

# Appendix 1 – Thames Tunnel Consultation Response Mayor of London

1 This appendix contains the Mayor's (and TfL and LDA's) views on the following aspects of the Thames Tunnel proposals:

- The three tunnel options
- General issues in relation to tunnelling and construction sites
- Site specific comments on the 22 preferred construction sites
- Further more detailed information is also attached regarding transport implications

## The Three Tunnel Options

2 Thames Water has worked up the Tunnel concept into a more detailed proposal. The company has examined three tunnel routes, described briefly below and identified a preferred route. The three options can be described as:

- **Thames Route** – a 7.2m diameter tunnel underneath the Thames from Hammersmith Embankment to Beckton Sewage Treatment Works, which follows the Thames apart from cutting across the southern end of the Greenwich Peninsula. This is broadly the route as proposed by the Thames Tideway Strategic Study in 2005.
- **Rotherhithe Route** – as the Thames Route but cutting across Rotherhithe peninsula
- **Abbey Mills Route** – as the Thames Route from Hammersmith to Kings Stairs Gardens then diverting north-east under Limehouse Cut Canal to join the Lee tunnel at Abbey Mills.

3 There is now additional detail in terms of a number of connecting tunnels from CSOs to the main tunnel. The main connecting tunnels are:

- Hammersmith Embankment to Acton Storm Tanks - this is approximately 2m diameter and is common to all three routes
- King George's Park to the Main tunnel via Bell Lane Creek - this is approximately 2m diameter and is common to all three routes
- Druid Street to Kings Stairs Gardens - this is approximately 2m diameter and is common to all three routes
- Greenwich to Kings Stairs Gardens, via Borthwick Wharf and Earl Pumping Station – this is approximately 4m diameter and is only required for the Abbey Mills Route
- There are a number of other short connecting tunnels also required

4 There is relatively little detail about these connecting tunnels. It is expected that they will be at a shallower depth than the main tunnel and whilst this may prove less disruptive it may also bring them closer to important underground transport and utility structures. The longer tunnels are still major construction projects in themselves and more detail will be required by the Phase 2 consultation stage.

5 All three routes involve tunnelling at depths in excess of 35m below ground level and up to 75m below ground level. This takes the tunnel beneath all tube, rail, road and foot tunnels and beneath all known other utility services. All three routes would require connecting shafts to connect the existing overflow points along the river to the tunnel.

6 The preferred route is the Abbey Mills Route. This is approximately five miles less main tunnelling, and includes significant reductions in tunnelling through chalk at 60-75m depths, which is technically difficult and brings increased risks. This route leaves the Charlton CSO without any direct works. However, Thames Water calculate that the reduction in flows to Crossness – by diverting the other south London CSOs to Beckton via the Tunnel will free up capacity at Crossness and mean that the Charlton CSO would not discharge frequently.

7 The shorter tunnel length reduces the overall tunnel storage capacity, although some is gained through the connecting tunnels. This means that instead of the original 1.6million cubic metres of required capacity there would be 1.5million cubic metres. The Environment Agency consider this to be acceptable – it is likely to result in 1-2 extra overflows per year, but these discharges are likely to be highly diluted – i.e. have a very high proportion of rain rather than sewage.

8 All of the options start at Hammersmith Pumping Station in the west with a connecting tunnel from Acton Storm Tanks, which removes the need for a direct connection of the Chiswick Ait CSO. All three routes also have a series of shorter connection tunnels from some CSOs to the Main Tunnel.

9 The tunnelling drive programmes for each of the three options are different as set out below: (tunnelling not set out chronologically, some drives will be going on at the same time)

#### **Thames Tunnel Route**

- Barn Elms to Hammersmith Embankment
- Barn Elms to Tideway Walk
- Tideway Walk to Kings Stairs Gardens
- Convoys Wharf to Kings Stairs Gardens via King Edwards Memorial Park
- Charlton to Convoys Wharf
- Beckton to Charlton

#### **Rotherhithe Tunnel Route**

- Barn Elms to Hammersmith Embankment
- Barn Elms to Tideway Walk
- Tideway Walk to Kings Stairs Gardens
- Convoys Wharf to Kings Stairs Gardens via under Rotherhithe Peninsula
- Charlton to Convoys Wharf
- Beckton to Charlton

#### **Abbey Mills Tunnel Route**

- Barn Elms to Hammersmith Embankment
- Barn Elms to Tideway Walk
- Tideway Walk to Kings Stairs Gardens
- Abbey Mills to Kings Stairs Gardens

- Connecting tunnel from Kings Stairs Garden to Greenwich Pumping Station via Borthwick Wharf

10 The Abbey Mills route is shorter than the other two routes by approximately five miles. This results in a lower cost and in a reduced number of main construction sites (five instead of seven). It also avoids tunnelling under some existing critical infrastructure, including the Blackwall tunnel/Blackwall tunnel approach road, the DLR lines to Lewisham and Woolwich, Woolwich foot-tunnel, Woolwich Ferry and Thames Barrier. Further it would also avoid the safeguarded routes for Thames Crossings at Silvertown and the previous Thames Gateway Bridge proposal. It would still tunnel under Crossrail (Abbey Wood line) in the Whitechapel area.

11 The two longer routes also require construction sites on Convoys Wharf in Lewisham, which is the subject of large scale planning proposals that have been in the planning system for several years.

12 The only comparative negative factors of the Abbey Mills proposal are that it does not address the Charlton CSO and it has approximately 100 000 cubic metres less storage. Thames Water has indicated that the rest of the scheme design will reduce overflows at Charlton. Environment Agency has indicated that the marginally reduced storage volume is not a significant issue.

13 It is not yet clear whether the direction of tunnelling from the various sites is flexible. Tunnel reception sites are likely to suffer significantly lower impacts than tunnel drive sites as the spoil out and tunnel linings going in will all be concentrated at the drive site. It may be possible to reduce impacts at some sites by driving tunnels in different directions. Inevitably such changes would result in increased impacts at some sites whilst reducing impacts at others. This will need to be clarified prior to the second stage of consultation later in 2011.

## Conclusion on routes

14 Of the three alternative tunnelling options the Mayor supports the preferred option of the Abbey Mills route. This is because it offers the lower cost solution with less disruption and fewer construction related risks, whilst the drawbacks appear to be marginal. The Mayor would however like to see further information on how the Charlton CSO is expected to perform under this scenario.

15 There are a considerable number of locations where the preferred tunnel route passes under or close to important transport infrastructure. As far as these have been identified in the information made available they are listed in the table below. Greater clarity over the potential impacts and how to protect these pieces of infrastructure will be required at the second phase of consultation and certainly as part of any planning application. For each of these locations, ground movement impacts together with monitoring of the infrastructure and other mitigation will need to be assessed by TW and agreed by the infrastructure operator. See also attached schedule (Appendix 2) of TfL impacts for full details.

