Site suitability report C06XL

Lower Richmond Road Foreshore
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
C06XL

Lower Richmond Road Foreshore
# Thames Tunnel

## Site suitability report C06XL

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List of abbreviations

AOD  above Ordnance Datum
BAP  biodiversity action plan
BT  British Telecom
CPO  compulsory purchase order
CSO  combined sewer overflow
EA  Environment Agency
GLA  Greater London Authority
HGV  heavy goods vehicle
LNR  local nature reserve
LU  London Underground
m  metre/metres
MOL  Metropolitan Open Land
ONS  Office of National Statistics
ORN  Olympic Route Network
PLA  Port of London Authority
POS  public open space
PTAL  public transport accessibility level
SAM  scheduled ancient monument
SINC  site of importance for nature conservation
SNCI  site(s) of nature conservation importance
SSR  site suitability report
SSSI  site(s) of special scientific interest
SuDS  sustainable drainage systems
TfL  Transport for London
TD  tunnel datum
TLRN  Transport for London Road Network
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
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<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>
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1 Introduction

1.1 Purpose and structure of the report

1.1.1 The *Site selection methodology paper* (May 2009 and revised August 2011)*a* outlines the process to be used to create the preferred list of main tunnel 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. Whether a consideration is relevant to the assessment of a site will depend on available information and professional judgement.

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 and this level of information is considered to be appropriate to this stage of assessment.

1.1.3 The *Site selection background technical paper* (Summer 2011) provides information on the requirements for different types of sites, their sizes and typical activities/within the sites.

1.1.4 Each site suitability report considers a particular site on its own merits*b*. In addition, an *Engineering options report* (Summer 2012) was produced, which relates to main tunnel and connection tunnel options. 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). The outcomes are reported in the *Section 48: Report on site selection process*.

1.2 Background

1.2.1 The process for selecting sites is set out in the *Site selection methodology paper*. All sites have previously passed through the following parts of Stage 1:

- Part 1A – Creation of the long list of potential main tunnel (and CSO) sites
- Part 1B – Creation of a short list of potential main tunnel (and CSO) sites
  - Table 2.2: Long list of main tunnel (and CSO) sites – an assessment against set considerations and values

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*a* The amendments made in August 2011 do not change the site selection methodology process. The amendments only related to the introduction of a second phase of consultation (paragraphs 2.3.13-2.4.15) and minor factual updates.

*b* The Site selection methodology was developed in the absence of any statutory requirement or specific guidance other than the general planning policy principles. We are aware of the various national level policy changes such as the introduction of the National Planning Policy Framework and the National Policy Statement for Waste Water, which is now the primary policy document for consideration of the Thames Tunnel (NPS) scheme. Overall, the approach taken in the methodology accords with the national policies and the NPS.
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 main tunnel (and CSO) sites – site data, site visits, site suitability reports, engineering options report and optioneering workshops that are reported in the *Section 48: Report on site selection process*.

1.2.3 The *Site selection methodology paper* also contains a provision for a back-check process in paragraph 2.5.6 that states:

“If any sites for any of the main tunnel sites or intermediate sites (or CSO site) are eliminated for any reason, if there are significant changes of circumstances in relation to existing sites or combinations of sites, if new or replacement sites are required or found or if the engineering design develops in unexpected ways then a targeted repeat of stages 1-3 will need to be undertaken in order to fill in any site gaps.”

1.3 **Consultation**

1.3.1 Thames Water's approach to engagement and consultation for the Thames Tunnel project is outlined in the *Statement of Community Consultation* and the accompanying *Community Consultation Strategy*. Thames Water has engaged regularly with all potentially affected London local authorities, other stakeholders and interested parties on sites and the project.

1.3.2 Phase two consultation has been completed for all the preferred and shortlisted sites along with the Abbey Mills route. The analysis of the consultation responses is set out in the *Report on phase two consultation*. Any relevant site comments were considered at the post phase two consultation optioneering workshops. The outcomes of these workshops are reported in the *Section 48: Report on site selection process*. After the workshops, engagement on sites has continued with key stakeholders, and the engineering design for sites has also continued in parallel.
2 Site information

2.1 Site and surroundings

2.1.1 This site, known as C06XL, is one of the back-check shortlisted sites for the Putney Bridge 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 Site C06XL is located to the west of Putney Bridge, within the River Thames foreshore and the London Borough of Wandsworth. A site location plan is provided in Appendix 2 – Site location plan.

2.1.3 The site is bounded by the River Thames to the north, and west and Putney Bridge to the east. Waterman’s Green, a small area of open space and Lower Richmond Road (B306) form the southern boundary of the site beyond which are a number of residential properties within large mansion blocks. A historic slipway (Putney drawdock) connecting the foreshore to the Embankment is positioned within the southern section of the site. The Thai Square restaurant, a two storey modern building, is positioned at the junction of Embankment and Lower Richmond Road to the west of the site. A small part of the site boundary extends further southeast under Putney Bridge where the interception chamber and connection culvert connects the Putney Bridge CSO to the shaft.

2.1.4 The site falls within designated areas in the Wandsworth Core Strategy including the Thames Policy Area, Putney Embankment Conservation Area and Putney Embankment Policy Area. All the mapped designations, where data was available, are shown on the planning and environment plans in Appendix 3 – Planning and environmental plans.

2.1.5 The wider area is mixed comprising commercial, retail and residential uses. The immediate locality falls within the Putney town centre. The area to the south of the high street is primarily residential. There are a number of listed buildings within the vicinity, including the Grade II Putney Bridge and bollards along the Embankment.

2.1.6 Photographs of the site and surroundings, together with an aerial photograph of the site, are provided in Appendix 4 – Photographs of the site and surroundings.

2.1.7 The site can be accessed by road via the Putney slipway off Lower Richmond Road. By road, the site is 0.2km from Putney High Street (A219) and 0.7m from the TLRN A205, Upper Richmond Road. The nearest railway station is Putney (0.7km), with the nearest London Underground station being Putney Bridge (0.7km). There are no existing wharfage/jetty facilities available at the site. A preliminary transport plan for the site is attached as Appendix 5 – Transport plan.

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

- The site is in the foreshore of the river. The shaft within 45m of Putney Bridge
2 Site information

- Putney draw dock in the inside southern quarter of the site
- There are no known major utilities within the site
- There are no known underground services within the site.

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. For this reason, they may not be shown on the services and geology plan.

2.1.10 Information on the specific geology of this site can be found in the services and geology plan in Appendix 6. This plan shows that the shaft would be in London Clay.

2.2 Type of site

2.2.1 Site C06XL is under considered as a CSO site to intercept the Putney Bridge CSO (CS06X).
3 Proposed use of site: Construction phase

3.1.1 The proposed construction phase layout for the CSO site is provided in Appendix 7 – Construction phase layout. It was based on a preliminary assessment of a possible layout.

3.1.2 The construction phase layout drawing is illustrative only and show:
   a. the layout for a CSO construction site within the foreshore
   b. potential access points.

3.1.3 The drawing provides an initial preliminary schematic layout that has not yet been optimised. If the site proceeds to the next stage as a proposed site, the construction phase layout would be optimised in order to minimise potential impacts.

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

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

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

<table>
<thead>
<tr>
<th>Activity</th>
<th>CSO site</th>
</tr>
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<tbody>
<tr>
<td>Length of construction period</td>
<td>2 to 4 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>Monday to Saturday</td>
</tr>
<tr>
<td>Primary means of transporting excavated material away from the site</td>
<td>Road</td>
</tr>
<tr>
<td>Primary means of transporting materials to site</td>
<td>Road</td>
</tr>
</tbody>
</table>
4 Proposed use of site: Operational phase

4.1 Introduction

4.1.1 An indicative operational phase layout for this CSO site is provided in Appendix 8 – Operational phase layout. It was based on a preliminary assessment of a possible layout.

4.1.2 The generic elevations of structures on the operational phase layout are provided in Appendix 8 and provide an illustration of typical example of the permanent structures which are applicable to CSO sites.

4.1.3 The underground infrastructure at this site would likely comprise an interception chamber, double flap valve chamber and a drop shaft with access openings.

4.1.4 The above-ground infrastructure would likely comprise a ventilation column and an electrical and control kiosk.

4.1.5 The top structures are envisaged to be finished at a minimum level of 104.5mTD (4.5mAOD). The site currently comprises foreshore and the mean ground level of the adjacent footway/carriageway is approximately 105mTD (5mAOD). The top structure would be flush with the current adjacent ground level. The top structure would provide access and egress into the drop shaft.

4.1.6 An area of hardstanding would be provided around the permanent structures. The site would not be fenced.

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

<table>
<thead>
<tr>
<th>Table 4.1 Operational phase data</th>
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<tbody>
<tr>
<td>Level of inspections and</td>
</tr>
<tr>
<td>maintenance and likely</td>
</tr>
<tr>
<td>working hours, ie,</td>
</tr>
<tr>
<td>(night/day/weekend) – frequency</td>
</tr>
<tr>
<td>of visits</td>
</tr>
<tr>
<td>One day-time visit every six</td>
</tr>
<tr>
<td>months for electrical/instrument</td>
</tr>
<tr>
<td>inspection. An additional one-</td>
</tr>
<tr>
<td>week maintenance period for</td>
</tr>
<tr>
<td>tunnel/shaft inspection required</td>
</tr>
<tr>
<td>per ten years that could be</td>
</tr>
<tr>
<td>night/day/weekend working.</td>
</tr>
<tr>
<td>No. of traffic movements</td>
</tr>
<tr>
<td>One van visit every six months.</td>
</tr>
<tr>
<td>An additional one-week period of</td>
</tr>
<tr>
<td>two to ten movements per day</td>
</tr>
<tr>
<td>(estimated to be several vans and</td>
</tr>
<tr>
<td>two cranes) every ten years.</td>
</tr>
</tbody>
</table>

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.
5 Engineering assessment

5.1 Access

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

Road

5.1.2 Road access to the site is possible via the Embankment carriageway. For the construction phase, the existing access at the top of the slipway would be used to access the site. The existing slipway would be closed for the duration of the works. For the operational phase, a new vehicle access would be constructed adjacent to the slipway.

Rail

5.1.3 The rail and London Underground networks are both local to this site. However, rail access is not considered to be a significant factor for CSO sites.

River

5.1.4 River access and wharfage/jetty facilities are not a requirement for CSO sites. However, as this site is in the foreshore, it may be feasible to deliver and take away materials by barge although there may be constraints associated with the proximity of Putney Bridge and the adjacent Putney Pier.

