Spring 2010

Site Suitability Report S69HF

Hurlingham Wharf and Whiffin Wharf, Carnwath Road
Please note:

After phase one consultation this site suitability report and the drive options were reviewed as part of a ‘back-check’. This report was superseded by Site Suitability Report S87HF Carnwath Road Riverside (Summer 2011). This report (Spring 2010) has been provided for information only, as Carnwath Road Riverside is a proposed main tunnel site in the application for development consent, submitted to the Planning Inspectorate. Further details are provided in the Final Report on Site Selection Process (doc ref: 7.05) that can be found on the Thames Tideway Tunnel section of the Planning Inspectorate’s web site.
Site Suitability Report
S69HF

Hurlingham Wharf and Whiffin Wharf,
Carnwath Road
# THAMES TUNNEL

## SITE SUITABILITY REPORT S69HF

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<th>Description</th>
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<tr>
<td>AOD</td>
<td>above Ordnance Datum</td>
</tr>
<tr>
<td>BAP</td>
<td>Biodiversity Action Plan</td>
</tr>
<tr>
<td>BT</td>
<td>British Telecom</td>
</tr>
<tr>
<td>CPO</td>
<td>compulsory purchase order</td>
</tr>
<tr>
<td>CSO</td>
<td>combined sewer overflow</td>
</tr>
<tr>
<td>DLR</td>
<td>Docklands Light Railway</td>
</tr>
<tr>
<td>EA</td>
<td>Environment Agency</td>
</tr>
<tr>
<td>HGV</td>
<td>heavy goods vehicle</td>
</tr>
<tr>
<td>GLA</td>
<td>Greater London Authority</td>
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<tr>
<td>LNR</td>
<td>local nature reserve</td>
</tr>
<tr>
<td>LPA</td>
<td>local planning authority</td>
</tr>
<tr>
<td>LU</td>
<td>London Underground</td>
</tr>
<tr>
<td>m</td>
<td>metre/metres</td>
</tr>
<tr>
<td>MOL</td>
<td>Metropolitan Open Land</td>
</tr>
<tr>
<td>ONS</td>
<td>Office of National Statistics</td>
</tr>
<tr>
<td>ORN</td>
<td>Olympic Route Network</td>
</tr>
<tr>
<td>PLA</td>
<td>Port of London Authority</td>
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<tr>
<td>POS</td>
<td>public open space</td>
</tr>
<tr>
<td>PTAL</td>
<td>public transport accessibility level</td>
</tr>
<tr>
<td>SAM</td>
<td>scheduled ancient monument</td>
</tr>
<tr>
<td>SINC</td>
<td>site of importance for nature conservation</td>
</tr>
<tr>
<td>SNCI</td>
<td>site(s) of nature conservation importance</td>
</tr>
<tr>
<td>SSR</td>
<td>site suitability report</td>
</tr>
<tr>
<td>SSSI</td>
<td>site(s) of special scientific interest</td>
</tr>
<tr>
<td>SuDS</td>
<td>sustainable urban drainage systems</td>
</tr>
<tr>
<td>TfL</td>
<td>Transport for London</td>
</tr>
<tr>
<td>TD</td>
<td>tunnel datum</td>
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<tr>
<td>TLRN</td>
<td>Transport for London Road Network</td>
</tr>
<tr>
<td>TPA</td>
<td>Thames Policy Area</td>
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<tr>
<td>UDP</td>
<td>unitary development plan</td>
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<tr>
<td>UXO</td>
<td>unexploded ordnance</td>
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1 INTRODUCTION

1.1 Purpose and structure of the report

1.1.1 The Site Selection Methodology (May 2009) paper (paragraphs 2.3.29 - 2.3.34) outlines the process to be used to create the preferred list of shaft sites, and this process also applies to CSO sites. Paragraph 2.3.31 lists the type of general considerations that will be addressed in each site suitability report, but they depend on the relevance to the site and professional judgement made in the assessments.

1.1.2 This report was prepared through the assessment of information from the perspective of a number of technical disciplines: Engineering, Planning, Environment, Property and Community. The reports have been prepared on the basis of the information listed in Appendix 1 - Sources of Information, and this level of information is considered to be appropriate to the current stage.

1.1.3 The Background Technical Paper provides information on the requirements for different site types, their sizes and typical activities/facilities within the sites.

1.1.4 Each site suitability report considers a particular site on its own merits. In addition, an engineering options report was produced. Information from both of these reports will feed into the technical assessment of how well the site may fit in with tunnel design options, ensuring combinations of sites spread across the length of the tunnel route provide a reasonable spatial distribution of sites (that will best assist with the construction of the tunnel, operation and maintenance). This is considered in the Preferred Scheme Report.

1.2 Background

1.2.1 The process for selecting sites is set out in the Site Selection Methodology (May 2009) paper. All sites have previously passed through the following parts of Stage 1:

- Part 1A - Creation of the long list of potential shaft (and CSO) sites
- Part 1B - Creation of a short list of potential shaft (and CSO) sites
  - Table 2.2: Long list of shaft (and CSO) sites - an assessment against set considerations and values
  - Table 2.3: Draft short list of shaft (and CSO) sites - assessment against a list of detailed considerations
  - Workshops to consider each site to arrive at a short list of sites.

1.2.2 The final part of Stage 1 includes this report. The following is an overall summary of all elements that apply to all the sites on the final short list:

- Part 1C - Creation of the Preferred List of shaft (and CSO) sites - site data, site visits, site suitability reports, engineering options report and optioneering workshops that will result in the Preferred Scheme Report.

1.3 Consultation

1.3.1 The Thames Water project team held meetings with London local authorities, statutory and other stakeholders to review the provisional short list of shaft and CSO sites. All general and site specific comments can be found in a separate report titled Consultation on the Short List of Sites: Consultation Feedback Report. These comments were considered to help determine the final short list of sites, but they were also considered at the optioneering workshops.

1.3.2 Further meetings were held with London local authorities, statutory and other stakeholders between January and March 2010. Comments are included in this report.
2 SITE INFORMATION

2.1 Site and surroundings

2.1.1 This section provides an overview of all the site information that will be used by one or more disciplines to assess the site in sections 3 to 9 of this report.

2.1.2 Site S69HF is known as Hurlingham Wharf and Whiffin Wharf, located in the London Borough of Hammersmith and Fulham. Existing access to the site is taken from Carnwath Road. A site location plan is attached as Appendix 2.

2.1.3 The site is relatively flat, derelict and currently vacant. It is covered in hardstanding and surrounded by a two-metre wooden fence along the north, east and west boundaries. From the site visit, there were no obvious signs of ongoing or future development. The surrounding area is characterised by a mix of industrial uses and residential properties.

2.1.4 The site is bounded to the north by Carnwath Road, a single carriageway which separates the site from a multi-storey block of flats of up to 11 storeys in height. The site is bounded to the east by the Thames Path and the Carnwath Industrial Centre, which consists of a number of small businesses, offices and manufacturing workshops. The site is bounded by the River Thames to the south and by numerous three- and four-storey residential properties to the west.

2.1.5 The boundary of the shaft working area is proposed within one metre of the side facade of residential properties nos 89 to 101 Carnwath Road, and set approximately 13 metres from the rear facade of nos 81 to 87 Carnwath Road.

2.1.6 The site is a safeguarded wharf and is covered by various planning and environment designations in the Hammersmith and Fulham Unitary Development Plan. All the mapped designations are shown on the planning and environment plans in Appendix 3.

2.1.7 Photographs of the site and surroundings, together with an aerial photograph of the site, are attached as Appendix 4.

2.1.8 The site can be accessed by road via Carnwath Road. Wandsworth Bridge Road (A217) is 0.3km from the site, to the east. The site is 1.9km from existing stabling sidings at Clapham Yard between the Windsor and Main lines for rail access. The nearest London Underground station (Putney Bridge) is less than one mile from the site. A transport plan for the site is attached as Appendix 5.

2.1.9 Third-party assets and significant utilities are listed below and are shown on the services and geology plan in Appendix 6:

- River wall in the south
- The Piper Building (12-storey) to the north
- Industrial units to the west.

2.1.10 The locations of other third-party assets, such as BT and fibre optic communication cables, are to be confirmed by further studies and utility searches and may not be shown on the services and geology plan.

2.1.11 Information on the geology specific to this site can be found within the services and geology plan which is in Appendix 6. This plan shows that the shaft would be founded in the London Clay.

2.1.12 It is understood that National Grid is planning to build a cable tunnel which would run through the outside eastern part of the site. If this site is selected, there would be dialogue with National Grid to consider matters if applicable, such as timing, engineering constraints, cumulative effects of the projects, potential for site sharing, etc.