Tunnel Element	Transport Infrastructure
Acton Storm Tanks Connecting Tunnel	District line elevated structures west of Ravenscourt Park Station Great West Road (A4)

Main Tunnel	District Line Putney Bridge over the Thames
King Georges Park Connecting Tunnel	TLRN A3 and A217
Main Tunnel	Chelsea Rail Bridge, where London Overground operates on National Rail infrastructure
Main Tunnel	TLRN A3220 Battersea Bridge
Main Tunnel	Victoria Line twin tube tunnels between Pimlico and Vauxhall
Main Tunnel	TLRN A202 Vauxhall Bridge
Main Tunnel	TLRN A3203 Lambeth Bridge
Main Tunnel	SRN A302 Westminster Bridge
Main Tunnel	Jubilee Line twin tube tunnels between Westminster and Waterloo
Main Tunnel	Bakerloo Line twin tube tunnels between Embankment and Waterloo
Main Tunnel	Northern Line (Charing Cross Branch) twin tube tunnels between Embankment and Waterloo and associated Charring Cross Loop tunnel (disused)
Main Tunnel	Waterloo and City Line twin tube tunnels between Embankment and Waterloo
Main Tunnel	TLRN A201 Blackfriars Bridge
Main Tunnel	City and South London Line twin tube tunnels (disused)
Main Tunnel	TLRN A3 London Bridge
Main Tunnel	TLRN A100 Tower Bridge
Druid St connection tunnel	TLRN A200 Tooley Street
Main Tunnel	Northern Line (City Branch) twin tube tunnels between Bank and London Bridge
Main Tunnel	District Line tracks between Bromley by Bow and West Ham
Main Tunnel	East London Line (Thames Tunnel)
Main Tunnel	TLRN A101 Rotherhithe Tunnel
Main Tunnel	TLRN A1203 Limehouse Link
Main Tunnel	A13 Commercial Road
Main Tunnel	A1205 Burdett Road
Abbey Mills Route	DLR Track between Stratford and Poplar
Main Tunnel	TLRN A102 Blackwall Tunnel Northern Approach
Abbey Mills Route	National Rail elevated structure between Bromley by Bow and West Ham
Abbey Mills Route	District Line tracks between Bromley by Bow and West Ham
Greenwich Connection Tunnel	East London Line south of Canada Water
Greenwich Connection Tunnel	Jubilee Line between Bermondsey and Canada Water

16 The other tunnel routes would have additional concerns of tunnelling underneath DLR tunnel to Lewisham, Greenwich Foot Tunnel, Jubilee Line Tunnels, Blackwall Tunnel Southern Approach, Woolwich Foot Tunnel, the DLR Tunnel to Woolwich Arsenal and the possible construction of the Silvertown Crossing. These routes intersect with the construction of Crossrail Tunnels between Custom House and Abbey Wood in the Woolwich area.

# General issues in relation to tunnelling and CSO connection construction sites

## General

17 It is clear that any construction project of this scale is going to lead to disruption and impacts. These effects are exacerbated as the project necessarily needs to be undertaken in the densely developed and populated core of London with its complex arrangement of infrastructure, buildings, congested roads, open spaces and historic/cultural assets. It is imperative that Thames Water minimise the construction related impacts at all available stages. The selection of the shorter and simpler tunnel route is the first step in this process.

## Transport

18 London Plan policy 4C.8 (Draft Replacement London Plan policy 7.26) and Mayor's Transport Strategy both support the use of the river for freight movement and in particular the movement of bulk materials associated with construction sites located near to the Blue Ribbon Network. River transport can play a significant role in mitigating the impact associated with construction activity and in particular removal of lorry trips from the road network.

19 Many of the worksites identified in the consultation are close to the Transport for London Road Network (TLRN) and this project will impact directly on the safe and smooth operation of the TLRN, Strategic Road Network (SRN) and on the bus network. TfL has a duty as London's strategic highway authority, traffic manager and public transport authority to ensure that site specific measures are clearly identified and overall impact is minimised. TfL views the use of water to transport construction related material and equipment as critical to ensure the project is properly mitigated in terms of the TLRN, SRN and Bus Network. The Thames Tunnel project represents a logistical challenge to TfL and the use of water is critical to ensuring that the Thames Tunnel can be delivered in an acceptable way in transport terms. The use of water is not just a desirable alternative to road use but essential given the likely quantities of materials involved and location of work sites.

20 The majority of construction materials, waste and tunnel arisings readily lend themselves to movement by the river. Indeed, water freight movements already exist in London for materials such as aggregates and construction waste and the construction of other tunnels, namely Crossrail and the Lee Tunnel are committed to using water transport. It was noted that, during discussions with Thames Water regarding the Lee Tunnel, a number of handling issues with tunnel linings were identified, which meant TW and its contractors were unable to develop a water transport solution even though the linings were being manufactured adjacent to a port in Kent (Ridham Dock). It is expected that TW will develop an appropriate solution that addresses these handling issues and enables tunnel and shaft linings to be delivered to Thames Tunnel work sites by water.

21 From the information provided by Thames Water in the public consultation documents, it is not possible to assess the extent water transport will play within the Thames Tunnel construction programme, even though Thames Water has published a

fact sheet regarding river transport. Given that the majority of construction activity (main tunnel drive, intermediate and reception sites, as well as CSO interception sites) are adjacent to the river, water transport should be the preferred method of moving material (and equipment including abnormal loads) directly to these sites, unless advice from relevant authorities, such as the Port of London Authority, identifies a hazard to navigation.

22 It is not expected that water transport will be suitable for 100% of all material moved to and from the worksites, so road transport will still form a key component of the construction programme. In order to manage road vehicle activity, it is expected that a construction logistics plan will be put into effect for each work site, road operators will be signed up to the Freight Operator Recognition Scheme (FORS) ensuring HGV drivers are aware of vulnerable road users and consideration is given to consolidation, London Plan policy (DRLP policy 6.14) and Mayor's Transport Strategy.

23 Without a clear logistics policy or strategy prioritising water freight, it is not possible to see how Thames Water will realise water freight opportunities given that it has already stated that using the river will be "a logistical challenge and require careful management" and the majority of site documents refer to road access for construction vehicles with very little reference to how sites will be able to access river transport.

24 TfL's experience in dealing with Thames Water during the Lee Tunnel and Beckton Sewage Treatment Works Extension planning process, in addition to other large scale construction developments adjacent to waterways, has identified that without a clear logistics policy or strategy, (that seeks to maximise the use of the river and reduce road freight activity to a minimum), it is very difficult to implement sustainable modes within the construction supply chain. Water freight cannot be considered in isolation to other aspects of the construction process. It determines critical aspects such as site selection, how work sites are laid out, the direction of tunnel drives, where materials are sourced from, where production facilities such as tunnel lining plants are located and what is specified by Thames Water in the procurement and contractual process.

25 Using water transport not only delivers improved environmental and network performance, it can, when planned and integrated into the construction process deliver operational and efficiency benefits. For example, barges can be used to store and stockpile material, thereby reducing the amount of land required at construction sites. Other efficiencies such as off site consolidation and pre fabrication can be combined with water transport and has been proven to work in significant construction projects such as Network Rail's Thameslink project at Blackfriars Bridge.

