

Thames Tideway Tunnel
Thames Water Utilities Limited



Application for Development Consent

Application Reference Number: WWO10001

Final Report on Site Selection Process

Doc Ref: **7.05**

Volume 9

APFP Regulations 2009: Regulation **5(2)(q)**

Hard copy available in

Box **47** Folder **A**
January 2013

**Thames
Tideway Tunnel**



Creating a cleaner, healthier River Thames

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Thames Tideway Tunnel

Final Report on Site Selection Process

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Thames Tideway Tunnel

Final Report on Site Selection Process Volume 9: Carnwath Road Riverside (formerly Barn Elms)

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1 Introduction

1.1 Introduction to the Thames Tideway Tunnel project

- 1.1.1 At present, untreated sewage mixed with rainwater (combined sewage) regularly overflows into the tidal reaches of the River Thames from London's Victorian sewerage system via combined sewer overflows (CSOs).
- 1.1.2 Combined sewage discharges must be reduced in order to comply with relevant wastewater legislation. The primary objective of the proposed Thames Tideway Tunnel project (the 'project') is to control discharges from CSOs in order to meet the requirements of the European Union's Urban Waste Water Treatment Directive (91/271/EEC) (UWWTD) and the related United Kingdom legislation.
- 1.1.3 The Environment Agency has identified 34 'unsatisfactory' CSOs that the project needs to address. The project would control CSO discharges by intercepting and diverting combined sewage flows into a new storage and transfer tunnel. The 'main tunnel' would run from west London to Abbey Mills in the east where it would connect to the Lee Tunnel. The Lee Tunnel would then transfer the flows to Beckton Sewage Treatment Works for treatment.

1.2 Introduction to this volume

- 1.2.1 The *Site selection methodology paper* states that the project team shall produce a final report that sets out the site selection process in full. This *Final Report on Site Selection Process* was prepared for that purpose. Volume 1 of this report explains our approach to identifying the sites required to construct and operate the project and includes a glossary of relevant terminology. Volume 2 comprises the complete *Site selection methodology paper* and *Site selection background technical paper*, which were the main documents that guided the site selection process. Volumes 3 to 23 describe the site selection process for each of the sites considered on the Abbey Mills route.
- 1.2.2 This volume sets out the site selection process that was followed to identify the most suitable site to construct the western sections of the main tunnel at each phase of the pre-application process. This is summarised below in Table 1.1.

Table 1.1 Summary of sites identified at each phase of the pre-application process

Phase	Site name	Site use
Phase one consultation	Barn Elms	To drive a short section of the main tunnel to Hammersmith Pumping Station, drive the main tunnel to Tideway Walk and intercept the West Putney Storm Relief CSO.

Phase	Site name	Site use
Phase two consultation	Carnwath Road Riverside *	To drive the main tunnel to Acton Storm Tanks, to receive the main tunnel from Kirtling Street and to receive the Frogmore connection tunnel, which will connect the Frogmore Storm Relief – Bell Lane Creek and Frogmore Storm Relief – Buckhold Road CSOs to the main tunnel.
Section 48 publicity	Carnwath Road Riverside *	As above.
Submission of the application	Carnwath Road Riverside *	As above.

* NB: Barn Elms would be used to intercept the West Putney Storm Relief CSO (see Volume 8).

1.2.3 This volume is structured as follows:

- a. This section describes the type of site needed and summarises how the *Site selection methodology paper* was applied at each stage of the pre-application process.
- b. Section 2 explains how we identified our preferred main tunnel site for phase one consultation.
- c. Section 3 details the post phase one consultation site selection review and explains why we changed our main tunnel site for phase two consultation.
- d. Section 4 describes the post phase two consultation site selection review and how we confirmed our proposed main tunnel site for Section 48 publicity.
- e. Section 5 describes the post Section 48 publicity site selection review and confirms our selected main tunnel site for the application.

1.3 Type of site

1.3.1 We needed to identify a series of suitable sites to allow us to build and operate the main tunnel. The main tunnel would transfer the collected overflows to the Abbey Mills Pumping Station, which would then be transferred via the Lee Tunnel (under construction) to Beckton Sewage Treatment Works.

1.3.2 Larger sites are required where a tunnel boring machine (TBM) would be inserted into the ground (known as main tunnel drive sites). This type of site would need to handle all the materials excavated by the TBM as it constructs that section of the tunnel. Smaller sites are required to remove the TBM from the ground at the end of a tunnel drive (known as main tunnel reception/intermediate sites). A more detailed description of the different types and sizes of site required to construct and operate the project can be found in the *Site selection background technical paper*.

1.4 Site selection process

- 1.4.1 The *Site selection methodology paper* recognises the vital complementary relationship between the site selection process and engineering design developments. Accordingly, as the site selection process progressed it was increasingly important to compare sites against engineering requirements. A fundamental consideration was the need to identify enough sites in the right locations to enable the project to be built.
- 1.4.2 All potential sites were identified in accordance with our *Site selection methodology paper*, which involved a ‘sieving’ approach that commenced with the identification of all potentially suitable areas of land (excluding concentrated residential sites and World Heritage Sites). The main tunnel sites went through levels of increasingly detailed assessments. All the assessments were informed by a multidisciplinary approach that took into account engineering, planning, environmental, community and property considerations and our teams’ professional judgement.
- 1.4.3 Prior to phase one consultation, we applied our multidisciplinary sieving approach to all the assessments outlined in the *Site selection methodology paper* (summarised at paragraph 2.1.2) for all three main tunnel route options under consideration at this stage of the pre-application process. This process is set out below in Section 2. In Volume 1, Section 4 there is a more detailed discussion of the tunnelling options and comparisons for the main tunnel on the three proposed routes.
- 1.4.4 Following phase one consultation, we reviewed the preferred site and decided to carry out a ‘back-check’ (as set out in the *Site selection methodology paper*) in order to review the preferred and shortlisted sites prior to phase two consultation. This back-check involved a repeat of each relevant stage of our site selection process to reconsider which sites would be most suitable to construct the main tunnel, including a re-examination of main tunnel drive options, to identify the preferred main tunnel site and use. The back-check utilised the same multidisciplinary approach that was followed prior to phase one consultation. The results of this back-check process are presented below in Section 3 and superseded all previous assessments undertaken prior to phase one consultation and reported in Section 2. This is the result of the iterative nature of the process. In Volume 1, Section 6 there is a more detailed discussion of the tunnelling options and comparisons for the main tunnel on the preferred Abbey Mills route.
- 1.4.5 Following phase two consultation, we reviewed the possible main tunnel sites. This involved re-checking the selection of sites identified as most suitable main tunnel sites associated with the preferred Abbey Mills route in order to confirm the proposed main tunnel sites and uses for Section 48 publicity. This process is set out below in Section 4 (also see Volume 1, Section 7 for tunnelling review).
- 1.4.6 Following Section 48 publicity, we reviewed our proposals having regard to the feedback from the publicity exercise. The purpose of this review was to define and decide any changes to our final proposals for the

application. Every proposed main tunnel site on the Abbey Mills route was re-checked in order to confirm its selection for the application. This process is set out in Section 5. In Volume 1, Section 8 there is a review of tunnelling options and comparisons for the main tunnel on proposed Abbey Mills route.

2 Phase one consultation preferred main tunnel site: Site selection process

2.1 Introduction

2.1.1 This section explains how the *Site selection methodology paper* was implemented in order to arrive at the preferred main tunnel site for the western sections of the tunnel for phase one consultation. This stage took place from Spring 2009 to Summer 2010.

2.1.2 In order to arrive at the preferred site for phase one consultation, the site selection process comprised:

- a. identification of sites for inclusion on a long list
- b. assessment of sites on the long list to create a draft short list
- c. assessment of the draft shortlisted sites to create a final short list
- d. preparation of detailed site suitability reports for each final shortlisted site; preparation of the *Engineering options report* (Spring 2010) with the tunnelling drive options
- e. a multidisciplinary optioneering workshop to consider the suitability of each of the shortlisted sites for each use (drive and/or reception/intermediate, depending on site size) in each main tunnel zone. The workshop then used these sites to consider the tunnelling options to determine the preferred phase one consultation main tunnel site and use (see Volume 1, Section 4 for detailed discussion of tunnelling drive options and comparisons).

2.1.3 The assessments described in this section were based on the information available at the time and the related stage in the pre-application process. The assessments in this section comprise a historic representation of the process and all of the assessments have been superseded by the ones set out in Section 3.

2.2 Assessment of the long list sites

2.2.1 The long list of potential main tunnel sites for the western sections of the tunnel route was created by conducting a desktop survey of the land in the London boroughs of Hounslow, Hammersmith and Fulham, Richmond upon Thames, Wandsworth and the Royal Borough of Kensington and Chelsea.

2.2.2 In total, 200 sites were included on the long lists. The sites were assessed having regard to the high-level considerations set out in Table 2.2 of the *Site selection methodology paper* (hereafter referred to as SSMP Table 2.2), which included engineering (site size, site features, availability of a jetty/wharf and access), planning and environment (heritage, landscape/townscape, open space and ecology), and community and property (neighbouring land uses, site use, Special Land/Crown land and acquisition costs) considerations.

- 2.2.3 Sites that were determined to be the least constrained in light of the SSMP Table 2.2 considerations passed to the draft short list. This did not necessarily mean that these main tunnel sites were ultimately judged to be suitable, but rather that no significant constraints were identified in relation to the high-level considerations set out in SSMP Table 2.2. Sites that were judged to be more constrained were not retained on the draft short list for more detailed assessment.
- 2.2.4 We then determined how the size of the sites that were retained at this stage would be assessed under the next stage of assessment. For some sites, this included examining neighbouring sites to see if they could be used together. The SSMP Table 2.2 assessments and plans are available on request and form part of our extensive evidence base.
- 2.2.5 Of the 200 sites identified on the long list of potentially suitable main tunnel sites for the western sections of the tunnel route, 29 were assessed as potentially suitable and passed to the draft short list, and 171 sites were eliminated as unsuitable.

2.3 Assessment of the draft short list sites

- 2.3.1 The remaining 29 draft short list main tunnel sites identified as potentially suitable at SSMP Table 2.2 were further assessed by the engineering, planning, environment, community and property disciplines. Regard was taken of the considerations set out in Table 2.3 of the *Site selection methodology paper* (hereafter referred to as SSMP Table 2.3) which included: engineering (site size, distance and route to the river, jetty/wharf facilities, means of road/rail access, site features, site efficiency, tunnelling and systems engineering requirements); planning and environment (planning applications/permissions, London Plan/UDP/LDF allocations or special policy areas, heritage designations, landscape/open space designations, ecological designation, transport and amenity); property (ownership of site, tenant on site, estimated acquisition cost, Crown land and special land, access and material transfer rights) and community (proximity to sensitive receptors, social, economic, health and equality considerations). This stage of the process built on the information gathered and the assessments undertaken at long list stage but focussed on more detailed local considerations.
- 2.3.2 At this stage, we also consulted with each of the London boroughs and pan-London stakeholders, such as the Environment Agency and English Heritage, to seek their views on the suitability of the sites for the short list.
- 2.3.3 As with the SSMP Table 2.2 assessment, sites that were assessed as the least constrained in light of the SSMP Table 2.3 considerations were retained on the short list and passed to the next stage of assessment. This did not necessarily mean that a site was ultimately judged suitable, but rather that no significant constraints were identified in relation to the considerations set out at SSMP Table 2.3. Sites that were judged to be more constrained were not retained on the short list for more detailed assessment. The decision of whether or not to retain a site on the short list was taken at a multidisciplinary workshop. The SSMP Table 2.3

assessments and plans are available on request and form part of our extensive evidence base.

- 2.3.4 Of the 29 sites on the draft short list, one was assessed as potentially suitable as a main tunnel drive or reception/intermediate site, and eight were assessed as suitable for main tunnel reception/intermediate sites. All nine of these sites passed to the final short list but the remaining 20 sites did not.

2.4 Assessment of the final short list sites

- 2.4.1 The nine sites identified for the inclusion on the final short list and assessment at the next stage were:

Suitable for use as a main tunnel drive or reception/intermediate site:

- a. S17RD: Barn Elms.

Suitable as main tunnel reception/intermediate sites only:

- a. S13RD: St Paul's School playing fields
b. S33HF: Vacant land and Thames Water Hammersmith Pumping Station, Chancellors Road
c. S18WH: Feathers Wharf, The Causeway
d. S69HF: Whiffin Wharf and Hurlingham Wharf, Carnwath Road
e. S70HF: Carnwath Road Industrial Estate, Carnwath Road
f. S72HF: Fulham Depot, next to Wandsworth Bridge, off Townmead Road
g. S76HF: Imperial Wharf, Imperial Crescent/Townmead Road – construction site
h. S08KC: Foreshore, Chelsea Wharf.