5.2 Construction works considerations

5.2.1 Based on the layouts provided in Appendix 7 – Construction phase layouts, the existing slipway would need to be demolished or protected during the construction period and reinstated in its original location and condition on completion of the works. If the existing slipway were to be demolished, a temporary slipway would need to be constructed for the duration of the works.

5.2.2 As the site is in the foreshore, a temporary cofferdam would need to be constructed and filled in order to provide a level site compound. The cofferdam would need to extend to include the interception chamber and connection culvert. Depending on the size of this part of the cofferdam, it is likely that it would not be filled. It is possible that there would be a divider between each part of the cofferdam.

5.2.3 Putney Bridge, the existing river wall and other structures would need to be monitored for settlement during construction of the drop shaft.

5.2.4 Data available on third-party assets and significant utilities show that there are no known underground services within the site. The main areas of concern for construction are the river wall and Putney Bridge. Construction methods would be adopted as appropriate to mitigate potential settlement of these assets.
5.2.5 There would be some disruption to the river. Since the proposed temporary site extends into the river channel, Putney Bridge spans 4 and 5 may require closure for the duration of the works.

5.2.6 The interception chamber would be constructed beneath the southern shore arch of Putney Bridge.

5.2.7 It is likely that the proposed works could be constructed within the overall construction programme.

5.3 **Permanent works considerations**

5.3.1 The top structures of the drop shaft and flap valve chamber would be flush with existing ground level adjacent to the river. The top structure of the interception chamber and drop shaft would be located in the foreshore. A new matching river wall around the permanent operational site would need to blend in with the existing river wall. The site would be finished to the same level as the adjacent Putney Embankment footpath.

5.3.2 It is possible that that the electrical and control kiosk may need to be located upon Watermans Green.

5.4 **Health and safety**

5.4.1 As the site would be in the foreshore, measures would need to be taken to mitigate the risks of flooding and working over/near water.

5.4.2 The site is located adjacent to Putney Pier. The creation of the foreshore-based construction site would need to take account of vessel movements associated with Putney Pier.

5.4.3 There are no other unusual health and safety issues at 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 assessment in the Site selection methodology paper 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 Wandsworth online planning applications database did not identify any relevant planning applications applicable to the site submitted within the last five years. However, several relevant planning and Listed Building Consent applications were identified for areas immediately adjacent to the site.

6.2.2 A non-material amendment application was granted on 16 July 2010 (reference no. 2010/1974) at 4-6 Putney High Street for “Amendment to planning applications (ref. 2007/5387 and 2005/4060) for alterations in connection with use of basement and ground floors as restaurant/café and bar (Class A3/A4) and use of upper floors as 1 x 3-bedroom and 1 x 2-bedroom flat and 1 x 1-bedroom flat. Rebuilding of rear with extensions at all levels to the rear and side. Removal of roof and proposed mansard roof extension to the front with a modern glass roof extension to the rear and retention of front façade”.

6.2.3 An application for Listed Building Consent (reference no. 2009/0414) at the same site for “Alterations to Putney Bridge walls involving opening of vault ends onto Lavatory Gardens in connection with use as a restaurant” was undetermined. It appears that this application was superseded by an application for Listed Building Consent (reference no. 2012/1998) for the “Formation of arched opening in listed river wall for each vault to No 4 and No 6; installation of glazed assembly with side louvre panels with new opening. Installation of spring dam flood barrier system to each new opening. Formation of new opening between vaults installation of newton 500 drained cavity membrane system to both vaults”, which was validated on 16 April 2012 and determination is pending.

6.2.4 An application for planning permission was granted on 7 January 2011 (reference no. 2010/3543) and Listed Building Consent (reference no. 2014/3584) for 2 Putney High Street for “Alterations to existing restaurant (Class A3) including extension at rear of ground and basement floors; alterations to the shopfront, provision of additional floorspace within existing basement vault and provision of an opening in the river wall with flood barrier to provide access onto Watermans Green”.
6.3 Planning context

6.3.1 The following is a summary of the relevant local planning policies and designations that affect the site. They were taken from the current statutory development plan for the borough. The Development Plan comprises the Core Strategy, adopted October 2010, the Development Management Plan (DMPD), adopted February 2012, the Site Specific Allocations Document, adopted February 2012 and the London Plan 2011.

6.3.2 The adopted Core Strategy, DMPD and Site Specific Allocations Document policies are afforded full weight in planning considerations and decisions on planning applications. These policies supersede all saved policies from the Wandsworth Unitary Development.

6.3.3 Designations are shown in Appendix 3 – Planning and environmental plans.

Land Use

6.3.4 This site lies within the foreshore of the River Thames, the Putney Embankment Policy Area, and the Wandsworth Thames Policy Area.

Core strategy

6.3.5 Core Strategy Policy PL 9, River Thames and the riverside seeks to protect existing river infrastructure that provides access to the river and the foreshore, such as piers, jetties, drawdocks, slipways, steps and stairs. The policy also seeks to protect Putney Embankment’s special recreational character and function, particularly in connection with river sports. Development that encroaches onto the river foreshore or that harms the stability or continuity of flood defences will not be permitted.

6.3.6 Core Strategy Policy PL 6, Meeting the needs of the local economy states that employment floorspace will be sought as part of mixed-use development on sites in the Wandsworth Thames Policy Area.

DMPD

6.3.7 DMPD Policy DMI 3, Thames Policy Area seeks to prevent the loss of existing B1, B2 and B8 and related Sui Generis floorspace unless there is evidence which demonstrates that there is no current or future demand for such space in the Wandsworth Thames Policy Area.

6.3.8 DMPD Policy DMO 6, Riverside development sets out criteria that all new development on sites adjoining the River Thames should comply with, including the incorporation of a public riverside walk, and the protection of existing views and biodiversity. Similarly, Policy DMO 7, Development in the river and on the foreshore sets out criteria for river-related development and seeks to enhance the river infrastructure and increase access to the River Thames. The policy also seeks to protect the residential amenity of adjoining sites, views of the river and biodiversity.
Heritage

6.3.9 The site falls within an archaeological priority area, Putney Embankment Conservation Area, and is in close proximity to a number of listed buildings, including the Grade II* listed St Mary’s Church and Grade II listed Putney Bridge and bollards along the Embankment.

Core strategy

6.3.10 Policy IS3 states that the Council will protect and reinforce the existing varied character and heritage of the borough.

DMPD

6.3.11 *DMPD Policy DMS 2, Managing the Historic Environment* requires development to sustain, conserve and, where appropriate, enhance the significance, appearance, character and setting of heritage assets and the surrounding historic environment. It also states that developments that would disturb archaeological priority areas will need to be assessed and may require an archaeological evaluation report.

6.3.12 Trees within conservation areas are also protected from damage or removal by DMPD Policy DMO5.

Nature conservation

6.3.13 The site lies within the River Thames, a designated Site of Importance for Nature Conservation. This is a general designation that covers the entire River Thames.

Core strategy

6.3.14 *Core Strategy Policy PL 4, Open Space and the Natural Environment* seeks to protect and enhance the biodiversity value of the borough and the River Thames. New development should avoid causing ecological damage and propose full mitigation and compensation measures for ecological impacts that do occur.

DMPD

6.3.15 *DMPD Policy DMO 4, Nature Conservation* states that development which would cause harm to a Special Area of Conservation, Site of Special Scientific Interest, Local Nature Reserve, Site of Importance for Nature Conservation (see Appendix 3 – *Planning and environmental plans*), any other site with important bio/geodiversity value, or any protected species will not be permitted unless any damaging impacts can be prevented by appropriate mitigation measures or planning conditions.

6.3.16 *DMPD Policies DMO 6, Riverside development* and *DMO 7, Development in the river and foreshore* seek to protect and enhance the habitat value of the river and shoreline and to ensure that no harm is caused to the river regime, environment, biodiversity or archaeology of the river (including banks, walls and foreshore).
Open space

6.3.17 The site lies adjacent to a ‘green chain’ that runs adjacent to the southern boundary of the River Thames. The site lies in the foreshore of the River Thames, which in itself is an area of open space.

Core strategy

6.3.18 Core Strategy Policy PL 4, Open space and the natural environment seeks to protect and improve open space in the borough, including the network of green chains.

DMPD

6.3.19 DMPD Policy DMO1, Protection and enhancement of open spaces seeks to protect and enhance open spaces, including green infrastructure and smaller areas not displayed on the proposals map. DMPD Policy DMT 3, Riverside walking and cycling routes states that development of sites on the Thames riverside will be permitted where provision is made for a riverside walk at least 6m wide and appropriate to the scale of development along the entire river frontage. That is unless an alternative route of equivalent width and equal amenity value around or through the site is necessary for safety, operational or nature conservation reasons.

Amenity

6.3.20 The proposed construction site lies close to residential properties on the Embankment and Lower Richmond Road and two houseboats located at Putney Pier.

DMPD

6.3.21 DMPD Policy DMS 1, General development principles – Sustainable urban design and the quality of the environment ensures that development does not harm amenity for occupiers through unacceptable noise, vibration, traffic congestion, air pollution, overshadowing, overbearing, loss of outlook, privacy or sunlight/daylight.

6.4 Planning comments

6.4.1 There are a number of planning designations and policies that are applicable to the site. These designations and policies are identified and described in Section 6.3 and those relating to land use, heritage, nature conservation and residential amenity are most relevant to the proposed development.

6.4.2 The site is within the foreshore of the River Thames which is a designated Site of Importance for Nature Conservation. This is a general designation, covering the entire River Thames. The purpose of the Thames Tunnel Project is to improve the overall environmental condition of the tidal Thames which, among other gains, would promote biodiversity. It is considered unlikely that construction activity within the river, with an appropriate level of mitigation, would adversely impact on or conflict with
the aims of this designation. A detailed assessment is provided in Section 7.

6.4.3 The entire site falls within Putney Embankment Conservation Area and it is close to several listed buildings. The location of the site within the foreshore is highly visible and offers little opportunity for adequate screening. With appropriate mitigation to reduce potential impacts on the setting of the nearby heritage assets and the surrounding historic environment, the proposal should not cause an unacceptable level of impact; however, some impact on these receptors is likely. Use of the site may involve some removal of mature trees that currently border the site. Trees should be retained and protected during the construction works wherever practically possible to help screen the construction works and avoid the loss of trees within the conservation area. A detailed heritage assessment is provided in Section 7.

6.4.4 The site falls within a designated Archaeological Priority Area. The appropriate level of site investigation should be agreed with the local planning authority in accordance with DMPD Policy DMS2. Further appraisal of the archaeological potential of the site is provided in Section 7 of this report.