26 In terms of the actual operation of sites and their impact on transport services and highways there are potentially a number of serious impacts upon the day to day operations. To date there has not been detailed engagement between TfL and Thames Water on the project and at present TfL is unable to say that the project can be delivered in a way that will be acceptable to TfL. Much more detailed information will be required between now and the Phase 2 consultation to enable TfL to build upon its current understanding of the project and to take a view on its likely impact. The level of engagement between the parties needs to be raised significantly if a consensus is to be reached prior to submission by Thames Water of any application for development consent to construct and maintain its project. The following comments broadly cover the minimum requirements for all sites including work/other sites. These issues will

need to be addressed in more detail at the second consultation stage in summer 2011 and certainly by the time of any planning submission:

- More detailed consideration must be given at an early stage to both the temporary and permanent impact on the road network operation from the works, including survey work for all sites.
- Thames Water should set up Traffic Management Liaison Groups for each Borough to co-ordinate works and disseminate information on the works. Regular stakeholder engagement will be key to the successful delivery of the project.
- A construction and logistics plan for each site will be required to provide a robust indication of how Thames Water intend to manage works. This needs to include details on road space requirements and lorry movements for demolition and all works stages and will need to pay careful attention to the transition stages for works. In this respect, a robust assessment to understand impacts of construction traffic in terms of number of construction vehicles, size, access and routing as well as the use of Lorry Delivery Bays will be required.
- In relation to the third point above, Thames Water, as part of this consultation, have expressed their desire to use the River Thames to transport materials as much as possible to reduce impacts on local roads and highways. TfL strongly supports this approach and recommends that the river should always be seen as the first option for transportation of spoil and construction materials. There are some other general considerations including the following:
  - TfL will seek off-peak servicing for all sites close to or on the TLRN /SRN.
  - Works on or close to TLRN / SRN will need to be planned to minimise disruption to all road users including pedestrians.
  - The carriageway footprint for the work should be kept to a minimum and Thames Water must be aware that restricted working hours are likely to be conditions of any permits issued by TfL.
  - Where works require closure of roads, footpaths, cycle paths, bus lanes and/or parking/standing areas, appropriate diversion routes/alternatives will need to be agreed. It is important to note that these may require changes to traffic regulation orders, junction layouts or signal timings and may have cost implications in terms of staff and time resources.
  - The location of plant and areas of special engineering difficulty must be identified prior to any detailed planning for the works.

27 It is also important to ensure that walking and cycling are maintained along the Thames Path and National Cycle Route 4 during the construction phase. Construction works are planned that will disrupt these transport modes. Wherever possible the routes should be kept open in a safe and attractive way. Where diversion routes are necessary, these should be high quality. Diversions are often particularly hard to follow and therefore should utilise Legible London wayfinding. Consideration should be given to the development of a Memorandum of Understanding on public realm between Thames Water, the Boroughs, TfL the Mayor and any other relevant parties as has been done for

Crossrail - see attached link. This is not a legally binding document but does provide a statement of intent, which is useful. <http://www.crossrail.co.uk/news/press-releases/areas-around-crossrail-stations-set-to-be-transformed> . Consideration should also be given to the location and access of any cycle hire docking station affected by the proposed sites and adequate alternatives provided in conjunction with TfL and the LPA.

28 Appendix 3 identifies Crossrail impacts in detail. However, given that both Thames Tunnel and Crossrail involve deep tunnelling, and that the two projects will cross in at least one location, there is a highly significant need to maintain close communications between the two schemes.

29 The most likely impacts can be summarised as direct impacts or settlement effects, dewatering and logistics. These are all detailed in Appendix 3. There may also be some good opportunities for co-ordination of logistics, construction and transport infrastructure – such as barges, and for training of specialised construction and transport labour.

30 There may also be impacts with Crossrail 2 – the Chelsea-Hackney Line, again these are identified in Appendix 3.

## **Construction Impacts**

31 Whilst impacts will be inevitable, the nature of the intense use and profile of much of the public realm that will be affected by the project, including the Thames Path and National Cycle Route 4 as stated above. High quality diversions and mitigation measures will need to be put in place for the duration of those works, especially where works are expected to last up to seven years.

32 The preferred scheme does not appear to result in the loss of any residential accommodation. This is to be welcomed, although the comments below in relation particularly to Druid Street, indicate a high level of concern at the impacts on nearby residents.

33 The preferred scheme does however impact on a significant number of businesses, involving the need to relocate many businesses. For these, it is important that suitable alternative premises are made available, either for a temporary period during construction, or for a limited number where the impacts are more serious, for an appropriate permanent relocation.

34 The preferred scheme and some of the alternatives suggested below would utilise brownfield sites that have been identified for redevelopment, in some cases sites have planning permissions. In these cases it is generally preferable to utilise such sites in preference to a Greenfield site. However, the construction should seek to ensure that once the Tunnel has been constructed, the planning permission/development potential of the site can be realised as far as possible, without undue impacts on the permanent development of the site.

35 In order to minimise impacts, it will be important for Thames Water to work with the relevant public authorities, notably the London boroughs and Transport for London for which bi-lateral discussions are essential. There is also an inter-Boroughs group that



has held meetings regarding a Code of Construction Practice (CoCP) and related issues. This will be a useful group for Thames Water to engage with in term of addressing:

- Air quality
- Noise & vibration
- Waste management
- Land quality
- Transport (both land and river transport)

## Noise, Air Quality, Odour Impacts

36 The GLA's and London Council's Best Practice Guidance (BPG) "The control of dust and emissions from construction and demolition" [http://static.london.gov.uk/mayor/environment/air\\_quality/construction-dust.jsp](http://static.london.gov.uk/mayor/environment/air_quality/construction-dust.jsp) should be implemented across the proposed sites. By the time construction is underway, it is likely that the BPG will have full statutory status as Supplementary Planning Guidance to the London Plan and so will be formally required as minimum. This will ensure that the construction and demolition activities are managed and thus minimise any nuisance for existing sensitive receptors.

37 There are no identified air quality impacts identified (at this stage) from the operation of the tunnel, although there may be odour implications from on site ventilation. At this stage it is too early to identify the full extent of these, and a full and formal EIA procedure will be required. but it is likely that they can be mitigated through appropriate location of columns and filtration systems, as per the following table:

Impacts	Alternative/Management	Conclusion
Air pollution from road transport	<ul style="list-style-type: none"> <li>• Maximise use of river transport</li> <li>• Ensure low-emission vehicles used</li> <li>• Manage deliveries to ensure minimisation of journeys (potential for consolidation construction centres)</li> </ul>	Manageable
Air pollution from river transport	<ul style="list-style-type: none"> <li>• Use efficient vessels</li> <li>• Manage docking procedure in event of receptors close to foreshore</li> </ul>	Manageable
Air Pollution from on site activities	<ul style="list-style-type: none"> <li>• Follow best practice to control dust from materials storage/handling and vehicle movement and to minimise air pollution from on-site machinery</li> </ul>	Manageable
In-use odour from ventilation	<ul style="list-style-type: none"> <li>• Management by location of columns and appropriate filtration</li> </ul>	Manageable

38 The construction activities will generate noise and vibration. The table of site specific impacts below highlights the clear cases where these will need to be mitigated and some of the likely mitigation methods. With more detailed design there may be a need to protect other properties or people who may pass close to work sites and/or to identify further mitigation measures.

## **Waste**

39 The project will result in the excavation of a large amount of tunnel spoil. Earlier comments have already indicated an imperative to ensure that the vast majority of this is transported using water transport. In parallel with this, further consideration is required by the second consultation stage to identify the most beneficial use for the spoil and whether it is suitable for a positive use as aggregate material.

## **Energy**

40 This project will create a considerable demand for energy both directly in the construction and operation of the tunnel and indirectly through the materials used in the construction process and Thames Water will need to produce a detailed Energy Statement for the planning application. The statement should ensure that the energy demand, and the carbon emissions related to this, are considered and minimised in all elements of the project from the energy used in tunnel construction and spoil transportation to embodied energy in tunnel materials and opportunities for on-site low or zero carbon energy generation. It should also examine options to minimise the amount of energy use in operation, particularly from the pumping of the sewage up to Beckton STW, and how at least a proportion of this could be generated by on-site low or zero carbon energy technologies. The Statement should also identify any opportunities for low or zero carbon energy generation on the construction sites or within the tunnel as well as identifying any possible links to support wider energy generating and distribution infrastructure, especially in key development areas such as Nine Elms or near the SELCHP plant in Lewisham, where viable opportunities for decentralised energy and specifically district heating networks have been identified.