- 2.4.2 A site suitability report was prepared for each of these final shortlisted sites. These reports contained an assessment of each site's suitability in light of engineering, planning, environment, community and property considerations. At this stage in the process, no comparisons were drawn between other sites; they were assessed in isolation and with no regard to tunnelling strategy. Sites were evaluated by each discipline using our teams' technical knowledge and professional judgement as appropriate, and assessed as suitable, less suitable or not suitable from that discipline's perspective based on the available information at this stage of the pre-application process.

- 2.4.3 A summary of the conclusions of each discipline's assessment from the site suitability reports is provided below.

S17RD: Barn Elms

- 2.4.4 Site S17RD forms part of the Barn Elms Sports Centre, off Queen Elizabeth Walk. The surrounding area is predominantly residential. The site is located in the eastern-most area of the London Borough of

Richmond upon Thames, and adjoins the London Borough of Wandsworth along its southern boundary.

2.4.5 **Engineering:** The site was considered **suitable** for use as either a main tunnel drive or reception/intermediate site. This was predominantly due to the good size, access to the river and the local road network.

2.4.6 **Planning:** The site was considered **suitable** for use as either a main tunnel drive or reception/intermediate site. A series of planning designations were applicable to the site. However, we judged that the potential impacts or conflicts with planning policy could be mitigated. The assessment revealed an opportunity for main tunnel site work to be combined with work to connect the local CSO, known as the West Putney Storm Relief CSO (site C05XQ). This arrangement would make more effective and efficient use of the land because only one construction site would be needed instead of two.

2.4.7 **Environment:** Overall, the site was considered **suitable** for use as either a main tunnel drive or reception/intermediate site. The site was considered **suitable** from the perspectives of transport, hydrology, surface water, built heritage, townscape, flood risk, noise, air quality and land quality. The site was considered **less suitable** from the perspectives of ecology and archaeology.

2.4.8 **Socio-economic and community:** The site was considered **suitable** for use as either a main tunnel drive or reception/intermediate site. Potential impacts on the local community were highlighted, in particular, the impact of works on people living in local residential properties, recreational river users and users of the Scout Hut and boat club. The temporary loss of a portion of the playing fields was also highlighted, especially given the apparently high usage by local clubs. The general amenity value of the site was also recognised.

2.4.9 **Property:** The site was considered **suitable** for use as either a main tunnel drive or reception/intermediate site.

S13RD: St Paul's School playing fields

2.4.10 Site S13RD occupies the playing fields of St Paul's School and is located to the east of the school complex. The site is bounded to the north by the River Thames and to the east by the Castelnau, which is the main road south from Hammersmith Bridge and forms part of the A306. St Paul's School is to the west of the site. The area is primarily residential in character, with residential properties to the east and south. The site is located in the London Borough of Richmond.

2.4.11 **Engineering:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. The site is large and had no constraints in terms of demolition or third-party assets. Temporary and permanent access would be possible and the site could be positioned to minimise the impacts of the tunnel on Hammersmith Bridge.

2.4.12 **Planning:** The site was considered **less suitable** for use as a main tunnel reception/intermediate site. Use of the site would result in the loss of a school playing field and an area of Metropolitan Open Land for a

lengthy period of time, some of it permanently. Impacts on residential amenity could be restricted by locating the construction works to maximise separation distances to sensitive receptors. The significance of the proposed school redevelopment and improvements of the playing fields were uncertain at this stage and would require further consideration. Visual impacts on the Castelnau Conservation Area were also considered likely.

2.4.13 **Environment:** Overall, the site was considered **suitable** for use as a main tunnel reception/intermediate site. The site was considered **suitable** from the perspectives of archaeology, water resources, ecology, flood risk and air quality. However, the site was considered **less suitable** from the perspectives of transport, built heritage, townscape, noise and land quality. Mitigation would need to be considered for effects on noise, air quality, land quality and built heritage and townscape.

2.4.14 **Socio-economic and community:** The site was considered **less suitable** for use as a main tunnel reception/intermediate site. Use of the site would result in the temporary loss of playing fields for St Paul's School and potential disruption to school activities due to noise, dust and vibration produced during construction. It appeared likely there would be impacts on local residents, as well as traffic and pedestrian movements, including users of the Thames Path.

2.4.15 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site as it is undeveloped and there would likely be acceptable acquisition costs. However, early contact with St Paul's school would be required.

S33HF: Vacant land and Thames Water Hammersmith Pumping Station, Chancellor's Road

2.4.16 Site S33HF is located on a vacant former industrial site known as Hammersmith Embankment. The site is rectangular in shape and contains hard surfaced areas with areas of vegetation. It also contains a Thames Water pumping station. The surrounding area is predominantly residential but includes a mix of other uses. The site is located in the London Borough of Hammersmith and Fulham, approximately 250m downstream of the Hammersmith Bridge.

2.4.17 **Engineering:** The site was considered **suitable** for use as a main tunnel reception/intermediate site as it is of sufficient size and has good access possibilities. Any tunnel diversion from the river would likely be minimal because the site is adjacent to the river. Furthermore, it was considered unlikely that third party assets would be affected by the construction.

2.4.18 **Planning:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. There were relatively few planning designations that applied to the site, and it was considered that with appropriate mitigation measures, these designations were unlikely to be unacceptably impacted on. If the existing approved redevelopment went ahead, it could present a constraint to the area of the site that may be available for use, but this would be subject to further discussions with the site owner and the council. Potential impacts on residential amenity would

need to be considered further, including the potential to relocate construction works within the site to increase the separation distance between the works and the front facades of nearby dwellings.

- 2.4.19 **Environment:** Overall, the site was considered **suitable** for use as a main tunnel reception/intermediate site. The site was considered **suitable** from the perspectives of transport, archaeology, built heritage and townscape, water resources, and ecology. However, the site was considered **less suitable** from the perspectives of flood risk, noise and land quality, and adequate mitigation measures would need to be provided.
- 2.4.20 **Socio-economic and community:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. Use of the site would potentially cause disruption to residential properties in the vicinity but mitigation measures should reduce these impacts. It appeared unlikely that there would be much impact on Frank Banfield Park. However, there might be impacts on the local economy due to the presence of local businesses in the works area.
- 2.4.21 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site in terms of cost, if it were acquired before development commenced. The site is adjacent to a Thames Water facility and is currently undeveloped. However, if development commenced before acquisition, costs would likely be very high and acquisition might not be possible.

S18WH: Feathers Wharf, The Causeway

- 2.4.22 Site S18WH is a long flat strip of land. The site is bounded by the River Thames to the north, Cory Environmental Western Riverside Solid Waste Transfer Station (WTS) including a significant new building under construction to the east, The Causeway to the south, and mud flats to the west. The River Wandle runs along the western boundary of the site and connects to the River Thames. The site is located in the London Borough of Wandsworth.
- 2.4.23 **Engineering:** The site was considered **less suitable** for use as a main tunnel reception/intermediate site as it is narrow and would have overhead working height restrictions due to third-party assets.
- 2.4.24 **Planning:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. There were a number of planning and environmental designations that related to the site but we considered that, with appropriate mitigation measures, these designations were unlikely to be unacceptably impacted on. A potential mixed-use development which it is proposed is located on the site might pose a constraint to works. However, the site works could be located to increase separation distance to the riverside walk and cycle routes.
- 2.4.25 **Environment:** Overall, the site was considered **suitable** for use as a main tunnel reception/intermediate site. The site was considered **suitable** from the perspectives of transport, built heritage, townscape, water resources, ecology, flood risk, noise and air quality. However, the site was

considered **less suitable** from the perspectives of archaeology and land quality. Adequate mitigation measures for archaeology and land quality would need to be provided.

2.4.26 **Socio-economic and community:** The site was considered **suitable** for use as a main tunnel reception/intermediate site as it would be unlikely to have unacceptable impacts on the local community. Mitigation might be required to reduce impacts on the Thames Path. A storage area for the adjacent waste transfer facility would also need to be accommodated on site or temporarily relocated.

2.4.27 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. However, dialogue with the landowners would be needed to assess the potential impacts on the neighbouring waste transfer facility. If the impacts were likely to be minimal, the acquisition costs should be acceptable. Resistance to the proposal might cause difficult negotiations in the context of Special Land procedures.

S69HF: Whiffin Wharf and Hurlingham Wharf, Carnwath Road

2.4.28 Site S69HF is known as Whiffin Wharf and Hurlingham Wharf. The site is relatively flat, derelict, currently vacant, and comprised of hardstanding. The surrounding area is characterised by a mix of industrial and residential properties. The site is located in the London Borough of Hammersmith and Fulham.

2.4.29 **Engineering:** The site was considered **suitable** for use as main tunnel reception/intermediate site, as it is an adequate size and has good road access. It is also a vacant industrial site with hardstanding, which would simplify the set-up of the worksite.

2.4.30 **Planning:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. There are a number of onsite and adjacent sensitive receptors, such as a conservation area, a site of metropolitan importance for nature conservation (the River Thames) and residential properties. However, moving some site activities to the east of the site adjacent to Carnwath Road Industrial Estate would increase the separation distance between residential properties and the construction works. Furthermore, reduced site working hours would limit impacts on adjacent designations.

2.4.31 **Environment:** Overall, the site was considered **suitable** for use as a main tunnel reception/intermediate site. The site was considered **suitable** from the perspectives of transport, built heritage, townscape, water resources, ecology, flood risk and air quality. However, the site was considered **less suitable** from the perspectives of archaeology, noise and land quality. Site suitability depended on whether archaeology, noise and land quality impacts could be adequately mitigated.

2.4.32 **Socio-economic and community:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. As the site is vacant land, it appeared likely that the use of the site would have a limited impact on the local community. The greatest potential for a negative impact was

considered to be noise for the residents adjacent and overlooking the site to the west. It would also be important to consider mitigating any disruption to the Thames Path, which runs around the site on the west, north and east borders.

- 2.4.33 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site as it is undeveloped and acquisition costs would likely be acceptable. If the site was likely to be redeveloped at some point, it could make acquisition costs unacceptable.

S70HF: Carnwath Road Industrial Estate, Carnwath Road

- 2.4.34 Site S70HF is known as Carnwath Road Industrial Estate and is an established industrial estate, with a number of light industrial/businesses in current operation. The surrounding area is characterised by a mix of industrial uses and residential properties. The site is located in the London Borough of Hammersmith and Fulham..

- 2.4.35 **Engineering:** The site was considered **suitable** for use as a main tunnel reception/intermediate site as it is an adequate size and has good road access. There would also be enough room to avoid a proposed National Grid cable tunnel.

- 2.4.36 **Planning:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. There are a number of onsite and adjacent sensitive receptors, such as a conservation area, a site of metropolitan importance for nature conservation (the River Thames), and residential properties. However, the proposed layout at this time would allow sufficient separation distance between residential properties and the construction works. Mitigation to reduce impacts on the conservation area might also be required.

- 2.4.37 **Environment:** Overall, the site was considered **suitable** for use as a main tunnel reception/intermediate site. The site was considered **suitable** from the perspectives of transport, archaeology, built heritage, townscape, water resources, ecology, and air quality. However, the site was considered **less suitable** from the perspectives of noise, flood risk and land quality. Site suitability would depend on whether these impacts could be adequately mitigated.

- 2.4.38 **Socio-economic and community:** The site was considered **less suitable** for use as a main tunnel reception/intermediate site. It was considered likely that use of the site would have an adverse impact on the businesses currently using the site. Noise and visual impacts on households in the overlooking high-density residential properties might also need to be mitigated. In addition, works might also impact on users of the Thames Path.

- 2.4.39 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site because acquisition costs would likely be acceptable. However, eight businesses would need to be temporarily or permanently displaced, which would incur compensation claims for disturbance.

S72HF: Fulham Depot, next to Wandsworth Bridge, off Townmead Road

- 2.4.40 Site S72WF covers sites known as Swedish Wharf, Comely Wharf and Albert Wharf. The site is covered in a mix of industrial buildings, warehouses, a motor car auction business and a company known as Fuel Oils Ltd and its associated oil tanks. The surrounding area is characterised by a mix of large warehouses, retail units, a supermarket and residential properties. The site is located in the London Borough of Hammersmith and Fulham.
- 2.4.41 **Engineering:** The site was considered **suitable** for use as a main tunnel reception/intermediate site because it is an adequate size and has good vehicular access.
- 2.4.42 **Planning:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. There are a number of onsite and adjacent sensitive receptors, such as a conservation area, a nature conservation area and residential properties. However, the proposed construction layout should provide sufficient separation between the site and residential properties and, combined with other mitigation measures, the impact on residential amenity should not be unacceptable.
- 2.4.43 **Environment:** Overall, the site was considered **suitable** for use as a main tunnel reception/intermediate site, although mitigation would be required. The site was considered **suitable** from the perspectives of transport, archaeology, built heritage, townscape, water resources, ecology, air quality and flood risk. However, the site was considered **less suitable** from the perspectives of noise and land quality. Mitigation required might include erecting noise barriers and remediating any contamination within the site.
- 2.4.44 **Socio-economic and community:** The site was considered **suitable** for use as a main tunnel reception/intermediate site, although mitigation for loss of business activity might be required. Apart from this, use of the site was assessed as unlikely to have a significant impact on the local community as there are few potential sensitive receptors in the immediate vicinity. However, noise mitigation would be required to reduce impacts on residential receptors to the north.
- 2.4.45 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. The acquisition costs of using this site should be acceptable. However, it would result in the loss of at least two businesses.

