Please note:

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
C05XA

Foreshore, adjacent to Barn Elms
# THAMES TUNNEL

## SITE SUITABILITY REPORT C05XA

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<th>Full Form</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>GLA</td>
<td>Greater London Authority</td>
</tr>
<tr>
<td>HGV</td>
<td>heavy goods vehicle</td>
</tr>
<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>
</tr>
<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>
</tr>
<tr>
<td>TLRN</td>
<td>Transport for London Road Network</td>
</tr>
<tr>
<td>TPA</td>
<td>Thames Policy Area</td>
</tr>
<tr>
<td>UDP</td>
<td>unitary development plan</td>
</tr>
<tr>
<td>UXO</td>
<td>unexploded ordnance</td>
</tr>
</tbody>
</table>
1 INTRODUCTION

1.1 Purpose and structure of the report

1.1.1 The Site Selection Methodology Paper (May 2009) (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 site is one of the shortlisted sites for West Putney Storm Relief CSO. 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 The proposed site C05XA is located within the River Thames foreshore in the London Borough of Richmond upon Thames, close to its boundary with the London Borough of Wandsworth. A site location plan is attached as Appendix 2.

2.1.3 The surrounding area is predominantly characterised by large expanses of protected public open space, river-based sports and leisure facilities and, set at a distance, residential properties. The site is bounded to the west by the Thames Path, which has benches overlooking the river. In close proximity is an existing Scout hut and Sea Cadets facility (located within 27 and 23 metres of the site respectively). Further west is the Barn Elms School Sports Centre playing fields. To the southeast is Leaders Gardens, another area of protected open space which includes children’s play facilities, located within London Borough of Wandsworth. To the east of the site, across the River Thames, is Bishops Park recreation ground, located in Hammersmith and Fulham.

2.1.4 The nearest residential properties are located in Stockhurst Close, approximately 135 metres from the proposed site and within the London Borough of Wandsworth. These properties are a mix of two-storey terraced dwellings and three-storey flats, screened from the site by dense vegetation which lines Beverley Brook.

2.1.5 The site is covered by a number of designated areas under the London Borough of Richmond upon Thames Unitary Development Plan, the Wandsworth Unitary Development Plan and the Consolidated London Plan, including Metropolitan Open Land, Thames Policy Area and Site of Nature Conservation Importance. All the mapped designations are shown on the planning and environment plans in Appendix 3.

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

2.1.7 There is no existing road access to the site. The existing footbridge leading to the site from Embankment is inadequate to provide vehicular access to the site. The site is 1.9km from the South Circular Road (A205). There is no rail network local to the site. There are no existing wharfage/jetty facilities at the site. A transport plan for the site is attached as Appendix 5.

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

- Beverley Brook gas crossing runs through the southern corner, but away from the shaft location
- Tide barrier to Beverley Brook
- River wall (including within Beverley Brook).

2.1.9 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.

2.1.10 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 London Clay.

2.2 Type of site

2.2.1 The site C05XA is being considered as a CSO site to intercept the West Putney Storm Relief Sewer CSO (CS05X).
3 PROPOSED USE OF SITE – CONSTRUCTION PHASE

3.1.1 The proposed construction phase layouts for the CSO site 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 a CSO site
- potential access point.

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 Photographs of typical activities associated with the CSO site construction phase are provided in Appendix 7. Potential above ground construction features include:
- approximately 3m high hoarding around the site boundary
- welfare facilities, temporary structures, approximately 3m high
- grout plant, approximately 3m to 5m high, including silos
- mobile crane, approximately 30m high (maximum and not for full construction duration).

3.1.5 Foreshore working is required for this site and a cofferdam or similar construction works would be needed.

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

Table 3.1 Construction phase data

<table>
<thead>
<tr>
<th>Activity</th>
<th>CSO site</th>
</tr>
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<tbody>
<tr>
<td>Length of construction period</td>
<td>0.5 to 2 years</td>
</tr>
<tr>
<td>Likely working hours, ie, (night/day/weekend)</td>
<td>12 hrs from 7am to 7pm</td>
</tr>
<tr>
<td>Working days</td>
<td>Mon to Sat</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 for this site.

4 PROPOSED USE OF SITE – OPERATIONAL PHASE

4.1 Introduction

4.1.1 The indicative operational phase layout for the CSO site is located in Appendix 8 – Operational Phase Layout, and is 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 CSO sites.

4.1.3 The above ground infrastructure at this site is likely to comprise a ventilation column 10m\(^a\) high and 3m diameter, a ventilation building 5m x 15m x 5m high and a 20m x 10m top structure with openings. The top structure is to provide access and egress into the main shaft and flap valve chamber.

\(a\) 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.
4.1.4 The top structures are envisaged to be finished at a level of 107m\(^b\) tunnel 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.

4.1.5 A hardstanding would be provided to the top structures. The site would not be fenced.

4.1.6 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 There is no existing access road to the site. The site is 1.9km from the South Circular Road (A205).

5.1.3 There are two options to provide access to the site by road. The first is to replace the existing footbridge at the end of the Embankment to take HGV loads and extend the road up to the site. The Embankment is a residential road with on-street parking. The shortest route to a Transport for London Road Network passes over a bridge, which is subject to a weight restriction of 16T. There is another, longer route (B349/A306) which avoids this bridge.

5.1.4 The alternative is to build a new road from the Queen Elizabeth Walk, which is off the A306 and is approximately 1.1 km away from the site. The route could follow an existing footpath along the riverside up to the Wetlands Centre before turning west to the A306.

5.1.5 These options apply to both the construction and operational phases.

Rail

5.1.6 There is no rail network local to this site. However, rail access is not considered to be a significant factor for CSO sites.

\[b\] 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.
5.1.7 River access and jetty/wharfage facilities are not a requirement for CSO sites. However, as this site is within the foreshore, there may be feasible opportunities for barge transport, which could be useful as road access would be difficult.

5.2 Construction works considerations

5.2.1 The site is in the foreshore and its size and shape can be adjusted if necessary.

5.2.2 The existing storm relief sewer needs to be extended to the foreshore to be connected to the drop shaft. Consideration could be given to move the drop shaft south of the Beverley Brook to improve access for construction and operational phases.

5.2.3 No demolition is required.

5.2.4 There are no neighbouring buildings so mitigating settlement of buildings is not a consideration for this site.

5.2.5 As the site is in the foreshore, a temporary cofferdam would be required and the contained area filled to provide a level site compound.

5.2.6 Foreshore sites carry with them a higher risk than inland sites in respect of unexploded ordnance, notably near bridges, and this would need to be investigated.

5.2.7 Foreshore sites carry with them a higher risk than inland sites of archaeological finds that might delay the construction programme.

5.2.8 Data available on third-party assets and significant utilities show that the main items of concern in this area would be the Beverley Brook gas main crossing that runs through the southern corner of the site, the tide barrier in Beverley Brook and the river wall (including within Beverley Brook). Construction methods would be adopted, as appropriate, to mitigate potential settlement of these assets.

5.2.9 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 structures to the drop shaft and flap valve chamber would be 2m above ground level.

5.3.2 The top structure to the interception chamber and drop shaft would be in the foreshore, and a river wall matching and tied into the existing river wall would be provided around the permanent operational site. The site would be finished to the same level as the adjacent shore.

5.3.3 The feasibility of structures in the foreshore from a navigation aspect would need to be discussed with the PLA.

5.4 Health and safety

5.4.1 As the site is within the foreshore, measures would need to be taken to mitigate the risks of flooding/site inundation.