## **River Impacts**

41 The construction works and permanent works will result in direct impacts on the river and its foreshore in many locations. These impacts will need to be investigated and assessed in more detail. Of particular concern are the hydraulic impacts on river flows on more structures in the river. In many locations the introduction of such structures may lead to either increased erosion or increased sedimentation. These effects may prove damaging to other river structures and navigation, and, if not designed out may need on-going management, for example by dredging. Changes to river flows will also impact on navigation and could lead to difficulties for river passenger, freight or leisure/tourist services. The Mayor will seek advice from the Port of London Authority and Environment Agency on these aspects.

42 The structures will also have impacts on the habitat value of the Thames Foreshore, again these will need to be assessed in more detail.

## **Design and Heritage**

43 Whilst it is appreciated that designs are at an early stage, Thames Water will have to present significantly improved design options for the sites for the second consultation stage and certainly for any planning submission. This will apply both to the screening, fencing etc of construction sites and to any permanent structures visible at surface level. Many of the sites are in sensitive locations with Listed Buildings and Structures and Conservation Areas adjacent or nearby, some of these structures are amongst the most high profile heritage assets in the country. In addition some of the

structures are close to or within viewing corridors of important buildings within London. The original sewer scheme by Bazalgette has set a high standard of design and it is this quality that should set the tone for the design standard of this project.

44 The GLA has serious concerns about the design process and wishes advise the Thames Water team on good approaches to follow, one of which may be to engage a Design Competition.

### **Legacy/Re-instatement**

45 The re-instatement works following the construction should aim to achieve a positive legacy. This will require a clearly thought through approach to the sites individually and as a series. Thames Water should work with the Mayor's Office to design and deliver these improvements in line with the principles of the Mayor's manifesto for improving public spaces, London's Great Outdoors and the associated practical guide Better Green and Water Spaces. This should include the introduction of the Legible London wayfinding scheme and consultation with TfL. The re-instatement works should incorporate Cycle parking wherever possible and appropriate within the public realm strategy for the legacy.

### **Property**

46 GLA /TfL will expect any occupation of its property by Thames Water to be on the basis of agreement as opposed to by exercise of powers. There are issues that TfL Group Property would wish to see addressed in agreements prior to Thames Water entering onto TfL sites. References to such issues need to be consistent with matters that need to be covered in subsequent legal agreements.

### **Integration with other major construction projects**

47 The project is of such a scale that it should be integrated with other large projects, which may offer the opportunity for integration and possibly sharing of construction and logistics sites and equipment. Crossrail is an obvious example, but there may also be other infrastructure/utilities projects as well, such as the proposed Northern line extension, and redevelopment schemes at or close to Thames Tunnel construction sites. The shared use of barge transport facilities and sites should be explicitly considered.

### **Conclusion on general impacts**

48 There are a wide range of potentially serious impacts that will have to be addressed by the project. More detail is required on these between now and the Phase 2 consultation in order to ensure that the project can be delivered in an acceptable way.

## Preferred Construction Sites

The table below sets out the Mayor's issues and views on each of the 22 sites identified as the preferred sites to deliver the preferred tunnel route.

<b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction Period</b>	<b>Acton Storm Tanks</b> Ealing CSO Connection Approximately 2 years
<b>Likely Impacts</b>	Construction close to residential properties. Construction traffic impacts on predominantly residential road network. Ventilation plant is close to residential properties in Emlyn Gardens. There are understood to be occasional odour problems at this site at present.
<b>Alternatives</b>	The alternatives suggested would have higher impacts on nearby properties. Construction at this location offers the opportunity to add in covering of the tanks and reduction in odour issues.
<b>Conclusion</b>	The preferred option appears to be the best option as it has the fewest impacts and reduces costs. However Thames Water will need to: <ul style="list-style-type: none"> <li>• Ensure that construction and traffic impacts are minimised to an acceptable level, in particular, opportunities to reduce road distances, potentially by using consolidation centres at a nearby barge served site should be investigated. There may be effects on the SRN. It is likely that 2.4m acoustic screens be recommended for site boundaries close to residential properties</li> <li>• Ensure that the location and design of the ventilation plant minimises any noise/odour impacts on nearby residents</li> </ul> <b>Legacy</b> <ul style="list-style-type: none"> <li>• Examine how to limit odour from the ongoing use of the open storm tanks at this location.</li> </ul>
<b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction Period</b>	<b>Hammersmith Pumping Station</b> Hammersmith & Fulham Main Tunnel reception shaft, CSO Connection and driving link tunnel to Acton Storm Tanks 7 Years
<b>Impacts</b>	Construction close to residential and commercial premises and to Public Open Space. Traffic on SRN Fulham Palace Road (A219) and impacts on Hammersmith Gyratory Possible delays to redevelopment of Hammersmith Embankment
<b>Alternatives</b>	The alternatives suggested would have higher impacts on Greenfield sites as opposed to the brownfield site preferred.
<b>Conclusion</b>	The preferred option appears to be the best option as it has the

	<p>fewest impacts. However, Thames Water need to:</p> <ul style="list-style-type: none"> <li>• Ensure that the majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Ensure that construction impacts are minimised to an acceptable level. It is likely that 2.4m acoustic screens be recommended for site boundaries close to residential properties</li> <li>• Ensure that arrangements are in place to minimise impacts on the re-development of Hammersmith Embankment - this may include the shared use of any river transport facilities.</li> <li>• Ensure that a good quality Thames Path diversion is put in place.</li> <li>• Ensure that the location and design of the ventilation plant minimises any noise/odour impacts on nearby residents</li> </ul> <p><b>Legacy:</b></p> <ul style="list-style-type: none"> <li>• The design and location of any facilities to support river transport should be designed in such a way that they have a purpose following construction such as river transport or river sports/recreation.</li> <li>• An improved Thames Path and public realm should be re-instated</li> </ul>
<p><b>Site Name</b> <b>Borough</b> <b>Purpose</b></p> <p><b>Construction Period</b></p>	<p><b>Barn Elms</b> Richmond Main Tunnel drive site for 2 tunnel bores (to Tideway Walk and to Hammersmith) and CSO Connection 7 Years</p>
<b>Impacts</b>	<p>Loss of open space/playing fields – the size/shape of the construction area does not appear to optimise the use of land Impact on MOL Construction close to residential properties to the south of the site Disruption to Thames Path Disruption to river users Construction impacts on Thames Foreshore Limited vehicle access Relocation of Scout Hut</p>
<b>Alternatives</b>	<p>The alternatives suggested would have higher impacts on either a public park or the Thames foreshore, the latter of which would also increase costs.</p>
<b>Conclusion</b>	<p>The preferred option appears to be the best option as it has the fewest impacts. However, in order to be acceptable, Thames Water need to:</p> <ul style="list-style-type: none"> <li>• Ensure that construction site is moved to the south eastern corner of the playing field and minimises its area to ensure that impacts on the school playing fields are minimised</li> <li>• Examine alternative tunnelling strategies</li> <li>• Ensure that the majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Ensure that construction impacts are minimised to an acceptable level</li> </ul>