6.4.5 The construction works and associated after use infrastructure should not result in overly prominent development in this location. The design and integration of the remaining legacy structures will require further consideration to ensure they are appropriate to the context of the site, in order to meet the requirements of DMPD Policy DMS 2 and Core Strategy Policy PL 9.

6.4.6 The slipway runs through the southern part of the site, connecting the Embankment to the River Thames. An alternative access to the river in the form of a temporary slipway for existing users within this location may be required during the construction period to comply with Core Strategy Policy PL 9.

6.4.7 It may be necessary to discuss with the adjacent landowners the proposed implementation timescales relating to the approved planning permission (ref: 2010/3543) for a restaurant in the basement vault of 2 Putney High Street and the currently pending listed building consent (2012/1998) relating to a similar development in the vault of 4-6 Putney High Street. It is likely that access and egress to the vaults across Waterman’s Green would need to be maintained during the construction works. The continued use of the vaults would need to be protected and mitigated wherever practicable, if the above planning permissions are implemented.

6.4.8 The site lies approximately 30m from the houseboats at Putney Pier to the northwest, 13m from the front façade of the Thai Square restaurant, 25m from the Star & Garter Mansions to the southwest, and 23m from Richmond Mansions to the southeast. Mitigation would likely be required to protect residential amenity from potential adverse impacts arising from noise, dust and increased traffic movements. Construction working hours may also need to be controlled, in accordance with normal working hours in residential areas.
6 Planning assessment

6.4.9 As the site is in close proximity to the Thai Square restaurant, mitigation would likely be required to ensure the temporary construction works and access arrangements do not adversely impact upon the business, as set out in DMPD Policy DMS 1.

6.4.10 Use of the site may also temporarily interrupt an existing green chain. This would also require suitable mitigation.
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 a CSO site in transport terms, subject to appropriate mitigation. A vehicular access and access road would require construction. Access for construction vehicles would be limited due to the tight alignment of the double right turn from Lower Richmond Road onto the Embankment and onto the temporary worksite. Modifications to the Embankment/slipway junction may be required to enable construction vehicles to manoeuvre into the site, and turn around to exit the site. Access routes to the TLRN (A205) and rail access at Clapham Junction contain some constraints in the form of a narrow road (the Embankment) and would pass through several high street areas for rail access. However the use of rail is unlikely due to the small quantities of excavated material produced at CSO sites.

7.2.2 River access is possible and it may be feasible to deliver and removed materials by barge. However, there may be constraints associated with the proximity of Putney Bridge and the adjacent Putney Pier.

7.2.3 There is good potential for the workforce to access the site using public transport, which would be important given that the site (along the Embankment) is unlikely to accommodate parking onsite, and on-street parking within the vicinity of the site is unsuitable. The majority of on-street parking along the Embankment is likely to require removal or reorganisation to allow access for construction vehicles.

7.3 Archaeology

7.3.1 Based on current information, this site is suitable as a CSO site. Consultation with English Heritage indicates that archaeological remains may be present in the area. However, no specific records of remains on this site have been identified at this stage. Overall, a lack of previous investigations in the area means that the nature and extent of archaeological receptors cannot be confidently predicted. It is possible that archaeological receptors of high or medium value may be present.

7.3.2 Peat deposits containing archaeological materials have been frequently recorded throughout London in a similar proximity to the River Thames. Given the location of the site, and general evidence for historical settlement along the river, it is a reasonable assumption that waterlogged remains of archaeological value may be present.

7.4 Built heritage and townscape

7.4.1 The site is suitable as a CSO site because the potential impact on the built heritage environment and the local townscape character is relatively limited. It is likely that there would be a direct impact on the Putney Embankment Conservation Area, the setting of Grade II listed Putney Bridge and there could be an adverse impact on the character and views
of the River Thames. However, there would likely be only an indirect impact on other receptors, including four listed buildings, two conservation areas and a registered historic park and garden. Potentially adverse impacts arising from construction and operation could be partly mitigated by means of a high quality scheme design and/or screening.

### 7.5 Water resources: Hydrogeology and surface water

**7.5.1** In terms of hydrogeology, this site is suitable as a CSO site because the drop shaft would be constructed in London Clay (unproductive strata). The Chalk piezometric head would likely be approximately 3.5m above the base of construction and this should be taken into account in the engineering design. No impact is expected on the Chalk aquifer. Superficial deposits at the site comprise Kempton Gravel, which is classified as a secondary aquifer and would be subject to a limited impact on flow due to the use of a diaphragm wall or caissons.

**7.5.2** The site is less suitable in terms of surface water resources, because it is located within and adjacent to the channel of the River Thames. Specific mitigation would be required to prevent pollution.

### 7.6 Ecology

**7.6.1** This site is less suitable as a CSO site due to the requirement for temporary and permanent land-take from the River Thames. The site is also immediately upstream of a stretch of the tidal Thames known to be the only spawning habitat for smelt. There may be a need for seasonal restrictions on working, off-site mitigation/compensation solutions, as well as extensive post-works restoration requirements.

### 7.7 Flood risk

**7.7.1** This site is less suitable as a CSO site as it would require specific mitigation to protect it from flooding. The working areas located in the river may cause displacement, which could increase the flood risk in the locality.

### 7.8 Air quality

**7.8.1** This site is less suitable as a CSO site as there is potential for fugitive emissions of dust during construction to have a perceptible impact on nearby residential properties, although these impacts could be minimised with standard dust control measures. There is potential for HGV movements on the local road network to cause localised air quality impacts in areas with existing poor air quality. This could be partially mitigated by minimising the movement of HGVs during peak hours.

### 7.9 Noise

**7.9.1** This site is less suitable as a CSO site due to the proximity of the residential receptors to the south of the site. Any shielding afforded by the site perimeter barriers would be largely ineffectual due to the height of some of the receptors. In addition, the number of vehicles associated with the construction phase and the proposed access route may cause noise impacts on the residential properties on Lower Richmond Road.
7.10 Land quality

7.10.1 The site is suitable as a CSO site as there is little potential for contamination from historical on- and off-site activities. This is due to the distance of potential sources of contamination from the site.
8 Socio-economic and community assessment

8.1 Introduction

8.1.1 The socio-economic and community assessment builds on the advantages and disadvantages set out in Table 2.3 of the Site selection methodology paper and covers the following areas:

a. Socio-economic profile
b. Socio-economic and community issues and impacts.

8.2 Socio-economic profile

8.2.1 The site lies within the Thamesfield ward of the London Borough of Wandsworth. Statistics from the Office of National Statistics 2001 Census data show the following indicators for the ward, in comparison to the rest of Wandsworth, London and England as a whole:

a. A higher proportion of the population has achieved some form of qualification, in particular Level 4 or 5 educational qualifications, than in Wandsworth, London and England as a whole.

b. Employment statistics are comparable, with a slightly higher rate of full-time employees or self-employed, and a higher proportion of the population work in the financial and business sectors.

c. A higher proportion of the population describes their health as ‘good’ and a considerably lower proportion has a limiting long-term illness.

d. A slightly higher proportion of the population has no religion, and a lower rate of religions other than Christianity across the board, and a higher rate of Christianity compared to the borough and London (but not England).

e. A higher proportion of the population is aged between 25 and 59, with a correspondingly lower proportion of children, younger adults and the elderly compared to the borough, London and England as a whole.

f. The majority of the population describes themselves as ‘white British’ compared with Wandsworth and London as a whole, with a lower overall ethnic diversity (relatively much lower proportions from all other ethnic groups).

g. Regarding tenure, there is a similar proportion of owner-occupied households, but a lower proportion of households rented from the council or housing associations, and a considerably higher proportion of privately rented households (almost double the proportion for London as a whole).

8.2.2 Overall, these findings indicated that the Thamesfield ward consists of predominantly white, professional, well-educated residents, and that the ethnic mix and age structure is not as diverse as elsewhere in London. In addition, the higher proportion of residents who stated their religion as Christianity suggests that St Mary’s Church, which is in the vicinity of the site, may be important for community cohesion.
8.2.3 At the site visit, the tenure of the residential properties on Lower Richmond Road (Richmond Mansions) appeared to be private ownership.

8.3 Issues and impacts

8.3.1 Due to the proposed location of the CSO works, the greatest impacts of the proposed works would likely be on the residential houseboats moored at Putney Pier (one of which may require temporary relocation during part of the construction period); residential properties, a restaurant and bar opposite the site on the Embankment and other residential properties located within large mansion blocks opposite the site on Lower Richmond Road. A number of these residential properties would likely have a direct view of the foreshore area, which would be affected by the works, while those on lower floors may be more affected by traffic movements. Disturbance caused by additional traffic movements may be limited due to the existing noise from the busy Lower Richmond Road and Putney High Street. The residential properties are also separated from the site by the carriageways of Lower Richmond Road and the Embankment. Some of those on Lower Richmond Road may be part shielded from the construction works by the buildings on the Embankment. There are a number of commercial businesses operating out of premises on Lower Richmond Road that may be affected by the use of the site.

8.3.2 The plan in Appendix 7 indicates that the existing slipway parallel to the Embankment would be unavailable during the two to four year construction phase. Further consideration will need to be given to alternative slipway and public access to the river during the construction works.

8.3.3 In addition to the potential impact on the houseboats moored at Putney Pier, it appears that the pier is in regular use. It appears likely that access from the river to the pier may be affected during the construction phase and possibly by the permanent structure.

8.3.4 Access to the signposted riverside walk and cycle path would also likely be affected during the construction phase. The Thames Path appears to be routed along Lower Richmond Road at this point, which means that it is unlikely that it would be directly affected by the proposed works but may be affected by site access and traffic.

8.3.5 In the vicinity of the site, there are other commercial premises (bars, restaurants and shops), as well as St Mary’s Church and the Busy Bees Nursery, all of which may be adversely affected by disturbance from site works. Any impacts, however, would likely be limited due to their distance from the site and the busy Putney High Street and Putney Bridge in between. There are many rowing clubs and other clubs located up-river of the site, but the potential impacts on these appear to be limited.
9 Property assessment

9.1 Introduction

9.1.1 This report builds on the advantages and disadvantages set out in Table 2.3 of the Site selection methodology paper and provides more up-to-date information.

9.1.2 The site comprises an area of the River Thames foreshore west of Putney Bridge. The surface of the site is mud and shingle (when exposed at low tide). It does not include any buildings, but there is any existing slipway.

