

Thames Tideway Tunnel
Thames Water Utilities Limited



Application for Development Consent

Application Reference Number: WWO10001

Code of Construction Practice Part A: General Requirements

11 March 2014

Doc Ref: **APP205.01**

Folder **256**
11 March 2014

DCO-DT-APP-ZZ200-050100

**Thames
Tideway Tunnel**



Creating a cleaner, healthier River Thames

Thames Tideway Tunnel

Code of Construction Practice Part A: General Requirements

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List of abbreviations

BPG	best practice guidance
BPM	best practicable means
CEMP(s)	construction environmental management plan(s)
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated land: applications in real environments
CoPA	Control of Pollution Act 1974
CoCP	Code of Construction Practice
CSO(s)	combined sewer overflow(s)
DCO	development consent order
EA	Environment Agency
EIA	environmental impact assessment
EMS	environmental management system
EPP(s)	emergency preparedness plan(s)
ES	Environmental Statement
FRA	flood risk assessment
GLA	Greater London Authority
HBMCE	Historic Buildings and Monuments Commission for England
HSSE	health, safety, security and environment
MMO	Marine Management Organisation
OAWSI	Overarching Archaeological Written Scheme of Investigation
PLA	Port of London Authority
PPG(s)	pollution prevention guidelines(s)
SPG	Supplementary planning guidance
SPZ	source protection zone
SRN	strategic road network
TBM(s)	tunnel boring machine(s)
TfL	Transport for London

1 Introduction

1.1 General

- 1.1.1 All works described in this document are to be managed and performed to meet the health and safety vision of 'Zero Incidents, Zero Harm, Zero Compromise' for the Thames Tideway Tunnel project (the 'project').
- 1.1.2 This *Code of Construction Practice (CoCP)* forms part of the development consent order (DCO) for the project. The DCO is an order made under the Planning Act 2008 approving a development; it is a statutory instrument which defines the terms under which development consent for a project is granted.
- 1.1.3 The principles and controls within this *CoCP* relate to the management of construction impacts and are to be read in conjunction with safety legislation and the employer's *Health, safety, security and environment standard* (the '*HSSE Standard*ⁱ') for contractors.
- 1.1.4 The *CoCP* was carefully developed to reduce and mitigate the effects of the project during construction. It aims to provide clear and appropriate means of monitoring and ensuring compliance with a wide range of good practice measures and sets out a series of measures and standards of work, which will be applied throughout the construction period to:
- a. provide effective planning, management and control during construction to manage and mitigate potential impacts on people, businesses and the natural and historic environments
 - b. provide a framework for engaging with the local community and its representatives throughout the construction period.
- 1.1.5 In this paper reference to the employer is to the party responsible for the delivery of the project being the party in whom the powers of the DCO are vested. That is Thames Water Utilities Limited, and/or the body to whom powers are transferred under the DCO to deliver the project. The employer is responsible for all of the works, which includes overseeing and assuring the activities carried out by the contractor, and the coordination between contractors. The employer shall have a project management organisation in place that is suitably skilled and resourced to aid this duty.
- 1.1.6 The term 'construction' in the *CoCP* includes all physical works carried out to implement the project: utility diversions including works carried out outside the main construction sites, site preparation, demolition, material delivery, removal of excavated material and waste, tunnelling and shaft construction, interception of combined sewer overflows (CSOs), installation of equipment, landscaping and reinstatement, commissioning, maintenance carried out prior to acceptance by the employer, and all

ⁱ This document has been produced to explain in simple terms how the project will strive to achieve outstanding arrangements for health, safety, security and environment.

- related engineering and construction activities as defined in Schedule 1 to the DCO.
- 1.1.7 As the project extends across 14 London boroughs, the *CoCP* establishes the basis for a consistent approach to the management of construction impacts across local authority boundaries and a range of key stakeholders. Any construction codes or guidance documents relating to construction that have been produced by the local authorities were considered during the preparation of this document.
- 1.1.8 The *CoCP* comprises two parts:
- a. Part A: General Controls. These measures are applicable project wide.
 - b. Part B: Site-specific Controls. These are site-specific controls that supplement and refine the controls set out in Part A that shall be implemented by the contractor.
- 1.1.9 The *CoCP* sets out a series of measures and controls to be applied throughout construction to mitigate the potential impact of site activities on the natural and historic environments, amenity, well-being, health and safety of local residents, road users and traffic flow, businesses and the public. Any significant effects from construction will be minimised in the vicinity of the works by implementation of this *CoCP*. The Contractor shall follow best practice at all times in minimising the construction impacts. Measures specified within this document are considered to be the minimum.
- 1.1.10 The *CoCP* supports the planning and delivery of the project in a sustainable, efficient and cost-effective manner to meet the objectives of the *Sustainability Statement*. It also promotes co-operation with other projects in the vicinity, as far as practicable, in order to reduce combined impacts.
- 1.1.11 The contractor shall adhere to a construction contract, which shall reference UK water industry standards, Thames Water requirements for capital delivery standards and Sewers for Adoption, as appropriate.
- 1.1.12 Requirement PW6 within Schedule 3 to the DCO states that the project will be carried out in accordance with both Part A and Part B of the *CoCP*. The *CoCP* includes a number of plans, procedures, reports, or other items that are to be approved by the relevant planning authority, the employer, or the contractor. Any such approval shall be given in writing by the relevant body identified in this document. Furthermore, wherever it is said that approval is sought, the works thereafter shall be carried out in accordance with the approved details.
- 1.1.13 Further specific measures for each site may be implemented through amendments to the *CoCP* Part Bs, in agreement with the relevant local authority and in consultation with relevant stakeholders, which may include Transport for London (TfL), the Environment Agency (EA), the Port of London Authority (PLA), the Historic Buildings and Monuments Commission for England (HBMCE, formerly referred to as English Heritage), and the Marine Management Organisation (MMO).

- 1.1.14 Where an agreement or approval is sought from the relevant local authority and not obtained (or obtained on terms that are not satisfactory to the employer), then it will be open to the employer to appeal to the Secretary of State under the appeal mechanism set out in the DCO (Schedule 17, para. 4). Applications made further to Requirements are to be regulated by virtue of Schedule 17, paras. 1 to 3.

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2 General requirements

2.1 Environmental impact assessment

- 2.1.1 An environmental impact assessment was carried out for the project and an *Environmental Statement (ES)* prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, as amended. Through the assessment process, mitigation identified with respect to construction effects is embedded within the *CoCP* in order to form part of the application for development consent (the ‘application’) for the project. The findings of the assessment are reported in the *ES*.
- 2.1.2 The contractor shall ensure that no significant adverse effects arise that are worse than those reported in the *ES*. This will be achieved through the process described in paragraph 2.1.3.
- 2.1.3 The contractor shall identify, before the relevant phase of construction, whether its detailed design, construction methodology, programme, site specific mitigation or other assumptions are materially different from those made during preparation of the *ES*. If they are, then the contractor shall carry out an assessment of the likely significant effects using the relevant assessment methodology for each topic as defined in the *ES*. That assessment will identify any mitigation that is necessary to ensure that no significant adverse effects arise that are worse than those reported in the *ES*.
- 2.1.4 The contractor shall as a minimum comply with and implement the mitigation measures described in the DCO and its requirements, the CoCP, Section 106 obligations and any secondary consents (eg, those under Section 61 of the Control of Pollution Act as described in Section 6 of the CoCP). The contractor shall identify and implement further mitigation that is reasonable and practicable to further reduce the adverse environmental effects of the scheme.

2.2 Environmental management system

- 2.2.1 The contractor shall be required by the employer to develop and implement an environmental management system accredited to British Standard (BS) EN ISO 14001: Environmental Management. This will align with the employer’s environmental management system and will set out:
- a. the contractor’s environmental policy
 - b. the procedures to be implemented to deliver and monitor compliance with environmental legislation
 - c. staff competence and awareness requirements and how these are achieved and maintained
 - d. the procedures to be implemented to deliver and monitor compliance with the environmental provisions in this *CoCP*.

- 2.2.2 The contractor's environmental management system will ensure and demonstrate that all the environmental controls of the contract and all relevant legislation, standards, regulations and consents are being met.