	<ul style="list-style-type: none"> <li>• Ensure that the Thames Path remains open with minimal disruption.</li> <li>• Ensure that the river jetty is designed in a way that does not cause unacceptable disruption to other river users</li> <li>• Provide suitable replacement premises for the Scout Hut.</li> <li>• Ensure impact of structures on MOL is minimised</li> </ul> <p><b>Legacy:</b></p> <ul style="list-style-type: none"> <li>• The design and location of the river jetty should be designed in such a way it has a purpose following construction such as river transport or river sports/recreation. This should be determined through liaison with river boat operators and sports clubs</li> <li>• Thames Water should liaise with school playing field users to identify the re-instatement requirements should be of the site.</li> <li>• An improved Thames Path and public realm should be re-instated</li> </ul>
<b>Site Name Borough Purpose Construction Period</b>	<b>Putney Bridge Foreshore</b> Wandsworth CSO Connection 2 Years
<b>Impacts</b>	Construction close to residential properties Disruption to river users Disruption to Thames Path Limited vehicle access Nearby passenger pier Possible disruption to highway
<b>Alternatives</b>	The preferred option appears to be the best option as it has the fewest impacts. The alternatives shown are closer to properties. – The preferred option appears to include all of alternative site #3.
<b>Conclusion</b>	The preferred option appears to be the best option as it has the fewest impacts. However, Thames Water need to ensure that: <ul style="list-style-type: none"> <li>• The majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Ensure that construction impacts are minimised to an acceptable level. It is likely that 2.4m acoustic screens be recommended for site boundaries close to residential properties</li> <li>• Disruption to the Highway and bus operation is minimised</li> <li>• The location and design of the ventilation plant should ensure that any noise/odour impacts on nearby residents are minimised.</li> <li>• Suitable alternative arrangements are in place for river users.</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• An improved Thames Path and public realm should be re-instated with suitable re-instatement of the river access facilities/slipway should be provided following liaison with river users</li> </ul>

<b>Site Name Borough Purpose Construction Period</b>	<b>King George's Park</b> Wandsworth CSO Connection 2 Years
<b>Impacts</b>	Loss of open space, including some very large trees Impact on MOL Construction close to residential properties
<b>Alternatives</b>	The preferred option appears to be the best option as it has the fewest impacts. The alternative shown is closer to properties
<b>Conclusion</b>	The preferred option appears to be the best option as it has the fewest impacts. The site forms a relatively small proportion of a large park. However, Thames Water need to ensure that: <ul style="list-style-type: none"> <li>• Disruption to the park is minimised</li> <li>• Ensure that construction impacts are minimised to an acceptable level. It is likely that 2.4m acoustic screens be recommended for site boundaries close to residential properties and to protect park users</li> <li>• The location and design of the ventilation plant should ensure that any noise/odour impacts on nearby residents are minimised.</li> <li>• Impact of structures on openness of MOL is minimised</li> </ul> <b>Legacy</b> <ul style="list-style-type: none"> <li>• Thames Water should liaise with LB Wandsworth and park users to determine a good quality re-instatement of the park.</li> </ul>
<b>Site Name Borough Purpose Construction Period</b>	<b>Bell Lane Creek</b> Wandsworth CSO Connection 2 Years
<b>Impacts</b>	Loss of local business (Panorama Antennas) Disruption to businesses including LB Wandsworth Depot HGV Movements on nearby A217 (TLRN)
<b>Alternatives</b>	The alternative shown appears to have similar impacts to the preferred site. There are other areas of brownfield land in the vicinity of this site, some of which appear to be used to a lesser extent than the preferred site. The option of extending the sewer Structure to the Thames and utilising Feathers Wharf, which is currently a temporary extension of the waste Transfer site, does not appear to have been examined.
<b>Conclusion</b>	Thames Water should undertake a further exercise to examine alternative sites that may have fewer impacts on active businesses and potentially enable river transport. If no other suitable sites are found then the preferred site would be acceptable, provided Thames Water : <ul style="list-style-type: none"> <li>• Ensure that there are suitable alternative premises for Panorama Antennas and any other affected businesses.</li> <li>• Ensure that the location and design of the ventilation plant minimises any noise/odour impacts on nearby businesses.</li> </ul>

<b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction</b> <b>Period</b>	<b>Jews Row</b> Wandsworth CSO Connection 2 Years
<b>Impacts</b>	Loss of aggregates Wharf during construction and a portion of the site permanently Construction close to residential properties Construction close to TLRN and SRN (A217) Wandsworth Bridge
<b>Alternatives</b>	Alternative site 1 appears to have similar impacts on the wharf with the addition of impacts on the pub and residential premises, plus the added cost of building in the Thames foreshore. Alternative site 2 would utilise public open space and make river borne transport more difficult.
<b>Conclusion</b>	The preferred option appears to be the best option as it has the fewest impacts. However, Thames Water need to ensure that: <ul style="list-style-type: none"> <li>• There are suitable alternative operating arrangements for the aggregates wharf, including potentially a permanent relocation as the site area is reduced by permanent plant.</li> <li>• The majority of construction materials/spoil away is moved by barge from the site.</li> <li>• The location and design of the ventilation plant should ensure that any noise/odour impacts on nearby residents are minimised.</li> </ul> <b>Legacy</b> <ul style="list-style-type: none"> <li>• Depending on the nature of the re-instatement works, the site may not be suitable to return the current aggregates operator. In which case a suitable permanent alternative site would need to be found.</li> <li>• An improved Thames Path and public realm should be re-instated</li> </ul>
<b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction</b> <b>Period</b>	<b>Bridges Court Car Park</b> Wandsworth CSO Connection 2 Years
<b>Impacts</b>	Loss of parking area Disruption to local residents and businesses
<b>Alternatives</b>	The alternatives shown either utilise areas of public open space or the Thames foreshore, which is close to, recently constructed residential properties.
<b>Conclusion</b>	The preferred option appears to be the best option as it has the fewest impacts. However, Thames Water need to ensure that: <ul style="list-style-type: none"> <li>• Ensure that construction impacts are minimised to an acceptable level. It is likely that 2.4m acoustic screens be recommended for site boundaries close to residential properties</li> <li>• The location and design of the ventilation plant should ensure that any noise/odour impacts on nearby residents are minimised and any opportunities for redevelopment of the</li> </ul>



	<p>parking areas are not jeopardized</p> <ul style="list-style-type: none"> <li>• Effects on the adjacent TLRN (York Road) are minimised</li> </ul>
<b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction</b> <b>Period</b>	<b>Cremorne Wharf Foreshore</b> Kensington & Chelsea CSO Connection 2 Years
<b>Impacts</b>	Development into the Thames Foreshore Site access through Cremorne Gardens Disruption to nearby residential properties Disruption to waste transfer station Potential traffic impact on nearby TLRN (A3220/A3212)
<b>Alternatives</b>	No alternatives are suggested. However, the part of the Lots Road development adjacent to Cremorne Wharf is currently vacant and there may be an opportunity to utilise the waste transfer station for access rather than the park.
<b>Conclusion</b>	<p>Thames Water should undertake a further exercise to examine an alternative for using either the adjacent Lots Road site or Cremorne Wharf waste transfer station for access instead of the park.</p> <p>If these alternative access options are not suitable sites then preferred option would be acceptable, provided Thames Water :</p> <ul style="list-style-type: none"> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Ensure that there are suitable alternative operating arrangements for the waste transfer station.</li> <li>• Ensure that the construction minimises disturbance to nearby residential properties, in particular those that overlook the Thames and for whom screen may be difficult</li> <li>• Ensure that the location and design of the ventilation plant should minimise any noise/odour impacts on nearby residents.</li> <li>• Ensure that the design of both the permanent and temporary works into the river does not cause unacceptable siltation, erosion or other hydrological impacts</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• Ensure that the re-instatement of the site enables the use of Cremorne Wharf for river freight transport</li> <li>• Ensure good quality re-instatement of Cremorne Gardens</li> </ul>
<b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction</b> <b>Period</b>	<b>Chelsea Embankment Foreshore</b> Kensington & Chelsea CSO Connection 2 Years
<b>Impacts</b>	Construction impacts on the Thames Foreshore Disruption to Thames Path Construction into highway (Chelsea Embankment (A 3212) is part of the TLRN) Impact on Listed Buildings and structures and Conservation Areas
<b>Alternatives</b>	No alternatives are identified and there are no obvious alternatives.

