

**Thames Tideway Tunnel**  
Thames Water Utilities Limited



# Application for Development Consent

Application Reference Number: WWO10001

## Sustainability Statement

Doc Ref: **7.07**

### **Appendix B.7**

#### **Carnwath Road Riverside**

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.7 Carnwath Road Riverside

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| <p><b>Type of site:</b></p>   | <p>Main tunnel drive and reception, and connection tunnel reception site.</p>  |
| <p><b>Description of proposals:</b></p>   | <p>The site would receive the main tunnel from Kirtling Street and the Frogmore connection tunnel from Dormay Street and would drive the main tunnel to Acton Storm Tanks.</p> |
| <p><b>Water quality</b><br/>Maintain and enhance river water quality</p>  |  |
| <p><b>Appraisal</b><br/>In general, 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. Dewatering would be required to construct the base of the shaft, which would result in groundwater being pumped out. This would be treated and managed in line with measures set out in the <i>Code of construction practice (CoCP)</i> before being discharged to the River Thames. The proposals would ensure that there would be no discharges which may potentially affect or reduce river water quality.</li> <li>• The main potential pollution pathway identified would be from the in-river works (campshed and jetty to support the operation of barges). There is a risk that material being loaded and unloaded from the barges could be discharged into the tidal Thames and affect river water quality. However, measures set out in the <i>CoCP</i> in accordance with EA guidance on pollution prevention, such as the provision of spill kits (and employees trained to use them) and regular employee briefs to raise awareness of pollution prevention, would encourage maintenance of water quality.</li> <li>• In-river construction works have been assessed and would result in the disturbance of 175m<sup>3</sup> (350t) of sediment from dredging. There is also potential for changes in sedimentation from scour caused by changes in water flow. However, as the tidal Thames is a high sediment environment with 40,000 tonnes (20,000m<sup>3</sup>) of sediment passing each site during spring tide, the anticipated change to the sediment load is not considered to have an effect on water quality.</li> <li>• Surface water run-off may result in pollutants affecting river water quality. The site drainage would operate in accordance with measures set out in the <i>CoCP</i> such as the provision and maintenance of holding and settling tanks and separators as required. Surface water would be discharged to main foul or combined sewers where possible, or would be discharged into the river in accordance with permits so that water quality would be maintained. The proposals would support the objective of maintaining river water during construction.</li> <li>• During operation, no CSOs would be intercepted at the site. Therefore, there would be no direct enhancement of water quality in accordance with the objective. However, indirectly, the site is necessary for the construction of the project, which would enhance water quality overall. It is therefore important and necessary in supporting the objective.</li> </ul> |  |

In summary, during construction, there are potential pollutant pathways which could affect water quality. However, measures in the *CoCP* would ensure that these are managed appropriately, such that river water quality would be maintained.

During operation, the site would have no effect on water quality. Indirectly, it is central to the implementation of the project which would enhance water quality. Water quality would be maintained during operation and enhanced through the development. The proposals would consequently support the objective.

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:

- The terrestrial habitat on site has been assessed as being of negligible to low (site) value. It includes dense scrub and scattered trees and hardstanding. The proposals would result in the removal of habitat, which would be reinstated following construction. Trees removed from the site due to construction would be replaced with native species. Given the low value of habitat and proposed reinstatement, there would be no changes to habitat diversity through the development
- The black redstart nesting features that would be provided on site during operation have been assessed as having a beneficial effect by encouraging an increase in the population of black redstarts. Further, a brown roof would be installed on the air management building. The proposals would consequently support the objective through the long term improvement in biodiversity.
- The site is within and adjacent to the River Thames and Tidal Tributaries Site of Importance for Nature Conservation (Metropolitan importance) and comprises intertidal habitat and river channel. There would be a temporary loss of approximately 3,200m<sup>2</sup> of intertidal habitat for in-river works.
- Fish species would be temporarily affected by the loss of intertidal feeding, resting and nursery habitat during construction. The use of appropriate piling methods would minimise effects from noise and vibration on aquatic species.
- The removal of temporary in-river works during operation would allow for the intertidal habitat to be reinstated and species to recover. Whilst the proposals would not support the objective during construction, aquatic diversity and resilience would be improved in the long term.

In summary the objective would be supported. There would be negligible effects on terrestrial biodiversity during construction and enhanced in operation. Aquatic diversity would be adversely affected through construction. Habitat and species diversity would recover post construction with longer term improvements in aquatic ecology linked to improvements in water quality.