9.2 Crown land and special land comments

9.2.1 The part of the site that abuts Lower Richmond Road is owned by the London Borough of Wandsworth and therefore may be classified as Special Land under Section 17 of the Acquisition of Land Act 1981. However, Section 17 does not apply where the body acquiring the land is a statutory undertaker. As Thames Water is a statutory undertaker, Section 17 does not apply to the project. However, Section 16 of the 1981 Act does apply and provides that land may not be acquired unless the minister is satisfied that there will be no detriment to the operations of the owner, or that the land can be replaced. Therefore, the compulsory purchase may be subject to a ministerial procedure. The owner should be contacted as soon as possible to establish whether acquisition can be agreed.

9.2.2 The land is also classed as open space and therefore may be classified as Special Land under Section 19 of the 1981 Act. If this is the case, and if acquisition cannot be agreed with the owner, a special parliamentary procedure may be needed once the Order is confirmed. As the whole Order would be subject to the special parliamentary procedure, not just the acquisition of this site, the project could be delayed by a minimum period of several months in the best case. In the worst case, the Order may be rejected by Parliament, in which case an Act of Parliament would be needed before the Order could come into effect. This could delay the project for a much longer period and the Order could fail as a result. The owner should be contacted as soon as possible to establish whether acquisition can be agreed.

9.2.3 The London Borough of Wandsworth land appears to comprise an area of open space and if this is the case, a special parliamentary procedure would not be needed.

9.2.4 It may also be advisable to consider the inclusion of exchange land in the development consent order, if any such land is available.

9.3 Land to be acquired

9.3.1 The site requires the temporary acquisition of foreshore during the construction phase and a permanent acquisition would be needed to accommodate the permanent structure, which would extend the riverbank.
9.3.2 In addition, rights would be required to construct a culvert eastwards along the foreshore to intercept the CSO under Putney Bridge.

9.3.3 The compensation assessment assumes that the majority of the worksite would be acquired temporarily, via the new rights acquired for the period of the works set out in the engineering section above. It also assumes that a smaller area would need to be acquired permanently to house operational plant.

9.3.4 The permanent works would include the provision of an area of hardstanding behind a new section of the river wall blocking the existing slipway. The slipway would be temporarily moved westward and reinstated once the construction works are complete.

9.4 **Property valuation comments**

9.4.1 Compensation for the acquisition of new rights is normally based on the diminution of the land’s value due to the acquisition. Compensation for the permanent acquisition of land is normally based on the market value, but may be based on equivalent reinstatement for the acquisition of unusual types of property.

9.4.2 If compensation is assessed on a diminution in value basis for 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 would likely be relatively low and therefore acceptable.

9.4.3 If compensation is assessed on the basis of re-provision of flood compensation land, and an allowance for a one-off payment to the owner, acquisition costs would likely be acceptable. However, costs on this basis are difficult to assess and there is a risk that the cost of flood compensation land could increase significantly.

9.4.4 The temporary worksite land would be reinstated following the construction phase as a part of the engineering works. Therefore, reinstatement costs are not included in the compensation assessment.

9.5 **Disturbance compensation comments**

9.5.1 The site comprises unoccupied river foreshore and embankment therefore it is considered that disturbance compensation is unlikely to be necessary.

9.6 **Discretionary purchase costs comments**

9.6.1 Works on the site would be limited to 12-hour working, Monday to Saturday. Therefore, it is unlikely that there would be any significant discretionary purchase costs.

9.7 **Offsite statutory compensation comments**

9.7.1 There should be limited potential for offsite statutory compensation under S.10 of the Compulsory Purchase Act 1965, as it is unlikely that there would be any physical interference with public or private property rights.
9 Property assessment

9.7.2 There is also limited potential for claims under the Land Compensation Act 1973 Part 1, as it is unlikely that the completed works would result in diminution in the value of property.

9.7.3 There may be an adverse effect on riverside businesses in close proximity to the site during the construction period.

9.8 Site acquisition cost assessment

9.8.1 The statutory acquisition costs would likely be low due to the undeveloped nature of the foreshore.
10 Site conclusions by discipline

10.1 Introduction

10.1.1 The conclusions set out in this section are drawn from each discipline’s assessment. They are designed to inform the workshop reach a final conclusion on whether or not the site should move forward as a preferred site.

10.2 Engineering

10.2.1 This site is less suitable as a CSO site because it is within the 100m exclusion zone from Putney Bridge and is directly adjacent to the Putney drawdock/slipway. The site is also located in close proximity to Putney Pier. However, the site being in the foreshore can be modified to suit actual requirements and there is reasonable vehicular access directly from a public highway and no known underground services. The slipway would need to be demolished to enable the construction of the permanent works. The close proximity to Putney Bridge may be a concern. The construction methodology of the connection culvert to the outfall will need to be finalised separately (notably for work under Putney Bridge close to an abutment).

10.3 Planning

10.3.1 This site is less suitable as a CSO site.

10.3.2 There are a number of planning and environmental designations relating to this site. Mitigation would be required to reduce potential impacts on the conservation area, nearby listed buildings and historic slipway, as well as residential properties and the Thai Square restaurant. In addition, continued or alternative public access to the river during the construction works would also require further consideration.

10.4 Environment

10.4.1 Overall, this site is less suitable as a CSO site, although mitigation would be required.

10.4.2 Based on current information, the site is suitable from the perspectives of transport, archaeology, built heritage and townscape, water resources (hydrogeology) and land quality.

10.4.3 The site is considered less suitable from the perspectives of water resources (surface water), ecology, flood risk, air quality and noise.

10.4.4 Overall, the site is considered less suitable, and further investigation would be required as to whether water resources (surface water), ecology, flood risk, air quality and noise impacts can be adequately mitigated. Likely mitigation considerations would include:

a. Surface water and flood risk – mitigation to reduce flood risk to the worksite and elsewhere (loss of capacity) and specific mitigation to reduce the impacts of in-river working.

b. Ecology – the site is immediately upstream of the stretch of the River Thames known to be the only spawning habitat for smelt in the
Tideway. This, and the potential for permanent and temporary land-take from the River Thames foreshore, would require comprehensive mitigation which may include seasonal working, offsite mitigation or compensatory works, and post works restoration.

c. Air quality – measures to ensure dust is adequately mitigated for the closest receptors.

d. Noise – standard noise barriers are unlikely to be entirely effective for upper floors of adjacent blocks, and other techniques may be required to reduce construction noise to acceptable levels.

10.5 Socio-economic and community

10.5.1 This site is less suitable as a CSO site because its use appears likely to impact on a large number of residential properties located opposite on Lower Richmond Road, a number of which will overlook the site. The site’s use also appears likely to affect a restaurant and properties above located on the Embankment directly opposite the proposed shaft. There are also further residential properties along the Embankment and in the vicinity.

10.5.2 A slipway will be affected during the construction phase, so an alternative temporary replacement in the vicinity will need to be investigated. The proposed after-use structure is to be located adjacent the reinstated slipway so may also impact on its use. Use of the site may cause some disturbance to houseboats moored at Putney Pier, but otherwise appears unlikely to impact on the Pier’s use.

10.5.3 Use of the site, and particularly the access, appears likely to affect the adjacent footpath and cycleway. Vehicle movements to and from the site appear likely to cause some disruption to Embankment and Lower Richmond Road and could cause some disruption in the surrounding area which may affect the local community.

10.6 Property

10.6.1 The advantages of the site are as follows:

a. The site is undeveloped foreshore and therefore acquisition costs are likely to be acceptable.

10.6.2 The disadvantages of the site are as follows:

a. Part may be classified as Special Land under Section 19 of the Acquisition of Land Act 1981.

b. Effect on nearby businesses during construction

10.6.3 This site is classified suitable. Discussions are taking place with the PLA to ensure relevant licences can be put in place to enable the works to be undertaken.

10.7 Next steps in the site selection process

10.7.1 It should be noted at this point that the above conclusions do not represent an overall recommendation on the suitability of a site. The next step for
the disciplines is to discuss their site suitability report conclusions at an optioneering workshop. All the shortlisted CSO sites will be compared at the workshop in order to determine the preferred site. This site will be put forward for targeted consultation. Summaries of the assessments and outcomes will be reported in the *Section 48: Report on site selection process.*
Appendix 1: Sources of information

Engineering
a. Traffic Management and Access Roads/Rail – URS
b. Access River – BMT Isis
c. Services (Utilities) and Third Party Assets – Thames Tunnel and utility companies
d. Geology – British Geological Society and Thames Tunnel
e. Construction and Operational Layout Template – Thames Tunnel
f. Site selection background technical paper – Thames Tunnel

Planning
a. London Borough of Wandsworth online planning applications database
b. Wandsworth, Core Strategy, adopted October 2010
d. Wandsworth, Site Specific Allocations Document, adopted February 2012
e. Greater London Authority, London Plan, adopted July 2011

Environment

Transport
g. Bus Route Maps: North-east, north-west, south-west, south-east – www.tfl.gov.uk
h. Crossrail Plans – www.crossrail.co.uk/crossrail-bill-documents
i. Public Transport Accessibility Level (PTAL) scores – Obtained from Table 2.3 information
j. Thames Path map – www.walklondon.org.uk
k. Capital Ring – www.walklondon.org.uk
l. Cycle Routes – www.sustrans.org.uk and Local Cycling Guides 1-14
m. Highways Agency, Design Manual for Roads and Bridge TD 42/95

Archaeology
a. Historic Environment data from Greater London Archaeology Advisory Service (GLAAS)
b. National Monuments Record – for some additional information regarding registered historic parks and gardens
c. London Archaeological Archive and Research Centre (LAARC)
d. Local authority websites
e. Bing maps

Built heritage and townscape
a. Local authority lists of Locally Listed Buildings
b. National Monuments Record – for some additional information regarding registered historic parks and gardens
c. Wandsworth, Core Strategy, adopted October 2010
d. Wandsworth, Development Management Policies Document (DMPD), adopted February 2012
e. Local authority websites
Appendix 1: Sources of information

f. Bing maps

**Water resources: Hydrogeology and surface water**

a. Local authority details of unlicensed abstractors
b. Environment Agency abstraction licence details
c. Environment Agency groundwater levels and contour maps (2009-11)
d. Environment Agency water quality (surface water and groundwater)
e. Environment Agency Groundwater Source Protection Zones
g. Envirocheck
h. British Geological Survey (BGS) logs
i. BGS 1:50,000 Geological Sheets – Solid and Drift Editions (England and Wales)
j. BGS Geology of London – Special Memoir for 1:50,000 Geological sheets 256 (North London), 257 (Romford), 270 (South London) and 271 (Dartford) (England and Wales)
k. Crossrail (2005) – Assessment of Water Impacts Technical Report: Appendix C – Baseline Data. Figure C.4: Extent of Saline Intrusion based on 177 mg/l *5mmol/l Isochlor