5.4.2 There are no other unusual health and safety issues 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
6.2 Planning applications and permissions

6.2.1 An initial desktop search of the London Borough of Richmond 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 provides a summary of the relevant local planning policies and designations affecting the site. They are taken from the saved policies from the London Borough of Richmond upon Thames Unitary Development Plan (First Review), which was adopted on 1 March 2005 and saved beyond 2008. As a close neighbouring borough, the policies for Wandsworth are also referred to. The local plan comprises the saved policies from the Wandsworth Unitary Development Plan, adopted August 2003, and the Consolidated London Plan, adopted February 2008.

6.3.2 ENV 26, Thames Policy Area – the site is situated within a Thames Policy Area and is subject to Policy ENV 26, which provides that the council will seek to protect and enhance the special character of the Thames by protecting views and vistas, including the individual reaches, and ensuring development is of an appropriate scale and design quality that respects and makes best use of the river frontage.

6.3.3 ENV 18, Sites of Special Scientific Interest and Other Sites of Nature Importance – the site is located in the River Thames, which is designated as an SNCI. Policy ENV 18 states that proposals which may have an adverse effect will not be permitted. Developers may be required to show that their proposals will not affect these areas by way of built form, noise, air pollution, light pollution, surface runoff of water, water quality, changes in level, landscaping and other factors, including those raised in the Local Biodiversity Action Plan.

6.3.4 Adjacent to and partly located within the site is the Barn Elms towpath – an area of Public Open Space (POS). Although the associated policy is concerned primarily with the retention and improvement of POS itself, it is important to note that an adverse impact on the visual context or enjoyment of existing POS is likely to be a consideration of the council. For reference, the associated policy is noted below.

6.3.5 ENV 11, Retention and Improvement of Public Open Space, states the council will resist the loss of POS, and endeavour to increase the enjoyment and visual quality of POS through a high standard of design and by improving access and facilities.

6.3.6 The site also contains a Public Right of Way, partly within and adjacent to the south-western edge of the site. In addition, the Thames Path and National Cycle Route run through the site. Policy TRN 10, Public Rights of Way, states that the council will seek to retain existing rights of way unless an alternative is proposed which is at least as safe, convenient and attractive.

6.3.7 The site is located adjacent to the Archaeological Priority Area of Barnes Common to the west of the site. The following two policies are applicable to this designation.

6.3.8 BLT 8, Evaluation of Archaeological Sites, states the council will require early discussion with developers and specialist bodies, as well as archaeological field evaluation on sites proposed for development that may affect archaeological remains or areas identified for their archaeological potential.

6.3.9 BLT 9, Development of Archaeological Sites, requires in cases where development will affect sites of archaeological importance, that the applicant ensures provision, including funding, for ‘the remains to be preserved in situ, or in exceptional cases where preservation in situ is not appropriate or feasible, excavated and recorded’.

6.3.10 BLT 16, Unneighbourliness Policy, states that in considering proposals for development, the council will seek to protect adjoining properties from unreasonable loss of privacy, pollution, visual intrusion, noise and disturbance.
6.3.11 **ENV 1, Metropolitan Open Land** – the site is located in the River Thames and Thames Barn Elms and is adjacent to Barn Elms (to the west). Under Policy ENV 1, there is a presumption against development that is incompatible with the openness of the Metropolitan Open Land. In considering development within MOL, the council will take into consideration the visual impact on the character of the open land.

6.3.12 Adjacent to the west of the site are the amenities of Scout Hall and a Leisure Centre (the Barn Elms Schools Sports Centre). UDP Proposal Site B5, Barn Elms Sports Grounds, proposes the ‘rationalisation of sports use, including provision of public indoor sports hall and upgrading sports pitches, enhancement of landscape’.

6.3.13 Adjacent to the site, a number of planning designations and policies from the Wandsworth Unitary Development Plan, adopted August 2003, are applicable and are detailed below:

6.3.14 Policy ON7, Green Chains and Links – Green Chains and links run along the southern boundary of the site in between the Richmond upon Thames and Wandsworth borough boundaries along Beverly Brook. Policy ON7 resists development proposals that would ‘harm the open nature of any open land, which could contribute to a Green Chain, or links between open spaces, especially between areas of Metropolitan Open Land, and where they would form strategic links with adjoining boroughs’.

6.3.15 Policies TBE14 and TBE15, Archaeological Priority Area – an Archaeological Priority Area is designated adjacent to the south of the site and requires provision for archaeological investigation, evaluation and, where applicable, preservation in situ or excavation of remains, similar to the requirements detailed in Paragraph 6.3.9.

6.3.16 Policy R14, Putney Embankment Policy Area – Putney Embankment Policy Area is located adjacent to the south of the site and protects from development that would result in loss of river-based uses and facilities or have a detrimental impact upon the historical character of the area for river sports.

6.3.17 To the south of the site is a Conservation Area. Conservation Areas are covered by Policy TBE10 – not permitting development if it would harm the character, appearance or setting of a conservation area or fail to respect the grain of the area – and Policy TBE11, that restricts development involving demolition.

6.3.18 The site is adjacent to a Thames Policy Area. Policy R1 states that within the Wandsworth Thames Policy Area outside the Industrial Employment Areas, Metropolitan Open Land, Putney Embankment Area and the safeguarded wharves, development of sites of 0.5 ha and over will only be permitted if it includes a mix of uses. Policy R2 states that development of sites on the Thames riverside within the WTPA, defined on the proposals map, will not be permitted unless certain provisions and alternative arrangements are made for routes and accesses.

6.3.19 To the south of the site are areas designated as Open Spaces Quality Rating, Open Spaces Quality of Supply and Open Spaces Improvement. These are in addition to other Larger Protected Open Spaces covered by the policy. Public Open Space is covered by Policies ON1, ON2 and ON3, which restrict development leading to loss of open space (or part of open space), allotments, and related environmental and recreational functions.

6.3.20 Adjacent to the south of the site (but separated) is the General Commercial (Wandsworth Chelsea & Fulham Sea Cadet Unit) Play Area. Policy LR1, Play Equipment, does not permit development involving the loss of children’s play facilities, unless the council has identified no need for the facilities or the use gives rise to harm to residential or other amenity and there is an identified need, with the site appropriately relocated.

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 Richmond

6.4.2 The council stated that there are sports facilities and a Scout hut/community hall near the site. The site is within flood territory and there is potential for the site to flood. Cover slabs and main buildings would need to be above flood levels. The Boat House public house is located on the riverside. The Wetlands Centre is situated immediately to the north of the site and the Barn Elms Playing Fields adjacent to the west (and which has been subject to a recent planning application). A local wildlife site is also near to the site and the impact of lighting, particularly during construction, on bats and birds should be considered. Access to the site is proposed via the A3003/A306, which can become congested. The site is sensitive in regard to noise. Security issues post-construction will also need to be considered.

English Heritage

6.4.3 No comment.

Environment Agency

6.4.4 No comment.

Port of London Authority

6.4.5 No comment.

Transport for London

6.4.6 No comment.

Other statutory consultees

6.4.7 No comment.

6.5 Planning comments

6.5.1 A number of planning designations are applicable both on and adjacent to the site. These designations have been identified and described in Section 6.3 and of these designations, those relating to nature conservation and public open space are of most relevance to the proposed development.

6.5.2 The proposed site should not result in any loss of public open space, although its location, close to Barn Elms, may impact visually within the immediate vicinity and some mitigation against potential construction impacts such as noise, dust and traffic movements may be required. However, it is unlikely the proposal site would result in long-term or significant harm to the designation. The proposal site should not conflict with policies ENV 1, ENV 11 or Proposal Site B5.