2.3 Construction environmental management plan

- 2.3.1 The contractor's construction environmental management plan (CEMP) will detail the practical execution of the construction works that demonstrates compliance with the measures and controls of the *CoCP*, the DCO, the Requirements and protective provisions, Section 106 Obligations and Undertakings and other necessary consents, along with legislation and best practice. The CEMP shall provide details of the general site layout and operations, working hours, site lighting, security, emergency planning and response, fire prevention and control, utility works and worker access and welfare.
- 2.3.2 Appendix B provides the template structure for the CEMP, ensuring a consistent approach across each construction worksite. Section B.3 of Appendix B sets out the additional topical environmental management plans that will be prepared to support the CEMP, which includes:
- a. Community liaison plan (see Section 3.1.2)
 - b. Lighting management plan (see Section 4.6.1)
 - c. Emergency preparedness plan (see Section 4.8)
 - d. Pollution incident response plan (see Section 4.10)
 - e. Traffic management plan (see Section 5.1.5)
 - f. River transport management plan (see Section 5.6)
 - g. Noise and vibration management plan (see Section 6)
 - h. Air quality management plan (see Section 7.1.2)
 - i. Water Management Plan (see Section 8)
 - j. Land quality (see Section 9)
 - k. Site waste management plan (see Section 10.1.3)
 - l. Resource management plans – water, energy, materials (see Section 10.4)
 - m. Ecology and landscape management plan (see Section 11.2.1)
 - n. Heritage management plan (see Section 12).
- 2.3.3 The principal securing mechanisms for the protection, mitigation and/or compensation measures relevant to each of the topical environmental management plans is set out in the relevant section of this *CoCP*, as noted above. The principal purpose of the contractor's topical environmental management plans is to identify the means by which the contractor will comply with and implement those protection, mitigation and compensation measures.
- 2.3.4 The CEMP will be prepared by the contractors before the commencement of relevant construction works. A consultation draft of the CEMP shall be

provided to the relevant local planning authority and other relevant stakeholders, including the EA, the PLA, the MMO and HBMCE for a period of not less than four weeks. Any responses received to consultation provided by these bodies will be taken into account in finalising the document for submission to the employer, in order to help ensure compliance with the controls put in place to manage and minimise construction-related impacts.

- 2.3.5 Following this, the contractor shall provide the CEMP to the employer for approval. The final CEMP shall then be made available to the relevant planning authority before the commencement of relevant construction works.
- 2.3.6 The CEMP will be monitored and updated on an annual basis to ensure the methods used reflect the changing needs of the works during construction and relevant updates to legislation. The contractor shall obtain approval for alterations to the scope of the CEMP from the employer. Prior to submitting a revised draft of the CEMP to the employer for approval, a draft of the revised document shall be submitted for consultation to relevant stakeholders, including the relevant planning authority, for a period of not less than four weeks.

2.4 Enforcement

- 2.4.1 Compliance with the provisions of this *CoCP* will be enforceable by means of a number of mechanisms. Non-compliance with the *CoCP* Part A would be a breach of DCO Requirement PW6. Further more, in respect of each site, compliance is secured through the relevant site-specific Requirement in respect of Part B. Such a breach would be enforced in the same way as breach of any other Requirement.
- 2.4.2 Project-wide Requirement PW4 requires the details of the body or bodies responsible for undertaking each of the scheduled works at individual sites to be provided to the local planning authority. Both the employer and the contractor would be open to enforcement action under Section 161 of the Planning Act 2008. The employer will enforce the contractor's compliance with these controls through the construction contracts.
- 2.4.3 The *CoCP* obliges the contractor to obtain a consent pursuant to Section 61 of the Control of Pollution Act 1974 (the 'CoPA'), detailing the way in which certain construction works are to be carried out. In the event of failure to comply with the terms of a Section 61 notice, local authorities would have the power to serve a notice under Section 60. Contravention of such a notice without a reasonable excuse is an offence.
- 2.4.4 Similarly, the *CoCP* identifies certain other consents, licences and permits that are required under other legislation, which provide a further means of ensuring that the works are carried out in compliance with applicable legislative requirements.
- 2.4.5 The contract between the employer and the contractor will specify that all construction activities shall be carried out in accordance with the terms of the DCO, including the *CoCP*.

- 2.4.6 The employer will require its contractor to deliver a programme of monitoring and auditing to confirm compliance. Site inspections and audits will be carried out by the employer to ensure compliance with the *CoCP*. On request, relevant planning authorities will be given access to the results of monitoring, along with the opportunity to attend site visits to ensure compliance with the controls of the *CoCP*.
- 2.4.7 The construction contract will require the contractor to ensure that all sub-contractors and suppliers meet the control measures of the *CoCP*.

2.5 Tunnelling

- 2.5.1 The contractor responsible for tunnelling will follow the Association of British Insurers/British Tunnelling Society's *Code of Practice for Risk Management in Tunnelling*.

2.6 Non statutory Off-site Mitigation and Compensation Policy

- 2.6.1 When there are impacts from construction that cannot be mitigated at source, the *Non statutory off-site mitigation and compensation policy* is available to address the residual effects.
- 2.6.2 The *Settlement Information Paper* and the *Exceptional Hardship Policy* are available as separate documents.

2.7 Pre-application procedure for consultation, consents and approvals

- 2.7.1 Schedule 17 (para. 1) of the DCO identifies the formal pre-application procedure for all consents, agreements and approvals that may be required in relation to requirements under Schedule 3 of the DCO. This requires submission of full draft proposals/application not less than 28 days before the application itself is made, unless agreed otherwise with the approving authority. The contractor or employer will follow this procedure when seeking approvals under the *CoCP*.
- 2.7.2 When consultation is required for processes described within the *CoCP*, save where different provision is made elsewhere within the document, informal engagement will begin before the steps identified in the Schedule 17 (para. 1) procedure. This will begin through a number of channels, which may include: working groups, community liaison, informal discussions, stakeholder engagement, provision of further information where reasonably necessary, or submission of documentation. Where the process involves the need for documents to be consulted on or approved, drafts will be provided to the identified consultees with the necessary details to enable them to provide written comments. Consultees will be asked to provide comments in writing within two weeks of receipt of the draft documents, unless otherwise agreed with the consultee.

2 General controls

- 2.7.3 Any feedback received shall be taken into account in finalising documentation, in order to help ensure compliance with the relevant controls, and/or to manage and minimise construction-related impacts.
- 2.7.4 Where the *CoCP* states "approved by the employer", then approval of the plan, procedure, report or other item shall be managed in accordance with the contract between the employer and its contractor.

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3 Communications and community/stakeholder liaison

- 3.1.1 The employer and the contractor shall take reasonable steps to engage with nearby residents, especially those who may be detrimentally affected by construction impacts. They shall provide stakeholder relations personnel who will provide information on the construction process and shall be the first line of response to resolve issues of concern.
- 3.1.2 The employer will ensure that the contractor notifies occupiers of nearby properties in advance of works taking place, including the type and duration of the activity. This notification will be undertaken in accordance with the community liaison plan.
- 3.1.3 In the case of work required in response to an emergency, the contractor will advise the local authority and local residents as soon as reasonably practicable. This engagement will comply with the HSSE communication procedure (see the *HSSE Standard*).
- 3.1.4 The contractor shall develop a community liaison plan in conjunction with the relevant local authority and approved by the employer and relevant local authority, as follows:
- a. The plan shall set out how the contractor and subcontractor will ensure compliance with community engagement commitments, as defined in the *Sustainability Statement*, including monitoring and reporting procedures throughout the construction of the project.
 - b. The plan shall set out communication protocols with the relevant planning authority, community, relevant stakeholders and affected parties that ensure that they are all kept informed of the construction works being carried out, the progress of the works and associated programme. At least two weeks prior to relevant works being carried out, the contractor shall distribute information sheets relating to the programmed construction activities, detailing expected disruptions and the measures being taken to minimise or mitigate adverse impacts of these works. A liaison plan will be produced by the contractor, for approval by the employer, and issued to the relevant local authorities ideally four weeks, but at least two weeks in advance of the relevant works, detailing the information to be supplied to the local community. The plan will include details and a map of properties to be notified directly with information sheets.
 - c. For tunnel boring, the employer shall establish a website to provide information on the forecast and actual passage of the tunnel boring machines. The contractor shall distribute leaflets to properties and affected parties, giving such notice along the route of tunnel drives, along with details of the first point of contact for any queries.
 - d. The contractor will liaise with appropriate local community projects, tenant and resident groups and employment and educational initiatives.