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 the 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, which would be expected to take effect 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 support the objective. The following issues are anticipated to arise at the site:

- Greenhouse gas emissions resulting from construction materials at the site would be approximately 110,000t CO<sub>2</sub>e. During the construction phase approximately 5,000t CO<sub>2</sub>e and 12,500t CO<sub>2</sub>e would result from logistics and construction (TBM, plant and machinery operation, lighting and welfare facilities) respectively.
- Barges would be used to transport materials to and from the site. This would help reduce the carbon footprint by reducing the individual number of HGV movements that would otherwise be required. At this site the carbon footprint would be reduced by 1,300t CO<sub>2</sub>e. Consequently, it would support the objective.

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 change 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).

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 operational site is at high risk of tidal and fluvial flooding from the river Thames. Flood defences in place would be maintained and would protect the site from flooding during construction. In addition a stretch of the river wall would be rebuilt as part of the proposed works. The *CoCP* requires that contractors provide and maintain continuous flood protection. It also requires vulnerable materials and operations should be located within elevated parts of the site away from potential flood paths. Flood risk has been considered in the design of sites. This has ensured that sites are adaptable to changes in climate where the frequency and severity of flood events may increase.
- The risk of surface water flooding is considered to be low and would not be increased through the development. Surface water would be directed to the river. Oversized pipes would be incorporated to ensure that should tidal conditions prevent discharge, surface water run-off could be stored appropriately. Further, the risk of

sewer flooding would remain unchanged as no CSO would be intercepted at the site. The objective would be supported as flood risk has been taken into account and would not be increased through the proposals.

- There would be no increase in permanent hard standing. A brown roof on the ventilation building is proposed and permeable surfaces would be promoted at this site. The site is also located adjacent to the River Thames, which helps alleviate the effects of urban heat. The proposals would be resilient to future changes in temperature and would consequently support the objective.

In summary, the site has taken flood risks into account during design, and mitigation measures are included in the *CoCP* to ensure that there would be no increase in flood risk through the development. The residual flood risk from flood defences have been modelled and are considered acceptable to variations in flood risk from climate change, therefore highlighting the resilience and adaptability to the site. Resilience to potential future changes in temperature would be given as there would be no increase in hard standing and the site would be located adjacent to the river, providing a cooling effect. Consequently, the objectives would be supported.

Further details can be found in the *Environmental Statement* 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 25m and a depth of 42m would be excavated at the site. It is estimated that 785,000t of excavated materials would arise during construction. The majority of this would be clay material (770,000t). This would be managed in accordance with the excavated materials and waste strategy (see the *Environmental Statement* Vol 3 Appendix A) which promotes the re-use, recovery, recycling and beneficial use of materials.
- The total estimated construction waste arising during tunnel construction is expected to be approximately 4,600t with the majority being concrete (3,300t). This would be managed in accordance with measures set out in the *CoCP*, including through the use of a site waste management plan which would seek to reduce waste arisings and promote re-use, recovery, recycling and beneficial use. The volume of construction waste has been minimised in part through the design development process which has enabled a different, smaller site to be used than initially proposed at phase one consultation.
- The site would generate approximately 58t per annum of welfare waste. This would be managed in line with measures in the *CoCP*, which incorporates a site waste management plan in accordance with the waste hierarchy. Waste arising from the construction would be minimised and diverted from land fill where possible. Consequently the proposals would support the objective.
- The use of barges to transport the material from the site would help reduce the impacts on communities and the environment, by reducing the number of HGVs required. Therefore, the objective would be supported.
- Demolition on site would be required for the removal of the existing buildings, including the business units on Carnwath Road Industrial Estate. The demolition has identified that there is a high risk of asbestos being discovered at the site. The *CoCP* sets out measures required for the removal of asbestos, including management and compliance with HSE regulations. This would ensure that

potential impacts on the environment and communities are managed and would therefore support the objective.

- The operational waste at the site is considered to be minimal, and would mainly arise from routine maintenance.

In summary, waste arising during construction would be diverted from landfill where possible and would be managed appropriately in accordance with the waste hierarchy. Site selection and design development has also enabled the size of the site to be reduced. The use of barges to transport material could also reduce adverse effects on the local community and environment, albeit some significant effects may remain. The proposals would therefore support the objective during construction. During operation, the waste arising is considered to be minimal and would not affect the objective.

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

### 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 materials 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 addressed predominantly at the project-wide level, specifics at the site level would support the objective. The following considerations are relevant to the sustainability at the site level.