<b>Conclusion</b>	<p>For the preferred site Thames Water need to:</p> <ul style="list-style-type: none"> <li>• Determine the details regarding how the works will affect the highway, it can be expected that there will be tight constraints on these works given the congested and strategic nature of the TLRN.</li> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Ensure a good quality diversion of the Thames Path.</li> <li>• Ensure that the design of both the permanent and temporary works into the river does not cause unacceptable siltation, erosion or other hydrological impacts</li> <li>• Ensure acceptable impacts on Listed Buildings and Structures and Conservation Areas</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• Discuss with river users, TfL and the LPA possible uses of the site for river uses including as a freight wharf.</li> <li>• Ensure that an improved Thames Path and public realm are re-instated.</li> </ul>
<b>Site Name Borough Purpose  Construction Period</b>	<p><b>Tideway Walk</b> Wandsworth Main Tunnel Driving site to Kings Stairs Gardens, Main Tunnel reception site from Barn Elms and CSO Connection 7 Years</p>
<b>Impacts</b>	<p>Delays to development of the Vauxhall Nine Elms Battersea Opportunity Area including delivering homes and jobs, subject to current planning application Impact on or relocation of riverboat dwellings Impact on or relocation of local businesses Disruption to Thames Path Impacts on Safeguarded Wharf (Wharves) Potential impact on proposed Northern Line extension</p>
<b>Alternatives</b>	<p>The Mayor is not satisfied that alternative sites have been fully explored. In particular the option of putting together alternatives 5 and 6, possibly with the site to the south of site 6 would offer a similar size parcel of land. Additionally options to utilise part of Site 2 Battersea Power Station should be further investigated, notwithstanding the recent resolution to grant planning permission. It is recognised that these alternatives would mean that two separate sites in this area would be required – 1 as a main construction site and 1 to connect the CSO.</p> <p>It is accepted that alternative sites 1, 3, 8 and 9 do not appear feasible. Alternative site 4 is an aggregates wharf, which whilst important in its own right, could also offer a good opportunity to provide construction materials to this site.</p> <p>It appears that alternative 3 is incorrectly marked on the plan.</p>
<b>Conclusion</b>	<p>Thames Water should re-examine the alternatives available for this site, with particular reference to combining sites 5 and 6 with other brownfield sites, it is recognised that this option may still require part of the preferred site. It is recognised that having a separate</p>

	<p>site for the Main Tunnel Construction site and for the CSO connection site may lead to increased costs and to increased impacts at the CSO connection site/safeguarded wharf.</p> <p>If no other suitable sites are found then the preferred site would be acceptable, however there would be a wide range of major impacts and Thames Water need to:</p> <ul style="list-style-type: none"> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site – for both a main tunnelling site and a CSO connection site should these be separate.</li> <li>• Ensure a good quality diversion of the Thames Path.</li> <li>• Ensure the suitable relocation of any affected businesses.</li> <li>• Ensure suitable relocation of any affected boats.</li> <li>• Ensure that the location and design of the ventilation plant should minimise any noise/odour impacts on nearby residents including future redevelopments</li> <li>• Ensure that the design of both the permanent and temporary works into the river does not cause unacceptable siltation, erosion or other hydrological impacts</li> <li>• Ensure that Cringle Dock and Battersea Wharf can continue to operate as freight wharves</li> <li>• Ensure that there is no conflict with the Northern Line extension construction requirements</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• Ensure that re-instatement works minimise their impact on the regeneration of the area including the development potential of the site.</li> <li>• Ensure that an improved Thames Path and public realm are re-instated.</li> </ul>
<p><b>Site Name</b>  <b>Borough</b>  <b>Purpose</b>  <b>Construction Period</b></p>	<p><b>Albert Embankment Foreshore</b>  Lambeth  CSO Connection  3 Years</p>
<p><b>Impacts</b></p>	<p>Construction in Thames Foreshore  Access off the TLRN  Construction close to Victoria Line Tunnels  Construction risks to TLRN (A202 Vauxhall Bridge) and highway impacts on TLRN (A3036 Albert Embankment)  Historic embankment structure  Construction close to commercial properties  Disruption to river slipway (Lacks Dock)</p>
<p><b>Alternatives</b></p>	<p>Alternatives 1 and 2 shown appear to have similar impacts but are closer to more sensitive landward buildings. Alternative 3 does not appear to be a realistic alternative given its close proximity to residential buildings.</p>
<p><b>Conclusion</b></p>	<p>The preferred option appears to be the best option as it has the fewest impacts, however there are still a wide range of major</p>

	<p>impacts, in order to address these satisfactorily, Thames Water need to:</p> <ul style="list-style-type: none"> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Protection of Victoria Line tunnels and operation</li> <li>• Ensure that construction impacts are minimised to an acceptable level. It is likely that 2.4m acoustic screens be recommended for site boundary close to the commercial office properties</li> <li>• Examine whether the site can be accessed from the existing slipway at Lacks Dock.</li> <li>• Ensure suitable protection to and management of the TLRN</li> <li>• Ensure a good quality diversion of the Thames Path.</li> <li>• Ensure that impacts on the use of Lacks Dock are minimised.</li> <li>• Ensure impacts on historic embankment structure are minimised.</li> <li>• Ensure that the design of both the permanent and temporary works into the river does not cause unacceptable siltation, erosion or other hydrological impacts</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• Discuss with river users, TfL and the LPA possible uses of the site for river uses including as a public wharf.</li> <li>• Ensure that an improved Thames Path and public realm are re-instated</li> </ul>
<p><b>Site Name</b>  <b>Borough</b>  <b>Purpose</b>  <b>Construction</b>  <b>Period</b></p>	<p><b>Victoria Embankment Foreshore</b>  Westminster  CSO Connection  2 Years</p>
<p><b>Impacts</b></p>	<p>Construction close to/under tube lines (Bakerloo &amp; District)  Impact on the TLRN (A3211 Victoria Embankment), including coach parking  Impact on navigation, in particular river passenger services at Embankment Pier  Construction in Thames Foreshore  Impact on Listed Buildings and structures and Conservation Areas  Impact on existing floating businesses such as the Hispaniola and Tattershall Castle  Impact on London View Management Framework view 17A.1 and 17A.2 from Hungerford bridge upstream</p>
<p><b>Alternatives</b></p>	<p>The alternative shown on Victoria Embankment Gardens is unlikely to be acceptable given the proximity of the District Line tube tunnel structures and the high profile nature of this open space in an area so short of open space</p>
<p><b>Conclusion</b></p>	<p>The preferred option appears to be the best option as it has the fewest impacts, however there are still a wide range of major impacts, in order to address these satisfactorily, Thames Water need to:</p> <ul style="list-style-type: none"> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site.</li> </ul>