- e. The contractor shall provide a point of contact for a small claims procedure, relating to physical damage to property or minor injuries. The contractor shall assist in enabling any claims to be progressed promptly, in coordination with the employer and insurer.
 - f. The contractor shall coordinate preconstruction defect surveys for identified properties, liaising (in conjunction with the employer) with the building surveyor employed to carry out the surveys and maintaining a dialogue with the relevant property owners throughout the duration of the works.
- 3.1.5 The community liaison plan shall be used to identify and further consult with the local authority with regards to relevant equalities groups in order to determine whether there are any additional issues or other mitigation measures required.
- 3.1.6 Appropriate meetings will be held with residents (or their representatives), businesses and other local occupiers to keep them informed about the works and to provide a forum for them to express their views. The relevant planning authority will be invited to participate. The participants, frequency and chair of the meetings will be determined in liaison with the employer and the local authority. The principal function of the meeting would be to discuss ongoing and planned construction and communication activities. The meeting would also seek the views of the group on the effectiveness of the project's community liaison activities and endeavour to make improvements where appropriate.
- 3.1.7 The employer will maintain a 24-hour Freephone (eg, 0800/0500) helpline service during the construction period to deal with enquiries and concerns from the general public. The service will also act as a first point of contact for information in the event of an emergency. All calls will be logged, together with a record of the responses and action taken. Appropriate contacts and response times will be the subject of a detailed procedure to be agreed prior to commencing construction. Potentially-affected occupiers will be notified of the helpline number and it will be widely advertised.
- 3.1.8 A confidential reporting line will be operated by the employer, which links to the *HSSE Standard* and the project incident plan.
- 3.1.9 A complaints register will be maintained by the employer and a copy provided to the relevant local authority each month (or other interval agreed with the local authority). The contractor shall notify the employer of complaints when they are received, along with the response and any ongoing actions.
- 3.1.10 Onsite communications, such as daily shift and activity briefings, will be used to advise the site workforce of health, safety, environmental and community matters. This will include information obtained from liaising with the community regarding matters, such as noise generation and access issues, together with constraints detailed in the contracts (eg, working hours) and other documents, such as the DCO and this *CoCP*, regulating the project. This communication will be addressed to all relevant members of the workforce, including new starters and sub-

contractors, before they commence work. Further information can be found in the project's health and safety documentation. Toolbox talks will be used as a means to disseminate information to the workforce on a routine basis.

- 3.1.11 The employer shall establish coordination and communication meetings with key stakeholders. The contractor shall attend these meetings as required and arrange other meetings where necessary. Any other meetings called by the contractor shall be notified to the employer. Such meetings will include a regular traffic/transport liaison meeting with TfL, the EA, PLA and Natural England, where relevant, and the relevant planning authority to consider all sites in that borough.
- 3.1.12 The employer will also establish project-wide coordination meetings with local authorities, TfL, the EA, PLA, MMO and Natural England at critical phases throughout the works.
- 3.1.13 Any plans which have been approved by the employer will be issued to the relevant stakeholders.

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4 General site operations

4.1 Construction process

- 4.1.1 The construction of the project will extend across central London and require a number of major construction sites, as well as smaller ones.

4.2 Working hours

General

- 4.2.1 Activities at the worksites will be varied and include the construction of major shafts, tunnels and other infrastructure over extended periods of time and will require periods of working on a continuous 24-hour, seven days a week basis.
- 4.2.2 The hours of working will vary across different sites, depending on the ability to mitigate the potential effects of site working. The specific land uses and receptors surrounding the sites also influence the working hours. The working hours by type of site are described in paras. 4.2.11 to 4.2.13.
- 4.2.3 Working hours are identified in the *CoCP* Part B for each site. Requirements within the DCO provide that the project shall be carried out in accordance with both Part A and Part Bs of the *CoCP*, unless agreed otherwise with the relevant planning authority. The contractor may apply pursuant to Section 61 of the *CoPA* to vary the working hours stated in the *CoCP* Part Bs, in order to accommodate the contractor's detailed working methods. Further Section 61 application guidance is provided in Appendix A.
- 4.2.4 The Section 61 application process will include submitting noise and vibration predictions and associated mitigation, as appropriate and agreed with, or required by the local authority (see Section 6 of this document). When implementing best practicable means (BPM) (as defined in the *CoPA*) for the control of noise and vibration, measures must be consistent with the recommendations of BS5228 (2009): *Code of practice for noise and vibration control on construction and open sites*.
- 4.2.5 This section details classifications of working hours, as well as the flexibility for the contractor and local authorities to agree the detailed works through Section 61 consents, dispensations or variations to ensure that construction activities are mitigated in order to protect local sensitive receptors.

Classification of working hours

- 4.2.6 The stated working hours at the worksites relate to the category of construction activity being undertaken. Table 4.1 categorises the construction activities and the expected working hours for that type of activity. Construction activities shall not be undertaken outside of the working hours stated in the relevant *CoCP* Part B unless, and until, any variation is first approved by a Section 61 consent, or by a dispensation.

Table 4.1 Classification of different types of working hours

Classification	Description
<p>Standard working hours 08:00 to 18:00 weekdays 08:00 to 13:00 Saturdays Plus up to one hour before and after for mobilisation, ie, 07:00 to 19:00 weekdays and 07:00 to 14:00 Saturdays Plus maintenance periods 13:00 to 17:00 Saturdays 10:00 to 16:00 Sundays</p>	<p>These hours comprise:</p> <ol style="list-style-type: none"> standard working hours mobilisation periods maintenance periods. <p>These are the standard hours that will apply to the majority of worksites and construction activities.</p> <p>These hours are the same as those defined by most local authorities within their respective boroughs.</p> <p>Mobilisation period Mobilisation activities will comprise the following: arrival and departure of the workforce at the site and movement to and from places of work (if parked, engines shall be turned off and staff shall be considerate towards neighbours with no loud music or raised voices); general refuelling (from jerry cans only, use of fuel tractors/bowsers shall be limited to standard working hours); site inspections and safety checks; site meetings (briefings and quiet inspections/walkovers); site clean-up (site housekeeping that does not require the use of plant); site maintenance; and low-key maintenance and safety checking of plant and machinery (provided this does not require or cause hammering or banging, etc).</p> <p>Mobilisation does not include lorry movements into and out of sites.</p> <p>Maintenance period Maintenance activities will comprise general mechanical maintenance to construction machinery and plant such as cranes, excavators, compressors, grouting equipment and dewatering pumps, or as agreed under the Section 61 consent. Only essential maintenance works will be undertaken on Sundays.</p>
<p>Extended working hours 18:00 to 22:00 weekdays 13:00 to 17:00 Saturdays</p>	<p>Periods of extended working hours will be intermittent and required to perform certain construction activities that will not be completed during standard working hours, such as works for major concrete pours including base slabs, bored piling and diaphragm walls.</p> <p>The number of activities that require these extended working hours are limited and do not necessarily take place on consecutive days.</p> <p>Where these works are not defined within the <i>CoCP</i> Part B, they will be agreed with the local authority through a Section 61 consent, dispensation or variation and notified to relevant stakeholders (eg, TfL). The detail of the duration and frequency of</p>

4 General site operations

Classification	Description
	extended working hours will be included in the Section 61 consent applications.
<p>Continuous working hours 00:00 to 00:00 Monday to Sunday</p>	<p>For tunnel construction activities, underground work and essential surface support activities will be carried out on a continuous 24-hour, seven days a week basis.</p> <p>Underground work includes maintenance of underground machinery and plant. Essential surface support activities include processing and handling of excavated material, shaft lifting operations, tunnel lining supply, grout and concrete batching plant operations, barge loading and movements.</p>
<p>Out of hours/possession working</p>	<p>It may be beneficial to carry out a number of activities outside of the standard working hours in order to:</p> <ol style="list-style-type: none"> a. utilise periods of low traffic flow for activities such as abnormal loads/construction plant delivery, works within the highway or footpaths and works affecting operational railways b. utilise periods of low demand or flow for utility diversions and works on the existing sewer system c. ensure minimum disruption to third parties that may have ongoing operations during the day. <p>Out of hours working will be agreed with the local authority through a Section 61 consent, dispensation or variation and in consultation with relevant stakeholders.</p>
<p>Tidal working</p>	<p>Certain works are located in the foreshore and construction activities must be undertaken at high or low tide. Any tidal working outside of standard working hours will be agreed with the local authority through a Section 61 consent, dispensation or variation and notified to relevant stakeholders.</p>
<p>River and rail transport hours As continuous working hours 00:00 to 00:00 Monday to Sunday</p>	<p>Main tunnel sites provide the opportunity to remove excavated material by barge or train. At these sites, barge and/or train loading and transfer takes place on a continuous 24-hour, seven days a week basis, unless otherwise modified by the <i>CoCP</i> Part Bs.</p> <p>The movement of barges from construction sites is dependent on suitable states of the tide.</p> <p>Movements at other sites using river transport are dealt with on a site-by-site basis in the <i>CoCP</i> Part Bs.</p>
<p>Short notice working</p>	<p>There may be isolated occasions where there is the potential for works that need to be completed or undertaken to secure and make safe construction operations that will be outside the standard working hours.</p>

Classification	Description
	At the commencement of such works, the process for notifying and coordinating these works will be approved by the local authority through a Section 61 consent, dispensation or variation and notified to relevant stakeholders.