6.5.3 The site falls within a designated Archaeology Important Area. The appropriate level of site investigation should be agreed with the LPA in accordance with policies BL 8 and BL 9, and also TBE 14 and TBE 15. Further appraisal of the archaeological potential on the site is provided in Section 7.

6.5.4 The proposal site is within the River Thames, a designated Site of Importance for Nature Conservation. This is a general designation covering the entire River Thames. The purpose of Thames Tunnel Project is to improve the overall environmental condition of the river which, among other gains, will promote biodiversity. Construction activity adjacent to and within the river, with the appropriate level of mitigation, is considered unlikely to adversely impact upon or conflict with the aims of this designation. However, a fuller assessment of the likely impact on the immediate location is included in Section 7.

6.5.5 The designations and policies which cover extensive areas of the borough, such as the Thames Policy Area (ENV N-26) and Metropolitan Open Land (ENV-N), are unlikely to be
significant constraints. The construction works in themselves and remaining top structures should not result in overly prominent development in this location and would not unacceptably obstruct local views. The design and integration of the remaining after-use structures will require consideration to ensure they are appropriate to this location and existing context.

6.5.6 As the Thames Path runs along the northern portion of the proposed worksite, temporary diversion of this route may be required. Further transport considerations are included in Section 7.

6.5.7 The site is located adjacent to the Putney Embankment Policy Area. This designation seeks to protect and enhance riverside sites as well as protect from development that would result in the loss of river-based uses. Use of the foreshore may impact on existing river sports uses, particularly those operating from the adjacent Sea Cadets facility, and within the wider locality. Potential mitigation measures to ensure these uses can continue and coexist alongside the temporary construction works will require further consideration.

6.5.8 The proposal works should not obstruct the Green Chain and Links designation and therefore would not conflict with Policy ON7.

6.5.9 The nearest residential properties are located in Stockhurst Close, approximately 135 metres from the proposed site and within the London Borough of Wandsworth. This separation distance is considered sufficient to safeguard residential amenity, although some mitigation against potential impacts from noise, dust and traffic movements may still be required.

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 less suitable as a CSO site because to achieve highway access, the construction of a new access road running through the Barn Elms Sport Centre grounds would be required, whereupon HGVs would use Queen Elizabeth Walk, which features traffic calming (speed cushions), to access the highway network. Rail access would utilise the same route to the TLRN. However, rail transport is unlikely to be feasible for the small volumes of excavated material produced by the site. The Thames Path and National Cycle Route 4 would require diverting/partially closing during construction.

7.2.2 The site is less suitable for public transport access, and parking for vehicles within the site boundary or along Putney Embankment is unavailable or inadequate. Parking for the workforce would potentially need to be provided in proximity to the site.

7.3 Archaeology

7.3.1 This site is potentially suitable as a CSO site. Owing to a lack of previous investigations in the area, the nature and extent of archaeological receptors cannot be confidently identified at this stage. However, on the basis of the information available, it is possible that archaeological receptors of potentially high or medium value may be present within this site.

7.3.2 Peat deposits containing archaeological material have been commonly recorded throughout London in a similar proximity to the Thames. While no direct evidence has been revealed, given the location of the site, and wider evidence for historical occupation along the river, it is a reasonable assumption to suggest that waterlogged remains and peat deposits of high or medium value may be present.
7.4 **Built heritage and townscape**

7.4.1 Based on the information currently available, the site is considered to be suitable as a CSO site from a built heritage perspective. It is unlikely to result in direct adverse impacts upon the built heritage environment and it is likely that potential indirect impacts on built heritage receptors, which include three conservation areas and one registered historic park and garden within 250m of the site, could be mitigated through a high-quality scheme design and/or screening and planting.

7.4.2 The site is considered to be less suitable in relation to landscape and townscape considerations, as the site could potentially result in an adverse impact on the character of the Thames and adjacent public open space, especially during construction.

7.5 **Water resources – hydrogeology and surface water**

7.5.1 In relation to hydrogeology, this site is suitable as a CSO site because the drop shaft is to be constructed in London Clay (non-aquifer), and no impact on the Chalk aquifer is expected. The Chalk piezometric head is likely to be approximately 2.8m above the base of construction and should be taken into account in the engineering design. The superficial deposits at the site comprise alluvium, which is classified as a minor aquifer and which is likely to be the subject of limited impacts on flow due to sheet piling.

7.5.2 In terms of surface water resources, this site is less suitable because it is located on the River Thames foreshore and there is a direct route for pollution to the Thames. As such, specific mitigation would likely be required to prevent pollution.

7.6 **Ecology**

7.6.1 This site is considered to be less suitable as a CSO shaft site, as it is located within the River Thames and would lead to temporary and permanent land-take from a Site of Metropolitan Importance. There is also the potential for adverse impacts to adjacent sites of borough importance, and the site is located at the point of confluence between the Thames and the Beverley Brook, which has potential value for spawning fish. Any loss of mudflat on the foreshore or other creek-side habitat is likely to require compensatory habitat provision and potentially arduous post-works restoration.

7.6.2 Invasive Japanese knotweed is known to occur near the mouth of Beverley Brook, in relatively close proximity to the site and, subject to investigations, may require treatment prior to construction.

7.7 **Flood risk**

7.7.1 This site is considered to be less suitable owing to its location within the river channel, which is a functional flood plain. The site would therefore require specific mitigation to protect it from flood levels and would potentially cause displacement, which could increase flood risk elsewhere in the local proximity.

7.8 **Air quality**

7.8.1 This site is suitable for use as a CSO site from an air quality perspective. There is sufficient distance from the site to potential dust sensitive residential receptors that the risk of a perceptible impact is low, provided that standard dust control measures are in place. There is potential for HGV movements on the local road network to cause localised air quality impacts. However, this could be reduced by minimising the movement of HGVs during peak hours.

7.9 **Noise**

7.9.1 This site is considered suitable as a CSO shaft site due to the relatively large separation distances between the site and the closest sensitive receptors. However, the number of vehicles associated with the construction phase and the access route via Queen Elizabeth Walk has the potential to cause disturbance to properties along the access route.
7.10  Land quality

7.10.1  The site is considered to be suitable as a CSO shaft site as it does not appear to have been developed for any previous industrial use, and the distance and nature of potentially contaminating activities in the vicinity of the site are unlikely to have resulted in significant contamination of the site.

8  SOCIO-ECONOMIC AND COMMUNITY ASSESSMENT

8.1  Socio-economic profile

8.1.1  A summary of population statistics from the 2001 Census for the Barnes ward in the London Borough of Richmond upon Thames are presented below and compared with population averages for London and England as a whole:

- Higher rate of full-time employees and self-employed people, which coincides with a lower proportion of unemployed people than in London or nationally
- Higher rate of employment in management, professional occupations and associated professional or technical occupations
- Substantially higher proportion of people educated to Level 4/5 (degree level)
- Higher proportion of people aged between 25 and 44 than in London or nationally
- Higher proportion of people with ethnic origin ‘white, other’ and around 72% of people who were born in the UK.

8.1.2  Overall, this community profile suggests that the population is comprised of mainly young professionals.

8.2  Issues and impacts

8.2.1  Due to the proposed CSO site location on the foreshore, with no apparent sensitive receptors on the site, the greatest impact from a community perspective is likely to be on the section of the Thames Path adjacent to the site.

8.2.2  The section of the Thames Path adjacent to the site is mentioned in several London walking guides and is likely to be a popular route, especially due to the annual Oxford to Cambridge boat race along the River Thames, which starts at Putney Bridge and passes by the site. The use of the site is likely to impact on the noise and traffic levels on the path and may disrupt people from using the route for leisure and recreation.