**Ecology**

c. Multi-Agency Geographic Information for the Countryside (MAGIC) – www.magic.gov.uk - statutory designated sites
d. London Wildweb – wildweb.london.gov.uk - non-statutory site of importance for nature conservation
g. Google Maps – aerial views of habitat features
h. BAP habitats – www.natureonthemap.org.uk
i. Priority habitats and species on national and local scales – www.ukbap.org.uk

**Flood risk**

b. Environment Agency National Flood and Coastal Defence Database
c. Envirocheck

**Air quality**

a. Local authority websites
c. Defra UK-AIR, air quality information resource – www.airquality.co.uk
d. Defra Air Quality Management Areas – http://aqma.defra.gov.uk
e. Defra Local Air Quality Management – http://laqm.defra.gov.uk

**Noise**

a. Envirocheck – Identification of receptors
b. Promap – Calculation of distances between site and receptors
c. Multimap – Aerial photography – www.multimap.co.uk
d. Defra noise maps – Identification of existing noise levels
Appendix 1: Sources of information

Land quality
a. Google Maps/Earth
b. Envirocheck Data Sheets provided as a GIS Database
c. British Geological Survey (BGS) logs

Socio-economic and community
a. Statistics from the Office of National Statistics 2001 Census data
b. Boats from Putney Pier (Transport for London):
c. London Rowing Club: www.londonrc.org.uk/contact.php

Property
a. Mouchel Land Registry information
b. Valuation Office Agency (VOA) website
c. Multimap
Appendix 2: Site location plan
Location
Putney Embankment Foreshore
London Borough of Wandsworth

Document Information
Site Suitability Report
APPENDIX 2
Site Location Plan
CO6XL
1PL04-SS-02443

Scale 1: 5,000 at A3

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Appendix 3: Planning and environment plans
Location
Putney Embankment Foreshore
London Borough of Wandsworth

Document Information
Site Suitability Report
APPENDIX 3B
Planning and Environment Plan
C06XL
1PL04-SS-02450

Scale 1:2,500 at A3

Keyplan:
- Local Authority Boundary
- Short Listed CSO Site
- CSO Directly Controlled
- Sites of Metropolitan Nature Conservation Importance
- Sites of Borough Nature Conservation Importance
- Green Corridor/Chains
- Nature Conservation Area
- Tree Preservation Orders

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Appendix 4: Photographs of the site and surroundings
The site, viewed from the north, showing the Star and Garter to the west

The site, viewed from the northwest, beyond the Putney Bridge
Appendix 5: Transport plan
Location
Putney Embankment Foreshore
London Borough of Wandsworth

Document Information
Site Suitability Report
APPENDIX 5
Transport Plan C06XL
1PL24-SS-02462

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Appendix 6: Services and geology plan
Appendix 7: Construction phase layout
THAMES TUNNEL SCHEME.
SELECTED AS A CONSTRUCTION SITE TO FORM PART OF THE THAMES TUNNEL. SHOULD NOT BE TAKEN TO MEAN THAT SUCH SITE WILL BE INCLUDED IN THE SHORTLIST OF CONSTRUCTION SITES FOR THE PROPOSED THAMES TUNNEL. INCLUSION OF A SITE ON THIS DRAFT PLAN SHOULD NOT BE CONFIRMED AS BEING ON THE FOLLOWING DISCUSSIONS WITH LOCAL AUTHORITIES AND OTHER STAKEHOLDERS, MAY BE CONFIRMED AS BEING ON THE SHORTLIST.

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DISCLAIMER:
INDICATIVE CONSTRUCTION PHASE ARRANGEMENT BASED ON PRELIMINARY ASSESSMENT.

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LUIGI VENARDI

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This is an indicative working draft plan which has been produced for the purpose of confidential discussions only. Accordingly, the draft plan must not be circulated wider than the limit of this drawing. It provides information of sites only. The expression of construction phase arrangements is representational and based on preliminary assessment.

NOTE:
1. DRAWING NO. INDICATIVE CONSTRUCTION PHASE ARRANGEMENT BASED ON PRELIMINARY ASSESSMENT.
2. FINAL DESIGN SUBJECT TO DEVELOPMENT.

Key:
- NEW
- ORIENTED MEANS OF INTERCEPTION
- HANDLING AREA
- EXCAVATED MATERIAL
- STORAGE STOCKYARD
- POWER SUPPLY
- OFFICE / WELFARE
- PRIMARY CRANE
- SECONDARY CRANE
- WORKSHOP
- STOCKYARD
- COFFERDAM
- AREA = 4475m²
- SITE BOUNDARY
- TQ2475

Power Supply
6.2m
COFFERDAM
AREA = 3032m²
TEMPORARY WORKING AREA
(OPEN CUT)
CULVERT 1.5m SQUARE
CSO CONNECTION
AND STORES
WORKSHOP
STOCKYARD,
HANDLING AREA
EXCAVATED MATERIAL
CSO DROP SHAFT
(TWO WAY)
ACCESS (TWO WAY)
COFFERDAM
STOPWALLS
CONSTRUCTION BODY (OPEN CUT)
SHORE LINE FOR DRILL, DREDGE AND REMOVAL
SHORE LINE FOR GUARD, DREDGE AND REMOVAL
SHELTER
MORRIS UNIVERSITY
Shingle
LOWER RICHMOND ROAD
55 to 78
31 to 64
69 1
Richmond Mansions
31 1
Kenilworth Court
8.6m
POWER SUPPLY

Area = 100m²
200m²
100m²
250m²
750m²
Appendix 8: Operational phase layout
VENTILATION COLUMN (CSO)

SCALE 1:50

ELECTRICAL CONTROL KIOSK (CSO)

SCALE 1:25

Diagrammatic representation of top structure above CSO 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 requirements.
3. Cladding of ventilation building to suit location and aesthetics.
4. All top structures to have:
   - Access stairs/ladder
   - Temporary or permanent hand railings
5. All dimensions in millimeters unless otherwise stated.
THAMES TUNNEL SCHEME.
SELECTED AS A CONSTRUCTION SITE TO FORM PART OF THE THAMES TUNNEL. SHOULD NOT BE TAKEN TO MEAN THAT SUCH SITE WILL BE INCLUDED ON THIS DRAFT PLAN SHORTLIST OF CONSTRUCTION SITES FOR THE PROPOSED STAKEHOLDERS, MAY BE CONFIRMED AS BEING ON THE FOLLOWING DISCUSSIONS WITH LOCAL AUTHORITIES AND OTHER LIMITED. IT PROVIDES AN INDICATION OF SITES THAT, EXPRESS WRITTEN PERMISSION OF THAMES WATER UTILITIES DISTRIBUTED OR SHOWN TO ANY THIRD PARTY WITHOUT THE ONLY. ACCORDINGLY, THE DRAFT PLAN MUST NOT BE COPIED, PRODUCED FOR THE PURPOSE OF CONFIDENTIAL DISCUSSIONS THIS IS AN INDICATIVE WORKING DRAFT PLAN WHICH HAS BEEN NUMBER 100019345 RIGHT 2012. ALL RIGHTS RESERVED ORDNANCE SURVEY LICENCE ON BEHALF OF HMSO. © CROWN COPYRIGHT AND DATABASE MAPPING REPRODUCED BY PERMISSION OF ORDNANCE SURVEY. 2008

OPERATIONAL PHASE LAYOUT
LOWER RICHMOND ROAD FORSHORE - C06XL

55 to 78
31 to 54
6 of 1
Richmond Mansions
8 of 1

Shelter

Shelter

CSC CONNECTION
COLUMN (FAI SQUARE
RESECTED)

VICTIM COLUMN

CSC DRAIN SHIELD ON FI

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## Transport

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<tr>
<th>Site considerations</th>
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<th>Mitigation required and conclusions</th>
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<tbody>
<tr>
<td>Access to road network</td>
<td>Site is located on the foreshore at the end of an existing slipway. A vehicular access and access road would require construction. Vehicles using the access would have to perform a right turn in and out of the site as Embankment is one-way. The junction between Embankment and Lower Richmond Road (for access onto Embankment only) is only 5m from the entry to the slipway. Construction vehicles arriving from the south east may struggle to negotiate the tight alignment. The Embankment/slipway junction may need to be modified to ensure vehicles are able to turn onto the slipway. Larger vehicles may also need to reverse into the slipway from embankment. Embankment is a one-way street lit road which is unsuitable for long vehicles and is subject to a 30mph speed limit. It has a carriageway width of 6.6m which is reduced to an effective width of 3.4m by on street parking on both sides where parked vehicles were observed to overspill the bays. Some on street parking along Embankment would require removal to allow access for construction vehicles. Access to the A205 (TLRN strategic highway network) from Embankment to Thames Place, then onto Lower Richmond</td>
<td>Conclusion: The site is possible in highway terms using an existing slipway to access Embankment within close proximity to the junction between Embankment and Lower Richmond Road. A vehicular access and access road would require construction. Access for construction vehicles both at the Embankment/slipway junction would be limited and further investigation is required. Some on street parking along Embankment would require removal to allow access for construction vehicles. Access to the TLRN (A205) passes through a high street area and along a narrow road with on street parking.</td>
</tr>
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</table>
## Appendix 9: Environmental appraisal tables

### Transport

<table>
<thead>
<tr>
<th>Site considerations</th>
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<tbody>
<tr>
<td>Road and southbound along Putney High Street through a high street area. Embankment is a narrow road with on street parking on both sides. Distance 1.0km to TLRN (A205). See Transport Access Plan in Appendix 5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to river</td>
<td>River access possible as site located in the river. However, further investigation required.</td>
<td>River access possible as site located in the river. However, further investigation required.</td>
</tr>
<tr>
<td>Access to rail</td>
<td>Use of rail is unlikely to be required due to the small quantities of excavated material produced by a CSO site. Access to existing railway sidings at Clapham Junction uses Lower Richmond Road (via Embankment and Thames Place), following onto Putney High Street and along Putney Bridge Road to the TLRN (A3). The route continues eastbound along the TLRN (A3) onto St John’s Hill before turning onto Plough Road for the Clapham Junction, Traincare Depot railway sidings. The route passes under two rail bridges along Putney Bridge Road and over one road bridge on the A3 with no visible restrictions. The route also runs through two high street areas (Putney High Street and St John’s Road) and a residential area on Putney Bridge Road. Distance 4.5km to rail access point from site.</td>
<td>Use of rail unlikely to be required due to the small quantities of excavated material produced by a CSO site. Route to possible rail link at Clapham Junction runs through two high street areas, one residential area, under two rail bridges and over one road bridge (none with any visible restrictions). Route may also run along a narrow road if site egresses onto Embankment. Clapham Junction railway sidings at the Traincare Depot accessible using Plough Road.</td>
</tr>
<tr>
<td>Parking</td>
<td>Parking unlikely to be provided on site for workforce as the site is located on the foreshore. On street parking along Embankment is unsuitable for Parking for workforce unlikely to be provided within site boundary and on street parking nearby unsuitable as the maximum stay is 4hrs. The majority of bays along</td>
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Site suitability report C06XL 38
### Transport