2.2 Type of site

2.2.1 The site S69HF is being considered as an intermediate shaft site.
3 PROPOSED USE OF SITE – CONSTRUCTION PHASE

3.1.1 The proposed construction phase layouts for the shaft sites are located in Appendix 7 – Construction Phase Layout, and are based on a preliminary assessment.

3.1.2 The construction phase layout drawings are illustrative and show:
- the layout as an intermediate shaft site
- potential access points.

3.1.3 These drawings provide initial preliminary schematic layouts that have not been optimised. If the site proceeds to the next stage as a preferred site, construction phase layouts would be optimised to minimise impacts.

3.1.4 Drawings of typical activities associated with the shaft construction phase are provided in Appendix 7. Potential above ground construction features (dependent on shaft type) include:
- approximately 3m high hoarding around the site boundary
- welfare facilities, temporary structures, approximately 3m high
- grout plant, approximately 3 to 5m high, including silos
- mobile crane, approximately 30m high
- gantry crane, approximately 8m high

3.1.5 Preliminary data associated with the construction phase are provided in Table 3.1.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Intermediate shaft site</th>
</tr>
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<tbody>
<tr>
<td>Length of construction period</td>
<td>4 to 5 years</td>
</tr>
<tr>
<td>Likely working hours, ie, (night/day/weekend)</td>
<td>24 hours</td>
</tr>
<tr>
<td>Working days</td>
<td>Mon to Sun</td>
</tr>
<tr>
<td>Primary means of transporting excavated material away from site</td>
<td>Road*</td>
</tr>
<tr>
<td>Primary means of transporting materials to site</td>
<td>Road*</td>
</tr>
</tbody>
</table>

*There may be feasible opportunities to use barge transport if used as an intermediate shaft site

4 PROPOSED USE OF SITE – OPERATIONAL PHASE

4.1 Operational requirements

4.1.1 The indicative operational phase layouts for the shaft sites are located in Appendix 8 – Operational Phase Layout, and are based on a preliminary assessment.

4.1.2 The generic elevations of structures shown on the operational phase layout are located in Appendix 8 and provide an illustration of typical examples of the permanent structures which are applicable to shaft sites.

4.1.3 The underground infrastructure at this site is likely to be made up of a shaft, double flap valve chamber and a 10m wide overflow culvert\(^a\).

4.1.4 The above ground infrastructure at this site is likely to comprise a ventilation column 10m\(^b\) high and 3m diameter, a ventilation building 5m x 15m x 5m high and a 20m x 10m top

\(^a\) It was anticipated that an overflow culvert would be required at shaft sites when the assessment in this report was undertaken. Although this was subsequently changed with overflow culverts no longer required at all sites, the assessment was not revised as it was considered that the difference would not change any discipline’s conclusion on the suitability of the site.
structure with openings. The top structure is to provide access and egress into the main shaft and flap valve chamber.

4.1.5 The top structures are envisaged to be finished at a level of 107m
\[\text{ctunnel datum (TD)}\] (7mAOD), and since the ground level mean value at this site is 104mTD (4mAOD), the top structures would be raised to approximately 3m above the current ground level. For further information on the generic layout of this top structure, refer to Appendix 8.

4.1.6 Hardstanding would be provided to the top structures. The site would be fenced.

4.1.7 Preliminary data associated with the operational phase are provided in Table 4.1.

| Level of inspections and maintenance and likely working hours, ie, (night/day/weekend) - frequency of visits | 1 daytime visit every six months for electrical/instrument inspection. An additional 1 week maintenance period for tunnel/shaft inspection required per 10 years that could be night/day/weekend working. |
| No of traffic movements | 1 van visit every six months. An additional 1 week period of 2 to 10 movements per day (estimated several vans and 2 cranes) every 10 years. |

4.2 Restoration and after-use

4.2.1 The portion of the site not occupied by the permanent works would be restored to its original condition on completion of the construction works. If any buildings were demolished, these would not be reinstated unless required.

5 ENGINEERING ASSESSMENT

5.1 Access

5.1.1 This section should be read in conjunction with Section 7.2.

Road

5.1.2 The site could be accessed direct from Carnwath Road and would be 0.8km to the Transport for London Road Network (TLRN). The access route to the site would be along a traffic calmed road and would pass over Wandsworth Bridge and under a height restricted railway bridge.

5.1.3 Access for both the construction and operational phases would be directly off Carnwath Road.

Rail

5.1.4 There would be no usable rail network local to this site. The site would be 1.9km from existing stabling sidings at Clapham Yard between the Windsor and Main lines. The nearest London Underground station (Putney Bridge) would be less than one mile from the

\[\text{b It was anticipated that the ventilation column at shafts sites would be 10m high when the assessment in this report was undertaken. Although this was subsequently changed to 15m high, the assessment was not revised as it was considered that the difference would not change any discipline's conclusion on the suitability of the site.}\]

\[\text{c It was anticipated that the elevation of top structures at both CSO and shaft sites would be finished at 107mTD when the assessment in this report was undertaken. Although this was subsequently changed to 104.5mTD, the assessment was not revised as it was considered that the difference would not change any discipline's conclusion on the suitability of the site.}\]
site. The closest Railway Station, Wandsworth Town, would be approximately 1.2km from the site.

**River**

5.1.5 Material movement for an intermediate shaft site would likely be by road. However, as the site is adjacent to the river, there may be feasible opportunities to use barge transport.

### 5.2 Construction works considerations

5.2.1 Available data on third-party assets show that the main assets of concern are the proposed 4.5m OD National Grid cable tunnel that would run through the eastern edge of the site, the river wall, the multi-storey building to the north and the industrial unit to the west. Construction methods would be adopted, as appropriate, to mitigate potential settlement of these assets.

5.2.2 The shaft has been located to be sufficiently remote from the proposed cable tunnel in order to minimise impact on it, but any change in its alignment could result in a revised shaft location.

5.2.3 The proximity of the shaft to the river means that the tunnel alignment deviation from the centre of the river would be minimised.

5.2.4 It is likely that the proposed works can be constructed within the overall construction programme.

### 5.3 Permanent works considerations

5.3.1 The top structure would be raised to approximately 1m above ground level.

### 5.4 Health and safety

5.4.1 There are no unusual health and safety issues associated with this site.

### 6 PLANNING ASSESSMENT

#### 6.1 Introduction

6.1.1 The planning assessment builds on the advantages and disadvantages reported in Table 2.3 and covers the following areas:

- Planning applications and permissions
- Planning context
- Planning comments.

#### 6.2 Planning applications and permissions

6.2.1 An initial desktop search of the London Borough of Hammersmith and Fulham online planning applications database did not identify any planning applications submitted within the last five years applicable to the site.

#### 6.3 Planning context

6.3.1 The following is a summary of the relevant local planning policies and designations affecting the site and is taken from the current statutory development plan for the borough. The local plan comprises the saved policies from the Hammersmith and Fulham Unitary Development Plan, adopted August 2003, and the Consolidated London Plan, adopted February 2008.
6.3.2 The majority of the site is protected as a safeguarded wharf. The council protects these sites for wharf related uses by applying the following policy:

6.3.3 TN31, Freight and Servicing - Use of Water, supports proposals for the provision of wharves or piers to facilitate river-based transport, and protects sites identified for wharf related uses against development that could preclude their future use for the transhipment of freight, including waste and aggregates, and for related activities.

6.3.4 Policy 4C.9 of the Consolidated London Plan states that the mayor will, and boroughs should, protect safeguarded wharves for cargo-handling uses. The policy also states that the mayor will, and the boroughs should, encourage appropriate temporary uses of vacant safeguarded wharves and where they do not preclude a wharf being reused for cargo handling uses. Development next to or opposite safeguarded wharves should be designed to minimise potential conflicts of use or disturbance. Redevelopment will only be acceptable where safeguarded wharves are no longer viable or capable of being used for cargo-handling, in accordance with criteria set out in the plan.

6.3.5 EN31X, Thames Policy Area, covers the majority of the site and requires all built development to be of a high quality design that respects the riverside location and contributes to its surrounding environment.

6.3.6 EN2, Conservation Areas – the site is located within the Sands Ends Conservation Area. Policy EN2 requires all development to preserve or enhance the character or appearance of the conservation area, paying particular attention to the historical context, quality of design, scale, bulk, massing and materials.

6.3.7 EN31, Important Views Along, Across, and From the River – the site is located within an important view from Wandsworth Bridge. The above policy seeks to protect identified views from development if it would cause demonstrable harm to the view and/or views of local landmarks or their settings. The policy states that the view from Wandsworth Bridge includes the view up and downstream of the river, its foreshore and banks, and of commercial wharves and riverside buildings.

6.3.8 EN27, Nature Conservation Areas – the site is adjacent to the River Thames, which is designated as a Nature Conservation Area along its entire stretch. This policy protects nature conservation sites from development that does not contribute to physical, social and economic regeneration objectives of the UDP, or that may result in harm to wildlife value.