8.2.3  There may also be impacts on the nearest buildings to the site, including the Wandsworth, Chelsea and Fulham Sea Cadet Unit to the southwest and the scout hut to the northwest.

8.2.4  The site visit identifies the area as generally tranquil but with relatively constant background noise from the Heathrow flight path overhead. The noise from the use of the site may cause disturbance to people using the Thames Path, National Cycle Route, nearby Barn Elms Sports Ground to the west and Leaders Gardens to the south.

8.2.5  The site can be viewed from Bishops Park (a community recreation space across the river) and potentially viewed from Putney Bridge. This may be a key pedestrian/cycle route for the local community and the access to the site is from the Embankment road that is well used, especially by recreational users.

9  PROPERTY ASSESSMENT

9.1  Introduction

9.1.1  The site is part of the foreshore of the River Thames
9.2 Crown Land and Special Land comments

9.2.1 While incomplete land referencing data has been made available, the site is part of the foreshore and likely to be owned by the Crown, or the Port of London Authority (PLA) on its behalf. Crown Land cannot be acquired compulsorily. Prior to selecting the site, the responsible authority should be consulted in order to establish whether there are any fundamental issues arising that might prejudice the practicability of using the land.

9.2.2 With co-operation of the Crown or PLA, there should be no risk to the project. However, with justifiable objections to the selection of this site, either the Crown or PLA could prevent it from being used for this purpose. Risk to the project then becomes significant, with no measurable timescale for addressing and overcoming the objections.

9.2.3 It would therefore be advisable to discuss the acquisition with the freeholder at an early stage and seek agreement to the acquisition. If this is not possible, it would be advisable to include in the CPO a substitute site that is not Crown Land or Special Land. This could enable the Order to be confirmed in part, excluding the subject site if necessary, but including the substitute site.

9.3 Land to be acquired

9.3.1 The compensation assessment assumes that the worksite and access to it may need to be acquired temporarily, via the acquisition of new rights for the period of the works stated in the engineering section above. At the end of the works, a smaller area may need to be acquired permanently.

9.3.2 The permanent area required for the operational phase comprises an extension to the existing river wall/bank measuring approximately 11m into the river by 20m long. Rights may also be required for the connection culvert from the sewer interception at Beverley Brook.

9.3.3 No rights of way or easements have been included in our assessment of this site acquisition cost. Access rights will be required to the site, as currently the only access available is via the Thames Path footpath/cycleway.

9.4 Property valuation comments

9.4.1 Compensation for the acquisition of new rights is normally based on the diminution in value to the land caused by the acquisition. Compensation for the permanent acquisition of land is normally based on market value. However, compensation for the permanent acquisition of unusual types of property, where there is no general market, can be assessed on the basis of the cost of equivalent reinstatement at a new site, but there must be a genuine intention to reinstate.

9.4.2 If compensation is 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, the costs are likely to be relatively low and therefore acceptable.

9.4.3 If compensation is assessed on an equivalent reinstatement basis, then the acquisition costs would be significantly higher, but it is unlikely that reinstatement of the foreshore could be undertaken.

9.5 Disturbance compensation comments

9.5.1 This site is unlikely to give cause to any disturbance compensation claims as the site is in the foreshore.

9.6 Offsite statutory compensation comments

9.6.1 There are unlikely to be any offsite statutory compensation claims under Part 1 of the Land Compensation Act 1973, on the assumption that the site is quiet and does not produce an odour. It is not in close proximity to any residential property.
9.6.2 The risk of claims arising under Section 10 of the Compulsory Purchase Act 1965 is considered to be low, provided the access arrangements to the site do not interfere with access to other properties.

9.7 Site acquisition cost assessment

9.7.1 The acquisition cost is expected to be relatively low and if the site is preferred, dialogue with the owner should take place at an early stage to establish if it would be prepared to agree to the acquisition and on what terms.

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 a CSO site because as it is a foreshore site, it would be reasonably unrestricted in shape and size and would be in close proximity to the main tunnel. There would be no requirement for demolition. However, road access to the site would be restricted and may require significant enabling works. Alternatively, it might be feasible to utilise river transport.

10.3 Planning

10.3.1 On balance, the site is considered suitable as a CSO site.

10.3.2 Although the site is subject to a number of direct and adjacent policy designations, none should be unacceptably impacted upon, with appropriate mitigation measures.

10.4 Environment

10.4.1 Overall, the site is considered suitable as a CSO site, although mitigation would be required.

10.4.2 Based on current information, the site is considered suitable from the perspective of archaeology, built heritage, hydrogeology, air quality, noise, and land quality.

10.4.3 This site is considered less suitable from the perspective of transport, townscape, surface water resources, ecology, and flood risk.

10.4.4 Overall, the site is considered suitable and further investigation would be required as to whether transport, townscape, surface water resources, ecology and flood risk impacts could all be adequately mitigated. Likely mitigation considerations may include:

- Transport – an acceptable route to the TLRN and adequate workforce parking would both need to be identified
- Townscape – a high-quality scheme design to minimise impacts on the character of the river and adjacent open space
- Flood risk and surface water – mitigation to reduce flood risk to the worksite and elsewhere (loss of capacity) and specific mitigation to reduce the impacts of in-river working
- Ecology – mitigation for foreshore habitats.
10.5 Socio-economic and community

10.5.1 On balance, this site is **suitable** as a CSO site, provided appropriate measures are taken to address disruption to the well-used section of the Thames Path.

10.5.2 The greatest impact from a community impacts perspective is likely to be on the adjacent Thames Path. The sea cadet premises and the scout hut are relatively close to the site and may also be affected by construction activities.

10.5.3 Subject to further investigation into the pattern of use of the nearby buildings, mitigation may include measures such as screening the site from the path and potentially limiting site working hours.

10.6 Property

10.6.1 This site has been assessed as a possible **suitable** CSO site. Assuming agreement can be reached with the freeholder, this would be a good site from a property viewpoint as the acquisition costs are anticipated to be acceptable.
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 Richmond online planning applications database
- Saved policies in the *London Borough of Richmond upon Thames Unitary Development Plan* (First Review), adopted in 1 March 2005 and saved beyond 2008

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*

- Wandsworth List of Locally Listed Buildings
- 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
Ecology
- Richmond upon Thames Habitat Action Plan for the Tidal Thames
- 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 2001 Census data
- Wandsworth, Chelsea & Fulham Sea Cadets http://units.ms-sc.org/Wandsworth%20Chelsea%20%20Fulham/Default
- South Bank Sailing Club http://www.southbanksailingclub.co.uk
• Hounslow LSP http://www.hounslow.gov.uk/index/council_and_democracy/lsp.htm
• Save Barn Elms http://www.savebarnelms.mfbiz.com/#
• The Boat Race http://www.theboatrace.org/article/introduction/thecourse

Property
• Site visit
• Promap, Ordnance Survey and A-Z mapping
• Multimap/Google Earth aerial/satellite photographs
• Mouchel referencing
APPENDIX 2 – SITE LOCATION PLAN
APPENDIX 3 – PLANNING AND ENVIRONMENT PLANS
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This plan is a strategic and standardised overview based on an interpretation of GIS policy designation layers provided by affected London local authorities. Please refer to the text in the SSR’s for the full planning and environment assessments.
APPENDIX 4 – PHOTOGRAPHS OF THE SITE AND SURROUNDINGS
The site, viewed from the foreshore in a south-easterly direction.