- 4.2.7 Key support equipment is required to safeguard the works and must operate and be maintained on a continuous 24-hour, seven days a week basis. This includes items such as site security, pumps, ventilation fans, cranes and compressors. Such equipment will be shielded to provide noise attenuation, as appropriate (see Section 6).
- 4.2.8 Suitably qualified staff are required to carry out monitoring and collect data and samples outside standard working hours, both within the worksites and in the surrounding areas.

Deliveries and lorry movements

- 4.2.9 Deliveries will be arranged to minimise impacts on the road network. As detailed in Section 5.1, a construction traffic management plan shall be prepared for each site, pursuant to the relevant site-specific Requirement (eg, ACTST6 Construction traffic management plan). Deliveries and all vehicle movements will be restricted to standard working hours, or extended hours, unless agreed with the local authority through a Section 61 consent, dispensation, variation or site-specific requirements in the CoCP Part B. Abnormal and special loads (as defined in the Road Vehicles (Authorisation of Special Types) (General) Order 2003 (Statutory Instrument (SI) 2003/1998) may be delivered outside standard working hours, subject to the requirements of the local highway authority and the Metropolitan Police. Any further requirements for specific sites will be included in the CoCP Part Bs. Lorry movements during extended working hours must relate to the activity that requires the extended time. This includes periods of road use relating to derogations to river transport.
- 4.2.10 Deliveries by lorry at night may only be allowed on a site-specific basis subject to approval from the local highway authority in accordance with relevant legislation, eg, in areas away from sensitive noise receptors.

Description of site types and associated working hours

Main tunnel sites

- 4.2.11 The main tunnel (including the Greenwich and Frogmore connection tunnels) will be constructed from a number of worksites. The construction phases on each worksite will include associated development works, site establishment, shaft construction, tunnel construction, shaft and tunnel lining, surface works and commissioning.
- 4.2.12 Tunnel construction phases (including secondary lining) will be carried out on a ‘continuous working hours’ basis. Other construction phases will be carried out within the standard working hours unless otherwise agreed with the local authority through a Section 61 consent, dispensation or variation and notified to relevant stakeholders.

- 4.2.13 There are practical considerations that necessitate the construction of diaphragm walls and other major concrete pours for main tunnel shafts to be carried out beyond extended working hours.

CSO sites

- 4.2.14 The construction phases, activities and durations for the CSO interception works and drop shafts will vary depending on the location; the working hours will depend on the construction phase.
- 4.2.15 The majority of the construction phases and activities will be completed within the standard working hours.
- 4.2.16 Certain activities cannot be completed within the standard working hours and will require extended hours, such as major concrete pours and piling/diaphragm wall works during CSO drop shaft construction.
- 4.2.17 A number of the construction sites will operate as short or long connection tunnel drive sites, where the tunnelling works will be carried out on a 'continuous working hours' basis.

CSO interception works

- 4.2.18 A number of construction sites require connections to existing sewers and outfalls outside of the drop shaft construction sites. These works include requirements for traffic management (where works require temporary closure of a carriageway, as governed by the DCO) and may be appropriate to be carried out outside the standard working hours.

Associated development works

- 4.2.19 Various associated development works are required, including traffic management and utility diversions. The working hours for these activities will aim to minimise disruption to traffic and the local environment. Any works giving rise to noise effects will be subject to the Section 61 process and approved by the local authority in consultation with the highway authority. It may be appropriate for certain works, such as works within existing highways, to be carried out in out of hours/possession working hours.

4.3 Worksite layout

- 4.3.1 The contractor shall ensure that the site layout and appearance is designed according to the following principles:
- All sites will be fully secured with appropriate hoardings or fences, as defined in the employer's specification.
 - Noise generating activities will be sited away from noise sensitive receptors where practicable, or screened so as not to exceed agreed levels within the Section 61 consent.
 - Storage sites, temporary offices, fixed plant and machinery equipment will be positioned to minimise environmental impacts, having due regard to neighbouring properties and the constraints of each site.

- d. The site layout will also consider and minimise potential impacts from restricting natural light to adjacent properties.
 - e. Site lighting will be positioned and directed to minimise intrusion into occupied residential properties and sensitive areas, including the river, and will not create a road, rail or river hazard.
 - f. River sites will have appropriate lighting to assist river navigation in accordance with the relevant Deemed Marine Licence Conditions and relevant legislation, such as the Port of London Act 1968.
 - g. Internal vehicle routes will be arranged to minimise the risk of carrying mud out of the site.
 - h. Site drainage will be carefully considered to avoid areas of mud in one part of the site contaminating other areas.
 - i. Security cameras will be positioned and directed to avoid intruding into occupied residential or commercial properties.
 - j. Site plant and facilities will be powered from mains electrical sources, where reasonably practicable.
 - k. Where required, temporary fencing will include appropriate noise attenuation.
 - l. Pedestrian access to and from adjacent residential and commercial premises will be maintained.
- 4.3.2 The contractor shall display an information board at appropriate locations on the boundaries of the sites containing contact names, telephone numbers, addresses and the helpline number (see Section 3 for more detail). This will be in accordance with the employer's specification.
- 4.3.3 The type of hoarding or fencing shall comply with the following principles:
- a. The employer's specification and standard detailed drawings must be adhered to.
 - b. The standard hoarding will be 2.4m high, unless the *CoCP* Part B specifies otherwise.
 - c. The extent and height of hoarding or fencing at a particular location will be selected to maintain effective security and achieve appropriate noise attenuation, dust containment and visual screening.
 - d. Hoardings, fencing and screens will be maintained in good condition throughout construction.
 - e. Measures set out at Section 11.6 shall be implemented to protect trees.
 - f. Where reasonably practicable, existing walls, fences, hedges and earth banks will be retained.
 - g. Notices will be displayed on all site boundaries, where appropriate, to warn of hazards onsite such as deep excavations and construction access.

- h. Appropriate sight lines/visibility splays will be maintained to ensure that the safety of both vehicles and pedestrians is preserved (see the *HSSE Standard*).
- i. Temporary fences may be used in certain areas, such as for short-term occupation of sites or at more remote locations. Where indicated in the *CoCP Part Bs*, temporary fencing will include appropriate noise attenuation.

4.3.4 The design of hoardings will be appropriate to the character of the surrounding townscape, where required, which may incorporate one or more of the following:

- a. art work visualising the proposed development or photographic views of the local area or art work mounted onto standard, well-maintained hoardings
- b. viewing windows in standard well-maintained hoardings to preserve important views and provide opportunities to observe construction activity
- c. a full cover of climbing plants on dark green painted hoardings, with the plants trimmed back only to accommodate essential lighting and health and safety signage.

4.3.5 Gates at vehicle access and egress points shall open inwards towards the site rather than outwards onto the highway, where possible. As far as is reasonably practicable, gates will be positioned to allow vehicles to drive into the site clear of any public highway. Where provided for noise control purposes, gates will be of a similar material and construction to the boundary fence in which they are situated and will be closed except when in use for access (see the *HSSE Standard*).