6.3.9 EN21, Environmental Nuisance – the site is within proximity to existing residential properties, and this policy seeks to ensure that no undue detriment occurs to general amenities.

6.3.10 The site is also within close proximity to an Archaeological Priority Area and the following policy applies:

6.3.11 EN6, Buildings and Artefacts of Local Importance and Interest, states that development will not be permitted if it would result in the demolition, loss or harmful alteration to buildings, structures and artefacts that are of local townscape, architectural or historic interest.

6.4 Consultation comments

6.4.1 A series of consultations on the shortlisted sites were held with London local authorities, statutory and other pan-London stakeholders during July to September 2009 and January to March 2010. This section summarises factual comments that have been made by consultees, and which have informed the SSR assessments.

London Borough of Hammersmith and Fulham

6.4.2 The council stated that the site is subject to wharf safeguarding. There are residential properties located to the west of the site.

English Heritage

6.4.3 English Heritage advised that there are archaeological issues associated with the site. However, it is noted that the site has been heavily industrialised and so it is less likely for an
archaeological issue to arise that would pose as a barrier to development. A desk-based assessment, including a modern disturbance plan, would be the next step if the site is taken forward.

**Environment Agency**

6.4.4 The Environment Agency stated that the wharf is safeguarded and the river edge is more urban. The site lends itself to potential reinstatement of an intertidal buffer. The Environment Agency advised that if the river wall needs replacing, there would be a requirement for enhancement (there is an example of retreated defence on the south bank opposite S73HF). The retreated defence has vegetation growth so is visually more attractive. Set back defences have been promoted for several years, in order that people have a better view of the river and there can be creation of habitat. There are opportunities for planting and habitat creation at the site.

**Port of London Authority**

6.4.5 The Port of London Authority advised that, despite being slightly shallow, it should be possible to move 1,000 tonne barges in the area as the site is located a sufficient distance down the river. Hurlingham Wharf is safeguarded (although Whiffin Wharf is not). The PLA advised that it would like to see the wharves brought back into operation.

**Transport for London**

6.4.6 The network assurance team would seek confirmation of construction traffic, construction traffic routes and possible traffic management requirements. The site is located near to the strategic road network – Wandsworth Bridge Road and the TLRN. Works would need to be co-ordinated as early as possible with other planned works/events on the network in the area and the neighbouring London Borough of Wandsworth. Residential properties are in close proximity to the site, and noise considerations may lead to working hour restrictions imposed by the local authority.

**Other statutory consultees**

6.4.7 No comment.

**6.5 Planning comments**

6.5.1 There are a small number of planning designations and policies that are applicable both on and adjacent to the site. These designations and policies have been identified and described in Section 6.3 and of these, those relating to wharfage, heritage, conservation and residential amenity are of the most relevance to the proposed development.

6.5.2 The site covers the majority of a safeguarded wharf. The wharf may provide the opportunity to export and import construction material via the River Thames, which would reduce the need for vehicular traffic to and from the site. Similarly, once construction is complete, the site could be returned to a use that incorporates freight-based transport and is consistent with its current designated use. Further investigation may be required to ensure the proposed works could retain and make use of this facility to avoid conflict with policies TN31 and 4C.9.

6.5.3 The site is within a predominantly residential area and at its closest point is set 1m from the nearest dwelling. This separation distance is not considered sufficient in terms of residential amenity, given the nature and longevity of construction works associated with an intermediate shaft site. The working area identified for excavated material and shaft segment stockyard would be more appropriately sited to the east of the shaft site, adjacent to the Carnwath Industrial Centre, thus increasing the separation distance from residential properties and, in turn, with other mitigation measures, reducing the potential impacts on amenity arising from noise, dust, vibration and traffic movements in accordance with Policy EN21. In addition, operational hours of the construction works would need to be consistent
with those normally operated in residential areas, for example 8am to 6pm during weekdays, 9am to 1pm on Saturdays and not at all on Sundays.

6.5.4 With appropriate mitigation, the construction works themselves and remaining top structures should also not result in overly prominent development in this location and should not unacceptably obstruct local views within the Thames Policy Area. The design of the remaining legacy structures would also require consideration to ensure they do not result in inappropriate development in this location.

6.5.5 The site is located wholly within the Sands Ends Conservation Area. The use of the site would result in the loss of buildings and/or built features, and the contribution of these buildings to the character and appearance of the conservation area and the impact of their loss may require further consideration. Potential impacts on character and appearance resulting from both the construction works and associated after-use top-structures should be reduced with appropriate mitigation and detailed design consideration. A detailed heritage assessment can be found in Section 7.

6.5.6 The proposed development should not be of a height or scale to unacceptably impact upon or impede protected views.

6.5.7 The site is adjacent to a Site of Metropolitan Importance for Nature Conservation designation, which covers the entire River Thames. Given the extensive nature of this designation, the purpose of the Thames Tunnel Project to improve the environmental condition of the river, and the siting of the construction works adjacent the protected area, it is unlikely that this designation would be unacceptably impacted upon. A detailed assessment of the likely impact is included in Section 7.

7 ENVIRONMENTAL APPRAISAL

7.1 Introduction
7.1.1 The following sections summarise specialist assessments which are provided in Appendix 9 – Environmental Appraisal Tables.

7.2 Transport
7.2.1 The site is suitable as an intermediate shaft site as potential road and rail access routes are suitable for HGVs. To enable site access, some on-street parking bays on Carnwath Road may require removal (alternative parking would be available nearby) if found to affect the turning movements of construction vehicles accessing the site.

7.2.2 The potential for the workforce to access the site by public transport is low; however, parking for the workforce could potentially be allocated within the site boundary, or workforce transport may need to be provided.

7.3 Archaeology
7.3.1 Based on current information, the site is less suitable as there are records of archaeological receptors of medium value, including alluvial deposits, within the western part of the site. It is reasonable to anticipate that further archaeological receptors of high or medium value may be present elsewhere within the site and these may include waterlogged deposits. A further desk-based assessment is required to assess, in detail, the risk posed by archaeological receptors within this site.

7.4 Built heritage and townscape
7.4.1 The site is potentially suitable as an intermediate shaft site as impacts on built heritage receptors are likely to be limited to the Sands End Conservation Area, and the site is unlikely to result in severe adverse impacts on townscape receptors. Mitigation in the form of a high quality design (with screening where appropriate) is likely to be required to ensure that the Sands End Conservation Area is preserved or enhanced.
7.5 Water resources – hydrogeology and surface water

7.5.1 In terms of hydrogeology, this site is suitable because the intermediate shaft is to be constructed in London Clay (non-aquifer). The Chalk piezometric head is likely to be approximately 8.66m above the base of construction and should be taken into account in the engineering design. No impact on the Chalk aquifer is expected. Superficial deposits at the site comprise alluvium, which is classified as a non-aquifer, and therefore no impact is expected at shallow depth.

7.5.2 In terms of surface water resources, this site is suitable as an intermediate shaft site because there is no direct overland pathway for pollution and standard mitigation to manage drainage (behind Thames Flood defences) to prevent pollution should be feasible.

7.6 Ecology

7.6.1 The site is considered to be suitable as an intermediate shaft site as few potential sensitive ecological receptors have been identified at this stage. There is a small area of wasteland habitat present onsite, which could potentially support uncommon or notable invertebrates, plant species and reptiles. Should this be the case, there may be a need for mitigation, which could include a limited amount of offsite provision. Basic ecological surveys would be required if the site were selected. The construction of the overflow culvert is likely to affect the Thames and would potentially require negotiation with the EA, post-works restoration and compensatory habitat provision.

7.7 Flood risk

7.7.1 The site is suitable as an intermediate shaft site as it is defended from flooding from the River Thames, and there is potentially space for attenuation SuDS to be accommodated onsite. However, further investigation is required to determine if the site is suitable for infiltration SuDS.

7.8 Air quality

7.8.1 This site is suitable for use as an intermediate shaft site as although there is potential for fugitive emissions of dust during construction to have a perceptible impact at residential receptors closest to the site, these impacts could be minimised with standard dust control measures. There is also the potential for HGV movements to cause localised air quality impacts, however this could be mitigated by minimising the movement of HGVs during peak hours.

7.9 Noise

7.9.1 The site is less suitable as an intermediate shaft site due to the relatively short separation distances between the site and the closest sensitive receptors. The number of vehicles associated with the construction phase and their access route has the potential to cause disturbance to properties lining those streets. Due to the short distance of the shaft location and the nearest sensitive properties, vibration levels during construction may give rise to complaints.

7.10 Land quality

7.10.1 The site is less suitable as an intermediate shaft site as it has been previously developed for industrial use, namely wharf operations, with potentially offsite contaminating activities including depots, concrete works, docks and paper works.

