and subtidal habitat (485m<sup>2</sup>). Further habitat adjacent to the cofferdam would be affected by disturbance and consolidation.
- There would be a loss of feeding, resting and nursery habitat for fish during the temporary landtake and consolidation and disturbance of further habitat. Fish populations would further be affected by suspended sediment and waterborne noise and vibration associated with the construction of the cofferdam and the campshed. Consequently, aquatic habitat diversity would not be maintained during construction.
- A permanent loss of up to 1230m<sup>2</sup> of intertidal habitat would result from the development. Compensation is discussed on a project wide level in Volume 3 (see *Environmental Statement*). The permanent landtake would result in a loss of intertidal feeding and resting habitat for fish as well as in a loss of intertidal feeding and burrowing habitat for invertebrates. Therefore, habitat diversity would be ensured on a project wide level but would be compromised at a local level.
- Water quality would be enhanced through interception of the CSO and would lead to enhanced habitat quality which would be beneficial to fish and invertebrate populations.

In summary, terrestrial biodiversity would be maintained during construction and operation. Aquatic biodiversity would not be maintained during construction as a temporary loss of intertidal and subtidal habitat would be associated with the construction of the cofferdam and campshed. The temporary landtake which would result from operation would be compensated on a project- wide level and would consequently not support the objective on a site level. However, enhanced river water quality would lead to an increase in pollution sensitive fish and invertebrate populations.

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

## 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 6,900t CO<sub>2</sub>e. During the construction phase approximately 560t CO<sub>2</sub>e and 760t CO<sub>2</sub>e would result from logistics and construction (TBM, plant and machinery operation, lighting and welfare facilities) respectively.
- At the site level the carbon footprint would greatly be reduced as the location facilitates transport by barge. 90% of the materials would be transported via barges rather than via HGVs. This would reduce the site specific carbon footprint by 260t CO<sub>2</sub>e.
- The site would make use of passive ventilation in operation. Energy requirements for venting would be minimised and efficiency of ventilations points maximised.

In summary, the proposals would support the objective as the carbon footprint would be reduced through the use of river services. Further energy requirements would be minimised and energy efficiency maximised.

Further details can be found in the *Environmental Statement* and the *Energy and Carbon Footprint 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 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 climate change, and take account of flood risk in design. Particular issues of relevance to the site appraisal include:

- The site is at high risk from tidal on fluvial flooding associated with the river Thames. Existing flood defences would be maintained. In order to protect the site from tidal flooding during construction flood defences would be built around the foreshore site. Monitoring of flood defences would be in place and repairs would be undertaken when necessary to maintain current crest levels. The proposals would consequently not lead to an increase in tidal or fluvial flood risk.
- Surface water would be discharged into the tidal Thames according to measures set

out in the *CoCP*.

- The CSO at the site would be maintained during the construction and intercepted in operation. The development would not lead to an increased risk of sewer flooding.
- Groundwater flood risk at the site is low and is not anticipated to be changed as a result of the development. Monitoring of groundwater levels is proposed for construction and operation.
- The site is located within the Central Activity Zone and within an area deficient of open space. However, the increase in permanent hard standing would be minor and the site is located adjacent to the tidal Thames, which helps alleviate the effects of urban heat. Therefore, the proposals would maximise adaptability and resilience to future changes in temperature and would support the objective.

In summary, the proposals would support the objectives. There would be no increase in flood risk from any source as it has been taken into account in the site design. The risk of urban heat would be alleviated, and adaptability and resilience to future temperature changes maximised.

Further details can be found in the *Environmental Statement*, *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:

- It is estimated that 99,000t of excavated materials mainly consisting of imported fill (64,000t) would be generated. 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 beneficial re-use of material.
- An estimated 2,400t of construction waste, along with approximately 13t of welfare waste per year, would be generated. This would be managed through measures set out in the *CoCP*, including application of a site waste management plan to maximise re-use, recovery, recycling and beneficial use.
- The excavated material would mainly be transported from the site via barge. This would reduce the number of HGVs needed and the impacts on communities and environment caused by denser road traffic.
- Operational waste would result from maintenance of the air management unit and would have limited bearing on the objective.

In summary, the *CoCP* and *Excavated material and waste strategy* (see *Environmental Statement Vol 3 Appendix A*) seek to promote re-use, recovery, recycling and beneficial use of excavated material and waste. The use of barges for the transport of material would minimise effects from waste transport on the local community and environment.

Consequently, the proposals would support the objective during construction. Operation of the site would have limited bearing on the objective.

Further details 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 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 material specification required are 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 within the resources and raw materials section (Appendix A).

Whilst largely addressed at the project-wide level, at the site level, the proposals would support the objective. The following considerations are relevant to the sustainability at the site level:

- It is estimated that 31,000L of water would be used every 24 hours during the peak construction period (2018-2019). This is largely accounted for by 20,000L/d for shaft and tunnel grout/concrete and by 8,000L/d for mitigation measures such as washdown and dust suppression. 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.
- The operation of the site is not anticipated to present a large demand for materials with the exception of those required in routine maintenance. Therefore, there would be no effects on the objective.

In summary, the proposals would make use of sustainable supplies of water and would support the objective.