4.3.6 Site access, egress and internal site vehicle routings shall adhere as far as is practicable, to the Health & Safety Executive (HSE) guidance HSG 144, *The safe use of vehicles on construction sites*. Where possible, there shall be separate entrances and exits to sites for vehicles and pedestrians. The layout shall where practicable have an internal circulation route or turning bays to turn lorries on site, so as to ensure vehicles exit the site in forward gear. Where reversing on to the highway is unavoidable, the Contractor shall provide traffic marshals to facilitate the safe departure of the vehicle.

4.3.7 Where hoardings will be placed on highway land, the contractor shall obtain any required hoarding licences from the appropriate highway authority. Where the area of works is stopped up and the hoarding is placed within the stopped-up area, no licence will be required.

4.3.8 The contractor shall promote and enforce 'good housekeeping' arrangements on all construction sites to ensure the sites remain clean, tidy and safe. Measures will be implemented to provide effective preventative pest and vermin control and prompt treatment of any pest and vermin infestation. The contractor shall ensure that the risk of infestation by pests and vermin is minimised. Adequate arrangements must be made for disposing of food waste or other material attractive to

vermin. If infestation occurs, the contractor must take action to eliminate the infestation and prevent further occurrence. Measures will be implemented to protect ecologically sensitive areas or legally protected and/or notable species (see Section 11 for further details). This will be assessed as part of the Considerate Constructors Scheme, where it applies.

- 4.3.9 The contractor shall provide welfare facilities appropriate to the type of site (eg, drive site). The facilities will be connected to mains services and drainage, where reasonably practicable. Alternative arrangements will be made when connection to the mains is not possible (see the *HSSE Standard* for further details).
- 4.3.10 In the event that a worksite becomes inactive, the employer shall ensure that site security, safety, and condition of hoardings are maintained. Any working areas in the public realm shall be minimised or removed where practicable.

4.4 Controls for works outside main site areas

- 4.4.1 Works outside main site areas include activities around existing sewer systems and connection or construction works to existing CSOs. The principles detailed within this *CoCP* will apply to such works, having regard to their size, location, duration and scope.
- 4.4.2 Each site requires appropriate method statements, risk assessments, consultation and approval from the employer.

4.5 Cranes

- 4.5.1 Crane arcs will be confined within site boundaries or limits of land to be acquired or used, unless agreed otherwise with the local authority in accordance with statutory legislation for use of cranes which over-sail the public highway and property owners/occupiers whose air space is affected (eg, London Underground Ltd, Docklands Light Railway, TfL, Network Rail and the PLA). The contractor shall obtain the relevant permissions (eg, licence for use of a crane which over-sails the public highway), in accordance with the relevant legislation, from TfL or the local authority (as appropriate) for cranes located adjacent to roads. Cranes will be operated in accordance with the requirements of BS7121, *Code of Practice for Safe Use of Cranes*.
- 4.5.2 Where there is potential for crane arcs to impact on trees and associated ecology, suitable protection measures will be implemented (see Section 11).

4.6 Site lighting

- 4.6.1 A lighting management plan will be prepared by the contractor for each site to detail how the following controls will be complied with. The Plans shall provide design layouts and demonstrate how the controls are met by

the design. The plan will be approved by the employer and issued to relevant stakeholders.

- 4.6.2 Site lighting will be provided to ensure safe working conditions and to maintain security on construction sites, having regard to sensitive ecological receptors or occupied residential properties. Where appropriate, and in discussion with the local authority and police, lighting will be provided to site boundaries and illumination will be sufficient to create a safe route for passing members of the public. In particular, precautions will be taken to avoid site hoardings casting shadows on surrounding footpaths and roads in order to deter potential street crime. Appropriate industry standard procedures will be implemented.
- 4.6.3 Lighting will be positioned and directed so as not to intrude unnecessarily on adjacent buildings and land uses and to avoid unnecessary interference with local residents or passing transport users (eg, road, rail and river). Lighting will be designed to ensure that any artificial light emitted from a site does not prejudice health or create a nuisance, as required by the Environmental Protection Act 1990.
- 4.6.4 Road lighting will be designed to comply with the provisions of BS5489 *Code of Practice for the Design of Road Lighting*, where applicable.
- 4.6.5 Further guidance is provided within *Guidance Notes for the Reduction of Obtrusive Light*, GN01 (2011) or later revisions published by the Institute of Lighting Engineers, and *Bats and Lighting in the UK*, Bat Conservation Trust, (May 2009). The lighting design needs to consider effects on:
- terrestrial ecology, including measures to prevent disturbance to notable species and ecologically sensitive areas (see Section 11)
 - the aquatic environment; direct lighting of watercourses shall be avoided, where reasonably practicable, to avoid inhibiting movements of photophobic species such as eel.

4.7 River works

- 4.7.1 All works in the river or foreshore below mean high water mark fall within the remit of licensable works under the Marine and Coastal Access Act 2009. Schedule 15 to the DCO (Deemed Marine Licence) includes the powers to carry out those works. Schedule 15, Part 2 includes draft Deemed Marine Licence Conditions that will apply to all river works required as part of the authorised project. The details of all river works below mean high water mark will therefore be approved by the MMO, pursuant to the relevant conditions of the Deemed Marine Licence.
- 4.7.2 In addition and notwithstanding the above, the details of all works in the river or foreshore (including those works in land within 16m of a flood defence in the case of the EA), shall be submitted to and approved by the PLA and the EA pursuant to their relevant protective provisions as set out in Schedule 16 to the DCO (Part 2 and Part 3 respectively).

Removal of in-river piles

- 4.7.3 The contractor shall design in river piling to facilitate removal, and make reasonable effort to remove all piles completely from the bed of the river upon completion of the works.
- 4.7.4 The contractor shall ensure any piles which prove impossible to fully extract, are driven down, cut off or removed to a depth of a least 1 metre below the adjacent riverbed level unless otherwise agreed with the PLA.
- 4.7.5 As the works are carried out the contractor shall compile and make available for inspection, by the EA, the MMO or the PLA, a survey report and plan, with plotted cut-off piles, a suitable permanent reference point, a note of the top level of each pile and adjacent riverbed level relative to chart datum. Upon completion of the works the contractor shall provide a copy of the completed survey report and plan to the EA, the MMO and the PLA.
- 4.7.6 The top of any cut-off piles will be retained and kept available for inspection by the PLA during the progress of the works and each one will be marked with the reference given to its pile stump in the survey so that by using the survey and plan the PLA can identify which stump it came from.

Cofferdam construction

- 4.7.7 The temporary and permanent material used for fill within cofferdams and temporary construction within the foreshore shall be suitable for use within the river environment and shall not cause any potential contamination to the river.

4.8 Security

- 4.8.1 Site security is a significant issue, particularly in central London and at highly visible construction sites. The contractor shall comply with the full security requirements set out in the *HSSE Standard* including the following:
- a. The contractor shall ensure that all construction sites are secure and are manned by security personnel on a 24-hour basis (swipe card access may be considered). Access to sites will be limited to specified entry points and all personnel entrances/exits will be recorded and monitored for security, health and safety purposes.
 - b. The contractor has a statutory duty to prevent unauthorised access to sites and will complete site-specific assessments of the security and trespass risk at each site and implement appropriate control measures.
 - c. The site boundary will be secured and constructed such that it minimises opportunities for unauthorised entry. The boundary will be monitored remotely by closed circuit television at relevant locations. These locations will be determined in consultation with the local authority or the Metropolitan Police, as appropriate. Should the site

boundary suffer any damage, it will be immediately rectified by the contractor.

- d. The contractor shall consult with local crime prevention officers to determine security proposals for each site and to identify any security issues at particular sites and liaise regularly to review security effectiveness and response to incidents.