<table>
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<tr>
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<tr>
<td>workforce as maximum stay is 4hrs (Mon-Sat 08:30-18:30 at £1.80/hr). In addition, the majority of the bays along Embankment require removal to allow access for construction vehicles. Workforce parking would therefore need to be provided elsewhere.</td>
<td>Embankment require removal to provide access for construction vehicles. Workforce parking needs to be provided.</td>
<td></td>
</tr>
<tr>
<td>Public transport accessibility</td>
<td>PTAL 5-6 (High) as identified within Table 2.3.</td>
<td>Good possibility of workforce being able to use public transport to access site.</td>
</tr>
<tr>
<td>Traffic Management</td>
<td>It has been assumed that the connection culvert would be joined to the existing sewer underneath Putney Bridge. Any construction affecting the carriageway on Putney Bridge would require a lane closure which would have an impact on traffic using the bridge. Some on street parking along Embankment requires removal. Modifications may be needed to the Embankment/slipway junction to ensure construction vehicles could manoeuvre in and out of the site. Construction vehicles may need to reverse along the access road and slipway as there would be nowhere to turn within site. Consideration should be given to a turning facility if possible</td>
<td>It has been assumed that the connection culvert would be joined to the existing sewer underneath Putney Bridge. However, Temporary Traffic Management would be required in the form of at least a lane closure on Putney Bridge if construction works associated with the connection culvert were to affect the carriageway. Some on street parking along Embankment requires removal for construction vehicle access. Modifications may need to be made to the Embankment/slipway junction to ensure construction vehicles could manoeuvre into the site and turn around to exit the site.</td>
</tr>
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</table>

**Summary:**
The site is suitable as a CSO site in transport terms, subject to appropriate mitigation. A vehicular access and access road would require construction. Access for construction vehicles would be limited due to the tight alignment of the double right turn from Lower Richmond Road onto the Embankment and onto the temporary worksite. Modifications to the Embankment/slipway junction may be required to enable construction vehicles to manoeuvre into the site, and turn around to exit the site. Access routes to the TLRN (A205) and rail access at Clapham Junction contain some constraints in the form of a narrow road (the Embankment) and would pass through several high street areas for rail access. The
use of rail is unlikely, however, due to the small quantities of excavated material produced at CSO sites.

River access is possible and it may be feasible to deliver and removed materials by barge. However, there may be constraints associated with the proximity of Putney Bridge and the adjacent Putney Pier.

Workforce parking would be required, as no spaces would be available on-site and on-street parking within the vicinity of the site (along the Embankment) is unsuitable. The majority of on-street parking along the Embankment would require removal to allow access for construction vehicles. There is good potential for the workforce to utilise public transport to access the site.

Temporary traffic management would be required if construction works associated with the connection culvert affected the carriageway on Putney Bridge as this would have an impact on traffic on the bridge. Modifications may be needed to provide heavy goods vehicle (HGV) access onto the temporary worksite.

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### Archaeology

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<tr>
<th>Site considerations</th>
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<tbody>
<tr>
<td>Designations, including Archaeological Priority Areas</td>
<td>No designation within the site boundary</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Summary of historical uses</td>
<td>The site is located on the Thames foreshore to the east of the current Putney Bridge. No previous development is recorded.</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>No archaeological receptors are recorded within the site. This does not preclude the possibility of unrecorded archaeological receptors of high value being within the site.</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 medium value with the potential to be directly affected</td>
<td>No archaeological receptors are recorded within the site. This does not preclude the possibility of unrecorded archaeological receptors of medium value being within the site.</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>Other receptors with the potential to be directly affected</td>
<td>Construction impact of potential waterlogged deposits containing archaeological remains may cause dewatering. This potential impact should be considered given the close proximity of the site to the River 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>There is no firm cartographic evidence for any ground disturbance.</td>
<td>A detailed desk based assessment is required to sufficiently understand the archaeological resource and define risk to potential development.</td>
</tr>
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</table>
| Potential issues | Detailed design proposals, and an outline method statement would be required to enable initial assessment of development impacts, and to inform mitigation proposals. With the currently available information it is not possible to | Mitigation methods could include:  
- Desk based assessment  
- Production of deposits model  
- Archaeological monitoring of geotechnical investigations  
- Archaeological evaluation  
- Archaeological watching brief |
### Archaeology

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<td>highlight specific potential issues.</td>
<td>• Archaeological excavation</td>
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**Summary:**

Based on current information, this site is suitable as a CSO site. Consultation with English Heritage indicates that archaeological remains may be present in the area. However, no specific records of remains on this site have been identified at this stage. Overall, a lack of previous investigations in the area means that the nature and extent of archaeological receptors cannot be confidently predicted. It is possible that archaeological receptors of high or medium value may be present. Peat deposits containing archaeological materials have been frequently recorded throughout London in a similar proximity to the River Thames. Given the location of the site, and general evidence for historical settlement along the river, it is a reasonable assumption that waterlogged remains of archaeological value may be present.
## Built heritage and townscape

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<tr>
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<tr>
<td><strong>Listed Buildings</strong></td>
<td>Church of St Mary the Virgin, Putney High Street, Grade II*: 45m Putney Bridge (Wandsworth end), Grade II: 11m Putney Bridge (Hammersmith and Fulham end), Grade II: 110m The White Lion Public House, Putney High Street, Grade II: 153m 3 Bollards at junction with Lower Richmond Road (Putney Embankment), Grade II: 15m 37, 39 and 41, Lower Richmond Road, Grade II: 150m Winchester House (Putney Constitutional Club), Lower Richmond Road, Grade II: 156m The Duke’s Head PH, Grade II: 115m</td>
<td>In the case of listed buildings, conservation areas, and registered historic parks and gardens 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 would be required to further determine the likely impact of the development and to inform more detailed mitigation proposals. On the basis of currently available information (May 2012) and on the basis of certain receptors not being present within 250m of C06XL, mitigation would not be applicable in the case of locally listed parks and gardens and protected views.</td>
</tr>
<tr>
<td><strong>Locally Listed Buildings</strong></td>
<td>4 Lower Richmond Road: 30m 6 Lower Richmond Road: 30m 32 Waterman Street: 120m 32-36 Putney High Street: 122m</td>
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<tr>
<td><strong>Conservation Areas</strong></td>
<td>Putney Embankment Conservation Area: 0m Deodar Road Conservation Area: 200m Oxford Road Conservation Area: 188m Bishops Park Conservation Area: 70m Putney Bridge Conservation Area: 84m Charlwood Road Conservation Area: 170m</td>
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<tr>
<td><strong>Registered Historic Parks and Gardens</strong></td>
<td>Bishops Park, Grade II: 175m</td>
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### Appendix 9: Environmental appraisal tables

#### Built heritage and townscape

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<tr>
<td><em><em>Fulham Palace, Grade II</em>: 210m</em>*</td>
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<tr>
<td><strong>Locally Listed Parks and Gardens</strong></td>
<td>There are no locally listed parks and gardens with 250m of C06XL.</td>
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<tr>
<td><strong>Protected Views</strong></td>
<td>There are no protected views within 250m of C06XL.</td>
<td></td>
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<tr>
<td><strong>Potential receptors of medium to very high importance with the potential to be directly affected</strong></td>
<td>There is the potential for the Putney Embankment Conservation Area to be directly affected as C06XL lies within the boundaries of the designated area.</td>
<td>Mitigation in the form of a high quality and sensitive scheme design and/or screening would be required to ensure that the development preserves or enhances the character or appearance of the Putney Embankment Conservation Area.</td>
</tr>
<tr>
<td><strong>Other receptors of lesser importance with the potential to be directly affected</strong></td>
<td>Not Applicable.</td>
<td>Not Applicable.</td>
</tr>
<tr>
<td><strong>Potential receptors of medium to very high importance with the potential to be indirectly affected</strong></td>
<td>There is the potential for eight listed buildings (one Grade II* and seven Grade II) to be indirectly affected through changes to their settings. There is also the potential for six conservation areas and two registered historic parks and gardens to be indirectly affected.</td>
<td>Of the eight listed buildings within 250m of C06XL, four do not share a visual relationship with the site (37, 39 and 41 Lower Richmond Road, the White Lion PH, The Duke’s Head PH and Winchester House, Lower Richmond Road). These receptors are unlikely to be affected by the development and no mitigation would be required. The other four listed buildings, which are between high and medium importance, all share a visual relationship with the site. The development therefore has the potential to affect the setting of these listed buildings. Mitigation to reduce the visual impact of the site on these receptors, including a high quality scheme design and/or screening, is likely to be required. The Deodar Road, Charlwood Road and Oxford Road Conservation Areas do not share a</td>
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### Built heritage and townscape

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<td>visual relationship with C06XL, reflecting the built up character of the local area. They are unlikely, therefore, to require any mitigation. In contrast, the Bishops Park and Putney Bridge Conservation Areas do share a visual relationship with C06XL, with views between the designated areas and the site across the River Thames and from Putney Bridge. Mitigation in the form of a suitable scheme design and/or screening may be required to reduce the visual impact of the development upon the setting and views to and from the Bishops Park and Putney Bridge Conservation Areas. The Fulham Palace registered historic park and garden does not share a visual relationship with C06XL as mature vegetation along the eastern bank of the River Thames obscures longer distance views to the western bank and the site. The development would therefore not affect the setting of this registered area and mitigation would not be required. In contrast, there are likely to be views from the Bishops Park registered historic park and garden towards C06XL and therefore the development has the potential to have an indirect impact upon the setting of the registered area. Mitigation in the form of a high quality scheme design and/or screening is therefore likely to be required in order to reduce the visual impact of the development upon the setting of the Bishops Park Conservation Area.</td>
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### Built heritage and townscape