7.10.2 The potential sources outlined above may impact on site workers and adjacent human receptors through direct contact/vapour inhalation exposure pathways. There is also the potential for surface water (the River Thames) to be impacted.
8 SOCIO-ECONOMIC AND COMMUNITY ASSESSMENT

8.1 Socio-economic profile
8.1.1 The site is within the Sands End ward, the area has a mixed population with a range of ages, ethnic backgrounds and economic conditions represented. Ward employment and housing tenure statistics are similar to London and national averages.
8.1.2 Site visits have confirmed that the site appears to have little or no value to the local community, and therefore the local community profile has not been investigated further at this stage.

8.2 Issues and impacts
8.2.1 Due to the proposed location of the engineering works, it appears likely that the residential buildings adjacent to the site to the west could be impacted by the use of the site.

9 PROPERTY ASSESSMENT

9.1 Introduction
9.1.1 The area identified as a potential intermediate shaft site is part of a larger vacant site, situated between Carnwath Road and the River Thames, known as Whiffin Wharf and Hurlingham Wharf. All buildings on the site appear to have been demolished. No inspection of the property has been undertaken for the purpose of preparing this property assessment, and maps, plans and aerial imagery have been relied upon.
9.1.2 Planning enquiries have not revealed any planning applications on the site in the last five years, although it appears to be a ‘brownfield site,’ ripe for redevelopment.

9.2 Crown Land and Special Land comments
9.2.1 The site does not include Crown land or Special Land within the meaning of the Acquisition of Land Act 1981.

9.3 Land to be acquired
9.3.1 The compensation assessment assumes that the working areas would be acquired temporarily via the acquisition of new rights for the period of the works stated in the engineering section above. A smaller area would need to be acquired permanently for the operational works, measuring approximately 40m by 50m, and located in the centre of the site.
9.3.2 Access is available from the public highway and no rights of way or easements have been included in the assessment of the site acquisition cost.

9.4 Property valuation comments
9.4.1 The referencing exercise has revealed no information as to the freehold ownership but suggests part of the freehold to be subject to nine leases. These may be historic and relate to buildings that are now demolished.
9.4.2 Despite the apparent lack of any recent planning applications, the site appears to be suitable for redevelopment, either with residential or commercial property. There is a modern residential development immediately to the west and commercial buildings to the east. The permanent land requirement is in the centre of the site, close to the river frontage, and liaison with the landowner(s) should be sought to ensure the affect on the retained land is minimised. Should planning consent be granted before the scheme commences, the compensation assessment could change significantly.
9.4.3 It is understood that the land would be reinstated after the works are complete as a part of the engineering work and therefore reinstatement costs are not included in the compensation assessment.

9.4.4 Compensation would be assessed on a diminution in value basis for the new rights (temporary occupation during works, access rights during works, access rights for operational purposes) and on a market value basis for the permanent acquisition.

9.5 Disturbance compensation comments
9.5.1 As the site is currently vacant, no disturbance costs are anticipated. However, if any development commences before acquisition, this could alter significantly.

9.6 Offsite statutory compensation comments
9.6.1 There should be limited potential for offsite statutory compensation under Section 10 of the Compulsory Purchase Act 1965, as there is unlikely to be any physical interference with public or private property rights.

9.6.2 There should also be limited potential for claims under Part 1 of the Land Compensation Act 1973, as the completed works are unlikely to emit 'physical factors' such as noise, vibration, smell, fumes, smoke, artificial lighting and discharge of solids or liquids, which may cause a diminution in value to property.

9.7 Site acquisition cost assessment
9.7.1 The likely statutory acquisition cost is assessed as significant but acceptable, provided redevelopment does not commence prior to acquisition.

10 SITE CONCLUSIONS BY DISCIPLINE

10.1 Introduction
10.1.1 The conclusions presented in this section are drawn from each discipline’s assessment, and are designed to inform the workshop where a final conclusion on whether the site moves forward as one of the preferred sites or not.

10.2 Engineering
10.2.1 This site is suitable as an intermediate shaft site because it is of adequate size and has good road access. It is also in a disused industrial site with hardstanding, that would simplify site set-up.

10.3 Planning
10.3.1 This site is suitable for use as an intermediate shaft site.

10.3.2 Site S69HF is the subject of a number of onsite and adjacent sensitive receptors, such as a conservation area, a site of metropolitan importance for nature conservation, and residential properties.

10.3.3 The site area does offer some flexibility in terms of the siting of construction works: moving the working area identified for excavated material and shaft segment stockyard to the east of the shaft site, adjacent to the Carnwath Industrial Centre, would increase the separation distance between residential properties and the construction works and therefore, with other mitigation measures, reduce potential impacts to residents. Further to this, reduced hours of construction and mitigation related to potential impacts on the conservation area and site of metropolitan importance for nature conservation may also be required.
10.4 Environment

10.4.1 Overall, the site is considered to be suitable as an intermediate shaft site, although mitigation would be required.

10.4.2 Based on current information, the site is suitable from the perspectives of transport, built heritage, townscape, water resources, ecology, flood risk and air quality.

10.4.3 This site is considered less suitable from the perspectives of archaeology, noise and land quality.

10.4.4 Overall, the site is considered suitable, subject to further investigation of whether archaeology, noise and land quality impacts could be adequately mitigated. Likely mitigation considerations would include:

- Archaeology – further investigation to assess in detail the risk posed by archaeological receptors within the site
- Noise – standard noise barriers are unlikely to be entirely effective and other techniques may be required to reduce construction noise to acceptable levels
- Land quality – any required remediation of contamination (at this medium risk site) and/or measures to ensure no mobilisation of contaminants retained in situ.

10.5 Socio-economic and community

10.5.1 The site is suitable as an intermediate shaft site.

10.5.2 As the site is vacant land, the use of the site appears likely to have a limited impact on the local community. The greatest potential for a negative impact appears to be from noise upon the residents adjacent and overlooking the site to the west.

10.5.3 It would be important to consider mitigating any disruption to the Thames Path, which runs around the site on the west, north and east borders.

10.6 Property

10.6.1 The site is considered suitable as an intermediate shaft site from a property perspective.

10.6.2 The advantage of the site is:

- it is undeveloped and the acquisition cost should be acceptable.

10.6.3 The disadvantage of the site is:

- it is likely to be redeveloped at some time and if this occurs before it is required for the scheme, the acquisition cost could become unacceptable.
APPENDICES
APPENDIX 1 – SOURCES OF INFORMATION

Engineering
- Traffic Management and Access Roads/Rail – Scott Wilson
- Access River – BMT
- Third Parties (Shafts/CSOs) – Mott MacDonald and AECOM
- Geology – Thames Water
- Utilities – Thames Water and AECOM
- Construction and Operational Layout Template – London Tideway Tunnels.
- Background Technical Paper – London Tideway Tunnels

Planning
- London Borough of Hammersmith and Fulham online planning applications database
- Saved policies in the Hammersmith and Fulham Unitary Development Plan, adopted in August 2003

Environment

Transport
- Map of Transport for London Road Network (TLRN) - www.tfl.gov.uk
- Bus Route Maps: North-east, north-west, south-west, south-east - www.tfl.gov.uk
- Crossrail Plans - www.crossrail.co.uk/crossrail-bill-documents
- PTAL scores - Obtained from Table 2.3 information
- Thames Path map - www.walklondon.org.uk
- Capital Ring - www.walklondon.org.uk
- Cycle Routes - www.sustrans.org.uk and Local Cycling Guides 1-14
- Design Manual for Roads and Bridge TD 42/95, Highways Agency

Built heritage and townscape
- Hammersmith and Fulham list of Conservation Areas
- Hammersmith and Borough list of Open Spaces
- National Monuments Record - for some additional information regarding registered historic parks and gardens
- Unitary development plans
- Local authority websites
- Bing maps

Water resources – hydrogeology and surface water
- Environment Agency abstraction licence details
- Environment Agency groundwater levels
- Local authority details of unlicensed abstractors
- Envirocheck

**Ecology**
- Multi-Agency Geographic Information for the Countryside (MAGIC) www.magic.gov.uk - statutory designated sites
- London Wildweb - http://wildweb.london.gov.uk - non-statutory site of importance for nature conservation
- National Biodiversity Network - http://searchnbn.net - distribution of protected species
- Google Maps - aerial views of habitat features
- BAP habitats - www.natureonthemap.org.uk
- Priority habitats and species on national and local scales - www.ukbap.org.uk

**Flood risk**
- Envirocheck

**Air quality**
- Local authority websites
  - www.londonair.org.uk/london/asp/default.asp?la_id=&showbulletins=&width=1680
  - http://www.airquality.co.uk/

**Noise**
- Envirocheck - Identification of receptors
- Promap - Calculation of distances between site and receptors
- Multimap - Aerial photography – www.multimap.co.uk
- Defra noise maps - Identification of existing noise levels

**Land quality**
- Google Maps/Earth
- Site walkover information

**Socio-economic and community**
- Statistics from the Office of National Statistics (ONS) 2001 Census data
Property
  - Multimap
  - Mouchel referencing data
APPENDIX 3 – PLANNING AND ENVIRONMENT PLANS

GIS data could not be obtained from London Borough of Hammersmith and Fulham (see section 6.3 for planning context).
APPENDIX 4 – PHOTOGRAPHS OF THE SITE AND SURROUNDINGS
View of the site looking south from Carnwath Road.