View towards the site taken 20m to the south, viewed in a north-westerly direction.
Photo of bridge over Beverly Brook and the Thames Path, running adjacent and along the western boundary of the site in a north-westerly direction.
APPENDIX 5 – TRANSPORT PLAN
APPENDIX 6 – SERVICES AND GEOLOGY PLAN
APPENDIX 7 – CONSTRUCTION PHASE LAYOUT
APPENDIX 8 – OPERATIONAL PHASE LAYOUT
**VENTILATION COLUMN (CSO)**

**ELECTRICAL CONTROL KIOSK (CSO)**

Diagrams depict:
- Ventilation column
- Electrical control kiosk

**Diagrammatic Representation of Top Structure Above CSO Shaft**

- Dimensions and measurements indicated.
- Access stairs/ladder.
- Temporary or permanent hand railing.

**Notes:**
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 requirements.
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 millimeters unless otherwise stated.
## 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 will require the construction of a road from the site along the Thames Path and through the sports centre to Queen Elizabeth Walk to allow vehicular access to and from the site. Thames Footway (footway) and National Cycle Route 4 will therefore require diverting. Direct vehicular access to Embankment unlikely to be possible as there is only a footbridge passing over Beverley Brook. Queen Elizabeth Walk is subject to a 30mph speed limit and is street lit. It has a carriageway width of 5.3m and is traffic calmed (speed cushions). Access to the A205 (TLRN strategic highway network) along new road, then most likely through open space and sports centre car park onto Queen Elizabeth Walk and then along Rocks Lane (A306). Access to the A205 (TLRN strategic highway network) runs along Queen Elizabeth Walk which is a traffic calmed (speed cushions) narrow road. There are no visible restrictions over railway bridge on Rocks Lane. Distance to TLRN 2.7km from site, requiring construction of a new road. See Transport Access Plan in Appendix 5. Conclusion from Table 2.3 changed following site investigation.</td>
<td>Construction of new road at least 250m in length required for highway access. Thames Footway (footway) and National Cycle Route 4 will need diverting. Conclusion: Road access is possible through the construction of a new access road (of at least 250m length) to access Queen Elizabeth Walk, through the open space and sports centre car park. Access route to the TLRN (A205) will use Queen Elizabeth Walk which is a narrow road with traffic calming (speed cushions).</td>
<td></td>
</tr>
<tr>
<td>Access to river</td>
<td>River access not required for CSO site as excavated material will be transported to a main shaft site by road.</td>
<td>River access not required as excavated material will be transported away by road.</td>
<td></td>
</tr>
<tr>
<td><strong>Site considerations</strong></td>
<td><strong>Comments</strong></td>
<td><strong>Mitigation required and conclusions</strong></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------</td>
<td>----------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Access to rail</strong></td>
<td>Use of rail is unlikely to be feasible due to the small quantities of excavated material produced by a CSO site.</td>
<td>Route to possible rail link (if required) at Clapham Junction runs through a high street area along York Road and under/over several bridges (with no visible restrictions) in addition to the constraints encountered upon accessing the TLRN (A205). Clapham Junction railway sidings at the Traincare Depot accessible using Plough Road.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Access to railway sidings at Clapham Junction uses the same route to the TLRN (A205); proceeding eastwards along the A205 then onto Putney High Street and Putney Bridge Road. Putney Bridge Road avoids the two 15’0” height restricted rail bridges on the A205. The route continues along the A3, A217, onto York Road and along Plough Road. On return, the A3 is used towards the roundabout with the A219 to avoid the 15’0” bridge on Upper Richmond Road. The route runs through a high street area, and over and under several bridges (with no visible restrictions) in addition to the constraints already identified upon accessing the TLRN. Access to rail taken off York Way (A3205) onto Plough Road for Clapham Junction, Traincare Depot railway sidings. Distance 8.9km to rail access point from CSO site.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parking</strong></td>
<td>No parking provision for workforce within the site boundary as site on the foreshore. On street parking is available within vicinity of site but is restricted to permit holders only Mon-Fri 09:30-10:30. Additional parking for workforce will therefore be required.</td>
<td>Parking for vehicles within site boundary is unavailable as site is located on foreshore. Alternative parking on street along Embankment is inadequate as it is assigned for permit holders only Mon-Fri 09:30-10:30. Parking for workforce would potentially need to be provided, depending on demand and acceptability Barn Elms Sports Centre could be a possible location.</td>
<td></td>
</tr>
<tr>
<td><strong>Public transport accessibility</strong></td>
<td>PTAL 1-2, as identified within Table 2.3.</td>
<td>PTAL least suitable. Public transport access issues for workforce.</td>
<td></td>
</tr>
</tbody>
</table>
## Transport

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Management</td>
<td>Thames Path (footway) and National Cycle Route 4 will require diverting for the construction of new road towards Queen Elizabeth Walk from the site. Construction of access road to site between sports centre and site required.</td>
<td>Construction of access road to site between site and sports centre required.</td>
</tr>
</tbody>
</table>

**Summary:** The site is less suitable as a CSO site, as to achieve highway access the construction of a new access road running through the Barn Elms Sport Centre grounds would be required, whereupon HGVs would use Queen Elizabeth Walk, which features traffic calming (speed cushions), to access the highway network. Rail access would utilise the same route to the TLRN, however, rail transport is unlikely to be feasible for the small volumes of excavated material produced by the site. The Thames Path and National Cycle Route 4 would require diverting/partially closing during construction.

The site is less suitable for Public transport access, and parking for vehicles within site boundary or along Putney Embankment is unavailable or inadequate. Parking for workforce would potentially need to be provided nearby.
<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 is located on mud banks within the Thames and appears to have been undeveloped to date. The exception being the south west of the site which extends onto the modern embankment on the edge of the river.</td>
<td>N/A</td>
</tr>
<tr>
<td>Potential receptors of very high or high value with the potential to be directly affected</td>
<td>No archaeological receptors are recorded within the area of the site. This does not preclude the possibility of unrecorded archaeological receptors of high value being present within the site. In particular preserved timber remains and peat deposits may be anticipated.</td>
<td>If this site is taken forward to preferred sites list, 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>No archaeological receptors are recorded within the area of the site. This does not preclude the possibility of unrecorded archaeological receptors of medium value being present within the site.</td>
<td>If site is taken forward to preferred sites list, 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>The dewatering of adjacent waterlogged deposits is unlikely to be an issue given the site location within the Thames.</td>
<td>N/A</td>
</tr>
<tr>
<td>Extent of existing disturbance</td>
<td>There is no evidence of any disturbance within the site.</td>
<td>If site is taken forward to preferred sites list, a detailed desk based assessment is required to sufficiently understand the archaeological resource and define risk to potential development.</td>
</tr>
</tbody>
</table>

Archaeology
**Archaeology**

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
</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. With the information currently available it is not possible to highlight specific potential issues. | Mitigation methods could include:  
  - Desk based assessment  
  - Production of deposits model  
  - Archaeological monitoring of geotechnical investigations  
  - Archaeological evaluation  
  - Archaeological watching brief  
  - Archaeological excavation |

**Summary:** This site is potentially suitable as a CSO site. Owing to a lack of previous investigations in the area, the nature and extent of archaeological receptors cannot be confidently identified at this stage. However, on the basis of the information available it is possible that archaeological receptors of potentially high or medium value may be present within this site.