S76HF: Imperial Wharf, Imperial Crescent/Townmead Road – construction site

- 2.4.46 Site S76HF comprises public open space to the south of Imperial Wharf. The site comprises a new park associated with a recently completed, high-density residential development known as Imperial Wharf. The surrounding area is largely residential. The site is located in the London Borough of Hammersmith and Fulham.

- 2.4.47 **Engineering:** The site was considered **suitable** for use as a main tunnel reception/intermediate site because it is a large area with good road access and would not require any demolition.
- 2.4.48 **Planning:** The site was considered **less suitable** for use as a main tunnel reception/intermediate site. There are a number of onsite and adjacent sensitive receptors, such as public open space, a conservation area, a nature conservation area and residential properties. However, arrangement of the works away from the residential properties would increase separation distance and, combined with mitigation, this could reduce the effects on these receptors and create a link from Townmead Road through the site to the river front. Loss of public open space might be a concern as the site is located in an area with a public open space deficiency.
- 2.4.49 **Environment:** Overall, the site was considered **less suitable** for use as a main tunnel reception/intermediate site. The site was considered **suitable** from the perspectives of transport, water resources, ecology and flood risk. However, the site was considered **less suitable** from the perspectives of archaeology, built heritage, townscape, air quality, noise, and land quality. Site suitability would depend on whether these impacts could be adequately mitigated.
- 2.4.50 **Socio-economic and community:** The site was considered **not suitable** for use as a main tunnel reception/intermediate site. It appeared likely that use of the site would cause significant disruption to the high-density residential developments to the north, south and west. Imperial Wharf residents and the wider local community would also stand to lose part of the riverside landscaped open green space temporarily.
- 2.4.51 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site as the site is undeveloped and acquisition costs would likely be acceptable.

S08KC: Foreshore, Chelsea Wharf

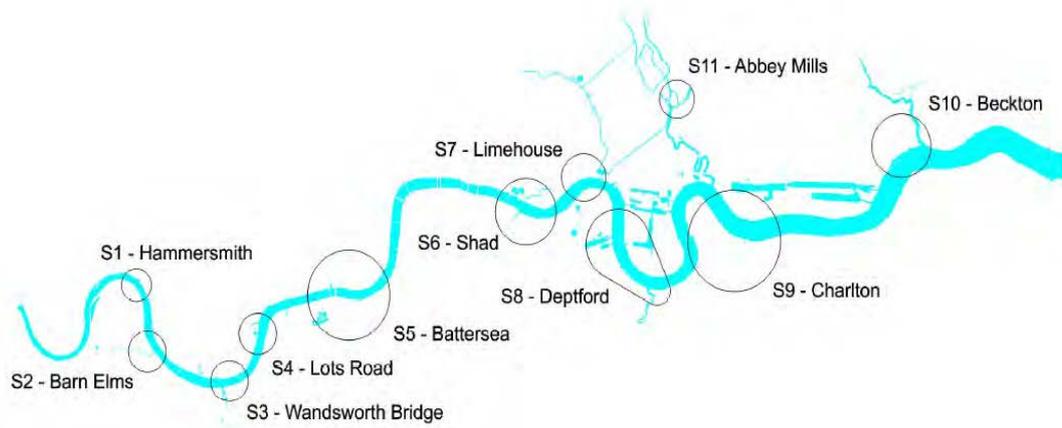
- 2.4.52 Site S08KC is situated on the foreshore of the River Thames. To the northwest of the site is a recycling centre. Further to the north is a newly built five-storey residential building. To the southwest is the now disused Lots Road Power Station, which is likely to be redeveloped. The site is bordered on the east, south and west by the River Thames. The site is located in the Royal Borough of Kensington and Chelsea.
- 2.4.53 **Engineering:** The site was considered **suitable** for use as a main tunnel reception/intermediate site because it is relatively unrestricted in size and shape. It is likely to be in close proximity to the alignment of the main tunnel. The site also has good access through Cremorne Gardens or by river.
- 2.4.54 **Planning:** The site was considered **less suitable** for use as a main tunnel reception/intermediate site. This is due to the likely visual impacts and loss of amenity to both Cremorne Gardens and nearby residential receptors with limited scope for mitigation. Access through the gardens might also result in loss of open space.

- 2.4.55 **Environment:** Overall, the site was considered **less suitable** for use as a main tunnel reception/intermediate site. The site was considered **suitable** from the perspectives of transport, water resources (groundwater), land quality and air quality. However, the site was considered **less suitable** from the perspectives of archaeology, built heritage and townscape, surface water, ecology, noise and flood risk. Substantial mitigation would be required to limit the impacts of these factors, particularly the considerable heritage and ecological risks associated with the foreshore in this location.
- 2.4.56 **Socio-economic and community:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. However, there would be impacts associated with access through Cremorne Gardens both during and after construction and construction impacts on both the gardens and the nearby residential development. There would also be disruption to the recycling centre and its pier facility.
- 2.4.57 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site. As an undeveloped site, the acquisition cost would likely be acceptable. However, a special ministerial procedure might be required.

2.5 Phase one consultation preferred site

- 2.5.1 Consideration of the main tunnel sites up until short list stage focussed principally on each as an individual site in isolation from the assessment of tunnel drive and alignment options (ie, how the tunnel would be constructed and the route it would take). However, due to the nature of the project, it was necessary to select a package of main tunnel sites, having regard to how they would work in combination and in relation to the tunnel alignment and CSO connections.
- 2.5.2 The *Engineering options report* (Spring 2010) describes the process of identifying the tunnelling options, taking into account engineering requirements. The main points are summarised below.
- 2.5.3 The engineering team considered possible drive options – the combination of ways in which the tunnel could be constructed by ‘driving’ between combinations of shortlisted main tunnel sites – paying particular attention to changes in ground conditions and the requirement for different types of tunnelling machines, as well as construction risks and timescales.
- 2.5.4 To manage the total number of combinations of tunnel drive and reception/intermediate site options that together make up a ‘drive option’, the available shortlisted main tunnel sites were grouped together in zones. The zones were based on the geographical locations of the sites along the line of the River Thames and numbered and named for convenient referencing, as illustrated in Figure 2.1 below.

Figure 2.1 Location of site zones



- 2.5.5 Our preferred route for the main tunnel runs from west London to Abbey Mills Pumping Station and involves Zones S1 to S7 and Zone S11. Zones S8 to S10 were only required for the previously considered River Thames and Rotherhithe routes, which did not become our preferred option and are not considered further in this volume.
- 2.5.6 Multidisciplinary workshops were held to identify the most suitable main tunnel site from those shortlisted within each zone, taking into account the conclusions reached in the site suitability reports, as described above.
- 2.5.7 The following sites were identified as the most suitable for Zones S1 to S4, which make up the western section of the main tunnel:
- Zone S1 – S33HF: Hammersmith Pumping Station (suitable for use as a main tunnel reception/intermediate site only).
 - Zone S2 – S17RD: Barn Elms (suitable for use as either a main tunnel drive or reception/intermediate site).
 - Zones S3 and S4: only contained sites identified as suitable for use as reception/intermediate sites. Because a main tunnel site was required in Zone S5 due to the change in geology in this location and restrictions in the tunnel drive length, no reception/intermediate sites were required in Zones S3 and S4 to support the tunnel drive options.
- 2.5.8 A series of comparisons were then made to determine how best to use the potential sites identified across all the zones to construct the main tunnel.
- 2.5.9 The changes in geology and restrictions in the proposed tunnel drive length made it desirable to have a potential main tunnel site in Zone S5 so the type of TBM used may be changed. To support the tunnelling strategy for the central section of the tunnel, site S79WH with S80WH: Tideway Walk was identified in Zone S5 as a main tunnel drive site. It was concluded that a main tunnel drive site would be required in Zones S1 to S4 in order to construct the western section of the main tunnel. The alternative would have been to use site S79WH with S80WH: Tideway Walk as a double drive site (ie, to construct the tunnel concurrently both east and west and based on a site size of 40,000 sq m) and this site was assessed as not suitable for this use.

2.5.10 There was only one shortlisted main tunnel drive site in Zones S1 to S4, which was site S17RD: Barn Elms, located in Zone S2. As a result, the tunnelling strategy required two sequential drives using a single TBM to drive from Zone S2 to a reception site in Zone S1 and then using the same TMB to drive from Zone S2 to Zone S5.

2.5.11 At a multidisciplinary workshop **S17RD: Barn Elms** was selected as our phase one consultation preferred main tunnel drive site from which to construct the western sections of the main tunnel and to intercept the West Putney Storm Relief CSO (C05XQ). The reasons are summarised below (not in order of importance):

- a. The site was considered suitable as a main site from the point of view of all disciplines: engineering, planning, environment, community and property.
- b. This site offered the opportunity to combine the requirements of the main tunnel drive site with the interception of the West Putney Storm Relief CSO. The CSO drop shaft could be incorporated into the main tunnel drive shaft, which would eliminate a separate CSO drop shaft and a further connection tunnel to the West Putney Storm Relief CSO.
- c. S17RD is a very large area and the required working area would only occupy the south-eastern corner of the site, adjacent to the river. Jetty access would need to allow for the maintenance of the Thames Path, which runs along the eastern boundary of the site.
- d. It was considered that the existing site constraints could be addressed adequately by positioning the site activities appropriately and providing suitable construction mitigation to reduce the impact on the surroundings. Among other things, it was important to consider the impact of any floodlighting on residential areas and to position works accordingly.
- e. We also needed to consider further the most appropriate access route. In particular, we judged that we could achieve conformity with the London Borough of Richmond upon Thames' *Unitary Development Plan* policies ENV1 and ENV11, which relate to Metropolitan Open Land and open space. The site would predominantly be temporary and appropriate mitigation could be provided to reduce potential impacts on views and openness. Construction activities could also be confined within a relatively small part of a much larger site.

2.5.12 Table 2.1 below sets out the preferred site and use.

Table 2.1 Preferred site and use for phase one consultation

<p>Site: S17RD/C05XQ: Barn Elms</p> <p>Use: To construct the western sections of the main tunnel and to intercept and connect the West Putney Storm Relief CSO to the main tunnel</p>

2.5.13 We also confirmed the following at the same time and by using the same process:

- a. S33HF/C04XJ: Hammersmith Pumping Station in Zone S1 was identified as a preferred main tunnel reception/CSO site (see Volume 4) – this site would be used to receive the main tunnel from S17RD/C05XQ: Barn Elms in Zone S2, to intercept Hammersmith Pumping Station CSO and to drive the connection tunnel to Acton Storm Tanks.
- b. S79WH with S80WH: Tideway Walk in Zone S5 was identified as a preferred main tunnel/CSO site (see Volume 13) – this site would be used to receive the main tunnel from S17RD/C05XQ: Barn Elms in Zone S2, to intercept Heathwall Pumping Station and South West Storm Relief CSOs and to drive the main tunnel to S54SK: King's Stairs Gardens.

2.5.14 Figure 2.2 sets out the preferred phase one consultation drive strategy for the western and central sections of the main tunnel.

Figure 2.2 Phase one consultation main tunnel drive strategy



2.5.15 A more detailed discussion of the tunnelling options and comparisons for the main tunnel sites for all routes at this stage of the pre-application process are presented in Volume 1, Section 4.

3 Phase two consultation preferred main tunnel site: Scheme development and site selection process

3.1 Introduction

3.1.1 This section explains how we implemented the *Site selection methodology paper* in order to arrive at the preferred main tunnel site for the western sections of the tunnel route for phase two consultation. This stage took place from Winter 2010 to Autumn 2011.

3.1.2 Following phase one consultation and prior to phase two consultation, the site selection process comprised:

- a. a review of comments from phase one consultation
- b. consideration of any ongoing scheme design and/or any new information received
- c. a back-check exercise to review the sites listed in Section 2 along with any potential new sites or a combination of sites
- d. application of the assessment process outlined in Section 2.1.2, including the preparation of a new *Engineering options report – Abbey Mills route* (Summer 2011) with revised tunnelling drive options
- e. a multidisciplinary optioneering workshop to consider the detailed contents of the site suitability report for each shortlisted site and the *Engineering options report – Abbey Mills route* (Summer 2011)
- f. comparison of sites to identify the preferred main tunnel site and use (drive or reception/intermediate) for phase two consultation (also see Volume 1, Section 6 for the pre-phase two consultation discussion of tunnelling drive options).

3.1.3 The assessments described in this section were based on the information available at the time and the related stage in the pre-application process.