View of the site looking southwest from Carnwath Road.
APPENDIX 5 – TRANSPORT PLAN
APPENDIX 6 – SERVICES AND GEOLOGY PLAN
APPENDIX 7 – CONSTRUCTION PHASE LAYOUT
APPENDIX 8 – OPERATIONAL PHASE LAYOUT
VENTILATION BUILDING (SHAFTS)

VENTILATION TOWER (SHAFTS)

DIAGNOSTIC REPRESENTATION OF TOP STRUCTURE ABOVE MAIN AND INTERMEDIATE SHAFTS.

NOTE:
1. STRUCTURE TO BE PROTECTED BY REMOVABLE HANDRAILS IN THE TEMPORARY CASE.
2. POSITION OF COVERS ARE VARIABLE WITHIN 10m FROM THE EDGE OF THE STRUCTURE, AND THE LOCATION IS BASED ON SITE SPECIFIC REQUIREMENT.
3. CLADDING OF VENTILATION BUILDING TO SUIT LOCATION AND AESTHETICS.
4. ALL TOP STRUCTURES TO HAVE:
   - ACCESS STAIRS/LADDER
   - TEMPORARY OR PERMANENT HAND RAILING
5. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

SCALE 1:50

TIDY UP PROCESSING

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ORDNANCE SURVEY LICENCE NUMBER 100019345.

PLOTTED ON 04/12/09 BY Andy.Purdy.
LOCATION: Thames Tideway Tunnel x:\project\371840\cad\design data\cad thames\drawings\planning-consents\Routewide\100-DH-GEN-00000-000002.dgn

THAMES WATER UTILITIES LTD 2008
## APPENDIX 9 – ENVIRONMENTAL APPRAISAL TABLES

<table>
<thead>
<tr>
<th>Transport</th>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to road network</td>
<td>Site accesses onto Carnwath Road from the disused Trinidad Wharf and Industrial site. On street parking in the vicinity of the access may affect the turning movements of construction vehicles. Carnwath Road is subject to a 30mph speed limit, is street lit and traffic calmed (speed cushions). It has a carriageway width of 8.0m and contains on street parking (reducing effective carriageway width to 6.0m). Some parking spaces will require removal if found to affect the turning movements of construction vehicles using the site access. Visibility splays in both directions from the site access were achievable to 90m. Access to the A3205 (TLRN strategic highway network) along Carnwath Road (eastbound) onto Wandsworth Bridge Road and across Wandsworth Bridge. Carnwath Road is traffic calmed featuring speed cushions (which will not require removal). There are no visible restrictions over Wandsworth Bridge. Distance to TLRN 0.8km. See Transport Access Plan in Appendix 5.</td>
<td>Removal of some on-street parking bays on Carnwath Road may be required if the turning movements of construction vehicles using the access are restricted. Alternative parking available within vicinity of site. Conclusion: Road access to site likely to be suitable for HGVs for accessing the TLRN (A3205). Some on street parking may also need to be removed if found to restrict the turning movements of construction vehicles using the site access. Access route to the TLRN (A3205) passes over Wandsworth Bridge with no visible restrictions.</td>
<td></td>
</tr>
<tr>
<td>Access to river</td>
<td>Located directly adjacent to river. Intermediate shaft site – river access not essential as road will be used to transport excavated material to main shaft site.</td>
<td>River access not required. Excavated material will be transported away by road.</td>
<td></td>
</tr>
<tr>
<td>Access to rail</td>
<td>Access to existing railway sidings at Clapham Junction uses the same route to the TLRN (A3205) although continues across the gyratory between the A217 and A3205 onto the A214. The route then turns onto East Hill following onto St John’s Hill before turning onto Plough Road for the Clapham Junction, Traincare</td>
<td>Route to possible rail link at Clapham Junction runs through a high street area along St John’s Hill and under a rail bridge with no visible restrictions in addition to the constraints encountered upon accessing the TLRN (A3205).</td>
<td></td>
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</table>
## Transport

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Depot railway sidings. The route contains the same constraints as the route to the TLRN (A3205), in addition to passing through a high street area along St John’s Hill. There are no visible restrictions under the rail bridge on Trinity Road. Distance 1.9km to rail access point from shaft site.</td>
<td>Clapham Junction railway sidings at the Traincare Depot accessible using Plough Road.</td>
<td></td>
</tr>
<tr>
<td>Parking</td>
<td>Parking to be provided within the site boundary for workforce. Parking is available on Carnwath Road for pay &amp; display users Mon-Sat 9:00-17:00 at £1.80/hr for a maximum 8hrs (unlikely to be suitable for workforce).</td>
<td>Up to ten on street parking spaces may require removal to allow construction vehicles access to the site. Alternative parking for displaced parking is provided on Carnwath Road and surrounding roads. Parking for workforce could be provided within site boundary.</td>
</tr>
<tr>
<td>Public transport accessibility</td>
<td>PTAL 1-2, as identified within Table 2.3.</td>
<td>PTAL least suitable. Public transport access issues for workforce. Workforce transport could be provided.</td>
</tr>
<tr>
<td>Traffic Management</td>
<td>Removal of on street parking on Carnwath Road may be required in order to accommodate HGV access. Existing site access will require widening.</td>
<td>On-street parking may require removal with alternative parking available within close vicinity of site. Existing site access will require widening.</td>
</tr>
</tbody>
</table>

**Summary:** The site is suitable as an intermediate shaft site as potential road and rail access routes are suitable for HGVs. To enable site access some on street parking bays on Carnwath Road may require removal (alternative parking available nearby) if found to affect the turning movements of construction vehicles accessing the site.

The potential for the workforce to access the site by public transport is low, however parking for the workforce could potentially be allocated within the site boundary or workforce transport may need to be provided.
<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designations, including Archaeological Priority Areas</td>
<td>No designations within the site boundary.</td>
<td>N/A</td>
</tr>
<tr>
<td>Summary of historical uses</td>
<td>The site appears to have been largely undeveloped until the early 20th century. By the 1960s the site was heavily developed and is marked on the map as ‘Hurlingham wharf’.</td>
<td>A detailed desk based assessment is required to sufficiently understand the archaeological resource and define risk to potential development.</td>
</tr>
<tr>
<td>Potential receptors of very high or high value with the potential to be directly affected</td>
<td>An archaeological evaluation was undertaken in 1996 in the west of the site. This evaluation identified archaeological material likely to be considered of medium value. This does not preclude the possibility of unrecorded archaeological receptors of high value being present elsewhere within the site.</td>
<td>A full review of previous archaeological evaluations as part of a detailed desk based assessment is required to sufficiently understand the archaeological resource and define risk to potential development.</td>
</tr>
<tr>
<td>Potential receptors of medium value with the potential to be directly affected</td>
<td>An evaluation undertaken in the west of the site in 1996 has identified a prehistoric pit feature and multi period alluvial deposits containing archaeological material. These archaeological receptors are likely to be considered of medium value, further material of medium value may be anticipated elsewhere within the site.</td>
<td>A full review of previous archaeological evaluations as part of a detailed desk based assessment is required to sufficiently understand the archaeological resource and define risk to potential development.</td>
</tr>
<tr>
<td>Other receptors with the potential to be directly affected</td>
<td>Dewatering of potential waterlogged deposits may be an issue considering the close proximity of the site to the Thames.</td>
<td>A detailed desk based assessment is required to sufficiently understand the archaeological resource and define risk to potential development.</td>
</tr>
<tr>
<td>Extent of existing disturbance (if known)</td>
<td>Previous archaeological investigations have shown that archaeological material, including alluvial deposits survive within the site. The extent of this survival is not known.</td>
<td>A detailed desk based assessment is required to sufficiently understand the archaeological resource and define risk to potential development.</td>
</tr>
</tbody>
</table>
| Potential issues                                                                      | Detailed design proposals and an outline method statement will be required to enable initial assessment of development impacts, and to inform mitigation proposals. Archaeological receptors of medium value have been | Mitigation methods could include:  
  - Desk based assessment  
  - Production of deposits model  
  - Archaeological |
## Archaeology

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
</table>
|                     | identified in the west of the site. Further archaeological receptors, including alluvial, peat and waterlogged deposits may be anticipated within the location of the shaft and crane sites. | monitoring of geotechnical investigations  
- Archaeological evaluation  
- Archaeological watching brief  
- Archaeological excavation. |