Peat deposits containing archaeological material have been commonly recorded throughout London in a similar proximity to the Thames. While no direct evidence has been revealed, given the location of the site and wider evidence for historical occupation along the river, it is a reasonable assumption to suggest that waterlogged remains and peat deposits of high or medium value may be present.
## 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 statutorily listed buildings within 250m of C05XA.  
**Locally Listed Buildings**  
Although a Local List is maintained by the borough of Hammersmith and Fulham, this data was not available at the time of this assessment. However, there are no locally listed buildings within 250m of C05XA located within the boroughs of Richmond-upon-Thames or Wandsworth.  
**Conservation Areas**  
Fulham Reach Conservation Area: 145m  
Bishops Park Conservation Area: 70m  
Putney Embankment Conservation Area: 15m  
**Registered Historic Parks & Garden**  
Bishops Park, Grade II: 150m  
**Locally Listed Parks and Gardens**  
There are no locally listed parks and gardens within 250m of C05XA.  
**Protected Views**  
King Henry VIII’s Mound, Richmond Park, to St Pauls: 155m  
Local information on protected views is not currently available for the boroughs of Hammersmith and Fulham and Wandsworth.  | In the case of conservation areas, registered historic parks and gardens, and protected views, 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 archaeology work will be required to further determine the likely impact of the development and to inform more detailed mitigation proposals.  
On the basis of information currently available (June 2009) and on the basis of certain receptors not being present within 250m of C05XA, mitigation will not be applicable in the case of listed buildings, locally listed buildings and locally listed parks and gardens. |
<p>| Potential receptors of medium to very high importance with the potential to be directly affected | Not Applicable. | Not Applicable. |
| Other receptors of lesser importance with the potential to be directly affected | Not Applicable. | Not Applicable. |</p>
<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential receptors of medium to very high importance with the potential to be <em>indirectly</em> affected</td>
<td>There is the potential for three conservation areas (Putney Embankment, Fulham Reach and Bishops Park Conservation Areas), one Registered Historic Park and Garden (Bishops Park) and one protected view (King Henry VIII’s Mound, Richmond Park to St Pauls) to be <em>indirectly</em> affected.</td>
<td>All three of the conservation areas within 250m of CO5XA share a visual relationship with the site. The Putney Embankment Conservation Area is located particularly close to the site (15m) whilst the Fulham Reach and Bishops Park Conservation Areas lie in excess of 70m from CO5XA on the opposite (eastern) bank of the River Thames. Mitigation in the form of a high-quality scheme design and/or screening is likely to be required to reduce the visual impact of CO5XA upon all three of the conservation areas, their setting and views to and from them. The Bishops Park registered historic park and garden (Grade II) is located 150m from CO5XA on the opposite (eastern) bank of the River Thames. From the boundary of the registered area there are likely to be views across the River Thames towards CO5XA and therefore mitigation in the form of a high-quality scheme design and/or screening is likely to be required to reduce the visual impact of the site upon this built heritage receptor. The protected view from King Henry VIII’s Mound, Richmond Park, to St Paul’s lies 155m from the site and the vista and its setting is unlikely to be altered by the development. Mitigation is therefore unlikely to be applicable in relation to this built heritage receptor.</td>
</tr>
<tr>
<td>Built Heritage and Townscape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Site considerations</strong></td>
<td><strong>Comments</strong></td>
<td><strong>Mitigation required and conclusions</strong></td>
</tr>
<tr>
<td>Other receptors of lesser importance with the potential to be <em>indirectly</em> affected</td>
<td>Not Applicable.</td>
<td>Not Applicable.</td>
</tr>
</tbody>
</table>
| Sensitive landscape character areas likely to be affected | Site is located within a Thames Policy Area, to the north of a Conservation Area, an within an area of Metropolitan Open Land.  
Sensitive site on the south bank of the River Thames.  
Barn Elms School Sports Centre to the west, Beverley Brook and Leaders Gardens open space to the south, River Thames to the north and east.  
The site has a number of mature trees on it, located in the south west of the site where it overlaps the embankment.  
The removal of mature vegetation on site would increase openness and reduce isolation. The presence and operation of machinery, materials stores and buildings is likely to result in temporary, adverse direct impacts on the character of the River and temporary, adverse indirect impacts on neighbouring areas.  
The top structure would potentially have a severe adverse impact on the character of the River. | Retention of trees where possible and protection in accordance with BS 5837.  
Introduction of landscape scheme to include appropriate surface treatments and planting to relate to adjacent river frontage.  
Conclusion: Removal of mature vegetation and the presence and operation of machinery, materials stores and buildings on site would severely impact character of river. This site is less suitable given its location and character and the character of the permanent elements on site. |
| Potential views likely to be affected | Open views from the Thames Path, the River and Putney Bridge.  
Seasonal views from adjoining public open space.  
View of vent column and top structure for various users of the River Thames. The top structure is likely to be visually intrusive along the bank of the River. | During construction, use of hoardings and appropriate lighting would minimise visual impact.  
Design of top structure, vent column, and electrical kiosk to be given careful consideration.  
Plants to screen permanent plant.  
Conclusion: Removal of mature vegetation would be visually significant, therefore, adequate new planting would be important to protect visual amenity. |
### 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>This site is less suitable given its location on the River Thames.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Particular considerations on sites where new permanent structures are required</td>
<td>New permanent structures will be constructed on the foreshore of the River Thames and these have the potential to have an impact upon the setting and/or views to and from three Conservation Areas and one Registered Historic Park and Garden. The potential visual intrusiveness of the new structures upon these built heritage receptors and the landscape character of the area and the River Thames will therefore need to be considered.</td>
<td>Any permanent structures will need to be of a high quality design in order that their visual intrusiveness is minimised; screening may also be required. In particular, the scheme design and/or screening will need to preserve or enhance the character or appearance of the Putney Embankment, Fulham Reach and Bishops Park Conservation Areas, their setting and views to and from them in accordance with planning policy and English Heritage guidance. Similar mitigation will be required to reduce the visual impact of C05XA upon the setting of the Bishops Park registered historic park and garden.</td>
</tr>
<tr>
<td>Potential issues</td>
<td>There are several built heritage receptors within 250m of C05XA. However, none are likely to experience a direct impact as a result of the development and there is the potential to mitigate against any adverse visual impacts through a high quality scheme design and/or screening.</td>
<td>The scheme design will have to be of a sufficiently high quality and may need to include some screening so that its potential visual intrusiveness upon three conservation areas and one registered historic park and garden is mitigated.</td>
</tr>
</tbody>
</table>

**Summary:** Based on the information currently available, the site is considered to be suitable as a CSO site from a built heritage perspective. It is unlikely to result in direct adverse impacts upon the built heritage environment; and it is likely that potential indirect impacts on built heritage receptors, which include three conservation areas and one registered historic park and garden within 250m of the site, could be mitigated through a high-quality scheme design and/or screening and planting.