3.2 Summary of phase one consultation feedback

3.2.1 Details of the consultation comments related to our proposed use of the Barn Elms site and our responses are provided in the *Report on phase one consultation*. The main concerns raised relevant to site selection can be summarised as follows:

- a. further justification requested as to how the site was selected, including why brownfield alternatives and solutions that split the drive site and CSO site were not explored
- b. disruption to water-based recreation, including the Oxford versus Cambridge boat race and other major river events
- c. impact of the loss of green space, playing pitches and Metropolitan Open Land

3 Phase two consultation preferred main tunnel site: Scheme development and site selection process

- d. impact on community fundraising for upgrade of the site
- e. access should not be disrupted along footpaths, including the Thames Path
- f. impact of increased congestion from heavy good vehicles and concern regarding proposed access routes
- g. impact on the environment, the tranquillity, biodiversity and wildlife in the area.

3.2.2 The main comments received in support of the phase one consultation preferred site included:

- a. It is the best choice for the location of the site in comparison to alternatives consulted on, which would cause more disruption to the community.
- b. The site is advantageous because two activities can be combined on one site. Although sports fields would be affected, many would remain the same.
- c. The location of the site by the river allows materials and excavated material to be transported by barges.
- d. It is the obvious choice, given the large amount of land.
- e. It would have the least impact on the historic environment as it combines both requirements in a single location.

3.3 Back-check process

3.3.1 In response to the feedback we received during phase one consultation, a number of engineering design developments and new technical information that became available, we undertook a back-check to review our selection of S17RD: Barn Elms as our preferred site. .

3.3.2 The back-check involved a targeted repeat of each relevant stage of our site selection process (as set out in the *Site selection methodology paper*) to reconsider which site would be the most suitable main tunnel drive site in Zones S1 to S4 for the construction of the western sections of the main tunnel.

3.3.3 The main factors that triggered the back-check process were as follows:

- a. In reviewing potential sites, we were aware that the London Borough of Hammersmith and Fulham had changed the designation of our preferred site S33HF/C04XJ: Hammersmith Pumping Station site from mixed use to residential. Also, the developers had submitted a new planning application for a residential development on this vacant and cleared site, except for the Hammersmith Pumping Station building. Planning permission was likely to be granted and construction to start before the end of 2011. We therefore determined that there was a high risk of not being able to obtain an area at our preferred site that would be large enough to accommodate a main tunnel reception site, to drive a connection tunnel to Acton Storm Tanks (to connect the Acton CSO to the main tunnel) and intercept

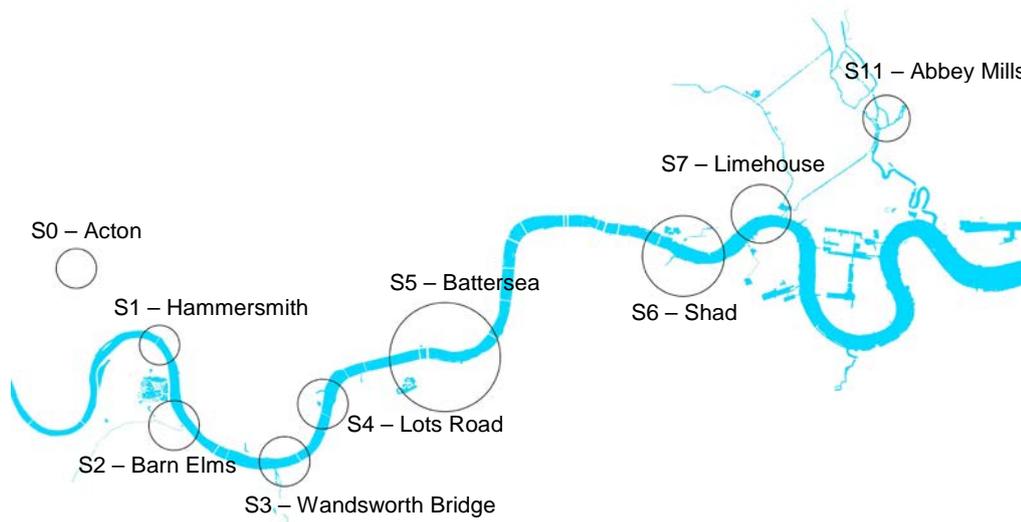
3 Phase two consultation preferred main tunnel site: Scheme development and site selection process

Hammersmith Pumping Station CSO. We therefore needed to review potential main tunnel sites between Hammersmith Bridge and Albert Bridge (main tunnel Zones S1 to S4, see Figure 3.1 Revised main tunnel shaft zones including Zone S0).

- b. Design developments and further modelling work found that the long connection tunnel proposed between the Acton Storm Tanks and Hammersmith Pumping Station sites would need to be a similar diameter to the main tunnel. We therefore decided to extend the proposed main tunnel to Acton Storm Tanks. This potentially altered our tunnelling options for the western section of the main tunnel.
- c. Technical studies of barge movements at Barn Elms confirmed that only 350 tonne barges could be used. This would create additional health and safety risks for river users and logistical issues due to the short tidal window.
- d. We considered various consultees' comments on the impacts of the proposed use of the Barn Elms site as a main tunnel drive site, the engineering assumptions on which site selection decisions were based and the tunnelling strategy for the western section of the main tunnel.

3.3.4 The above factors led to a review of the potential main tunnel sites and tunnelling strategy for the western sections of the main tunnel. This also resulted in the creation of a new zone, Zone S0, to address the extension of the proposed main tunnel to Acton Storm Tanks (see Figure 3.1).

Figure 3.1 Revised main tunnel shaft zones including Zone S0



Engineering assumptions

3.3.5 As part of the back-check process, the engineering assumptions from the initial phase of site selection were reviewed to see if any of the design developments or new technical information altered the original assumptions.

3.3.6 The outcome of this review was that the size of construction site required for a main tunnel drive shaft in Zones S0 to S4 (which covered the majority

of the section of the tunnel that must be constructed predominantly in London Clay) was reduced from 18,000m² to 15,000m². This change allowed the back-check process to review sites that were previously considered too small for main tunnel drive sites. At the same time, the size of site required for a double drive site (ie, tunnelling in two directions simultaneously from one shaft) was adjusted to 20,000m² (see Section 4.4 of the *Site selection background technical paper* (Summer 2011)).

3.3.7 The following section outlines the results of each stage of the back-check process.

Assessment of the back-check long list

The original long list of main tunnel sites in Zones S1 to S4 comprised 200 sites. These sites were reviewed alongside any newly identified sites to determine the 'scope' of the back-checking exercise (ie, which sites would be reassessed as a result of the relevant changes of circumstances or new information that had emerged). The scoping exercise found that we needed to reassess the following nine sites:

- a. S17RD: Barn Elms
- b. S72HF: Fulham Depot, next to Wandsworth Bridge
- c. S73HF: Townmead Road
- d. S76HF: Imperial Wharf
- e. S87HF: Carnwath Road Riverside – a new site that combined two previous sites: S69HF and S70HF (this site emerged as a result of new information regarding site size – see paragraph 3.3.6)
- f. S17WH: Land between Osiers Road, Enterprise Way and Bell Lane Creek
- g. S18WH: Feathers Wharf, The Causeway
- h. S08KC: Foreshore, Chelsea Wharf
- i. S09KC: Foreshore, Cheyne Wharf.

3.3.8 All the other sites on the original long list were scoped out as there had been no change in circumstances to necessitate a reappraisal. The potential group of sites listed above was put on the back-check long list. It should be noted that at this stage, we also considered alternative sites suggested by consultees. However, besides the sites listed above, none were judged to be feasible, mainly due to size and/or location.

3.3.9 In the case of preferred phase one consultation site, S33HF: Vacant land and Thames Water Hammersmith Pumping Station, Chancellor's Road, our monitoring revealed that this site was no longer available as a main tunnel site. Therefore, we did not include it in our back-check process. However we carried out a back-check in this area for a smaller CSO site to intercept Hammersmith Pumping Station CSO (see Volume 4).

3.3.10 The back-check long list sites were then assessed against the high-level considerations set out in SSMP Table 2.2 which included engineering (site size, site features, availability of a jetty/wharf and access), planning and

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environment (heritage, landscape/townscape, open space and ecology) and community and property (neighbouring land uses, site use, Special Land/Crown land and acquisition costs) considerations..

3.3.11 Table 3.1 below provides a summary of the outcome of the back-check assessment of the back-check long list of sites. Sites that were determined to be the least constrained in light of the SSMP Table 2.2 considerations passed to the draft short list. This did not necessarily mean that these sites were ultimately judged suitable, but rather that no significant constraints were identified in relation to the high-level considerations set out in SSMP Table 2.2. Sites that were judged to be more constrained were not retained on the draft short list for more detailed assessment. The main rationale for excluding these sites at this stage is summarised below in Table 3.1.

Table 3.1 Long list to draft short list for main tunnel sites in Zones 1 to 4 (SSMP Table 2.2 assessment)

Site ID	Site name/description	Recommendation
S17RD	Barn Elms	Recommendation: To draft short list as a main tunnel site and main tunnel reception/intermediate site.
S72HF	Fulham Depot, next to Wandsworth Bridge	Recommendation: To draft short list as a split main tunnel site with S73HF and a main tunnel reception/intermediate site.
S73HF	Townmead Road	Recommendation: To draft short list as a split main tunnel site with S72HF and a main tunnel reception/intermediate site.
S76HF	Imperial Park	Recommendation: To draft short list as a main tunnel site and main tunnel reception/intermediate site.
S87HF	Carnwath Road Riverside	Recommendation: To draft short list as a main tunnel site and main tunnel reception/intermediate site.
S17WH	Land between Osiers Road, Enterprise Way and Bell Lane Creek	Recommendation: To draft short list as a main tunnel site, a split main tunnel site with S18WH and a main tunnel reception/intermediate site.
S18WH	Feathers Wharf, The Causeway	Recommendation: To draft short list as a split main tunnel site with S17WH and a main tunnel reception/intermediate site.
S08KC	Foreshore, Chelsea Wharf	Recommendation: To draft short list as a split main tunnel site with S09KC and a main tunnel

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Site ID	Site name/description	Recommendation
		reception/intermediate site.
S09KC	Foreshore, Cheyne Wharf	Recommendation: To draft short list as a main tunnel site and a main tunnel reception/intermediate site.

NB. The site ID and site name/description were used as an internal mechanism to record and describe the site but could be updated as necessary.

3.3.12 All nine sites on the long list were assessed as potentially suitable and passed to the draft short list. No sites were eliminated as unsuitable.

Assessment of the back-check draft short list sites

3.3.13 The nine back-check draft shortlisted sites were further assessed by the engineering, planning, environment, community and property disciplines, having regard to the considerations set out in SSMP Table 2.3 which included: engineering (site size, distance and route to the river, jetty/wharf facilities, means of road/rail access, site features, site efficiency, tunnelling and systems engineering requirements); planning and environment (planning applications/permissions, London Plan/UDP/LDF allocations or special policy areas, heritage designations, landscape/open space designations, ecological designation, transport and amenity); property (ownership of site, tenant on site, estimated acquisition cost, Crown land and special land, access and material transfer rights) and community (proximity to sensitive receptors, social, economic, health and equality considerations).

3.3.14 Table 3.2 below summarises the outcome of the SSMP Table 2.3 back-check assessment of the draft short list of sites. Sites that were assessed as being the least constrained in light of the SSMP Table 2.3 considerations were retained on the short list and passed to the next stage of assessment. This did not necessarily mean that a site was ultimately judged suitable, but rather that no significant constraints were identified in relation to the considerations set out at SSMP Table 2.3. Sites that were judged to be more constrained were not retained on the short list for more detailed assessment. The decision of whether or not to retain a site on the short list was taken at a multidisciplinary workshop. The main rationale for excluding sites at this stage is summarised below in Table 3.2.

Table 3.2 Draft short list to final short list for main tunnel sites in Zones S1 to S4 (SSMP Table 2.3 assessment)

Site ID	Site name/description	Recommendation and rationale
S17RD	Barn Elms	Recommendation: Retain on short list as a main tunnel site and main tunnel reception/intermediate site.
S72HF	Fulham Depot, next to Wandsworth Bridge	Recommendation: Retain on short list as a main tunnel reception/intermediate site.