**Summary:** Based on current information the site is less suitable, as there are records of archaeological receptors of medium value, including alluvial deposits, within the western part of the site. It is reasonable to anticipate that further archaeological receptors of high or medium value may be present elsewhere within the site and that these may include waterlogged deposits. Further desk based assessment is required to assess in detail the risk posed by archaeological receptors within this site.
### Built heritage and townscape

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
</table>
| Designations including Conservation Areas, including trees                           | **Listed Buildings**  
There are no listed buildings within 250ms of the S69HF.  
**Locally Listed Buildings**  
Although the boroughs of Hammersmith and Fulham maintain a list of locally listed buildings, this data was not available at the time of this assessment.  
There are no locally listed buildings within 250m of the site within the boroughs of Richmond upon Thames and Wandsworth.  
**Conservation Areas**  
Sands End Conservation Area: 0m  
Hurlingham Conservation Area: 200m  
**Registered Historic Parks and Gardens**  
There are no Registered Historic Parks and Gardens within 250m of S69HF.  
**Locally Listed Parks and Gardens**  
There are no locally listed parks and gardens within 250m of S69HF.  
**Protected Views**  
There are no protected views within 250m site within the borough of Wandsworth. | **In the case of conservation areas, a high quality scheme design and adequate screening for the development may be required as discussed below.**  
A detailed desk-based assessment in conjunction with archaeological work will be required to further inform the likely impact of the development and to determine more detailed mitigation proposals. |
| Potential receptors of medium to very high importance with the potential to be directly affected | Sands End Conservation Area is likely to be directly impacted upon as a result of the development scheme. | Mitigation to enhance or preserve the character or appearance of Sands End Conservation Area. This is likely to require a high quality scheme design in order to mitigate against potential adverse impacts upon the designated area. |
| Other receptors of lesser importance with the potential to be directly affected       | Not Applicable.                                                                                                                                                                                          | Not Applicable.                                                                                                                                                                                                                     |
| Potential receptors of medium to high importance with the potential to be directly affected | Hurlingham Conservation Area                                                                                                                                                                             | The Conservation Area has |

**Appendix 9 - Page 5**
<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>very high importance with the potential to be indirectly affected</td>
<td></td>
<td>no visual relationship with the site. As such it is unlikely that the development will result in any impact and consequently no mitigation would be required.</td>
</tr>
<tr>
<td>Other receptors of lesser importance with the potential to be indirectly affected</td>
<td>Not Applicable.</td>
<td>Not Applicable.</td>
</tr>
<tr>
<td>Sensitive landscape character areas likely to be affected, including trees and TPOs</td>
<td>The site is within the Thames Policy Area and in a Conservation Area.</td>
<td>Retention of trees where possible and protection in accordance with BS 5837 (where relevant).</td>
</tr>
<tr>
<td></td>
<td>The site is a vacant, industrial site.</td>
<td>Introduction of landscape scheme to include appropriate surface treatments and planting to relate to river frontage.</td>
</tr>
<tr>
<td></td>
<td>The mixed–use Piper Building and Carnwath Road lie to the north, the River Thames to the south, a densely built-up residential development to the west and Wandsworth Bridge to the east. A designated Thames Path runs through the site however this is not currently accessible.</td>
<td>Introduction of appropriate new planting along the river frontage.</td>
</tr>
<tr>
<td></td>
<td>The presence and operation of machinery, materials stores and buildings would potentially result in temporary, adverse direct impacts on the character of the river frontage and temporary, adverse indirect impacts on neighbouring areas.</td>
<td>Presence and operation of machinery, materials stores and buildings on site would potentially impact the character of the site and river frontage. Appropriate mitigation such as screening would reduce such impacts.</td>
</tr>
<tr>
<td>Potential views likely to be affected</td>
<td>Open views from the River and street.</td>
<td>During construction, use of hoardings and appropriate lighting.</td>
</tr>
<tr>
<td></td>
<td>Views from the surrounding properties and Wandsworth Bridge.</td>
<td>Design of finished appearance of top structure and ventilation column to be given careful consideration.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planting to screen permanent plant.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adequate new planting would be important to protect visual amenity.</td>
</tr>
</tbody>
</table>
### Built heritage and townscape

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particular considerations on sites where new permanent structures are required</td>
<td>The development site is located within Sands End Conservation Area and as such should be of a high quality design to ensure it preserves or enhances the character of the area.</td>
<td>Any permanent structures will need to be of a high quality design in order that their visual intrusiveness is minimised and, in particular, so that they preserve or enhance the character or appearance of the Sands End Conservation Area and Park.</td>
</tr>
<tr>
<td>Potential issues</td>
<td>The main consideration is the development site’s location within the Sands End Conservation Area. There is the potential to mitigate against adverse impacts through a high quality scheme design and/or screening.</td>
<td>The scheme design will have to be of a sufficiently high quality so that it preserves or enhances the character or appearance of the Sands End Conservation Area.</td>
</tr>
</tbody>
</table>

**Summary:** The site is potentially suitable as an intermediate shaft site as impacts on built heritage receptors are likely to be limited to the Sands End Conservation Area, and the site is unlikely to result in severe adverse impacts on the townscape receptors. Mitigation in the form of a high quality design (with screening where appropriate) is likely to be required to ensure that the Sands End Conservation Area is preserved or enhanced.
# Water resources – hydrogeology and surface water

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
</table>
| Hydro-geological conditions (Groundwater and Surface Water) From BGS Geological Model giving average ground condition profile. Local near surface conditions may vary, particularly within the river. | **Geology (thickness)**  
- Superficial Geology and Made Ground (1 m)  
- London Clay (46 m)  
- Lambeth Group (20 m)  
- Thanet sand (11 m)  
**Hydrogeology**  
- Piezometric Level: ~ -25 mAOD (~30 mbgl)  
**Groundwater Monitoring Location**  
- EA Hydrometry Sites: TQ27-159 - approximately 875 m south of the site (other side of the River Thames)  
**Watercourses**  
- Adjacent to River Thames | The shaft will be constructed to an invert level of approximately 38.66 mbgl therefore the shaft will be founded in the London Clay. Piezometric head in Chalk will be approximately 8.66 m above the base of the construction. |

## SPZs and groundwater users

<table>
<thead>
<tr>
<th>SPZ</th>
<th><strong>Not located in a Source Protection Zone</strong></th>
</tr>
</thead>
</table>

**EA Licensed Groundwater Abstractions and Details**  
- No public water supply  
- 5 licensed abstraction borehole within 2 km radius  

**Licence Numbers:**  
1. 28/39/42/0071 (1 borehole)  
2. 28/39/41/0081 (1 borehole)  
3. 28/39/39/0177 (2 borehole)  
4. 28/39/39/0157 (1 borehole)  

**Locations:**  
1. 390 m southeast of the site (other side of the River Thames)  
2. 1.2 km south of the site (other side of the River Thames)  
3. 800 m northwest of the site  
4. 1.77 km northeast of the site  

**Operator:**  
1. Hanson Quarry Prod Europe Ltd  
2. London Borough of Wandsworth  
3. Trustees of the Hurlingham Club  
4. Circadian Limited  

**Abstracted Aquifer Unit:**  
A simple volumetric approach has been used to calculate the catchment area of the abstraction borehole. A conservative mean annual recharge of 100mm/year was used to calculate a radius of 274 m for licence 1, 160 m for licence 2, 219 m for licence 3 and 851 m for licence 4. As a result, the shaft is not located within the catchment area.
## Water resources – hydrogeology and surface water

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Chalk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Chalk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Gravel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Chalk</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Abstraction Purposes:**
1. Industrial, commercial and public service (mineral products-general use)
2. Industrial, commercial and public service (municipal grounds-make up or top up water)
3. Industrial, commercial and public service (sports grounds/facilities- spray irrigation)
4. Production of energy (electricity-boiler feed)

**Abstraction Quantity (annual):**
1. 23,515 m$^3$
2. 8,000 m$^3$
3. 15,000 m$^3$
4. 227,300 m$^3$

**Local Authorities (LA) Unlicensed Groundwater Abstractions and Details**
- Information pending from Hammersmith and Fulham Council
- No abstraction borehole within 1 km radius inside Wandsworth Council Boundary

**Borehole locations and depths**
There are 11 historical records of water wells: 9 deep wells and 2 shallow wells within 1 km radius.
Depth range: 101.8 – 192.02 m.
Depth range: 6.8 – 9.1 m.

**Potential impacts on surface water features**
The site is located adjacent to the River Thames. The site is behind flood defences so the pollution risk is through drainage to the Thames.
Work needs to be undertaken in consideration of Pollution Prevention Guidelines – PPG1, PPG5 and PPS23.