4.9 Emergency preparedness plan

- 4.9.1 The employer will develop and implement an emergency preparedness plan for each site (see the *HSSE Standard*), which the contractor shall adhere to. The appropriate content, relevant to their statutory remit, will be submitted to the EA for approval. The procedures will be standardised, as far as possible, across the worksites and appropriately adapted to the anticipated hazards and specific layout. The plan will include emergency pollution control measures that will take account of EA guidelines. It will provide emergency phone numbers and a means of notifying local authorities, statutory authorities and local community representatives. Contact numbers for the employer and contractor's key staff will also be included. The approved plan will be notified to relevant stakeholders.
- 4.9.2 Consideration will also be given to vulnerable buildings and elements of transport infrastructure.
- 4.9.3 The contractor shall ensure that legislative requirements are followed for the provision of safe site access points. This may include forums with relevant emergency services, where appropriate. In all cases, the arrangements put in place will be developed in consultation with and be suitable for the emergency services (London Ambulance Service, London Fire Brigade and the Metropolitan Police), and in consultation with the local authority emergency planning officer.
- 4.9.4 The contractor shall have standby equipment readily available (eg, road diversion signs).
- 4.9.5 The contractor shall ensure that procedures are in place for flood warnings and prepare for a potential flood event relevant to the flood risks at each site. This will include identifying an evacuation route and potential refuge areas in the event of a flood to enable the workforce to leave the site.
- 4.9.6 The plan will need to cover key areas for monitoring and mitigation measures for buildings, transport and utility infrastructure, and riverbed monitoring for scour. Any separate plans for these areas shall be identified and referenced in the emergency preparedness plan.
- 4.9.7 Suitable spill kits shall be provided and positioned in vulnerable areas and staff will be trained in their use. A record will be kept of all pollution incidents or near-misses to ensure that appropriate action is taken and lessons learned. Regular 'toolbox talks' will be held to raise staff awareness of incident prevention and to share lessons learned. The pollution incident control plan shall set out written procedures for dealing with spillages and pollution. The plan will contain the following as a minimum:

- a. guidance on the storage and use of hazardous materials with the aim of preventing and containing spills and releases of potentially hazardous material
- b. guidelines on the degrees of containment that take account of the nature of the materials and the sensitivity of the environment
- c. procedures to be adopted in the event of an environmental incident, to contain and minimise any adverse effects
- d. procedures and appropriate information required in the event of any spill or release
- e. procedures to link into the project incident management plan
- f. systems for notifying appropriate emergency services, the EA, other relevant authorities, the employer and the contractor's personnel.

4.10 Pollution incident control plan

- 4.10.1 The employer and the contractor will develop and implement a pollution incident control plan. For work in the river, before works commence the plan shall be submitted to and approved by the MMO, pursuant to the relevant Deemed Marine Licence Condition (CoCP and CEMP), in consultation with the EA and the PLA.
- 4.10.2 The plan will detail the practical measures that will be implemented to avoid pollution incidents and shall have regard to best practice measures and guidance set out in the EA's pollution prevention guidance notes. The plan will detail the procedure to deal with any pollution incident that may occur, including response procedures (including appropriate equipment, materials and resources), timescales and notification procedures that would be implemented to minimise the effects.
- 4.10.3 The site procedures, methods of working and materials shall be selected having regard to the risk of pollution incidents and include mitigation measures to reduce the likelihood and impact of any incident. Preventative containment measures will also be considered. Such procedures and measures will cover atmospheric, aquatic and land pollution and procedures in the event of fire.
- 4.10.4 The storage, handling, use and disposal of any potentially hazardous materials will comply with the relevant statutory provisions, EA and Health and Safety Executive codes of practice and guidance notes, together with any manufacturers' recommendations.
- 4.10.5 The relevant statutory bodies, including the Health and Safety Executive, Fire Authority, the EA, PLA and the local authority (Emergency Planning) will be consulted during the development of the pollution incident control plan. The plan will set out the procedures to be followed to minimise the spread of pollution in the event of an incident. It will complement and be consistent with the relevant emergency preparedness plans as required by health and safety legislation, other environmental management and health and safety procedures. The plan will be approved by the employer and issued to relevant stakeholders. It will contain:

- a. an assessment of the type of materials to be used and the risk of contamination
 - b. guidance on the storage and use of hazardous materials, with the aim of preventing and containing spills and releases
 - c. guidelines on pollution prevention for sites on or adjacent to the river and watercourses
 - d. guidelines on the degrees of containment which take account of the nature of the materials and the sensitivity of the environment
 - e. procedures to be adopted in the event of a pollution incident, to contain and minimise any adverse effects
 - f. procedures and appropriate information required in the event of any incident such as a spill or release
 - g. systems for notifying appropriate emergency services, relevant authorities, the employer and the contractor's personnel
 - h. arrangements for notifying appropriate statutory bodies and local authorities of pollution incidents, where required by legislation
 - i. standby equipment and materials
 - j. specific arrangements for sites on or adjacent to the river
 - k. relevant procedures and contacts for each worksite for forwarding to the emergency services and appropriate authorities.
- 4.10.6 Where pollution is likely to affect an environmentally designated site, safeguards will be included in the ecology and landscape management plan.

4.11 Fire prevention and control

- 4.11.1 All construction sites and associated accommodation and welfare facilities will have in place appropriate plans and management controls to prevent fires (see the *HSSE Standard*).

4.12 Electromagnetic interference

- 4.12.1 The contractor shall consider the effects of electromagnetic interference on wireless telecommunication systems (including river vessel, traffic and rail signalling equipment) during the design and construction of the project, which will include site-specific impacts from the demolition of buildings and installation of tower cranes. Where appropriate, the contractor will employ best practice technology to ensure that levels of radio frequency interference associated with the project are acceptable.

4.13 Unexploded ordnances

- 4.13.1 Before the commencement of relevant works, the contractor shall complete a risk assessment for the possibility of finding unexploded

ordnances on all sites (particularly those within the foreshore) and a response process will be included in the emergency response procedures.

- 4.13.2 Unexploded ordnance surveys will be carried out by an accredited specialist using a 'magnetometer survey'. Any magnetic contacts that model as an unexploded ordnance will be investigated to confirm identity. Any confirmed find will be managed and made safe by a suitably qualified specialist.

4.14 Utility works

- 4.14.1 The contractor shall identify any utility diversions and new works required in the detailed design and produce and agree schedules with the utility owners and relevant authorities in accordance with the DCO and other applicable legislation, and where appropriate, with the protective provisions. The contractor shall take account of any outages when planning the utility diversions. All out of hour's utility work shall be covered by a Section 61 consent.
- 4.14.2 Where further changes in utility infrastructure cannot reasonably be avoided, the contractor shall make arrangements with the employer and owner of the infrastructure to be relocated, either temporarily or permanently, in accordance with the protective provisions, where appropriate. In some instances, the apparatus may be surplus to requirements and be decommissioned.
- 4.14.3 When such work is carried out, any new equipment will be installed and commissioned before the existing infrastructure is disconnected. However, there may be circumstances in which a period of disconnection is essential to enable safe completion of the work. In such cases, the contractor shall agree appropriate arrangements (such as planned night time or weekend closures) with the relevant utility operator in accordance with the protective provisions, where appropriate.
- 4.14.4 The contractor shall identify and protect (or divert if necessary) all utility plant and equipment reasonably expected to be materially adversely affected by project works. Methods will include the use of ground penetrating radar and vacuum excavation. On a site-specific basis, this will require preliminary site investigations to confirm the extent and exact location of underground infrastructure to confirm the accuracy of existing records. Even with these precautions, in a city as densely developed as London there is a risk of encountering unrecorded infrastructure unexpectedly. Before commencing construction, the contractor shall establish procedures with the utility operators to manage and mitigate unforeseen events in accordance with the protective provisions, where appropriate. Information from the *Environmental Statement* and site investigations work will be made available to assist this process.

4.15 Worker access

- 4.15.1 Site-specific DCO Requirements (eg, ACTST7) require a construction workforce travel plan for a site to be submitted and approved by the

relevant planning authority. This plan will be developed in accordance with the *Draft Project Framework Travel Plan* to encourage project workers to use public transport and is secured by Requirements in the DCO.

- 4.15.2 In addition, the contractor shall only allow vehicles necessary to undertake the works on site. No worker parking will be allowed except where specifically identified in the *CoCP* Part B or agreed with the local authority. Site parking will be limited to operational vehicles such as mini buses, management and maintenance vehicles. The contractor shall put measures in place to monitor and eliminate 'fly-parking' by workers in the vicinity of the site.
- 4.15.3 No temporary living accommodation shall be permitted on sites.