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<tbody>
<tr>
<td>Other receptors of lesser importance with the potential to be indirectly affected</td>
<td>There are four locally listed structures within 250m of the development area. There is the potential for the scheme to indirectly impact on their setting.</td>
<td>None of the locally designated structures share a visual relationship with the scheme due to the urban context of the site; therefore, they will not be impacted.</td>
</tr>
<tr>
<td>Sensitive landscape character areas likely to be affected, including trees and TPOs</td>
<td>Site located in Putney Embankment Policy Area. Sensitive site on the south bank of the River Thames. River Thames to the north with Putney Bridge to the east of the site, Lower Richmond Road and densely built-up residential area to the west and south. The site is contained from Lower Richmond Road by mature vegetation. The presence and operation of machinery, materials stores and buildings would result in temporary, but severe, adverse, direct impacts on the character of the river and temporary, adverse indirect impacts on neighbouring areas.</td>
<td>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. Presence and operation of machinery, materials stores and buildings on site would severely impact character of river. However, this site is suitable since permanent elements would tie into existing ones, like the river wall.</td>
</tr>
<tr>
<td>Potential views likely to be affected</td>
<td>Open views from the River, Putney Bridge and overlooking residences to the south of the site. Interrupted views from Lower Richmond Road. During construction there would be views of cranes from surrounding residences in Lower Richmond Road.</td>
<td>During construction, use of hoardings and appropriate lighting. Design of top structure, vent column, and electrical kiosk to be given extremely careful consideration. Plants along river wall to screen permanent plant. Permanent elements on site would have an adverse visual impact, therefore, adequate new planting would be important to protect visual amenity. This site is suitable, although, it is on the banks of the River Thames.</td>
</tr>
<tr>
<td>Particular considerations on</td>
<td>The potential direct impact of permanent structures at the site</td>
<td>Any permanent structures would need to be of a high quality design</td>
</tr>
</tbody>
</table>
## Appendix 9: Environmental appraisal tables

### 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>sites where new permanent structures are required</td>
<td>upon the Putney Embankment Conservation Area would need to be carefully considered. Similarly, the potential visual intrusiveness of permanent structures upon five listed buildings, the Bishops Park and Putney Bridge Conservation Areas and the Bishops Park registered historic park and garden would also need to taken into account.</td>
<td>in order that their visual intrusiveness is minimised and, in particular, so that they preserve or enhance the character or appearance of the Putney Embankment Conservation Area in accordance with planning policy and English Heritage guidance. Screening of permanent structures may also be required to reduce any visual intrusiveness of the site upon the conservation area. Mitigation through scheme design and/or screening would reduce the visual impact of the development upon the setting of five listed buildings and the setting and views to and from the Bishops Park and Putney Bridge Conservation Areas and the Bishops Park registered historic park and garden.</td>
</tr>
</tbody>
</table>

### Potential issues

<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>Although there are numerous built heritage receptors within 250m of C06XL, the main issues concern the potential direct impact of the development upon the Putney Embankment Conservation Area and the character and views of the River Thames and indirect impacts on five listed buildings, the Bishops Park and Putney Bridge Conservation Areas and the Bishops Park registered historic park and garden. There is, however, the potential to successfully mitigate any adverse effects through the scheme design and/or screening.</td>
<td>The scheme design would need to be of a sufficiently high quality and may need to include some screening in order that it preserves or enhances the character or appearance of the Putney Embankment Conservation Area. Mitigation is also likely to be required to reduce the visual impact of the site upon the setting of five listed buildings and the setting and views to and from the Bishops Park and Putney Bridge Conservation Areas and the Bishops Park registered historic park and garden.</td>
</tr>
</tbody>
</table>

### Summary:
The site is suitable as a CSO site because the potential impact on the built heritage environment and the local townscape character is relatively limited. It is likely that there would be a direct impact on the Putney Embankment Conservation Area, the setting of Grade II listed Putney Bridge and there could be an adverse impact on the character and views of the River Thames. However, there would likely be only an indirect impact on other receptors, including four listed buildings, two conservation areas and a registered historic park and garden.
### 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>Potentially adverse impacts arising from construction and operation could be partly mitigated by means of a high quality scheme design and/or screening.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Appendix 9: Environmental appraisal tables

## 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 (4 m)  
- London Clay (43 m)  
- Lambeth Group (18 m)  
- Thanet sand (12 m)  
**Hydrogeology**  
- Piezometric Level in Chalk Aquifer: ~ -24 mAOD (~28 mbgl) from EA Jan 08 water level contouring  
**Groundwater Monitoring Location**  
- EA Hydrometry Sites: TQ27-159 - approximately 1.83 km southeast of the site (water levels to March 2009)  
**Watercourses**  
- Within the River Thames | The drop shaft would be constructed to an invert level of approximately 31.53 mbgl therefore the shaft would be founded in the London Clay. Piezometric head in Chalk is approximately 3.53 m above the base of the construction. |
| SPZs and groundwater users | **SPZ**  
- Not located in a Source Protection Zone  
**EA Licensed Groundwater Abstractions and Details**  
- No public water supply  
- 5 licensed abstraction borehole within 2 km radius | A simple volumetric approach has been used to calculate the 400 days travel times of the abstraction borehole. A conservative mean annual recharge of 100 mm/year was used to calculate a radius for licensed abstraction boreholes as follows:  
1. 72 m  
2. 2.109 m  
3. 137 m  
4. 80 m  
As a result, the shaft is not located within any of these catchment areas. |

---

*Site suitability report C06XL*
## 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>
| 4. London Borough of Wandsworth | Abstracted Aquifer Unit:  
1. Chalk  
2. Gravel  
3. Chalk  
4. Chalk  
Abstraction Purposes:  
1. Industrial, commercial and public service (sports grounds/facilities- spray irrigation)  
2. Industrial, commercial and public service (sports grounds/facilities- spray irrigation)  
3. Industrial, commercial and public service (mineral products-general use)  
4. Industrial, commercial and public service (municipal grounds-make up or top up water)  
Abstraction Quantity (annual):  
1. 6,500 m³  
2. 15,000 m³  
3. 23,515 m³  
4. 8,000 m³  
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 7 historical records of water wells: 4 deep wells and 3 shallow wells within 1 km radius.  
Depth range: 96.3 – 152.4 m.  
Depth range: 14.6 – 14.8 m. | |
| Potential impacts on surface water features | There is a direct pathway to the River Thames due to the work being undertaken on the river bank. | Work needs to be undertaken in consideration of current guidance. |
| Potential impacts on groundwater (resources and quality) | No impact on groundwater at depth is likely since the main shaft is to be constructed in London Clay (unproductive strata). At shallow depth, the shaft is located in Kempton Gravel which is classified as a secondary aquifer. Limited impact on shallow aquifer if water is excluded from the excavation by diaphragm wall or caissons. | See below (likely types of mitigation measures that would be required). |
## 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>Likely types of mitigation measures</td>
<td>No mitigation required if groundwater is not impacted.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>that would be required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential issues</td>
<td>The drop shaft to be excavated in London Clay but to be below piezometric head in Chalk. Potential pressure effects.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited impact on flow in shallow aquifer.</td>
<td>Confined head in Chalk to be considered as part of geotechnical design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impact on shallow aquifer would depend on construction design.</td>
</tr>
</tbody>
</table>

**Summary:**

In terms of hydrogeology, this site is suitable as a CSO site because the drop shaft would be constructed in London Clay (unproductive strata). The Chalk piezometric head would likely be approximately 3.5m above the base of construction and this should be taken into account in the engineering design. No impact is expected on the Chalk aquifer. Superficial deposits at the site comprise Kempton Gravel, which is classified as a secondary aquifer and would be subject to a limited impact on flow due to the use of a diaphragm wall or caissons.

The site is less suitable in terms of surface water resources, because it is located within and adjacent to the channel of the River Thames. Specific mitigation would be required to prevent pollution.
## 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>Barnes Common LNR and Barnes Wetland Centre SSSI are within 2km</td>
<td>None required.</td>
</tr>
<tr>
<td>Non-statutory designated wildlife sites</td>
<td>Site is within River Thames &amp; Tidal Tributaries SMI</td>
<td>Any constructions or working methods affecting the River Thames, particularly above ground features of a permanent nature, but also temporary or buried works would require compensatory habitat provision. There may also be post-works restoration required.</td>
</tr>
<tr>
<td>BAP priority habitats</td>
<td>The Tidal Thames is a London BAP habitat</td>
<td>Any constructions or working methods affecting the River Thames, particularly above ground features of a permanent nature, but also temporary or buried works would require compensatory habitat provision. There may also be post-works restoration required.</td>
</tr>
<tr>
<td>protected or otherwise notable species within the Study Area</td>
<td>Site is located predominately on shingle. Shallow water and marginal habitat immediately downstream of this stretch known to be only spawning area in Tideway for smelt. The area may also be utilised by uncommon aquatic invertebrates.</td>
<td>Detailed negotiation may be required with the EA for the placement of structures (particularly permanent ones) or dewatering in this location. Any constructions in the River Thames would require detailed aquatic invertebrate and fish investigation. There may be seasonal restrictions on working (avoiding March –April spawning period)</td>
</tr>
<tr>
<td>Potential issues</td>
<td>The cumulative impact of all jetties and other above ground structures proposed within the River Thames may increase flow velocity in the river with effects on juvenile migratory fish</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.</td>
</tr>
</tbody>
</table>

**Summary:**
This site is less suitable as a CSO site due to the requirement for temporary and permanent land-take from the River Thames. The site is also immediately upstream of a stretch of the tidal Thames known to be the only spawning habitat for smelt. There may be a need for seasonal restrictions on working, off-site mitigation/compensation solutions, as well as extensive post-works restoration requirements.
### 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>River Channel and river bank - therefore flood zone 3b, functional flood plain.</td>
<td>The site would be developed with a cofferdam and should be protected to the 1 in 200 year tidal return period. An evacuation plan would be required for this site in the event the dam is breached.</td>
</tr>
<tr>
<td>Assessment of conditions for SuDS</td>
<td>Not suitable for SuDS due to location within the River Thames.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Potential issues</td>
<td>No further issues.</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

**Summary:**

This site is less suitable as a CSO site as it would require specific mitigation to protect it from flooding. The working areas located in the river may cause displacement, which could increase the flood risk in the locality.
## Air quality