	<ul style="list-style-type: none"> <li>• Ensure suitable safeguards to District and Bakerloo tube lines structures</li> <li>• Ensure satisfactory highway management measures, including the movement of coach parking spaces</li> <li>• Ensure that Embankment Pier can continue to operate safely</li> <li>• Ensure a good quality diversion of the Thames Path.</li> <li>• Ensure that there are suitable relocation arrangements in place for the impacted businesses.</li> <li>• Ensure that the design of both the permanent and temporary works into the river does not cause unacceptable siltation, erosion or other hydrological impacts</li> <li>• Ensure acceptable impacts on Listed Buildings and Structures and Conservation Areas.</li> <li>• Ensure that LVMF view is not harmed</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• Discuss with river users, TfL and the LPA possible uses of the site for river uses including as an extension to Embankment Pier.</li> <li>• Ensure that an improved Thames Path and public realm are re-instated</li> </ul>
<p><b>Site Name</b>  <b>Borough</b>  <b>Purpose</b>  <b>Construction</b>  <b>Period</b></p>	<p><b>Blackfriars Bridge Foreshore</b>  City  CSO Connection  4 Years</p>
<p><b>Impacts</b></p>	<p>Protection of Waterloo &amp; City and District tube lines  Impact on the TLRN (A3211 Victoria Embankment), including coach parking  Impact on navigation, in particular river passenger services due to removal/relocation of Blackfriars Pier  Construction in the Thames Foreshore  Impact on Listed Buildings and structures and Conservation Areas  Impact on existing businesses such as those in the Blackfriars Pier Structure  Impact on London View Management Framework view 16B.1 and 16B.2 from Gabriel's Wharf Hungerford bridge upstream</p>
<p><b>Alternatives</b></p>	<p>No alternatives are identified.</p>
<p><b>Conclusion</b></p>	<p>The preferred site has a wide range of major impacts, in order to address these satisfactorily, Thames Water need to:</p> <ul style="list-style-type: none"> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Ensure suitable safeguards to Waterloo &amp; City and District lines tube tunnels</li> <li>• Ensure satisfactory highway management measures, including the movement of coach parking spaces.</li> <li>• Ensure satisfactory alternatives including temporary relocation/compensation for river passenger services and other businesses based at Blackfriars Pier</li> <li>• Ensure that the design of both the permanent and temporary</li> </ul>

	<p>works into the river does not cause unacceptable siltation, erosion or other hydrological impacts</p> <ul style="list-style-type: none"> <li>• Ensure impacts on historic embankment structure are minimised.</li> <li>• Ensure a good quality diversion of the Thames Path.</li> <li>• Ensure acceptable impacts on Listed Buildings and Structures and Conservation Areas</li> <li>• Ensure that LVMF view is not harmed</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• Provide suitable re-instatement of Blackfriars Pier</li> <li>• Ensure that an improved Thames Path and public realm are re-instated</li> </ul>
<p><b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction Period</b></p>	<p><b>Druid Street</b> Southwark CSO Connection 2 Years</p>
<p><b>Impacts</b></p>	<p>Loss of open space Construction close to residential properties Impact on TLRN (A2207 Druid Street) Protection to nearby over-ground mainline rail viaduct and Jubilee line tunnel</p>
<p><b>Alternatives</b></p>	<p>The Mayor is not satisfied that alternative sites have been fully explored.</p> <p>Alternative 1 should be further investigated. This would be similarly close to residential properties without removing an area of open space and children's playground in a locality that is very short of such facilities. Furthermore Alternative 1 would facilitate use of barges for transport and remove the need for the tunnel connection to Kings Stairs Gardens.</p> <p>Two further construction sites should be examined, it is recognised that both of these would require diversion works to the current CSO, but neither result in the loss of accessible open space and the Chambers Wharf site would not be so close to residential properties:</p> <p>St Saviours Dock Chambers Wharf</p> <p>Chambers Wharf should also be investigated in relation to alternatives to Kings Stairs Gardens</p> <p>It is accepted that Alternative 2 is not a viable alternative.</p>
<p><b>Conclusion</b></p>	<p>Thames Water should undertake a further exercise to examine alternative sites that have fewer impacts on residential premises and open spaces.</p> <p>At present the preferred site is not considered justified</p> <p>If no other suitable sites are found then the preferred site would require a very high level of mitigation in order to be acceptable, including Thames Water to :</p> <ul style="list-style-type: none"> <li>• Ensure an acceptable minimum level of disruption to nearby residents</li> </ul>

	<ul style="list-style-type: none"> <li>• Ensure suitable protection to the national rail viaduct and Jubilee line tube tunnels</li> <li>• Ensure suitable traffic management measures for the TLRN</li> <li>• Ensure that the location and design of the ventilation plant should ensure that any noise/odour impacts on nearby residents are minimised.</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• Ensure good quality re-instatement of the park.</li> </ul>
<p><b>Site Name</b> <b>Borough</b> <b>Purpose</b>  <b>Construction Period</b></p>	<p><b>Kings Stairs Gardens</b> Southwark Reception site for 2 main tunnel bores, construction site for 2 connecting tunnels and CSO Connection 7 years</p>
<b>Impacts</b>	<p>Loss of open space and impact on MOL Construction close to residential properties Impact on river passenger services/City Cruises boat servicing Traffic impact on TLRN (A200 Jamaica Road)</p>
<b>Alternatives</b>	<p>The Mayor is not satisfied that alternative sites have been fully explored. Whilst no alternative site has been identified, the alternative of Chambers Wharf should be considered given that it is a brownfield site which, while having the benefit of a planning permission has not yet commenced construction – see also comments in relation to Druid Street.</p>
<b>Conclusion</b>	<p>Thames Water should undertake a further exercise to examine the alternative site of Chambers Wharf that would avoid impacts on open Greenfield site. It is recognised that this alternative would delay the regeneration and provision of housing on an important site and is likely to increase construction costs but it avoids construction on a Greenfield site.</p> <p>If no other suitable sites are found then the preferred site could be acceptable, provided Thames Water :</p> <ul style="list-style-type: none"> <li>• Ensure an acceptable minimum level of disruption to nearby residents. – One option to reduce impacts may be to drive the connecting tunnel to Greenwich Pumping Station from Greenwich rather than this site, subject to detailed investigation into the impacts at the Greenwich site, for example on the DLR. It is likely that 2.4m acoustic screens be recommended for site boundaries close to residential properties</li> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Ensure the suitable relocation of river boat operations from Cherry Garden Pier.</li> <li>• Ensure a good quality diversion of the Thames Path.</li> <li>• Ensure suitable access arrangements are in place for local residents to use nearby Southwark Park.</li> <li>• Ensure that traffic impacts on the nearby TLRN are minimised and managed</li> <li>• Ensure that the location and design of the ventilation plant</li> </ul>

	<p>should ensure that any noise/odour impacts on nearby residents are minimised.</p> <ul style="list-style-type: none"> <li>• Ensure impact of structures on openness of MOL is minimised</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• Ensure good quality re-instatement of the park and the Thames Path</li> <li>• Work with TfL, river operators and the LB Southwark to determine whether the re-instatement works should be designed to leave a passenger pier at the site.</li> </ul>
<p><b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction Period</b></p>	<p><b>King Edward Memorial Park Foreshore</b> Tower Hamlets CSO Connection and connection tunnel to Butchers Row 3-4 years</p>
<p><b>Impacts</b></p>	<p>Construction in Thames Foreshore Construction on part of park Construction close to residential properties Access off TLRN (The Highway A1203) Impact on local sailing club (Shadwell Basin Outdoor Activity Centre) Avoidance or protection of nearby Rotherhithe Tunnel</p>
<p><b>Alternatives</b></p>	<p>The alternative shown would result in the loss of much of the park and would have difficulties in construction above Rotherhithe Tunnel.</p>
<p><b>Conclusion</b></p>	<p>The preferred option appears to be the best option as it has the fewest impacts, however Thames Water need to:</p> <ul style="list-style-type: none"> <li>• Ensure that construction impacts are minimised to an acceptable level. It is likely that 2.4m acoustic screens be recommended for site boundaries close to residential properties. Thames Water should also explore whether the construction activities can be moved slightly further west to reduce these impacts</li> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Ensure suitable access arrangements from The Highway.</li> <li>• Ensure suitable protection to the Rotherhithe Tunnel</li> <li>• Ensure a good quality diversion of the Thames Path</li> <li>• Ensure suitable relocation of the nearby Shadwell Basin sailing facilities</li> <li>• Ensure that the design of both the permanent and temporary works into the river does not cause unacceptable siltation, erosion or other hydrological impacts</li> <li>• Ensure that the location and design of the ventilation plant should ensure that any noise/odour impacts on nearby residents are minimised.</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>• Ensure good quality re-instatement of the park and the Thames Path</li> <li>• Ensure good quality re-instatement of sailing club facilities</li> <li>• Work with TfL, river operators and the LB Tower Hamlets to</li> </ul>