**Potential impacts on groundwater (resources and quality)**
No impact on groundwater at depth is likely since the intermediate shaft is to be constructed in London Clay (non aquifer). At shallow depth, the shaft is located in Alluvium which is classified as a minor aquifer. Limited impact on
## Water resources – hydrogeology and surface water

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>shallow aquifer if water is excluded from the excavation by diaphragm wall or caissons.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likely types of mitigation measures that will be required</td>
<td>No mitigation required if groundwater is not impacted.</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Potential issues</td>
<td>The intermediate shaft to be excavated in London Clay but to be below piezometric head in Chalk. Potential pressure effects. Limited impact on flow in shallow aquifer.</td>
<td>Confined head in Chalk to be considered as part of geotechnical design. Impact on and mitigation for shallow aquifer will depend on construction design.</td>
</tr>
</tbody>
</table>

**Summary:** In terms of hydrogeology, this site is suitable because the intermediate shaft is to be constructed in London Clay (non aquifer). The Chalk piezometric head is likely to be approximately 8.66m above the base of construction and should be taken into account in the engineering design. No impact on the Chalk aquifer is expected. Superficial deposits at the site comprise Alluvium which is classified as a non aquifer, and therefore no impact is expected at shallow depth.

In terms of surface water resources, this site is suitable as an intermediate shaft site because there is no direct overland pathway for pollution and standard mitigation to manage drainage (behind Thames Flood defences) to prevent pollution should be feasible.
## Ecology (terrestrial and aquatic)

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statutory designations</td>
<td>No sites within 2km</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Non-statutory designated wildlife sites</td>
<td>River Thames and Tidal Tributaries SMI lies immediately adjacent to site</td>
<td>The construction of the overflow culvert is likely to affect the Thames and would potentially require negotiation with the EA, post-works restoration and compensatory habitat provision.</td>
</tr>
<tr>
<td>BAP priority habitats</td>
<td>Small amounts of wasteland vegetation appear to be present in the western part of the site. It is possible that the site could be classed as UK BAP habitat ‘Open Mosaic (on previously developed land)’. Aerial photography is unclear on the quality of the foreshore habitat, but BAP priority habitat ‘mudflats’ may be present.</td>
<td>Compensatory provision may be required but the areas are small and this is likely to be easily achieved. The construction of the overflow culvert is likely to affect the Thames and would potentially require negotiation with the EA, post-works restoration and compensatory habitat provision.</td>
</tr>
<tr>
<td>Protected or otherwise notable species within the Study Area</td>
<td>Wasteland habitat may support uncommon or notable invertebrates, locally notable plant species, and reptiles. No direct impacts on aquatic ecology receptors, although piling close to the river bank could result in impacts on fish in the River Thames.</td>
<td>The presence of any notable species within the development area would lead to a need for mitigation, which may include off-site provision. The construction of the overflow culvert in the Thames would require detailed aquatic invertebrate and fish investigation. Controls may need to be placed on piling operations close to the river bank. Negotiation with EA required.</td>
</tr>
</tbody>
</table>

### Potential issues

**No other issues.**

**No other issues.**

### Summary

The site is considered to be suitable as an intermediate shaft site as few potential sensitive ecological receptors have been identified at this stage. There is a small area of wasteland habitat present on site, which could potentially support uncommon or notable invertebrates, plant species, and reptiles; and should this be the case there may be a need for mitigation, which could include a limited amount of off-site provision. Basic ecological surveys would be required if the site were selected. The construction of the overflow culvert is likely to affect the Thames and would potentially require negotiation with the EA, post-works restoration and compensatory habitat provision.
### Flood risk assessment

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Risk Zone</td>
<td>Flood Zone 3 – Defended to the 1in1000year flood level. There is the potential for a breach for which mitigation would need to be considered as part of the FRA. Sewage transmission infrastructure is considered to be water compatible according to table D.2 of PPS25.</td>
<td>An FRA would be required to assess the risk of flooding to the site.</td>
</tr>
<tr>
<td>Assessment of conditions for SuDS</td>
<td>There is space for SuDS and the site is brown field open ground. The site would need to be investigated for it’s suitability for infiltration SuDS because of the geology. Attenuation would be possible.</td>
<td>N/A</td>
</tr>
<tr>
<td>Potential issues</td>
<td>No other issues.</td>
<td>No other issues.</td>
</tr>
</tbody>
</table>

**Summary:** The site is suitable as an intermediate shaft site as it is defended from flooding from the River Thames, and there is potentially space for attenuation SuDS to be accommodated on site. However, further investigation is required to determine if the site is suitable for infiltration SuDS.
### Air quality

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQMA</td>
<td>The air quality objective for NO(_2) is exceeded on major roads in vicinity of site.</td>
<td>There is a need for more site specific data.</td>
</tr>
<tr>
<td>Sensitive Receptors</td>
<td>There are residential properties along Wandsworth Bridge Road (A217) and along the access route from the A217 to the site. There are residential properties within 20m of the proposed site.</td>
<td>There are relevant air quality sensitive receptors present along the route the construction traffic is likely to take and close to the proposed construction works.</td>
</tr>
<tr>
<td>Existing traffic issues</td>
<td>The main traffic issue in this area is exhaust emissions along the A217 corridor.</td>
<td>Additional vehicle emissions have a high potential to interfere with local air quality action plan policies.</td>
</tr>
<tr>
<td>Existing sources of significant air pollutants</td>
<td>See above.</td>
<td>See above.</td>
</tr>
<tr>
<td>Notable gaps in existing air quality monitoring</td>
<td>There is no data available at the likely access to A217 and the nearest existing data indicates that existing AQLV exceeded.</td>
<td>Collect a minimum of 6 months diffusion tube data at site access to A217 or other point of access to major road network.</td>
</tr>
<tr>
<td>Potential issues</td>
<td>The risk from additional exhaust emissions from construction HGVs is undefined at present. The risk from dust impacts is moderate.</td>
<td>Minimise HGV movements on the local road network during the peak hour. Standard dust control measures will minimise the effect of fugitive dust on nearby sensitive receptors.</td>
</tr>
</tbody>
</table>

**Summary:** This site is suitable for use as an intermediate shaft site as although there is potential for fugitive emissions of dust during construction to have a perceptible impact at residential receptors closest to the site, these impacts could be minimised with standard dust control measures. There is also the potential for HGV movements to cause localised air quality impacts, however this could be mitigated by minimising the movement of HGVs during peak hours.
### Noise

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise band level (from Defra noise maps)</td>
<td>Information from Defra noise maps indicates daytime noise levels of between less than 58 dB and 63 dB $L_{Aeq}$ and nighttime noise levels of between less than 50 dB and 55 dB $L_{Aeq}$ at residential properties on Carnwath Road located to the west of the site and at the Piper Building to the north. The residential properties facing the site are likely to experience moderate to low daytime and nighttime noise levels due to their distance from major roads. Noise levels from the Defra noise maps provide an indication of prevailing noise levels only, and will not be employed in any detailed assessments for chosen sites.</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sensitive Receptors</td>
<td>There are sensitive receptors at a distance of approximately 5m during construction works and 85m during operational activities at the nearest sensitive receptors on Carnwath Road to the west. The Piper Building receptors are located 19m to the north. To the south of the site, on the opposite side of the Thames, are residential flats on Smugglers Way. To the east of the site are industrial/warehousing buildings. Sensitive receptors to the west of the site consist of 3-4 storey residential dwellings. The Piper Building located to the north is 6 storey's in height. The properties on the opposite side of the Thames are 7-8 storey residential flats. There are a number of sensitive receptors adjacent to the site access route on Carnwath Road which will be considerably affected by HGV traffic.</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Site considerations</td>
<td>Comments</td>
<td>Mitigation required and conclusions</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Existing traffic issues</td>
<td>Local road traffic on Carnwath Road and other nearby residential streets, coupled with more distant road traffic on the A219 to the east of the site, will contribute to the local noise climate in the area of the sensitive receptors.</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Existing sources of significant noise emissions</td>
<td>Local road traffic on Carnwath Road and other nearby residential streets, coupled with more distant road traffic on the A219 to the east of the site, will contribute to the local noise climate in the area of the sensitive receptors. There are no railway lines or significant industrial noise sources evident in the area.</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
| Potential issues                    | Construction:                                                           | Adherence to the good site practices provided in BS5228.  
|                                     | The construction period is estimated at 4 to 5 years and working hours will be 24 hours per day Monday to Saturday. This has the potential to result in adverse noise impacts upon the sensitive receptors on Carnwath Road. A relatively large number of daily HGV movements are anticipated. This number of vehicle movements has potential to result in adverse noise impacts upon properties on Carnwath Road. Proposed 3m site boundary fencing will provide useful noise mitigation to some plant and construction activities. Situating plant in the south eastern area of the site would maximise the distance between them and the nearest receptors and minimise the potential disturbance. Vibration resulting from general construction works is not anticipated to result in an adverse impact. The nearest receptors to the proposed shaft location are at a distance of approximately 19m and it is unlikely that vibration levels will result in minor cosmetic damage. | Siting of noisy equipment and construction activities as far as is practicable from sensitive receptors. Provision of site boundary noise fences. Noisy construction activities, or activities which may cause vibration, be undertaken during daytime hours only to reduce the noise impact during night-time construction. |
### Noise