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

**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. The proposals would encourage equality and sustainable communities. Particular issues of relevance to the site appraisal include:

- Construction would last approximately four years with most of the work taking place during standard working hours. Continuous working hours would be required during construction of the short connection tunnel which would last approximately one month.
- Mitigation measures outlined in the *CoCP* would ensure that health, safety and well-being within the community would not be affected through noise and vibration resulting from the construction.
- The site is located within the Royal Borough of Kensington and Chelsea AQMA. Air quality would not be further diminished through the construction at the site, however, some receptors could experience increased dust levels during construction which

could have effects on their well-being. The proposals would ensure that health and safety would not be compromised.

- A temporary diversion of the Thames Pathway would be necessary during construction. The footpath would be reinstated for public use on weekends, with adequate signage provided.
- Closure of a traffic free stretch of a national cycling route would be necessary during construction. An alternative route would bear a slightly higher risk for cyclist due to traffic. However, it was shown that this route is already the preferred route for most cyclists due to convenience.
- Diversion of the footpath and closure of the national cycling route could affect the well-being of users but is not anticipated to compromise health and safety.
- In operation there would be a gain of public amenity space (approximately 0.1ha) through the extension of the river wall into the foreshore. This would contribute the well-being of communities.
- The number of days recreational river users would be exposed to pathogens would be reduced from 104 days to 8 days through interception of the CSO. This would ensure safety, health and well-being of river users.
- 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, health and safety within the community would be ensured throughout the construction period. The well-being of Thames Path and the national cycling route users could be diminished during construction. A gain of public amenity space would support the well-being within the community during operation. Pathogen exposure of recreational river users would be reduced through interception of the CSO. Consequently, the proposals would support health, safety and well-being within the community during operation.

Further details 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 relevant to the site appraisal include:

- Approximately 65 workers would be employed at one time during construction. This would support employment and contribute towards the objective.

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

## Environmental protection and enhancement:

Minimise significant adverse environmental effects relating to air quality, noise & 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 significant adverse environmental effects but would not support the objective relating to the townscape. The proposals would support the objective regarding the historic environment, albeit with some restrictions. Particular issues relevant to the site appraisal include:

***Environmental effects***

- No significant adverse environmental effects relating to air quality, noise and vibration or lighting would arise through the development as mitigation measures embedded in the proposals would mitigate these. Consequently, the proposals would support the objective.

***Landscape and townscape***

- The character of the site and the surrounding townscape would temporarily be altered due to vegetation clearance, the presence of construction activity and equipment as well the introduction of a cofferdam.
- Introduction of the cofferdam and permanent above ground structures would result in permanent changes to the site and the surrounding townscape. Consequently, the proposals would not support the objective.

***Historic environment***

- The site lies within the locally designate Thames Conservation Area and is adjacent to the Royal Hospital Conservation Area. The Royal Hospital Chelsea South Grounds and Ranelagh Gardens form a Grade II listed park and lie adjacent to the site. Parts of the boundary wall and railings fall into the site. The site further comprises parts of the Chelsea Embankment river wall.
- Parts of the Ranelagh Gardens brick boundary wall and railing would temporarily be removed during construction. A Standing Structure recording and photographic survey to English Heritage Level 1 would form preservation by record.
- Standing Structure recordings and photographic surveys to English Heritage Level 2 would be in place to form preservation by record of unlisted parts (eg, retaining wall and ornamental lamp standards) of the Chelsea Embankment River Wall.
- The setting of the surrounding conservation areas and historic assets would be altered through the presence of construction works.
- The Thames Conservation Area would be permanently altered through the loss of lamp standards and alteration of the present line of the river wall. However, other historic assets and areas such as the Grade I listed Royal hospital would profit from the development, as the setting would be enhanced during the operational phase.
- There is potential for buried heritage assets to be present on site. Preliminary investigation followed by targeted archaeological investigation as well as archaeological excavation and/or watching briefs are proposed to form preservation by record where appropriate.
- The proposals would consequently support the objective albeit with some restriction during construction and operation.

In summary, no significant adverse environmental effects would arise through the development, consequently supporting the objective. The proposals would result in temporary and permanent changes to the landscape and would therefore not support the objective. Preservation by record would ensure conservation of historic assets. The historic environment would be altered during construction but enhanced during operation, albeit with some restrictions regarding the Thames Conservation Area.

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

## Land use

### Efficient and sustainable use of land and buildings

#### Appraisal

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

- The need of an undeveloped site is avoided through use of this brownfield site making efficient and sustainable use of land and therefore supporting the objective.

In summary, the proposals would support the objective by making efficient and sustainable use of brownfield land.

Further details 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:

- Approximately 90% of the materials would be transported to and away from the site along the river by barge. The use of HGVs would be minimised and detrimental impacts on communities and the environment relating to transport mitigated.
- It is estimated that 84 HGV movements per day would be generated at the site during the peak construction period, which would last 1 month. On average 14 HGV movements per day are anticipated throughout the duration of the construction. Detrimental impacts associated with additional traffic would be mitigated through measures set out in the *CoCP* such as provision of a traffic management plan.
- The PTAL for the site has been classified as 3, indicating a moderate level of accessibility via public transport. Measures in the *CoCP*, such as only allowing vehicles necessary to undertaking works on site, would help minimise additional road traffic and therefore minimise detrimental effects on communities and environment.
- The objective refers to impacts associated with transport during the construction period and is therefore not applicable during operation.

In summary, the proposals would support the objective by minimising detrimental impacts on the community and the environment by using river transport for material movement and by promoting public transport.

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

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DCO-DT-000-ZZZZZ-070700