4.16 Site clearance on completion of activities

- 4.16.1 The contractor shall clear and clean all working areas and accesses as work proceeds and when no longer required for works.
- 4.16.2 On completion of a construction activity, all plant, temporary buildings and vehicles not required for subsequent activities will be removed from the site as soon as practicable. All land, including highways, footpaths, public open spaces, river embankments/waterways, loading facilities or other land occupied temporarily will be made good to the satisfaction of the employer, the landowner, any Section 106 provisions, and in accordance with the approved landscape scheme and timetable for that site (eg, Requirements ACTST5 Landscaping works).
- 4.16.3 Temporary working areas within the foreshore are controlled by the DCO, Schedule 16 (Protective provisions), Part 2 and 3, which require reinstatement details to be approved by the PLA and EA prior to commencing the works.

4.17 Considerate Constructors Scheme

- 4.17.1 The contractor shall be required to manage sites and achieve formal certification under the Considerate Constructors Scheme for the following five areas (or as amended):
- a. enhancing appearances
 - b. respecting the community
 - c. protecting the environment
 - d. securing everyone's safety
 - e. caring for the workforce.
- 4.17.2 For each site, the contractor will be required to achieve a minimum score (eight out of ten) for each of the above sections (a maximum score of 50). Should the contractor be unable to achieve a score of 40 for a site, an explanation indicating that the highest possible score has been achieved will be required, as well as an improvement plan that will be agreed with the employer. Should the Considerate Constructors Scheme be updated, the employer will update these requirements accordingly.

- 4.17.3 A copy of the Considerate Constructors Scheme certificate will be sent to the employer and compliance will be audited through the contractor's environmental management system. Reports on compliance with the Considerate Constructors Scheme shall be provided to the local authority on a regular basis, together with any resultant improvement plans for failed items.

5 Public access, the highway and river transport

5.1 Traffic management and control

- 5.1.1 The DCO Requirements provide the principal framework of controls for traffic management during the construction stage. Relevant requirements are as follows:
- a. PW15: River Transport Strategy: secures the commitment of excavated material by barge and the monitoring and reporting system
 - b. Construction traffic management plans: eg, ACTST6
 - c. Travel plans: eg, ACTST7
 - d. Highway works (including junction layout): eg, ACTST8
 - e. Specification of accesses (operation and construction): eg, ACTST9.
- 5.1.2 The CoCP Part B identifies relevant site-specific controls and constraints, such as access/egress points and temporary and permanent closures or diversions of highways.
- 5.1.3 The contractor shall comply with legislation as amended by the DCO (including but not limited to the Highways Act 1980, the Road Traffic Regulation Act 1984, the New Roads and Street Works Act 1991 and the Traffic Management Act 2004). Articles 10, 56 and 57 of the DCO modify and, in some cases exclude, relevant highways legislation and the contractor must also comply with these articles. The contractor shall undertake the works in such a way as to maintain, as far as is reasonably practicable, existing public access routes and rights of way during construction (see the *HSSE Standard*). Alternative signposted routing will be provided, where required and feasible.
- 5.1.4 The contractor will consider the risk of incidents when transporting materials (including hazardous materials) and include mitigation measures to reduce the likelihood and impact of any incident. Preventative containment measures will also be considered in advance.
- 5.1.5 The contractor shall carry out the works in such a manner as to minimise inconvenience to the public arising from increased traffic flows and disruption from construction traffic.
- 5.1.6 For each worksite, a site-specific traffic management plan will be produced, coordinated and implemented by the contractor. The plan will be prepared in consultation with highway and traffic planning authorities and the emergency services. It will be approved by the local planning authority in consultation with the relevant highway and traffic authority and is secured by a DCO Requirement (eg, ACTST6). The plan will include:
- a. site boundaries and the main access/egress points for the worksites

- b. temporary and permanent closures or diversions of highways (including programme and/or phasing)
- c. details of how the contractor will meet the requirements of the *Transport Assessment*
- d. a strategy for traffic management such as using parking measures and/or site operatives to manage how construction vehicles enter and exit sites
- e. local routes to be used by lorries, cranes and abnormal loads generated by construction activity including, where required, the timings of use of such routes, lorry holding areas, a signage strategy for the routes, means of monitoring lorry use and any prohibited routes
- f. a schedule and programme of planned traffic management schemes and measures required to complete the works
- g. details of traffic modelling required to support traffic management schemes applications including procedures, further surveys and baseline traffic data and modelling methods
- h. required bus diversions and bus stop locations
- i. requirements for amendments to traffic signal infrastructure or timing to be agreed with and implemented by TfL
- j. interfaces with adjacent developments and other project construction sites, including measures to coordinate and reduce combined impacts
- k. arrangements for lorry management (see Section 5.2)
- l. measures to address potential risk to residents and activities on local roads adjacent to construction sites, including (where practical and appropriate) notifying suppliers, restricting delivery hours and strictly enforcing speed limits
- m. procedures for carrying out regular full safety audits on all permanent highway works and temporary diversion routes
- n. monitoring and reporting mechanisms for the construction traffic management plan and travel plan, including frequency of reporting to the relevant planning authority.

5.1.7 Traffic management schemes will be submitted for approval to the relevant highway authority, in consultation with TfL. Such schemes will detail the proposals to control, divert or modify traffic flows during construction works. The submission will include:

- a. scheme details and layouts including drawings and any traffic signal amendments
- b. phasing and programming of the scheme including control measures
- c. fully validated traffic modelling and reports for traffic management and control measures, where necessary, produced in accordance with relevant guidance issued by TfL

- d. safety audits on all permanent highway works, temporary diversion routes and accesses and any other details specified in the *CoCP* Part B
 - e. details of mitigation measures to reduce impacts on traffic (buses, cyclists and pedestrians) including traffic signal modifications, temporary diversions and measures to minimise the duration of the scheme
 - f. proposed publicity to notify and inform users before and during the implementation of all traffic management and control measures.
- 5.1.8 The employer and the contractors shall use the highway works review and approval process defined in Appendix C. The process includes approval of traffic management plans by the local planning authority, in consultation with TfL and affected highway authorities. The process also requires approval of traffic management schemes by TfL and affected highway authorities. The process includes traffic liaison groups with stakeholders, advance notification of programme for all highway works including the use of the Electronic Transfer of Notices system, pre-application consultation, and review and co-ordination by the employer.
- 5.1.9 Before commencing works at a site, the contractor shall produce a construction logistics plan for that worksite. This plan shall detail the measures to ensure the efficient and sustainable management of material and movements of vehicles and vessels to transport it to and from the site. The plan will be prepared in consultation with the PLA and local highway authorities and shall be submitted to the local planning authority for approval, before commencing the relevant works.
- 5.1.10 The planning of the works will include consideration of the access and servicing requirements of affected residential and commercial premises, and the need to control lorry movements during school opening and closing times. The contractor shall regularly communicate with parties affected by the works, as detailed in Section 3. Local residents and businesses will be informed in advance of the dates and durations of closures and provided with details of diversion routes at least two weeks in advance of the works. Access and servicing requirements will be maintained, within the constraints of the works and the need to ensure the safety of the public.
- 5.1.11 Some traffic management proposals may require traffic regulation orders under the Road Traffic Regulation Act 1984 to cover measures such as the introduction of one-way streets, road closures, banned turns and temporary speed limits. Where such measures are not identified in schedules to the DCO, applications will be made to the relevant highway authority in advance of the works.
- 5.1.12 The employer will assess overall traffic impacts from the project and ensure that, where required, traffic management is coordinated between the worksites and contractors.

5.2 Lorry management and control

- 5.2.1 The contractor shall apply the following lorry management requirements and vehicle measures to the contractor's own vehicles and those of sub-contractors and suppliers:
- a. membership of TfL's Fleet Operators Recognition Scheme; the contractor and sub-contractors will register and attain bronze membership for the start of construction progressing to silver within six months
 - b. use of lorries that have 'active' fitted cyclist safety measures including side safety bars, a close proximity warning system comprising a front-mounted, rear-facing closed circuit television camera or Fresnel lens, a close proximity sensor, an in-cab warning device (visible or audible) and an external warning device to make nearby road users aware of the driver's planned manoeuvres
 - c. use of lorries and vans that display prominent signage on the rear of the vehicle to warn cyclists of the dangers of passing the vehicle on the inside
 - d. requirement for lorry drivers to complete a TfL-recommended lorry drivers awareness course for travelling in and around London focussing on identifying and considering known risks and hazards, including on highways, and safety issues and implications
 - e. a monitoring and reporting system to check training and licences of lorry drivers and to report and investigate all collisions involving project vehicles
 - f. use of lorries that meet current best environmental standards, including Euro 6 emission standards, where appropriate (as a minimum, all hauliers shall adhere to the standard as set by the London Low Emission Zone at all times)
 - g. a review and assessment of potential conflicts and hazards that may lead to collisions involving construction vehicles en route to and entering sites and confirmation of mitigation measures.
- 5.2.2 Approval of local routes, holding areas and back-up routes to be used by construction lorries will be identified in the traffic management plan.
- 5.2.3 The routes between the sites and the Transport for London Road Network and strategic road network will be selected to minimise effects on residential properties, businesses and sensitive receptors, such as schools, as far as is reasonably practicable. Where available, these routes have been identified in the *CoCP* Part B.
- 5.2.4 Lorries shall not be permitted to park on the highway in the vicinity of any worksite while waiting to deliver or remove materials, except in specified areas identified in the traffic management plan.
- 5.2.5 The contractor shall communicate to all suppliers the access requirements for each site to ensure that lorries do not arrive before standard working hours or wait in non-agreed areas.