- It is estimated that 83,500l of water would be used every 24 hours during the peak construction period 2017 - 2020. The greatest demand on the site comes from the requirements for the shaft and tunnel grout/concrete (56,000L/d) and mitigation measures such as washdown and dust suppression (15,000L/d). Water use would be managed through a water use management plan, implemented through the *CoCP*, which would ensure water resources are used efficiently. The water requirements are well within the volume of available water for use as identified in Thames Water's water resources management plan.
- The choice of the site through site selection and design development between phase one consultation and submission has enabled the site area required for construction to be reduced, which has in turn, helps to minimise the demand for resources and raw materials at the site level.
- The operation of the site is not anticipated to present a large demand for materials.

In summary, the amount of water which would be required for construction is considered to be sustainable. The site selection process has allowed the minimisation of the amount of resources and raw materials required for the development. During operation, the demand for materials is anticipated to be minimal. The proposals would consequently support the

objective throughout construction and operation.

Further details 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 overall support the objective by ensuring the safety and health and supporting the well-being of the community. The proposals would encourage equality and sustainable communities. Particular issues of relevance to the site, which have been considered in the appraisal include:

- Construction work would last approximately 6 years. Standard hours would be used with extended hours required approximately once a month during major concrete pours. Continuous working hours would be required for 25 months during tunnelling works and would mainly be underground or within noise enclosures. The *CoCP* sets out measures to ensure that contractors notify and agree with the local authority and relevant stakeholders prior to undertaking longer working hours to ensure that the safety, health and well-being of communities is considered and not compromised. The development of the design includes the use of a noise enclosure over the shaft during tunnelling works which would contribute to ensuring the safety and health of communities and supporting its well-being.
- Measures in the *CoCP* would ensure that safety and health within the community would not be compromised by noise relating to the construction. However, significant adverse effects are anticipated to occur at a number of receptors on Carnwath Road resulting from the surface construction works and from river-based construction transport. As no further on-site mitigation measures would be possible, measures such as secondary glazing and compensation would be provided to off-set such effects, where applicable, to ensure safety and health of affected receptors. However, the well-being of the receptors could be affected. Consequently the proposals would not fully support the objective.
- The development of the design and the inclusion of measures within the *CoCP* would ensure that safety, health and well-being would not be affected through vibration resulting from construction works.
- The site is located within the Hammersmith and Fulham AQMA. Measures set out in the *CoCP* and the use of river services would ensure that health and well-being within the community would not be compromised through construction road traffic, plant emission and dust.
- The Thames Path would be temporarily diverted to enable construction works to take place. Adequate signage and lighting would be provided to ensure the safety and security of users. The Thames Path would be reinstated following construction.
- Encouraging equality and sustainable communities is predominantly addressed at the project-wide level. However, extensive public consultation has been undertaken to consider the community's views on the proposals at the site. The outcomes have been assessed 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, during construction the measures within the *CoCP* ensure the safety and health of the community. However, significant adverse effects relating to noise have been assessed at some receptors. Measures to off-set such effects would be provided and ensure safety and health of all receptors. The proposals would not fully support the

objective as some members of the community are predicted to experience a reduction in their well-being should relocation be required. Diversion of the Thames Path would be necessary during construction. Appropriate signage and lighting would ensure safety of users and the path would be reinstated during operation supporting the well-being of the community. There have been extensive opportunities for public engagement during the development of this site.

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, which have been considered in the appraisal include:

- Local businesses within the Carnwath Road Industrial Estate would be displaced during construction. It is uncertain whether the businesses would find alternative locations in the vicinity of the site, the wider borough or elsewhere within the region. Reasonable compensatory measures would be provided to facilitate the relocation of the businesses. As a consequence of being relocated rather than closed down and assuming successful relocation, these businesses would continue to contribute to the economy, which would support the objective.
- Revitalising use of wharves on a site which has been vacant for more than ten years.
- Providing enhanced landscaping once operational making the area more attractive for London Borough of Hammersmith and Fulham's development objectives for the area.
- Approximately 289 workers would be employed on site with a maximum of 165 workers on site at any one time. These employment opportunities would support the objective for a strong and stable economy.
- After construction the permanent land take would be reduced, enabling future development on the remainder of the site, which could be brought forward by others. However, the permanent development would have displaced economically productive land uses.

In summary, some local business would be displaced during construction. Compensation would be provided to help with relocation and it is assumed that the businesses would still be contributing to the economy. Employment opportunities would be created on site. Consequently, the proposals would support the objective. During operation, the permanent land take required by the project would be reduced, enabling the land available for development to be released for this purpose.