	determine whether the re-instatement works should be designed to leave a passenger, freight or recreational pier at the site.
<b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction</b> <b>Period</b>	<b>Butcher Row</b> Tower Hamlets CSO Connection 2 Years
<b>Impacts</b>	Construction close to residential properties Protection to DLR/Mainline viaducts Loss of development opportunity Close to TLRN (A101 Rotherhithe Tunnel, A1203 Limehouse Link, A13 Commercial Rd)
<b>Alternatives</b>	Alternative 1 would involve complex works in the Thames foreshore, immediately adjacent to residential properties. Option 2 would involve the loss of an open space and is immediately adjacent to Rotherhithe Tunnel cutting.
<b>Conclusion</b>	The preferred option appears to be the best option as it has the fewest impacts, however Thames Water need to: <ul style="list-style-type: none"> <li>• Ensure satisfactory highway management measures</li> <li>• Ensure that construction impacts are minimised to an acceptable level. It is likely that 2.4m acoustic screens be recommended for site boundaries close to residential properties</li> <li>• Ensure suitable protection to railway viaducts</li> <li>• Ensure that the location and design of the ventilation plant should ensure that any noise/odour impacts on nearby residents are minimised and that there is minimal impact on any future development on the site.</li> </ul>
<b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction</b> <b>Period</b>	<b>Earl Pumping Station</b> Lewisham CSO Connection 3 years
<b>Impacts</b>	Construction close to residential and commercial properties Relocation of some local businesses
<b>Alternatives</b>	The alternative sites all have similar or greater impacts with some being in active use and others being subject to development proposals with planning permission.
<b>Conclusion</b>	The preferred option appears to be the best option as it has the fewest impacts, however Thames Water need to: <ul style="list-style-type: none"> <li>• Ensure an acceptable minimum level of disruption to nearby residents. Given the proximity of the residential properties noise and vibration problems seem likely at this location</li> <li>• Ensure that local businesses are suitably relocated</li> <li>• Ensure that the location and design of the ventilation plant should ensure that any noise/odour impacts on nearby residents are minimised.</li> </ul>
<b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction</b>	<b>Borthwick Wharf Foreshore</b> Greenwich CSO Connection 3 Years

<b>Period</b>	
<b>Impacts</b>	Construction in the Thames Foreshore Impact on the Ahoy sailing centre Construction close to residential properties Impacts on the TLRN (A200)
<b>Alternatives</b>	Alternative 1 would result in the need to relocate the Ahoy Sailing club and Alternative 2 would result in the loss of a local park
<b>Conclusion</b>	The preferred option appears to be the best option as it has the fewest impacts, however Thames Water need to: <ul style="list-style-type: none"> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site.</li> <li>• Ensure that construction impacts are minimised to an acceptable level. It is likely that 2.4m acoustic screens be recommended for site boundaries close to residential properties</li> <li>• Ensure that the location and design of the ventilation plant should ensure that any noise/odour impacts on nearby residents are minimised</li> <li>• Ensure a good quality diversion of the Thames Path.</li> <li>• Ensure that the Ahoy Centre can continue to operate during construction and that suitable re-instatement works enable its continued operation after the works</li> <li>• Ensure that the design of both the permanent and temporary works into the river does not cause unacceptable siltation, erosion or other hydrological impacts</li> </ul> <b>Legacy</b> <ul style="list-style-type: none"> <li>• Thames Water should work with LB Lewisham, river users and local community groups to ensure that re-instatement works provide for a beneficial use of any river structures possibly including the existing redundant river jetty</li> <li>• Ensure that an improved Thames Path and public realm are re-instated</li> </ul>
<b>Site Name</b> <b>Borough</b> <b>Purpose</b>  <b>Construction Period</b>	<b>Greenwich Pumping Station</b> Greenwich CSO connection and receipt of the connecting tunnel from Kings Stairs Gardens 2 years (see comments on King's Stairs Gardens)
<b>Impacts</b>	Protection of National Rail and DLR viaducts Works in or adjacent to the tidal Deptford creek
<b>Alternatives</b>	The alternative shown on the Thames foreshore at Maritime Greenwich has a higher order of impacts.
<b>Conclusion</b>	The preferred option appears to be the best option as it has the fewest impacts, however Thames Water need to: <ul style="list-style-type: none"> <li>• Ensure the majority of construction materials/spoil away is moved by barge from the site, which is viable even this far up Deptford Creek</li> <li>• Ensure suitable protection to the DLR and mainline rail viaducts</li> <li>• Ensure acceptable minimal impacts on nearby residents</li> <li>• Ensure that the location and design of the ventilation plant should ensure that any noise/odour impacts on nearby</li> </ul>

	<p>residents are minimised</p> <ul style="list-style-type: none"> <li>If the site were to have an enhanced role, then further impacts may arise</li> </ul> <p><b>Legacy</b></p> <ul style="list-style-type: none"> <li>Thames Water should examine opportunities to enhance river uses using any structures required for this project</li> <li>If the connecting tunnel to Kings Stairs Gardens were to be tunnelled from this site, this is expected to be broadly acceptable.</li> </ul>
<p><b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction Period</b></p>	<p><b>Abbey Mills Pumping Station</b> Newham Main Tunnel construction site and connection to the Lee Tunnel 7 years</p>
<b>Impacts</b>	Loss of open space Impact on potential redevelopment/Olympic Legacy
<b>Alternatives</b>	It is accepted that the alternative site locations introduce more construction impacts.
<b>Conclusion</b>	<p>The preferred option appears to be the best option as it has the fewest impacts, however Thames Water need to:</p> <ul style="list-style-type: none"> <li>Ensure the majority of construction materials/spoil away is moved by barge from the site</li> <li>Use the need for water borne construction activities at this site to justify use of water transport at this site for the Lee Tunnel works currently commencing construction</li> <li>Ensure that the location and design of the ventilation plant minimises any noise/odour impacts on future development in this area</li> </ul>
<p><b>Site Name</b> <b>Borough</b> <b>Purpose</b> <b>Construction Period</b></p>	<p><b>Beckton Sewage Treatment Works</b> Newham Minor works Not known</p>
<b>Impacts</b>	These works are expected to have limited impacts, as they are within the existing Beckton Sewage Treatment Works.
<b>Alternatives</b>	No alternatives have been identified
<b>Conclusion</b>	<p>The extent of works are likely to be broadly acceptable, however Thames Water should ensure that: Any significant movement of construction materials/spoil away should be by barge from the site Any opportunities to further reduce odour nuisance should be taken.</p>
<p><b>Site Name</b> <b>Purpose</b> <b>Construction Period</b></p>	<p><b>Other Works</b></p>
<p>There are a number of other minor works that will be necessary to enable the project to proceed. These are not set out in any detail at present but will need to be assessed and any impacts/risk managed.</p>	