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Site ID	Site name/description	Recommendation and rationale
S72HF with S73HF	Fulham Depot, next to Wandsworth Bridge	<p>Recommendation: Not to short list for consideration as a split main tunnel site with S73HF.</p> <p>Rationale:</p> <ul style="list-style-type: none"> Property: The combined acquisition costs with S73HF were likely to be significant, especially since the value of any planning permissions would be based on residential and supermarket uses.
S73HF	Townmead Road	<p>Recommendation: Not to short list as a split main tunnel site with S72HF and a main tunnel reception/intermediate site.</p> <p>Rationale:</p> <ul style="list-style-type: none"> Property: The acquisition costs were likely to be significant, especially since the value of any planning permissions would be based on residential and supermarket uses.
S76HF	Imperial Park, Imperial Crescent/Townmead Road	<p>Recommendation: Not to short list as a main tunnel site and main tunnel reception/intermediate site</p> <p>Rationale:</p> <ul style="list-style-type: none"> Planning/Environment: Use of the site would conflict with numerous planning designations of borough-wide importance, including Imperial Wharf Open Space. Community: Potential impact on a high density residential area and community cohesion due to the loss of open space.
S87HF	Carnwath Road Riverside	<p>Recommendation: Retain on short list as a main tunnel site and main tunnel reception/intermediate site.</p>
S17WH	Land between Osiers Road, Enterprise Way and Bell Lane Creek	<p>Recommendation: Not to short list as a main tunnel site, a main tunnel reception/intermediate site or a split main tunnel site with S18WH (see below).</p> <p>Rationale:</p>

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Site ID	Site name/description	Recommendation and rationale
		<ul style="list-style-type: none"> • Planning/Environment: Construction of a high-density residential development has started on the site. • Property: The site is not available as development has started. • Community: Use of the site would have a large impact on high rise flats.
S18WH	Feathers Wharf, the Causeway	<p>Recommendation: Retain on short list as a main tunnel reception/intermediate site.</p>
S18WH with S17WH	Feathers Wharf, The Causeway	<p>Recommendation: Not to short list for consideration as a split main tunnel site with S17WH</p> <p>Rationale:</p> <ul style="list-style-type: none"> • Planning/Environment: Construction of a high density residential development has started on S17WH. • Property: The site is not available as development has started on S17WH. • Community: Use of the site would have a large impact on high rise flats on S17WH.
S08KC with S09KC	Foreshore, Chelsea Wharf	<p>Recommendation: Not to short list for consideration as a split main tunnel site with S09KC</p> <p>Rationale:</p> <ul style="list-style-type: none"> • Engineering: Access to these sites is problematic. • Property: There were several disadvantages associated with this split site as it is unsuitable on grounds of acquisition cost and likely complexity, including dealing with up to 60 residential moorings. • Community: Use of this split site was likely to have numerous impacts on community cohesion, health and well-being, and equality considerations, particularly in relation to the large existing houseboat community on the

3 Phase two consultation preferred main tunnel site: Scheme development and site selection process

Site ID	Site name/description	Recommendation and rationale
		site.
S08KC	Foreshore, Chelsea Wharf	<p>Recommendation: Not to short list for consideration as a main tunnel reception/intermediate site</p> <p>Rationale:</p> <ul style="list-style-type: none"> • Engineering: Access is very constrained and alternatives (eg, Cremorne Gardens, canoe club or adjacent buildings) were unlikely to be acceptable. • Property: There is some risk for foreshore sites because if the Crown or PLA did not agree to the acquisition then a CPO would not be possible. • Community: Concern regarding the impact on Cremorne Gardens, the canoe club, a residential area and the large houseboat community.
S09KC	Foreshore, Cheyne Wharf	<p>Recommendation: Not to short list for consideration as a main tunnel site or a main tunnel reception/intermediate site.</p> <p>Rationale:</p> <ul style="list-style-type: none"> • Property: There were several disadvantages and the site was considered unsuitable on grounds of acquisition cost and likely complexity, including dealing with up to 60 residential moorings. • Community: Use of the site was likely to have numerous impacts on community cohesion, health and well-being, and equality considerations particularly in relation to the existing houseboat community on the site.

NB. The site ID and site name/description were used as an internal mechanism to record and describe the site but could be updated as necessary.

3.3.15 Of the nine sites on the back-check short list, four were assessed as potentially suitable and passed to the back-check final short list and five sites did not proceed to the back-check final short list.

Assessment of the back-check final short list sites

3.3.16 Following the back-check, the four final shortlisted sites identified for assessment at the next stage were as follows:

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Sites identified as suitable for reception/intermediate sites only:

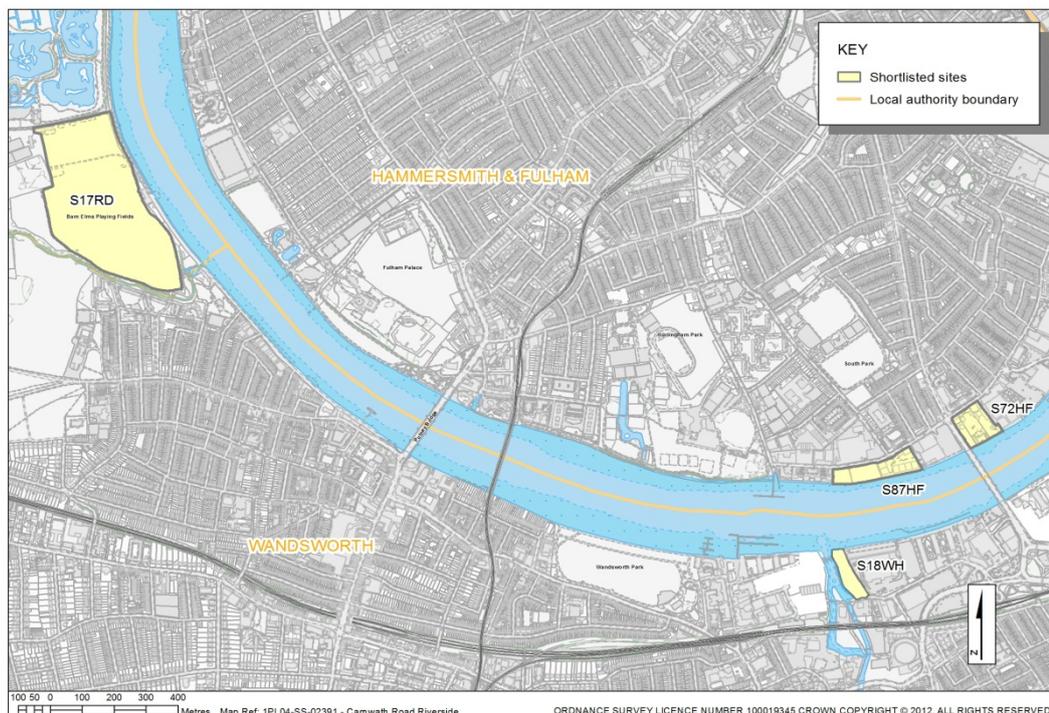
- a. S18WH: Feathers Wharf
- b. S72HF: Fulham Depot.

Sites identified as suitable for main tunnel drive or reception/intermediate sites:

- c. S17RD: Barn Elms
- d. S87HF: Carnwath Road Riverside.

3.3.17 Figure 3.2 shows the location of the shortlisted sites in Zones S1 to S4 that could potentially be used in the tunnelling strategies for the construction of the western section of the main tunnel.

Figure 3.2 Location of shortlisted main tunnel sites in Zone S1 to S4



3.3.18 The construction layout considered prior to phase one consultation was still applicable to S72HF: Fulham Depot, so we only needed to review the existing site suitability report. We considered whether any new information would have a bearing on any of the disciplines' recommendations and previous assessments. This review superseded the previous assessments set out in Section 2. We prepared new site suitability reports for the other three sites, where we proposed new site layout options and checked for any new information.

3.3.19 These site suitability reports contain an assessment of each site's suitability in the light of engineering, planning, environment, community and property considerations. At this stage in the process, no comparisons were drawn between sites; they were assessed in isolation and with no regard to tunnelling strategy. Sites were evaluated by each discipline using our teams' technical knowledge and professional judgement as

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appropriate, and assessed as suitable, less suitable or not suitable from that discipline's perspective.

3.3.20 A summary of the conclusions of each discipline's assessment from the site suitability reports is provided below.

S18WH: Feathers Wharf

3.3.21 Site S18WH is a long flat strip of land. The site is bounded by the River Thames to the north, Cory Environmental Western Riverside Solid Waste Transfer Station (WTS) including a significant new building under construction to the east, The Causeway to the south, and mud flats to the west. The River Wandle runs along the western boundary of the site and connects to the River Thames. The site is located in the London Borough of Wandsworth.

3.3.22 The site was re-assessed based on a revised site layout for use as a main tunnel reception/intermediate site.

3.3.23 **Engineering:** The site was considered **less suitable** for use as a reception/intermediate site at phase one. However, based on the revised site layout this was amended to **suitable** as it is flat, cleared, and has good road links to the TLRN. However the existing road to access the site, The Causeway, passes under a railway bridge with height restrictions. Also the site is narrow and would require careful management to ensure safety during construction.

3.3.24 **Planning:** The site was considered **suitable** for use as a main tunnel reception/intermediate site at phase one and this recommendation remained unchanged. There were a number of planning and environmental designations that related to the site but we considered that, with appropriate mitigation measures, it would be unlikely that these designations would be unacceptably impacted on. The site is allocated in the London Borough of Wandsworth's emerging *Site Specific Allocations Document (SSAD)* for mixed-use residential. The project works would be contradictory to this allocation, however the use of the site would be temporary and the layout of permanent structures configured so as not to prejudice the future development potential of the site. The site is adjacent to the Western Riverside Transfer Station, a safeguarded wharf, and works would not conflict with operations and barge movements. The recent planning approvals for the use of Feather's Wharf for the new civic amenity facility would have a construction timetable likely to be compatible with the project.

3.3.25 **Environment:** Overall, the site was considered **suitable** for use as a main tunnel reception/intermediate site at phase one and this recommendation remained unchanged. The site was considered **suitable** from the perspectives of transport, built heritage, townscape, water resources, ecology, flood risk, noise and air quality. However, the site was considered **less suitable** from the perspectives of archaeology and land quality. Adequate mitigation measures for archaeology and land quality would need to be provided.

3.3.26 **Socio-economic and community:** The site was considered **suitable** for use as a main tunnel reception/intermediate site at phase one and this

recommendation remained unchanged. It was assessed that use of the site would be unlikely to have unacceptable impacts on the local community. Mitigation might be required to reduce impacts on the Thames Path. A storage area for the adjacent waste transfer facility would potentially need to be accommodated on site or temporarily relocated.

- 3.3.27 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site at phase one and this recommendation remained unchanged. However, dialogue with the landowners would be needed to assess the potential impacts on the neighbouring waste transfer facility. If the impacts were likely to be minimal, the acquisition costs should be acceptable. Resistance to the proposal might cause difficult negotiations in the context of Special Land procedures.

S72WH: Fulham Depot

- 3.3.28 Site S72WF covers sites known as Swedish Wharf, Comely Wharf and Albert Wharf. The site is covered in a mix of industrial buildings, warehouses, a motor car auction business and a company known as Fuel Oils Ltd and its associated oil tanks. The surrounding area is characterised by a mix of large warehouses, retail units, a supermarket and residential properties. The site is located in the London Borough of Hammersmith and Fulham.

- 3.3.29 The phase one site suitability report was reviewed by all disciplines for the following uses: main tunnel reception/intermediate site. This resulted in slight changes to some of the assessments as specified below, but they did not materially alter the overall assessment.

- 3.3.30 **Engineering:** Assessed the site as **suitable** for use as a main tunnel reception/intermediate site at phase one and this recommendation remained unchanged. The site is an adequate size and has good vehicular access.

- 3.3.31 **Planning:** The site was considered **suitable** for use as a main tunnel reception/intermediate site at phase one and this recommendation remained unchanged. There are a number of onsite and adjacent sensitive receptors, such as a conservation area, a nature conservation area, and residential properties. A new planning application and the London Borough of Hammersmith and Fulham's *Core Strategy* have now been adopted. However, the proposed construction layout should provide sufficient separation between the site and residential properties and, combined with other mitigation measures, the impact on residential amenity should be acceptable.

- 3.3.32 **Environment:** Overall, the site was considered **suitable** for use as a main tunnel reception/intermediate site at phase one and this recommendation remained unchanged. The site was considered **suitable** from the perspectives of transport, archaeology, built heritage, townscape, water resources, ecology, air quality and flood risk. However, the site was considered **less suitable** from the perspectives of noise and land quality. Mitigation measures might include erecting noise barriers and remediating any contamination within the site.

3.3.33 **Socio-economic and community:** The site was considered **suitable** for use as a main tunnel reception/intermediate site at phase one and this recommendation remained unchanged. While it was recognised that mitigation against loss of business activity might be required, use of the site was assessed as unlikely to have a significant impact on the local community as there are few potential sensitive receptors in its immediate vicinity. However, noise mitigation would be required to reduce impacts on residential receptors to the north.

3.3.34 **Property:** The site was considered **suitable** for use as a main tunnel reception/intermediate site at phase one and this recommendation remained unchanged. The acquisition costs of using this site should be acceptable. However, use of the site would result in the loss of at least two businesses including one that uses specialist plant and machinery.

S17RD: Barn Elms

3.3.35 Site S17RD forms part of the Barn Elms Sports Centre, off Queen Elizabeth Walk. The surrounding area is predominantly residential. The site is located in the eastern-most area of the London Borough of Richmond upon Thames, and adjoins the London Borough of Wandsworth along its southern boundary.