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

## 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 objectives in relation to minimising significant adverse environmental effects relating to noise and vibration and air quality, as this has been achieved as far as practicable. The objective to protect and enhance the character of the

landscape and townscape would also be supported. They would also support the protection and conservation of the historic environment. Particular issues of relevance to the site appraisal include:

**Environmental effects**

- The site is located within the London Borough of Hammersmith and Fulham AQMA. Stringent measures in the *CoCP* and use of river services ensure that there are no significant adverse effects in relation to air quality.
- Significant adverse effects have been assessed on some receptors along Carnwath Road in relation to noise. All practical on-site mitigation measures have been incorporated into the design. Measures to off-set any remaining effects would be provided where applicable. There would be no significant adverse effects from vibration as measures set out in the *CoCP* have minimised any potential effects. Consequently, the proposals have minimised significant adverse effects as far as possible and as such, the proposals would support the objective, albeit some impacts would remain.
- Effects arising from lighting would be minimised to a non-significant level through measures set out in the *CoCP*.
- The design of the ventilation and air flow through the tunnel has been assessed as causing no significant effects on odour during operation. Therefore, the objective would be supported.
- Lighting has been assessed as having a minor adverse effect as measures set out in the *CoCP* have minimised the intrusion of light from the site.

**Landscape and townscape**

- There would be visual effects at this site during construction affecting residential and commercial settings. The character of the site and the River Thames Wandsworth and Sands End Reach Townscape Character Areas would be altered through the presence of construction activity and equipment. Consequently the proposals would not support the objective during construction.
- During operation, the landscaping plan and design principles would result in high quality new public realm and operational structures on the site (notably, the building housing the air management plant and equipment) which would be beneficial to the townscape. Consequently, the proposals support the objective by enhancing the townscape in operation.

**Historic environment**

- The site lies within the Sands End Conservation Area, but does not form part of an archaeological priority area or contain any national statutory designations.
- No buried heritage assets of significant value have been identified at the site. Measures are outlined in the *CoCP* should assets be found during construction. These include targeted archaeological investigation and recording. Any buried assets would therefore be conserved by record. Application of visual recording and intrusive archaeological investigations would conserve above ground heritage structures by record. Therefore, the proposals would support the objective through preservation by record.
- During operation, the project would result in improved public realm in keeping with the scale of the Sands End Conservation Area and would enhance views to historic structures such as Wandsworth Bridge. Consequently the proposals would support the objective during operation.

In summary, the proposals would seek to reduce adverse environmental effects. However, some significant effects relating to noise would remain at some receptors during construction. No significant adverse environmental effects would arise during operation. The character of the site and townscape would be temporarily changed during construction but would be enhanced in operation. Preservation by record would conserve buried and above

ground heritage assets. The historic environment would be enhanced in operation.

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

## Land use

**Make sustainable use of land and buildings**

### Appraisal

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

- The site would be located upon Hurlingham Wharf (safeguarded under the *London Plan 2011*), Whiffin Wharf and Carnwath Road Industrial Estate. The site makes use of brownfield land that is predominantly vacant.
- The development of the design between phase one consultation and the proposals as described, established that a smaller site could be used (approximately 3,000m<sup>2</sup> smaller than initially anticipated). The proposals would make efficient use of previously developed land and would minimise the need for development on greenfield.
- During operation, the provision of enhanced public realm would support the objective by providing additional land for public recreation.

In summary, the site makes efficient use of brownfield land. Further, new public realm would be provided after completion of the construction. The proposals would therefore support the objective.

Further details are available in the *Environmental Statement*, the *CoCP*, 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:

- It is estimated that there would be 38 HGV movements per day on average during the construction period. During peak construction (17 months), there would be 90 HGV movements per day. Detrimental impacts relating to traffic would be minimised through measures set out in the *CoCP*, such as the provision of a traffic management plan.
- It is anticipated that 90% of excavated material would be removed from site by river barge. Similarly, 90% of aggregates would be brought to site by barge. The selection of the site has enabled larger barges to be used, which would reduce the total number of barge trips required. The use of river services would reduce the number HGV trips required and associated detrimental impacts on communities and the environment.
- Accessibility by public transport is considered to be poor with a PTAL level of 2. Measures in the *CoCP* encourage contractors to adopt sustainable transport options when travelling to the site. The traffic management plan would minimise the effects of traffic on communities.
- The objective refers to impacts associated with transport during the construction period and is therefore not applicable during operation.

In summary, The use of barges minimises the effects of road traffic on the communities and environment. The *CoCP* includes measures to further minimise the effects of road traffic associated with construction, and access of the site by workers. The proposals would encourage minimise detrimental effects arising from transport and support sustainable transport.

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

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DCO-DT-000-ZZZZ-070700