The site is considered to be less suitable in relation to landscape and townscape considerations, as the site could potentially result in an adverse impact on the character of the Thames and adjacent public open space, especially during construction.
<table>
<thead>
<tr>
<th><strong>Site considerations</strong></th>
<th><strong>Comments</strong></th>
<th><strong>Mitigation required and conclusions</strong></th>
</tr>
</thead>
</table>
| Hydrological conditions (Groundwater and Surface Water) | Geology (thickness)  
  - Superficial Geology and Made Ground (4m)  
  - London Clay (40m)  
  - Lambeth Group (17m)  
  - Thanet sand (9m)  
  - Piezometric Level in Chalk Aquifer: ~-25mAOD (~25mbgl) from EA Jan 08 water level contouring | The drop shaft will be constructed to an invert level of approximately 27.83mbgl therefore the shaft will be founded in the London Clay. Piezometric head(1) in the Chalk is approximately 2.83m above the base of the construction. Therefore, pressure effects would be expected during construction and this will require consideration as part of geotechnical design. |
| Hydrogeology | Groundwater Monitoring  
  Location  
  - EA Hydrometry Sites:  
    TQ27-336 - approximately 2.46 km south of the site (water levels to Dec 1994)  
    TQ27-159 - approximately 2.64 km southeast of the site (water levels to March 2009)  
  Watercourses  
  - Within the River Thames | |
| Source Protection Zones (SPZ) and groundwater users | SPZ  
  - Not located in a Source Protection Zone defined by EA  
  - EA Licensed Groundwater Abstractions and Details  
    - No public water supply  
    - 3 licensed abstraction borehole within 2km radius  
    Licence Numbers:  
      1. 28/39/39/0221 (1 borehole),  
      2. 28/39/39/0177 (2 borehole)  
    Locations:  
      1. 250m northeast of the site (other side of the River Thames)  
      2. 1.4 km southwest of the site (other side of the River Thames)  
  Operator:  
    1. Fulham Football Club Ltd.  
    2. Trustees of the Hurlingham Club  
  Abstracted Aquifer Unit:  
    1.Chalk | A simple volumetric approach has been used to calculate the 400 days travel times of the abstraction borehole. A conservative mean annual recharge of 100mm/year was used to calculate a radius for licensed abstraction boreholes as follows;  
    1. 72 m  
    2. 109 m  
  As a result, the drop shaft will not be located within either of these catchment areas. |
### 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>2. Gravel Abstraction Purposes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Industrial, commercial and public service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Industrial, commercial and public service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abstraction Quantity (annual):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. 6,500 m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 15,000 m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Authorities (LA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unlicensed Groundwater Abstractions and Details</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No abstraction borehole within 1 km radius inside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hammersmith and Fulham Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No abstraction borehole within 1 km radius inside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richmond Upon Thames Council Boundary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No abstraction borehole within 1 km radius inside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wandsworth Council Boundary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borehole locations and depths</td>
<td>There are 8 historical records of water wells: 5 deep wells and 3 shallow wells within 1 km radius.</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Depth range: 96.3 – 152.4 m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth range: 14.6 – 14.8 m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential impacts on surface water features</td>
<td>The site is located on the River Thames Foreshore and as such, there is a direct pathway for pollution to the Thames.</td>
<td>Work needs to be undertaken in consideration of Pollution Prevention Guidelines – PPG1, PPG5 and PPS23.</td>
</tr>
<tr>
<td>Potential impacts on groundwater (resources and quality)</td>
<td>No likely impact on groundwater at depth is likely since the drop shaft is to be constructed in London Clay (non aquifer). At shallow depth, the drop shaft is located in Alluvium which is classified as a minor aquifer. Limited impact on shallow aquifer if water is excluded from the excavation by sheet piling.</td>
<td>See below (likely types of mitigation measures that will be required)</td>
</tr>
<tr>
<td>Likely types of mitigation measures that will be required</td>
<td>No mitigation is likely to be required as groundwater is not impacted.</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
### 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>Potential issues</td>
<td>Potential upward pressure is expected during construction. Limited impact on flow in shallow aquifer due to sheet piling.</td>
<td>Pressure to be considered as part of geotechnical design.</td>
</tr>
</tbody>
</table>

**Summary:** In relation to hydrogeology, this site is suitable as a CSO site because the drop shaft is to be constructed in London Clay (non aquifer), and no impact on the Chalk aquifer is expected. The Chalk piezometric head is likely to be approximately 2.8 m above the base of construction and should be taken into account in the engineering design. The superficial deposits at the site comprise alluvium which is classified as a minor aquifer, and which is likely to be the subject of limited impacts on flow due to sheet piling.

In terms of surface water resources, this site is less suitable because it is located on the River Thames Foreshore and there is a direct route for pollution to the Thames. As such, specific mitigation would be likely to be required to prevent pollution.
<table>
<thead>
<tr>
<th>Ecology (terrestrial and aquatic)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site considerations</strong></td>
</tr>
<tr>
<td>Statutory designations</td>
</tr>
<tr>
<td>Non-statutory designated wildlife sites</td>
</tr>
<tr>
<td>BAP priority habitats</td>
</tr>
<tr>
<td>Protected or otherwise notable species within the Study Area</td>
</tr>
</tbody>
</table>
### 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>Potential issues</td>
<td>The cumulative impact of all jetties and other above ground structures proposed within the Thames may increase flow velocity in the river with effects on juvenile migratory fish. Course of Beverley Brook is known to support stands of Japanese knotweed.</td>
<td>Consideration needs to be given to the cumulative impacts on hydrodynamics with reference to known critical flow velocities for fish. Not considered significant at a site specific level. Presence of invasive species within 10m of construction site will be noted during any initial site survey. However, eradication could lead to delays in construction programme.</td>
</tr>
</tbody>
</table>

**Summary:** This site is considered to be less suitable as a CSO shaft site, as it is located within the River Thames, and would lead to temporary and permanent landtake from a Site of Metropolitan Importance. There is also the potential for adverse impacts to adjacent sites of borough importance, and the site is located at the point of confluence between the Thames and the Beverley Brook which has potential value for spawning fish. Any loss of mudflat on the foreshore or other creekside habitat is likely to require compensatory habitat provision and potentially arduous post-works restoration.

Invasive Japanese knotweed is known to occur near mouth of Beverley Brook in relatively close proximity to the site, and may require treatment prior to construction.
### 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>Site is located in the River Channel - therefore flood zone 3b, functional flood plain.</td>
<td>The site will be developed with a coffer dam and should be protected to the 1in200 year tidal return period. An evacuation plan will be required for this site in the event the dam is breached. Mitigation may also be required for the impact of displacement of flood water as a result of defending the site on the foreshore. The impact of such a physical construction (the coffer dam) would also have to be assessed for the impact of sediment erosion on the integrity of the defences.</td>
</tr>
<tr>
<td>Assessment of conditions for SuDS</td>
<td>Site is not suitable for SuDS due to location within the Thames.</td>
<td>N/A</td>
</tr>
<tr>
<td>Potential issues</td>
<td>No further issues identified</td>
<td>No further issues identified</td>
</tr>
</tbody>
</table>

**Summary:** This site is considered to be less suitable owing to its location within the river channel which is functional flood plain. The site would therefore require specific mitigation to protect it from flood levels and would potentially cause displacement which could increase flood risk elsewhere in the local proximity.
### Air quality