3.3.36 At phase one consultation, we considered a worksite in the corner of Barn Elms playing fields at the outlet of Beverly Brook into the River Thames. However, as part of the back-check process, we revised the site area for the site suitability report assessments and elongated the proposed worksite so that it would have less impact on the adjacent playing fields and also moved the site further north adjacent to the Boat House to be further away from the residential area around Horne Way.

3.3.37 The site was assessed for use as a single and double main tunnel drive site and a reception/intermediate site. All site options also included the interception of the West Putney Storm Relief CSO, which is located in the corner of Barn Elms near the outlet of Beverley Brook into the River Thames.

3.3.38 We also assessed three access options to the site:

- a. option 1: Rocks Lane
- b. option 2: Queen Elizabeth Walk
- c. option 3: Mill Hill Road (across Lower Putney Common and over Beverley Brook).

3.3.39 All disciplines except property, (although this was marginal), thought that the most **suitable** access to the worksite was option 1 - Rocks Lane. This would involve a dedicated access route to the construction site which would enable segregation from the adjacent third-parties and be safer than the other two access route options.

3.3.40 **Engineering:** The site was considered **suitable** for use as a main tunnel reception/intermediate site or a single or double main tunnel drive site with the preferred access option 1 - Rocks Lane. The site is a suitable size and could accommodate the increased size requirements associated with

3 Phase two consultation preferred main tunnel site: Scheme development and site selection process

- a double drive main tunnel site. It is also clear and predominantly level, and minimal enabling works would be required.
- 3.3.41 For the purposes of a main tunnel drive site, there is suitable river frontage to build jetty and wharfage facilities in the River Thames to deliver materials and remove excavated material by river. However, barge movements are restricted in this area of the River Thames.
- 3.3.42 **Planning:** The site was considered **suitable** for use as a main tunnel reception/intermediate site or a single main tunnel drive site with a CSO interception. A series of planning designations are applicable to the site. However, despite the possible constraints and the potential for mitigation of likely impacts or conflicts with policy, this site was considered suitable for use subject to successful mitigation of the constraints identified. Additionally, there might be disruption to recreational river users and the residential receptors to the south for a single drive site. However, use of the site as a main tunnel and CSO interception site (West Putney Storm Relief CSO - site C05XQ) would make more effective and efficient use of the land because only one construction site would be needed instead of two.
- 3.3.43 The site was considered **less suitable** for use as a double drive main tunnel site. This was due to the increase in traffic movement associated with removal of excavated materials for a double drive main tunnel site. The resulting impacts on the amenity of the surrounding area were of particular concern, as well as potential visual impacts as a result of triple stacking of office and welfare facilities.
- 3.3.44 **Environment:** Overall, the site was considered **suitable** for use as a reception/intermediate, single or double main tunnel site with access from Rocks Lane. However, mitigation would be required.
- 3.3.45 Based on current information, the site was considered **suitable** from the perspectives of transport, hydrogeology, built heritage, townscape, noise, air quality (for access options 1 and 2) and land quality.
- 3.3.46 The site was considered **less suitable** from the perspectives of archaeology, ecology, surface water, and flood risk and air quality (for access option 3).
- 3.3.47 **Socio-economic and community:** The site was considered **suitable** for use as a main tunnel reception/intermediate site, but the recommendation for use as a main tunnel drive site was altered to **less suitable** following further consideration of the potential community impacts. The site was also considered **less suitable** for use as a main tunnel double drive site. The main tunnel drive site option would require increased levels of construction activity and a larger site. There would be a temporary loss of sports fields, disruption to the users and operations of the Boat House, Sailing Club, Thames Path and recreational river users.
- 3.3.48 In general, it was assessed that this site was likely to have an important amenity value to neighbouring residential users and a value to the local community as a sports facility and area of open space. We recognised that the river in the area is of high value to recreational users. The current ambient noise level is generally low, except during the core flight times to

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Heathrow airport, so residential areas near the site and across the river and the Barnes Wetlands Centre would experience increased noise from the works, especially from site set-up and tunnelling activities.

- 3.3.49 Access from Rocks Land (option 1) appeared likely to have the least impact on the local community, although efforts would need to be made to minimise the impact of additional traffic past the residential properties on this road and the impact of the new access route on the sports fields and users.
- 3.3.50 **Property:** Following re-assessment, the site was considered **less suitable** for use as a single or double main tunnel drive site. While the site is undeveloped, the provision of replacement land would likely result in high acquisition costs and be extremely difficult to obtain. Therefore, a special parliamentary procedure may be required, which could cause delays to the project. In addition, significant public and political opposition to the use of the site as a main tunnel site was identified, which would also be likely to increase the acquisition risk. Furthermore, the boat house buildings would need to be demolished and reinstated, which could disrupt these operations. There was also found to be considerable potential for discretionary purchase costs.
- 3.3.51 The site was considered **suitable** for a main tunnel reception/intermediate site at phase one and this recommendation remained unchanged. Acquisition costs for the small site layout were likely to be acceptable and the boat house and sailing club buildings were not required.
- S87HF: Carnwath Road Riverside**
- 3.3.52 Site S87HF incorporates Hurlingham Wharf as well as Whiffin Wharf to the west and the Carnwath Road Industrial Estate to the east, which contains a number of two-storey industrial, warehouse and retail units.
- 3.3.53 The site is adjacent to the River Thames and the surrounding area is characterised by a mix of land uses. Immediately to the north of the site along Carnwath Road is the Piper Building, a large, mixed-use building with high-density residential properties, including car parking on the corner with Peterborough Road. Also to the north of the site are residential properties within Philpot Square. A four storey residential block and a Currys superstore are located immediately adjacent to the site to the east. To the west of the site are three to four-storey high residential properties that overlook the site and the River Thames. The site is located in the London Borough of Hammersmith and Fulham.
- 3.3.54 The site was assessed for use as a main tunnel drive site or main tunnel reception/intermediate site.
- 3.3.55 **Engineering:** The site was considered **suitable** for use as a main tunnel drive or reception/intermediate site. The site is a suitable size with sufficient proportions to enable efficient working. It is a level and predominately clear site, and only a minimal amount of enabling works would be required to demolish the light industrial units.
- 3.3.56 **Planning:** This site was considered **suitable** for use as a main tunnel drive or reception/intermediate site. Hurlingham Wharf is designated as a

safeguarded wharf and is currently vacant. Temporary use of this site, including the waterborne transport of construction materials (for the main drive site), would be consistent with local policy and regional planning guidance. The site is subject to a number of planning policy designations and the shaft location and layout of the permanent structures would need particular consideration, especially with regards to the wider conservation area and regeneration area. However, none of these designations were deemed significant enough to preclude the use of the site. Of most concern was the potential adverse impact on residential amenity, particularly to the adjacent residential properties to the west and east, but we considered that these impacts could be reduced with appropriate mitigation measures.

3.3.57 **Environment:** Overall, the site was considered **suitable** for use as a main tunnel drive or reception/intermediate site. The site was considered **suitable** from the perspectives of transport, built heritage, townscape, water resources (hydrogeology) and ecology. In the case of the reception/intermediate option, it was also considered **suitable** from the perspectives of water resources (surface water) and flood risk. However, the site was considered **less suitable** from the perspectives of archaeology, air quality, noise and land quality. In the case of the main tunnel drive option, it was also considered **less suitable** from the perspectives of water resources (surface water) and flood risk.

3.3.58 **Socio-economic and community:** The site was considered **less suitable** for use as a main tunnel drive or reception/intermediate site. This was due to the potentially adverse impact on the businesses operating from premises located on the eastern section of the site and the residential properties located to the west, north, east and in the general vicinity of the site. While these impacts would likely be lower for a reception/intermediate site, this would likely be partially offset by the increased road transport impacts of not utilising river transport.

3.3.59 **Property:** The site was considered **less suitable** for use as a main tunnel drive or reception/intermediate site. The site is partially vacant, however large acquisition costs would be likely because the businesses on Carnwath Road Industrial Estate would need to be relocated or extinguished.

3.4 Phase two consultation preferred site

3.4.1 Following the completion of the back-check process, we held a multidisciplinary workshop to identify the most suitable sites in main tunnel Zones S1 to S4. This workshop took into account the site suitability report findings, potential drive options, feedback received during phase one consultation and interim engagement (carried out after phase one consultation and before phase two consultation).

3.4.2 In Zone S0, Acton Storm Tanks (S01EG) was identified as the most suitable main tunnel reception site. As this site has no river access (see Volume 3), a main tunnel drive site had to be identified in Zones S1 to S4 to construct the western sections of the main tunnel.

3 Phase two consultation preferred main tunnel site: Scheme development and site selection process

- 3.4.3 No shortlisted sites were identified within Zones S1 and S4.
- 3.4.4 In Zone S2 Barn Elms (S17RD) was identified as the most suitable main tunnel drive or reception/intermediate site. While in Zone S3 Carnwath Road Riverside (S87HF) was identified as the most suitable main tunnel drive site and Feathers Wharf (S18WH) was identified as the most suitable main tunnel reception site over Fulham Depot (S72HF). This meant that a main tunnel drive site was required in either Zone S2 or Zone S3.
- 3.4.5 In Zones S2 and S3, we considered the most suitable sites for each type of use (ie, main tunnel drive or reception/intermediate site) and potential drive options in the *Engineering options report - Abbey Mills route* (Summer 2011). The preferred main tunnel site and use was determined by carrying out a series of comparisons of sites identified as most suitable in Zones S2 and S3. These comparisons involved comparing drive options based on the various uses (ie, the way in which the sites could be used to construct the tunnel) to identify a preferred main tunnel site. These are explained in Volume 1, Section 6.
- 3.4.6 On the basis of the assessments described above, the tunnelling comparisons between Zones S2 and S3 and professional judgement, it was agreed by all disciplines that **S87HF: Carnwath Road Riverside** should become the phase two preferred main tunnel drive site. We believed this to be the most appropriate site, subject to further engagement with stakeholders, further design development and phase two consultation.
- 3.4.7 In summary, S87HF: Carnwath Road Riverside was identified as the preferred site for the following reasons (not in order of importance):
- a. Carnwath Road Riverside is a brownfield site whereas Barn Elms is a greenfield site.
 - b. The site has better river access via the existing safeguarded wharf than at Barn Elms. This would allow much larger barges (800 to 1000 tonne rather than 350 tonne) to be used to remove excavated materials and deliver construction materials to the site. Use of larger barges also has associated cost and environmental benefits.
 - c. There would be much less conflict with the recreational users of the River Thames than at Barn Elms.
 - d. Carnwath Road Riverside has better existing road access and links to the strategic road network. In contrast, at Barn Elms we would need to construct lengthy temporary access roads across the playing fields to local roads that are congested at peak times.
 - e. Use of Carnwath Road Riverside would avoid disrupting the Thames Path at Barn Elms. The Thames Path is already diverted around the site at Carnwath Road Riverside.
 - f. Use of this site would be likely to have less impact on the natural and built environment in terms of planning policies and designations compared with Barn Elms.

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- g. Use of this site presented less likely programme risk and would likely have lower construction costs. Enabling works could also be carried out more easily, especially as there is an existing energy supply on site.
- h. This site would have a higher resale land value, whereas the Barn Elms site would have higher site set-up costs and no resale value.

3.4.8 The use of Carnwath Road Riverside as a main tunnel drive site would mean that a small CSO site would still be required at Barn Elms to intercept the West Putney Storm Relief and connect it to the main tunnel (see Volume 5).

3.4.9 The Carnwath Road Riverside site is also closer to residential properties than the main tunnel drive site proposed at phase one site at Barn Elms, so additional mitigation would be required to reduce the potential impacts of construction activities. This aspect alone does not outweigh all the conclusions above.