<table>
<thead>
<tr>
<th>Site considerations</th>
<th>Comments</th>
<th>Mitigation required and conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AQMA</strong></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><strong>Sensitive Receptors</strong></td>
<td>There are residential properties along Putney High Street (A219). The nearest residential properties are around 25m from the site on Lower Richmond Road.</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><strong>Existing traffic issues</strong></td>
<td>The main traffic issue in this is exhaust emissions from vehicles along the A219 and A3209 corridors.</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 existing traffic issues above.</td>
<td>See existing traffic issues above.</td>
</tr>
<tr>
<td><strong>Notable gaps in existing air quality monitoring</strong></td>
<td>There is no data at likely access to A219 and the nearest existing data indicates existing exceedance of AQLV.</td>
<td>Collect minimum 6 months diffusion tube data at the nearest residential receptors to the site access to A219 or other point of access to major road network.</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 at residential properties is moderate.</td>
<td>Minimise HGV movements on the local road network during the peak hours. Standard dust control measures would minimise the effect of fugitive dust on nearby sensitive receptors.</td>
</tr>
</tbody>
</table>

**Summary:**
This site is less suitable as a CSO site as there is potential for fugitive emissions of dust during construction to have a perceptible impact on nearby residential properties, although these impacts could be minimised with standard dust control measures. There is potential for HGV movements on the local road network to cause localised air quality impacts in areas with existing poor air quality. This could be partially 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 69 and 74 dB LAeq and night-time noise levels of between 60 and 65 dB LAeq at residential properties located at Kenilworth Court on Lower Richmond Road to the south of the site. The residential properties facing the site are likely to experience relatively moderate daytime and night time noise levels due to their distance to the A219 Putney Bridge Approach.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td></td>
<td>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></td>
</tr>
<tr>
<td>Sensitive Receptors</td>
<td>There are sensitive receptors in close proximity to the southern boundary of the site. Further residential properties are located to the south east on the corner of Lower Richmond Road and Putney High Street. On the other side of the River Thames lies Bishops Park.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td></td>
<td>Sensitive receptors to the south on at Kenilworth Court consist of 6 storey residential dwellings. These are located at a distance of approximately 25m from the southern site boundary.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There are a number of sensitive receptors adjacent to the site access route, including properties on Lower Richmond Road and Putney High Street which will be considerably affected by HGV</td>
<td></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><strong>Existing traffic issues</strong></td>
<td>Local road traffic, coupled with more distant road traffic on the A219 to the east and north and the A3209 to the south would contribute to the local noise climate in the area.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Existing sources of significant noise emissions</strong></td>
<td>Local road traffic, coupled with more distant road traffic on the A219 to the east and north and the A3209 to the south would contribute to the local noise climate in the area.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Potential issues</strong></td>
<td>Construction:</td>
<td>Adherence to the good site practices provided in BS5228.</td>
</tr>
<tr>
<td></td>
<td>The construction period is estimated at 2-4 years and working hours would be 12 hours per day (7am to 7pm) Monday to Saturday. This has the potential to result in adverse noise impacts to the sensitive receptors surrounding the site, and in particular those located on Putney High Street and Lower Richmond Road.</td>
<td>Siting of noisy equipment and construction activities as far as is practicable from sensitive receptors.</td>
</tr>
<tr>
<td></td>
<td>A relatively high number of daily HGV movements are anticipated. This number of vehicle movements has the potential to result in adverse noise impacts along the length of Lower Richmond Road, off which permanent access is proposed.</td>
<td>Provision of site boundary noise fences.</td>
</tr>
<tr>
<td></td>
<td>The immediate site area is fairly small and, whilst the shaft location may be fixed, ancillary plant should be sited as far as is practicable from surrounding sensitive receptors. Situating plant in the northern area of the site would maximise the distance between them and the nearest sensitive receptors and minimise potential disturbance.</td>
<td></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>Proposed 3m site boundary fencing would provide useful noise mitigation to some plant and construction activities however it would not provide any attenuation to higher floor levels. Vibration resulting from general construction works is not anticipated result in an adverse impact. The nearest receptors to the proposed shaft location are at a distance of approximately 50m and it is unlikely that vibration levels would result in minor cosmetic damage during shaft sinking but may give rise to annoyance. Vibration from tunnelling should be considered on a case by case basis at particular sensitive locations. Operation: With appropriate attenuation (if necessary), there is no reason why noise from the ventilation column and top chamber should not result in adverse noise impacts to nearby sensitive receptors.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summary:**
This site is less suitable as a CSO site due to the proximity of the residential receptors to the south of the site. Any shielding afforded by the site perimeter barriers would be largely ineffectual due to the height of some of the receptors. In addition, the number of vehicles associated with the construction phase and the proposed access route may cause noise impacts on the residential properties on Lower Richmond Road.
# Appendix 9: Environmental tables

## Land quality

<table>
<thead>
<tr>
<th>Site Location</th>
<th>Grid Reference: 524127, 175668</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Site Use</td>
<td>Foreshore of the River Thames</td>
</tr>
<tr>
<td>Topography</td>
<td>Foreshore of the River Thames</td>
</tr>
<tr>
<td>Field Evidence of contamination (ie, visual/olfactory)</td>
<td>None</td>
</tr>
</tbody>
</table>
| Current surrounding land use (immediately adjacent to site) | North: River Thames  
East: Putney Bridge  
South: River Embankment; Lower Richmond Road; beyond this is the 4 storey residential development - Richmond Mansions (which also contains shops in the ground floor) and Kenilworth Court – a 6 storey row of flats; St Mary’s Church and Busy Bees Nursery lie to the south east  
West: Putney pier, Thai Square restaurant |

### Geological and Hydrogeological Information

<table>
<thead>
<tr>
<th>Geological Strata&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Geology (thickness)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Superficial Geology and Made Ground (4 m)</td>
</tr>
<tr>
<td>2.</td>
<td>London Clay (43 m)</td>
</tr>
<tr>
<td>3.</td>
<td>Lambeth Group (18 m)</td>
</tr>
<tr>
<td>4.</td>
<td>Thanet sand (12 m)</td>
</tr>
</tbody>
</table>
| Underlying Aquifer Classes | Unproductive Strata: London Clay  
Secondary Aquifer: River Terrace Deposits, Lambeth Group, Thanet Sands  
Principal Aquifer: Chalk |
| Groundwater Vulnerability/Soil Classification (High/Intermediate/Low/Not applicable)<sup>2</sup> | River Terrace Deposits – Minor Aquifer  
High Leaching Potential of Soils (U)<sup>1</sup> |
| Source Protection Zone Details | Not located in a Source Protection Zone |
| Surface Water Receptor | Site partially located within the River Thames |

### 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>
</tr>
</thead>
<tbody>
<tr>
<td>11 Historical maps show the site’s land use has remained largely unchanged.</td>
<td></td>
</tr>
<tr>
<td>12 The northern half of the site is partially located on sand and shingle adjacent to the River Thames and below the Mean</td>
<td></td>
</tr>
</tbody>
</table>

---

<sup>1</sup> Site suitability report C06XL  
<sup>2</sup> Site suitability report C06XL
## Appendix 9: Environmental tables

<table>
<thead>
<tr>
<th>Land quality</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High Water Level from 1874 onwards.</td>
<td></td>
</tr>
<tr>
<td>The remaining half of the site from 1874 onwards is located on the embankment and road adjacent to the River Thames.</td>
<td></td>
</tr>
<tr>
<td><strong>Offsite</strong></td>
<td></td>
</tr>
<tr>
<td>14 Depot, use not specified (75m southeast) 1954 – 1968</td>
<td></td>
</tr>
<tr>
<td>15 Works, use not specified (100m southwest) 1954 – 1968</td>
<td></td>
</tr>
<tr>
<td>16 Tanks (100m southeast, 130m south and 216m south east) 1951 – 1969 and (140m south, 220m south) no mapping dates</td>
<td></td>
</tr>
<tr>
<td>17 Gas Works (140m southeast) 1954 – 1968, with suction gas plant (177m south east), two gas engines/dynamos (145m southeast) and associated gas use, fuel tanks and oil storage (147 – 236m southeast to south of site)</td>
<td></td>
</tr>
<tr>
<td>18 Mills, use not specified (140m southeast) 1896 – 1899</td>
<td></td>
</tr>
<tr>
<td>19 Wharf, (transport support and cargo handling), (166m southeast) 1896 - 2009</td>
<td></td>
</tr>
<tr>
<td>20 Electrical substations (168m west, 210m southwest and 235m southeast) 1969 – 1971</td>
<td></td>
</tr>
<tr>
<td>21 Asbestos curtain feature from historical building plans (169m south), interpreted to be the flameproof curtain from a historical theatre no mapping dates</td>
<td></td>
</tr>
<tr>
<td>22 Paint based oils feature from historical building plans (190m southwest), interpreted to be a historical paint manufacturing site no mapping dates</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pollution Incidents to controlled waters</th>
<th>Four</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 Unknown, significant incident (11m north)</td>
<td></td>
</tr>
<tr>
<td>24 Unknown, minor incident, (59m northeast)</td>
<td></td>
</tr>
<tr>
<td>25 Sewage, major incident, (158m northwest)</td>
<td></td>
</tr>
<tr>
<td>26 Sewage, major incident, (164m northwest)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Landfill Sites</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Waste Sites</td>
<td>None</td>
</tr>
<tr>
<td>Registered Radioactive Substances</td>
<td>None</td>
</tr>
<tr>
<td>Fuel Stations/Depots</td>
<td>None</td>
</tr>
<tr>
<td>Contemporary Trade Directory Entries</td>
<td>Four</td>
</tr>
<tr>
<td>27 Photographic Processors, Inactive (140m south)</td>
<td></td>
</tr>
<tr>
<td>28 Furniture Manufacturers (Home and Office), Inactive (246m northwest)</td>
<td></td>
</tr>
<tr>
<td>29 Door Manufacturers (Domestic), Inactive (246m northwest)</td>
<td></td>
</tr>
<tr>
<td>30 Furniture (Repairing and Restoring), Inactive (246m northwest)</td>
<td></td>
</tr>
</tbody>
</table>
## Land quality

### Site Classification Based on Above Information

<table>
<thead>
<tr>
<th>Activity</th>
<th>Distance and Direction to Site</th>
<th>Contaminants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential Site Contaminants derived from surface sources (e.g. contaminants in made ground)</td>
<td>1) Some potential for made ground from potential filling operations during development</td>
<td>1) On site and directly adjacent to site</td>
</tr>
<tr>
<td>Potential Site Contaminants derived from offsite sources and transported to site</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Potential Contamination Pathways to Site (Conceptual Site Model)³</td>
<td>Source 1: A1, A2, A3, B4</td>
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</tr>
</tbody>
</table>

### Contamination Category

Category 1 – Assessed as Low Risk

### Summary:

The site is suitable as a CSO site as there is little potential for contamination from historical on- and off-site activities. This is due to the distance of potential sources of contamination from the site.

### 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

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

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