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing Air Quality</strong></td>
<td>The air quality objective for NO&lt;sub&gt;2&lt;/sub&gt; is exceeded on major roads in vicinity of site.</td>
<td>There is a need for more site specific data.</td>
</tr>
<tr>
<td><strong>Sensitive Receptors</strong></td>
<td>There are residential properties along the A306. There are residential properties adjacent to the site access on Queen Elizabeth Walk. The nearest residential properties to the site, are more than 100m away, on Stockhurst Close.</td>
<td>There are relevant air quality sensitive receptors present along the route the construction traffic is likely to take.</td>
</tr>
<tr>
<td><strong>Existing traffic issues</strong></td>
<td>The main traffic issue in this area is exhaust emissions along the A306 and A3003 corridor.</td>
<td>Additional vehicle emissions have a high potential to interfere with local air quality action plan policies.</td>
</tr>
<tr>
<td><strong>Existing sources of significant air pollutants</strong></td>
<td>See above.</td>
<td>See above.</td>
</tr>
<tr>
<td><strong>Notable gaps in existing air quality monitoring</strong></td>
<td>There is no data available at the likely access to the A306 and the nearest existing data indicates existing exceedance of AQLV.</td>
<td>Collect minimum 6 months diffusion tube data at site access to A306 or other point of access to major road network in case the LA removes their tube.</td>
</tr>
<tr>
<td><strong>Potential issues</strong></td>
<td>The risk from additional exhaust emissions from construction HGVs is undefined at present. The risk from dust impacts is low.</td>
<td>Minimise HGV movements on the local road network during the peak hours. 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 a CSO site from an air quality perspective. There is sufficient distance from the site to potential dust sensitive residential receptors, that the risk of a perceptible impact is low provided that standard dust control measures are in place. There is potential for HGV movements on the local road network to cause localised air quality impacts, however this could be reduced 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 less than 58 dB L_Aeq and night-time noise levels of less than 50 dB L_Aeq at residential properties on Horne Way and Stockhurst Close, located to the south and south west of the site. The residential properties facing the site are likely to experience low daytime and night-time noise levels due to their remoteness 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 140m to the south of the site, and playing fields to the west and northwest of the site. To the east of the site, on the other side of the River Thames, is Bishops Park with residential properties beyond on Stevenage Road. Sensitive receptors comprise 3-storey residential dwellings at Stockhurst Close approximately 120m to the south, and 6 storey residential flats on Horne Way approximately 160m to the south west. There are a number of sensitive residential receptors on Queen Elizabeth Walk, on the site access route which are likely to be affected by HGV traffic. The Thames Path and other recreational facilities lie adjacent to the site access.</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Existing traffic issues</td>
<td>Local road traffic on Horne Way and Embankment coupled with more distant road traffic on the A306 and A219, are likely to contribute to the local noise climate in the area of the sensitive receptors.</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
### Noise

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing sources of significant noise emissions</td>
<td>Local road traffic, coupled with more distant road traffic on the A306 to the west and the A219 to the south east 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>
<tr>
<td>Potential issues</td>
<td>Construction: The construction period is estimated at up to 2 years and working hours will be 12 hours per day (7am to 7pm) Monday to Saturday. This has the potential to result in adverse noise impacts upon the sensitive receptors on Embankment to the south of the site. A relatively high number of daily HGV movements are anticipated, and this has potential to result in adverse noise impacts upon properties on Queen Elizabeth Walk to the north of the site, which is the proposed access route. Proposed 3m site boundary fencing will provide useful noise mitigation to some plant and construction activities. Situating plant in the northern 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 140m and it is unlikely that vibration levels will result in minor cosmetic damage or annoyance during shaft sinking. Vibration from tunnelling should be considered on a case by case basis at particular sensitive locations.</td>
<td>Adherence to the good site practices provided in BS5228. Siting of noisy equipment and construction activities as far as is practicable from sensitive receptors. Provision of site boundary noise fences if practicable.</td>
</tr>
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</tbody>
</table>

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Noise

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>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>
</tr>
</tbody>
</table>

**Summary:** This site is considered suitable as a CSO shaft site due to the relatively large separation distances between the site and the closest sensitive receptors. However, the number of vehicles associated with the construction phase and the access route via Queen Elizabeth Walk has the potential to cause disturbance to properties along the access route.
## Land Quality

<table>
<thead>
<tr>
<th>Site Location</th>
<th>Grid Reference: 523518, 176287</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Site Use</td>
<td>Site comprises foreshore – sand and shingle, and small part of the embankment wall which is colonised by vegetation and semi-mature/mature trees.</td>
</tr>
<tr>
<td>Topography</td>
<td>Slight downward slope from south-west to north-east towards the centre of the River. Steep river embankment immediately to the south-west.</td>
</tr>
<tr>
<td>Field Evidence of Contamination (ie, visual/olfactory)</td>
<td>No evidence identified on or immediately adjacent to site, at this stage.</td>
</tr>
</tbody>
</table>
| Current surrounding land use (immediately adjacent to site) | North: River Thames  
East: River Thames  
South/southwest: Site is immediately adjacent to Thames Path and the Beverley Brook wharf area at the point of confluence with the River Thames. Beyond this is the embankment road, a quiet road which runs towards Putney Bridge, and a Sea Cadet Centre.  
West/Northwest: The site is bordered by the Thames Path, beyond which is an area of trees and vegetation and a scout hall centre. The Thames Path runs along the Thames to the sailing and rowing club. |

## Geological and hydrogeological information

| Geological Strata | Superficial Geology and Made Ground (4m)  
London Clay (40m)  
Lambeth Group (17m)  
Thanet sand (9m) |
| Underlying Aquifer Classes (Major/Minor/Non-Aquifer) | Non-Aquifer: London Clay  
Minor Aquifer: River Terrace Deposits, Lambeth Group, Thanet Sands  
Major Aquifer: Chalk |
| Groundwater Vulnerability/Soil Classification (High/Intermediate/Low/Not Applicable) | River Terrace Deposits - Minor Aquifer  
High Leaching Potential of Soils (U)¹ |
| Source Protection Zone Details | Not located in a Source Protection Zone defined by EA |
| Surface Water Receptors | Beverly Brook (15m south)  
River Thames (directly adjacent to the site) |
| Relevant information within a 250m radius of the site |  |
| Site History Information and Historical Potentially Contaminating Activities | Onsite  
- Historical maps show the sites land use has remained largely unchanged. The site is located on sand and shingle adjacent |

¹: High Leaching Potential of Soils (U) is a measure of the risk of contaminants leaching from the site into groundwater.
## Land Quality

### (based on mapping data)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Distance and direction to site</th>
<th>Contaminants</th>
</tr>
</thead>
</table>
| Offsite  | 1) Embankment (20m southeast) 1986 - present  
2) Sea Cadet Corps HQ (27m south) 1955-present  
3) Scout Hall (28m west) 1976 - present  
4) Works yard/depot (32m south) 1954 - present  
5) Wharf operations/Transport support and cargo handling (35m south) 1910 – present  
6) Tide barrier (52m southwest) 1976 - present  
7) Barn Elms School sports centre (55m west) 1967-present  
8) Two electrical substations (155m south and 238m southwest), 1951-1972  
9) Tank – contents unspecified, (160m southwest), 1913-1952  
10) Marsh Land (220m southeast) 1868 - 1882 | 1) None as site located on sand and shingle on bank of River Thames  
2) Metals, TPH, PAHs  
3) PCBs  
4) Metals, TPH, PAHs | |

### Pollution Incidents to Controlled Waters

- One  
  - Miscellaneous – Unknown, minor incident (183m east), within River Thames

### Landfill Sites

None

### Other Waste Sites

None

### Registered Radioactive Substances

None

### Fuel Stations/Depots

None

### Contemporary Trade Entries

None

### Site classification based on above information

- **Potential Site Contaminants derived from surface sources (eg, contaminants in made ground)**
  - 1) None as site located on sand and shingle on bank of River Thames

- **Potential Site Contaminants derived from offsite sources and transported to site**
  - 1) Works yard/depot 32m south  
2) Wharf operations 35m south  
3) Electrical substation closest 155m south  
4) Tanks – contents unknown 160m southwest

### Identified Source-Pathway-Receptor risk assessment at CSO construction stage (Conceptual Site Model)

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

### Contamination category

Category 1 – assessed as Low Risk
### Land Quality

| Conclusion | The site is considered to be suitable as a CSO shaft site, as it does not appear to have been developed for any previous industrial use, and the distance and nature of potentially contaminating activities in the vicinity of the site are unlikely to have resulted in significant contamination of the site. |
| Notes: | 1. 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.  
2. Refer to schematic Conceptual Site Model for explanation of site-specific source-pathway-receptors |
Contacts

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

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