3.4.10 Table 3.3 below sets out the preferred site and use.

Table 3.3 Preferred site and use for phase two consultation

Site: S87HF: Carnwath Road Riverside

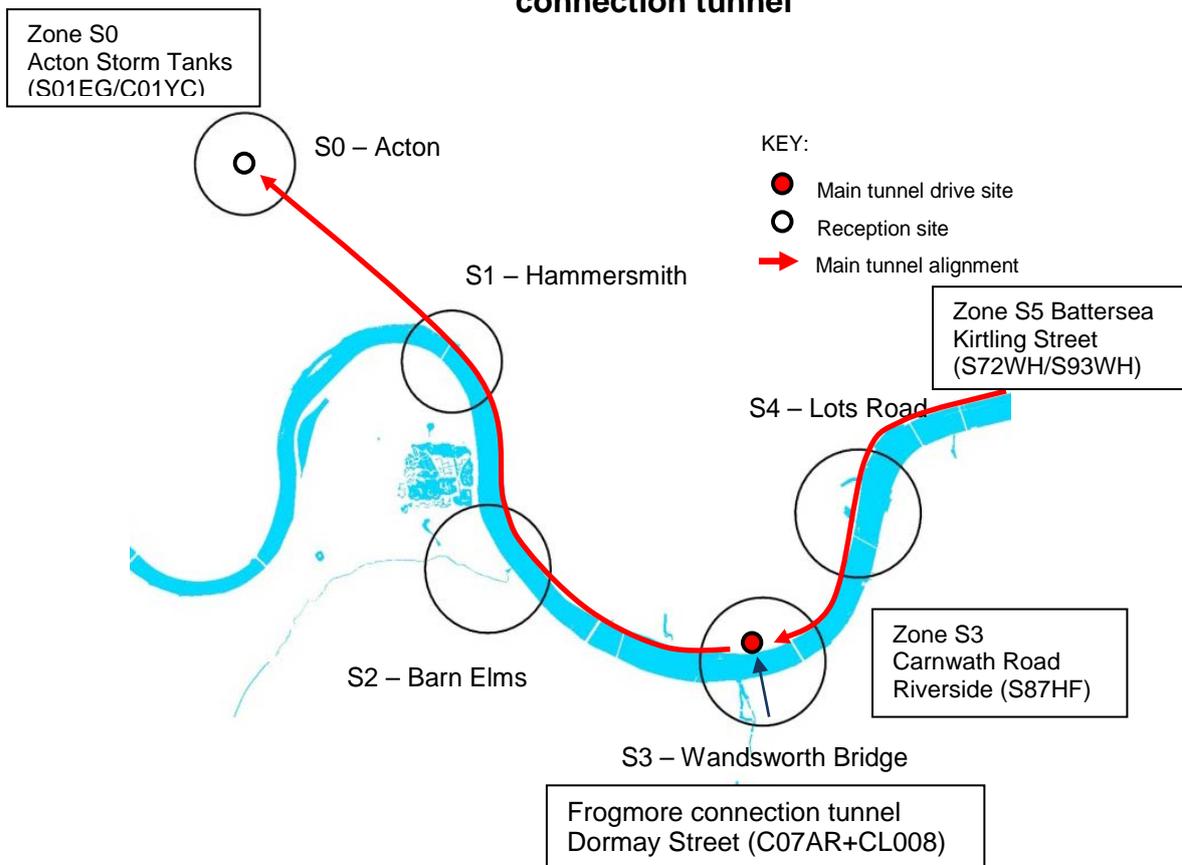
Use: To construct the western sections of the main tunnel, to drive the main tunnel to Acton Storm Tanks (S01EG/C01YC) and to receive the main tunnel from Kirtling Street (S72WH/S93WH) and the Frogmore connection tunnel from Dormay Street (C07AR + CL008)

3.4.11 We also confirmed the following at the same time and by using the same process:

- a. S01EG/C01YC: Acton Storm Tanks in Zone S0 was identified as a preferred main tunnel reception/CSO site (see Volume 3) – this site would be used to receive the main tunnel from S87HF: Carnwath Road Riverside Zone S3.
- b. S72WH/S93WH: Kirtling Street (with Cringle Street) was identified our phase two consultation preferred main tunnel drive site in Zone S5 (see Volume 13) – this site would be used to drive the main tunnel to S87HF: Carnwath Road Riverside.

3.4.12 Figure 3.3 sets out the preferred phase two consultation drive strategy for the construction of the western and central sections of the main tunnel.

Figure 3.3 Phase two consultation preferred sites and tunnelling strategy for the western section of the main tunnel and Frogmore connection tunnel



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4 Post phase two consultation: Review and confirmation of proposed main tunnel site for Section 48 publicity

4.1 Introduction to the review

- 4.1.1 This section explains how we implemented the requirement in the *Site selection methodology paper* to review the preferred site following phase two consultation and prior to Section 48 publicity. This stage took place from Spring 2012 to Summer 2012.
- 4.1.2 The review at this stage of the site selection process comprised:
- a. a review of comments from phase two consultation related to main tunnel sites and tunnelling options associated with Zones S1 to S4 for the western sections of the main tunnel as set out in the *Engineering options report - Abbey Mills route* (Spring 2012)
 - b. consideration of any ongoing scheme design and/or new technical information
 - c. multidisciplinary workshops and reviews to identify the proposed main tunnel site and use for Section 48 publicity.
- 4.1.3 The assessments described in Section 4 were based on the information available at the time and the related stage in the pre-application process.

4.2 Summary of phase two consultation feedback

- 4.2.1 Details of the consultation comments related to the proposed use of the Carnwath Road Riverside site and our responses are provided in the *Report on phase two consultation*. The main concerns raised relevant to site selection can be summarised as follows:
- a. Object to the use of the site and the site is unsuitable.
 - b. Alternative sites should be considered. Site selection should avoid densely populated or residential areas. The preferred site is close to sensitive receptors, including schools and nurseries, and commercially established areas.
 - c. The selection of this preferred site has been poorly justified/inadequately explained or is flawed/questionable. Reasons for this view included: the impact of use of this site has been underestimated and it would cost too much.
 - d. The scale of effects on the local area and community resulting from the selection of this site is unacceptable.
 - e. The preferred site put forward at phase one consultation, Barn Elms, is more suitable as it would have less impact on the local area and would enable CSO interception and tunnelling activities to be undertaken at

4 Post phase two consultation: Review and confirmation of proposed main tunnel site for Section 48 publicity

the same site. The reasons for changing the preferred site since phase one consultation are unclear.

- f. The site is too small and does not have sufficient capacity to accommodate the proposals.
- g. Site selection has been influenced by pressure from politicians, celebrities and Non-Governmental Organisations.
- h. Alternative drive strategies were suggested for the western section of the main tunnel.
- i. Alternative site suggestions included Barn Elms and Kirtling Street / Battersea Power Station / Nine Elms / Battersea.

4.2.2 The main comments received in support of the phase two consultation preferred site included:

- a. support for the use of the preferred site
- b. support for the identification of a new preferred site since phase one consultation/the preferred site is more suitable than the site put forward at phase one consultation
- c. it is a brownfield site that is vacant/derelict/available for redevelopment.

4.2.3 We recognised the concerns that were raised, including impact on the local environment and site specific matters, and have taken these into account in developing the scheme, including measures which could be put in place to minimise any significant potential impacts.

4.2.4 In light of comments received suggesting alternative drive options prior to Section 48 publicity, we reviewed our tunnelling strategy and prepared a revised *Engineering options report - Abbey Mills route* (Spring 2012). This report concluded that the suggested alternatives would not add any new drive options, so the potentially feasible main tunnel drive options remained the same as those in the *Engineering options report - Abbey Mills route* (Summer 2011) set out prior to phase two consultation. Despite there being no new options, we still checked the sites and tunnelling drive options to ensure our assessments were still valid. This process did not lead to different sites or tunnelling strategy for the western section of the main tunnel (see Volume 1, Sections 6 and 7).

4.2.5 Having taken all comments received during phase two consultation into account, we believed S87HF: Carnwath Road Riverside remained the most suitable drive main tunnel site to construct the western sections of the main tunnel.

4.3 Consideration of project design or new information

4.3.1 Planning permission was granted (application reference: 2010/01792/FUL) for the redevelopment of a new concrete plant in February 2012, including the erection of a replacement concrete plant, aggregate storage facility, transfer building and conveyors at RMC House 15 Townmead Road. This permission covers part of site S72HF: Fulham Depot.

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- 4.3.2 Planning permission was granted (application reference: 2010/02481/FUL) for mixed use redevelopment including a supermarket, residential dwellings, cafés and bars and a training centre at 51 Townmead Road. This permission is adjacent to the east of site S72HF: Fulham Depot.
- 4.3.3 Having considered this new information, we believed S87HF: Carnwath Road Riverside remained the most suitable main tunnel drive site to construct the western sections of the main tunnel.

4.4 Proposed site and use for Section 48 publicity

- 4.4.1 Having completed the site selection review described above, we held a further multidisciplinary workshop prior to Section 48 publicity. On balance, the review process did not identify any additional considerations that would have caused us to change our preferred site from phase two consultation. **S87HF: Carnwath Road Riverside** remained the proposed drive main tunnel site to construct the western sections of the main tunnel for Section 48 publicity for the following reasons (not in order of importance):
- a. It is a brownfield site and would not result in the loss of undeveloped, open land.
 - b. Part of the site is a safeguarded wharf and we would make use of this area in a way that would be an appropriate temporary use of the safeguarded wharf allocation. The presence of wharves at this site, combined with the width of the River Thames at this point, would allow large barges (800 to 1000 tonne) to be used to remove excavated materials and deliver construction materials to the site. Use of large barges has associated cost and environmental benefits and reduces potential conflict with other river users as fewer barges would be required.
 - c. Although the use of the site could delay any future redevelopment of the parts of the site that are not safeguarded as a wharf, use of the site would be temporary. It would therefore not interfere with wider regeneration plans for the area or prevent housing targets identified in adopted local and regional plans being met.
 - d. Use of the site at Carnwath Road Riverside is likely to have much less conflict with recreational users of the River Thames than use of the site at Barn Elms for a main tunnel site.
 - e. The Carnwath Road Riverside site has better direct access to the public road network and links to the strategic road network than the Barn Elms site.
 - f. Use of the Carnwath Road Riverside site would have less impact on the natural and built environment in terms of planning policies and designations. Using Barn Elms as a main tunnel drive site would affect Metropolitan Open Land (MOL), the site is adjacent to a SSSI (Wetland Centre). It would also affect Barn Elms Playing Fields and would require the demolition and relocation of a local community boating facility.

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- g. A special parliamentary procedure would not be required to secure the site.
- h. Use of the Carnwath Road Riverside site would be less disruptive to users of the Thames Path, which is already diverted around the site.
- i. A significant proportion of the site is undeveloped and a limited number of commercial occupiers would need to be relocated.

4.4.2 Table 4.1 below sets out the proposed site and use.

Table 4.1 Proposed site and use for Section 48 publicity

Site: S87HF: Carnwath Road Riverside

Use: To construct the western sections of the main tunnel, to drive the main tunnel to Acton Storm Tanks (S01EG/C01YC) and to receive the main tunnel from Kirtling Street (S72WH/S93WH) and the Frogmore connection tunnel from Dormay Street (C07AR + CL008)

5 Post Section 48 publicity: Review and final selection of main tunnel site for the application

5.1 Introduction to the review

5.1.1 This section explains how we conducted a site selection review in order to arrive at the final selection of sites to be included in the application. This stage took place during Autumn 2012.

5.1.2 The final site selection review comprised:

- a. review of comments from Section 48 publicity related to main tunnel sites and tunnelling options associated with Zones S1 to S4 for the western sections of the main tunnel as set out Volume 1, Section 6.6
- b. consideration of any ongoing project design and/or new technical information
- c. final review of shortlisted sites in Zones S1 to S4 which comprised multidisciplinary workshops and reviews to re-consider the various site and main tunnel drive comparisons and the rationale for selecting the main tunnel site and its use for the application.

5.2 Summary of Section 48 publicity feedback

5.2.1 Details of the comments to Section 48 publicity related to this site and our responses are provided in the *Consultation Report*. The main concerns raised relevant to site selection can be summarised as follows:

- a. Objections to use the site. Barn Elms was suggested as a more suitable site.
- b. Disagree with the selection of the proposed site.
- c. Reasons for changing the preferred site since phase one consultation are unclear/ unjustified/ unsatisfactory. Selection of the proposed site has been poorly justified/ inadequately explained.
- d. Site selection should avoid sites that have been allocated for, are known to be awaiting, or have planning permission for redevelopment.
- e. Impact on residential amenity should be considered as part of the site selection process.
- f. Concerns over the effects on planned regeneration and socio-economic impact on the area.

5.2.2 The main comments received in support of the proposed site included:

- a. Support the identification of a new preferred site since phase one consultation/ the preferred site is more suitable than the site put forward at phase one consultation.

5 Post Section 48 publicity: Review and final selection of main tunnel site for the application

- b. The site relocates major tunnelling activities from a Greenfield to a partially derelict Brownfield site and increases the viability of barge transport by using a currently vacant safeguarded wharf.

5.2.3 Relevant Section 48 publicity comments were taken into account in the review of shortlisted main tunnel sites set out in Section 5.4 below.