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>during shaft sinking. Vibration levels may give rise to annoyance. Vibration from tunnelling should be considered on a case by case basis at particular sensitive locations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation: With appropriate attenuation (if necessary), there is no reason why noise from the ventilation column and associated permanent structures should result in adverse noise impacts to nearby sensitive receptors.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summary:** The site is less suitable as an intermediate shaft site due to the relatively short separation distances between the site and the closest sensitive receptors. The number of vehicles associated with the construction phase and their access route has the potential to cause disturbance to properties lining those streets. Due to the short distance of the shaft location and the nearest sensitive properties vibration levels during construction may give rise to complaints.
### Land quality

<table>
<thead>
<tr>
<th>Site Location</th>
<th>Grid Reference: 525574, 175563</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Site Use</td>
<td>Summarises the current use of the site (e.g. playground, road verge) based on information obtained from Envirocheck report maps, current aerials and photographs from Planning team site visits.</td>
</tr>
<tr>
<td>Topography</td>
<td>The site is flat, ex-industrial made ground adjacent to the Thames. The site is vacant land with no buildings.</td>
</tr>
<tr>
<td>Field Evidence of contamination (ie, visual/olfactory)</td>
<td>The site was not accessible, however no evidence of contamination was observed from the boundary.</td>
</tr>
</tbody>
</table>

### Current surrounding land use (immediately adjacent to site)

**Situation in June 2009:**

**North:** The single carriageway (two lane) Carnwath Road runs along the northern boundary of the site. Beyond the road is a mixed use building (The Piper Centre/Piper building) including a multi-storey flats (about 5 storeys).

**East:** The site is adjacent to Carnwath Road Industrial Estate (small businesses, offices, manufacturing workshops etc.) to the east, separated by a pedestrian route to access the Thames Path.

**South:** The Thames runs along the southern boundary of the site.

**West:** The site is adjacent to 3 storey residential properties to the west.

### Geological and hydrogeological information

#### Geological Strata

- Superficial Geology and Made Ground (1 m)
- London Clay (46 m)
- Lambeth Group (20 m)
- Thanet sand (11 m)

#### Underlying Aquifer Classes

- **Non-Aquifer:** London Clay
- **Minor Aquifer:** River Terrace Deposits, Lambeth Group, Thanet Sands, Harwich Formation,
- **Major Aquifer:** Chalk

#### Groundwater Vulnerability/Soil Classification

- **River Terrace Deposits – Minor Aquifer/London Clay – Non aquifer**
- **High Leaching Potential of Soils (U)** (Note that soil information for urban areas is based on fewer observations than elsewhere in the country. Therefore a worst case vulnerability (H) is assumed until proven otherwise).

#### Source Protection Zone Details

Not located in a Source Protection Zone.

#### Surface Water Receptor

The site is located adjacent to the River Thames but is behind flood defences so the pollution risk is through drainage to the river.
## Land quality

### Relevant information within a 250m radius of the site

<table>
<thead>
<tr>
<th>Historical Potentially Contaminating Activities (based on mapping data)</th>
<th>Onsite</th>
<th>Offsite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Open land, riverside 1874 – 1920</td>
<td>• Open land (directly adjacent to site) 1874 – 1880</td>
</tr>
<tr>
<td></td>
<td>• Wharf/Transport support and cargo handling operations listed on site 1896 - 1999</td>
<td>• Wharf operations/transport support and cargo handling (closest directly adjacent west of site) 1948 – 1999</td>
</tr>
<tr>
<td></td>
<td>• Numerous industrial buildings located on site 1920 – 1999</td>
<td>• Tanks (closest located 12m west) 1951 - 1976</td>
</tr>
<tr>
<td></td>
<td>• Tanks identified on site 1951</td>
<td>• Concrete works (15m north) 1954 – 1962</td>
</tr>
<tr>
<td></td>
<td>• Electrical substation located on site 1971</td>
<td>• Electrical substations (closest located 33m north) 1951 - 1971</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Gravel pit (50m north) 1920 – 1950</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Works – use unspecified (80m northeast) 1962 – 1977</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Petroleum storage facility (98m west) 1976</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Paper works (120m north) 1954 – 1962</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Broom House Dock (170m west) 1896 – present</td>
</tr>
</tbody>
</table>

#### Pollution Incidents to controlled waters
- None

#### Landfill Sites
- None

#### Other Waste Sites
- None

#### Registered Radioactive Substances
- None

#### Fuel Stations/Depots
- None

#### Contemporary Trade Directory Entries
- Two
  - Cement works, inactive (15m north)
  - Paper works, inactive (120m north)

### Site classification based on above information

<table>
<thead>
<tr>
<th>Potential Site Contaminants derived from surface sources (e.g. contaminants in made ground)</th>
<th>Activity</th>
<th>Distance and direction to site</th>
<th>Contaminants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Made Ground</td>
<td>1) Onsite, directly adjacent to site</td>
<td>1) Metals, TPH, PAHs</td>
<td></td>
</tr>
<tr>
<td>2) Wharf operations (transport support and cargo handling)</td>
<td>2) Onsite, directly adjacent to site</td>
<td>2) Metals, TPH, PAHs</td>
<td></td>
</tr>
<tr>
<td>3) Tanks – contents unknown</td>
<td>3) Onsite, directly adjacent to site</td>
<td>3) Metals, TPH, PAHs, Solvents</td>
<td></td>
</tr>
<tr>
<td>4) Electrical Substation</td>
<td>4) Onsite, directly adjacent to site</td>
<td>4) PCBs</td>
<td></td>
</tr>
<tr>
<td>5) Historical potentially industrial</td>
<td>5) Onsite, directly adjacent to site</td>
<td>5) TPH, PAHs, Metals</td>
<td></td>
</tr>
</tbody>
</table>

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### Land quality

<table>
<thead>
<tr>
<th>buildings – use not specified</th>
<th>1) Wharf operations (transport support and cargo handling)</th>
<th>1) closest directly adjacent to site</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2) Concrete works</td>
<td>2) 15m north</td>
</tr>
<tr>
<td></td>
<td>3) Electrical Substation</td>
<td>3) closest located 33m north</td>
</tr>
<tr>
<td></td>
<td>4) Paper works</td>
<td>4) 120m north</td>
</tr>
<tr>
<td></td>
<td>1) TPH, PAHs, Metals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) TPH, PAHs, Solvents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) PCBs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4) Solvents, PAHs, PCBs</td>
<td></td>
</tr>
</tbody>
</table>

#### Potential Site Contaminants derived from off-site sources and transported to site

1) Wharf operations (transport support and cargo handling)
2) Concrete works
3) Electrical Substation
4) Paper works

1) TPH, PAHs, Metals
2) TPH, PAHs, Solvents
3) PCBs
4) Solvents, PAHs, PCBs

#### Potential Contamination Pathways to Site

(Conceptual Site Model)³

- **Source 1:** A1, A2, A3, B4
- **Source 2:** D6, E1

Refer to schematic Conceptual Site Model for explanation of site-specific source-pathway-receptors.

#### Contamination Category

Category 2 – Assessed as Medium Risk

#### Summary:

The site is less suitable as an intermediate shaft site as it has been previously developed for industrial use, namely wharf operations, with potentially offsite contaminating activities including depots, concrete works, docks and paper works.

The potential sources outlined above may impact on site workers and adjacent human receptors through direct contact/ vapour inhalation exposure pathways. There is also the potential for surface water (the River Thames) to be impacted.

#### Notes:

1. From BGS Geological Model giving average ground condition profile. Local near surface conditions may vary, particularly within the river.

2. Soil information for urban areas is based on fewer observations than elsewhere in the country. Therefore a worst case vulnerability (H) is assumed until proven otherwise.

3. Refer to schematic Conceptual Site Model for explanation of site-specific source-pathway-receptors
Contacts

For information about the Thames Tideway Tunnel

Call: 0800 0721 086 Lines are open 24 hours a day
Visit: www.thamestidewaytunnel.co.uk
Email: info@tidewaytunnels.co.uk

For our language interpretation service call 0800 0721 086

For information in Braille or large print call 0800 0721 086

For information about acceptance of our application and the examination process please contact the Planning Inspectorate.

Call: 0303 444 5000
Visit: http://infrastructure.planningportal.gov.uk