5.3 Consideration of project design or new information

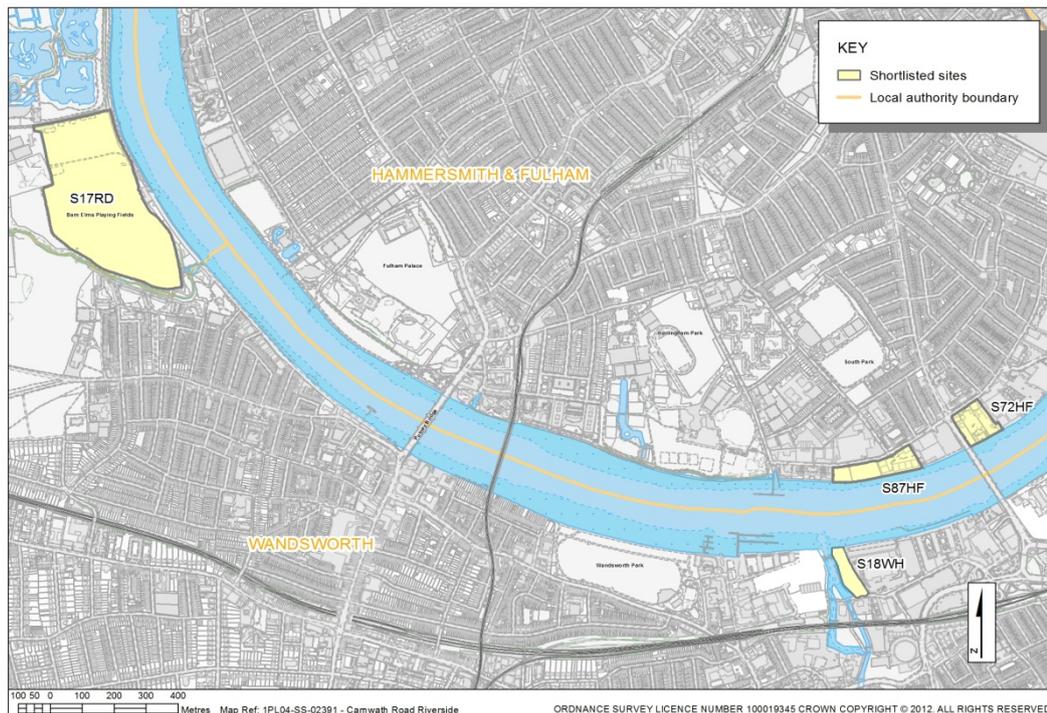
5.3.1 The review of this site confirmed that there was no new project design issues and/or information relevant to site selection.

5.4 Final review of shortlisted main tunnel sites in Zones S1 to S4

5.4.1 As part of the final review process, all the final shortlisted sites in main tunnel Zones S1 to S4 were once again reviewed and compared following Section 48 publicity. For the avoidance of doubt, we did not re-review the phase one shortlisted sites because we undertook a back-check following phase one consultation that generated an updated shortlist of sites based on new information and this therefore superseded the shortlist drawn up prior to phase one consultation. We reviewed the shortlisted site assessments presented in Section 3, which remain valid. To avoid unnecessary repetition, site specific points have not been reproduced in this section.

5.4.2 Below is a summary of the final list of shortlisted sites by main tunnel zone and illustrated in Figure 5.1.

Figure 5.1 Shortlisted main tunnel sites in Zone S1 and Zone S4



Zone S1 Hammersmith

5.4.3 There were no shortlisted main tunnel sites in Zone S1.

Zone S2 Barn Elms

5.4.4 S17RD: Barn Elms was the only shortlisted site in Zone S2 and was identified as suitable for use as a main tunnel drive or reception/ intermediate site.

Zone S3 Wandsworth Bridge

5.4.5 There were three shortlisted main tunnel sites in Zone S3:

- a. S18WH: Feathers Wharf – identified as suitable for use as a main tunnel reception/ intermediate site only
- b. S72HF: Fulham Depot – identified as suitable for use as a main tunnel reception/ intermediate site only
- c. S87HF: Carnwath Road Riverside – identified as suitable for use as a main tunnel drive or reception/ intermediate site.

Zone S4 Lots Road

5.4.6 No main tunnel sites were shortlisted in Zone S4.

Summary of sites by zones

5.4.7 In summary the most suitable site within the Zones S1 to S4 were confirmed as:

- a. Zone S1 – no shortlisted sites

- b. Zone S2 – S17RD: Barn Elms for use as a main tunnel drive or reception/intermediate site
- c. Zone S3 – S87HF: Carnwath Road Riverside for use as a main tunnel drive site and S18WH: Feathers Wharf as a main tunnel reception/intermediate site
- d. Zone S4 – no shortlisted sites.

5.5 Final review of tunnelling drive options

5.5.1 Having established the most suitable site in each zone for each site use (i.e. drive or reception), we then reviewed the drive options. The drive options were set out in *Engineering options report – Abbey Mills route* (Spring 2012) and explained in Volume 1, Section 6.6 (also see Volume 1, Section 7.6 for an update). In summary, when we considered the possible drive options, these were refined down to the requirement for a main tunnel drive site in either Zone S2 Barn Elms or Zone 3 Wandsworth Bridge to drive the main tunnel to Zone S0. No drive option required a main tunnel drive site in both zones. Also, due to length of drive it was not possible to drive from Zone S5 to Zone S0 using only an intermediate site in Zone S2 or S3, so this eliminated S18WH: Feathers Wharf.

Zone S2 compared to Zone S3

- 5.5.2 A review was therefore undertaken to compare the use of site S17RD: Barn Elms with S87HF: Carnwath Road Riverside as a main tunnel drive site for the construction of the western sections of the main tunnel. A summary of comparison points is presented below.
- 5.5.3 The Carnwath Road Riverside site is a brownfield site that is partly vacant, whereas Barn Elms is a greenfield site.
- 5.5.4 The Carnwath Road Riverside site includes a safeguarded wharf and has much better river access, meaning larger barges could be used for the transportation of construction materials than could be used at Barn Elms. Use of the Carnwath Road Riverside site would be an appropriate temporary use of this safeguarded wharf, whereas the Barn Elms site has no existing wharves on site and the area is predominantly used for recreational purposes.
- 5.5.5 Health and safety issues associated with using the river and, in particular, the danger of barges transporting construction materials conflicting with recreational river users and users of the Thames Path would be less at Carnwath Road Riverside.
- 5.5.6 Carnwath Road Riverside has better existing road access and links to the Transport for London Road Network (TLRN), given that it comprises a previously developed site. Use of Carnwath Road Riverside, however, would require relocation of existing retail businesses. Although, notwithstanding this, it appears likely the businesses would ultimately be relocated under the long term re-development aspirations for the site, even if the project were not constructed at the site.

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- 5.5.7 Use of Carnwath Road Riverside would reduce the potential impact on users of the Barn Elms sports fields, including: the loss of four to five sports pitches; and the possible relocation of the Scout Hut and boathouse, which would be necessary should Barn Elms be utilised as a main tunnel drive site. We acknowledge, however, that the Barn Elms site would still be required to intercept the West Putney Storm Relief CSO; although with reduced impacts when compared to utilising Barn Elms as a main tunnel site.
- 5.5.8 Use of Carnwath Road Riverside is supported in planning policy terms by its brownfield and partial safeguarded wharf status, although Carnwath Road Riverside and the surrounding area is currently proposed for regeneration in London Borough of Hammersmith and Fulham's adopted *Core Strategy* and draft *South Fulham Riverside Supplementary Planning Document*. However, use of the site would be temporary and would have a limited impact upon the overall developable land available in the regeneration area. Barn Elms is subject to more planning policy constraints, including its designation as Metropolitan Open Land (MOL) which would make mitigation of construction impacts more difficult.
- 5.5.9 In environmental terms, as a brownfield site the use of Carnwath Road Riverside would have fewer ecological impacts than use of a greenfield site and designated MOL at Barn Elms. Use of Barn Elms as a main tunnel drive site also has the potential to impact on nearby ecological sites, including the London Wetland Centre Site of Special Scientific Interest (SSSI), and the River Thames and Beverley Brook Sites of Importance for Nature Conservation. The construction site at Carnwath Road Riverside is closer to residential dwellings when compared to the proposed site at Barn Elms. However, both options could result in construction noise and dust impacts on nearby residential receptors and would require mitigation.
- 5.5.10 At Carnwath Road Riverside the Thames Path is already diverted around part of the site, and further diversion was considered more acceptable than at Barn Elms because the path is less well used. Furthermore, a diversion around the site at Barn Elms would need to be long and was not considered as feasible.
- 5.5.11 Lower acquisition costs are expected at Barn Elms than Carnwath Road Riverside, although the majority of the site could be sold after the construction phase. However, use of open space at Barn Elms, which is owned and operated by a local authority, would likely be subject to special parliamentary procedure. Acquisition of Carnwath Road Riverside would not require a special parliamentary procedure.

5.6 Selected site for the application

- 5.6.1 In summary, we reviewed and considered:
- Section 48 publicity feedback
 - any relevant changes and/or new information
 - shortlisted sites and tunnelling drive option comparisons.

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5.6.2 The final site selection review described above, culminated in a multidisciplinary workshop following Section 48 publicity. On balance, the review process did not identify any new considerations that would have caused us to change our proposed site from Section 48 publicity. Therefore, **S87HF: Carnwath Road Riverside** was selected as the main tunnel site for the application for the following reasons (not in order of importance):

- a. It is a brownfield site and would not result in the loss of an undeveloped, greenfield site (playing fields).
- b. Part of the site is a safeguarded wharf and we would make use of this area in a way that would be an appropriate temporary use of the safeguarded wharf allocation. The presence of wharves at this site, combined with the width of the River Thames at this point, would allow the use of large 800 to 1000 tonne barges to remove excavated materials and deliver construction materials to the site.
- c. The use of large barges has associated cost and environmental benefits and reduces potential conflict with other river users as fewer barges would be required.
- d. Although use of the site could delay any future redevelopment of the parts of the site that are not safeguarded as a wharf, it would be temporary. It would therefore not interfere with wider regeneration plans for the area or prevent housing targets identified in adopted local and regional plans being met.
- e. The site has direct access to the public road network and onto the Transport for London Road Network (TLRN).
- f. A special parliamentary procedure would not be required to secure the site.
- g. The Thames Path is already diverted around the site.
- h. A significant proportion of the site is undeveloped.

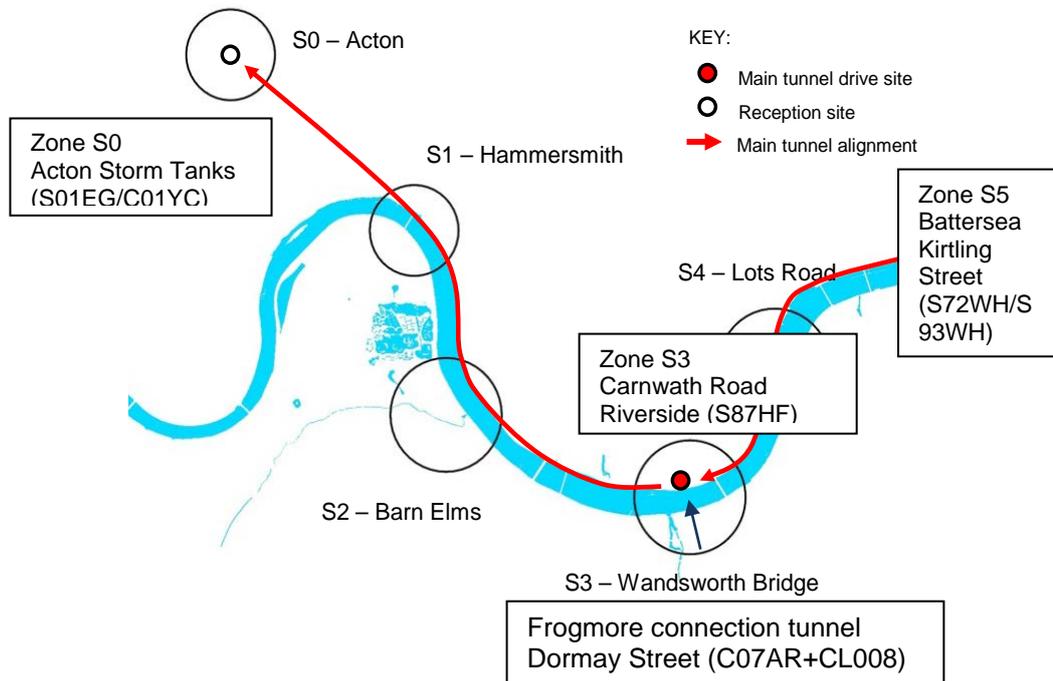
5.6.3 The use of the site as a main tunnel drive site would mean that a small CSO site would still be required at Barn Elms to intercept the West Putney Storm Relief and connect it to the main tunnel (see Volume 5).

5.6.4 Table 5.1 below sets out the selected site and use. Figure 5.2 illustrates the selected sites and tunnelling strategy for the construction of the western section of the main tunnel.

Table 5.1 Selected site and use for the application

<p>Site: S87HF: Carnwath Road Riverside</p> <p>Use: To construct the western sections of the main tunnel, to drive the main tunnel to Acton Storm Tanks (S01EG/C01YC) and to receive the main tunnel from Kirtling Street (S72WH/S93WH) and the Frogmore connection tunnel from Dormay Street (C07AR + CL008)</p>

Figure 5.2 Sites and tunnelling strategy for the western section of the main tunnel and Frogmore connection tunnel



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DCO-DT-000-ZZZZ-070500