- 5.2.6 An appropriate control system will be implemented for the arrival and departure of all vehicles containing excavated material or demolition materials to prevent congestion around the worksite and its access routes. Only vehicles notified in advance will be allowed to enter the site. No vehicle queuing outside of the site will be permitted unless specified in the travel management plan. Procedures will be established to move vehicles on to prevent queuing.

5.3 Works within the highway or on a Public Right of Way

- 5.3.1 The DCO includes provisions relating to carrying out highway works (including stopping-up orders). Article 14 requires alternative rights of way to be provided prior to the removal of Public Right of Way, or permissive paths. Any temporary diversionary signage for pedestrians shall be approved by the local planning authority in consultation with the highway authority in accordance with DCO Requirement PW10 (Signage for temporary footpath diversions).
- 5.3.2 In addition, the duration of any temporary closure of highways and Public Rights of Way should be as short as practicable. Pedestrian access to premises will be maintained.
- 5.3.3 Local residents and businesses will be informed in advance (as far as is reasonably practicable) of the dates and durations of closures and provided with details of diversion routes, as detailed in Section 3.
- 5.3.4 The contractor shall:
- minimise the need for diversions of Public Rights of Way, cycle routes or National Trails (including the Thames Path)
 - minimise the length of any such diversions
 - minimise the duration of diversions
 - implement controls to ensure the safety of pedestrians and cyclists needing to cross a haul route
 - provide advance notice of any closures/diversions and clear signage
 - ensure that any diversions are fully accessible and comply with the requirements of the Disability Discrimination Act 1995, as far as practicable and in the context of the route to be closed temporarily.
- 5.3.5 The design and operation of the works will take account of people with reduced mobility.

5.4 Road cleanliness

- 5.4.1 All reasonable measures shall be put in place to avoid/limit and mitigate the deposition of mud and other debris on the highway, which will also minimise dust generation.

- 5.4.2 These measures will have regard to the nature and use of the site and include:
- a. hardstanding at access and egress points that will be cleaned at appropriate intervals
 - b. vehicle wash-down points to clean wheels at each egress point
 - c. correct loading of vehicles and sheeting of loads where necessary to avoid spillage on the journey
 - d. use of sealed vehicles to transport wet materials that otherwise have the potential to leak from the vehicle
 - e. use of mechanical road sweepers combined with water sprays to suppress dust and clean site hardstanding, roads and footpaths in the vicinity of the site (must be available to respond to emergencies within one hour)
 - f. flushing of gullies in the vicinity of the site
- 5.4.3 The contractor is responsible for ensuring that concrete supplies do not spill on journeys to sites and any spills shall be adequately cleaned up.
- 5.4.4 After completion of any works affecting a highway, all surplus materials will be cleared from the highway, leaving it in a clean and tidy condition in accordance with the requirements of the highway authority.

5.5 Reinstatement of highways and Public Rights of Way

- 5.5.1 Where temporary alterations to the highway are required, the highway will be restored to the same condition as before the works or to a standard that is acceptable to the relevant highway authority.
- 5.5.2 Surveys will be used to establish the condition of the highway or Public Right of Way before commencing and following completion of project works, in consultation with the highway authority. The locations at which surveys will be carried out will be identified in the traffic management plan. The highway authority will be notified of surveys and may send a representative to agree the survey.

5.6 River transport

- 5.6.1 The framework of controls for matters related to river transport and works are set out within the DCO Requirements, protective provisions and Deemed Marine Licence Conditions.
- 5.6.2 The *River Transport Strategy*, secured by Requirement PW15, sets out the overarching commitments to river transport. Project-wide Requirement PW12 (Excavated material and waste) is also of relevance.
- 5.6.3 For each relevant worksite, the contractor shall prepare proposals for the management of river transport, in a river transport management plan. These proposals will be developed to demonstrate compliance with Schedule 16 (Protective Provisions), Part 2 (the Port of London Authority).

The Deemed Marine Licence Condition 16 (Vessels) requires the MMO to be notified before vessels are used for construction activities.

- 5.6.4 The Schedule 16 Protective Provisions for the PLA and the EA, Parts 2 and 3 respectively, require detailed method statements and navigational risk assessments to be prepared to further assess risks to recreational and commercial river users and confirm the mitigation measures.
- 5.6.5 Where relevant, the CoCP Part Bs set out further details of any site-specific controls such as moorings, loading facilities, navigational aids and signage.
- 5.6.6 In addition to these measures, the contractor shall ensure that legal requirements for works affecting navigational channels are adhered to and will carry out the works in such a way as to maintain existing navigational channels during construction, through liaison with the PLA and in accordance with navigational risk assessments.
- 5.6.7 All vessels used on the project are required to meet the PLA Technical and Operational Standards for Commercial Vessels on the Tidal Thames (2013 or updated standards).
- 5.6.8 The contractor shall carry out the works in such a manner as to minimise undue inconvenience to the public and other river users arising from increased barge movements.
- 5.6.9 The planning of the works will include consideration of access and other needs of affected river users. The contractor shall regularly communicate with parties affected by the works, as detailed in Section 3. Access will be maintained, within the constraints of the works and the need to ensure the safety of the public.

5.7 References

- a. Highways Act 1980
- b. New Roads and Street Works Act 1991
- c. Traffic Management Act 2004
- d. Road Traffic Regulation Act 1988
- e. Town and Country Planning Act 1990
- f. Disability Discrimination Act 2005.

Design standards

- a. Traffic signs Regulations and General Directions 2002
- b. *Traffic Signs Manual*, Chapter 3 (Department for Transport)
- c. *Traffic Signs Manual*, Chapter 5 (Department for Transport)
- d. *Traffic Signs Manual*, Chapter 8 (Department for Transport)
- e. *Safety at Street Works and Road Works: A Code of Practice* (Department for Transport)

- f. *Guidance on the use of tactile paving surfaces* (Department for Transport)
- g. *Design Manual for Roads and Bridges* (Department for Transport).

6 Noise and vibration

6.1 General

- 6.1.1 The *CoCP* and the *Non statutory off-site mitigation and compensation policy* establishes the framework for the control of noise and vibration as a result of project works, secured by Requirement PW6 and a Section 106 Undertaking respectively. The *CoCP* Part Bs identify any site-specific requirements such as restrictions on noise-generating activities (including mitigation measures) or working hours, activities and locations requiring further detailed consideration. Section 61 consent applications will be used to further detail the noise predictions of the works, along with the precise nature of the mitigation that will be implemented. Section 61 Consents may seek to vary the working hours specified in the *CoCP* Part B in order to accommodate the contractor's detailed working methods.
- 6.1.2 The appeals process in the CoPA Sections 60(7) and 61(7) has been modified by the DCO (Article 56, Schedule 19, Part 1, para. 14, and Schedule 17, para. 4(1)(b)). The contractor shall be responsible for any appeals under the DCO in relation to Sections 60 and 61 of the CoPA.
- 6.1.3 The contractor will be required to submit to the local authority applications for Section 61 consents, variations and dispensations under the CoPA for all construction activities that may generate noise, including surface activities related to tunnelling, unless agreed with the relevant local authority. Activities that typically do not require Section 61 consent include those which do not create significant noise and vibration impacts, such as utility connections, existing sewer modifications, footpath crossovers and traffic management schemes. The contractor will agree with the local authority which activities will require Section 61 consent as part of the Noise and Vibration Management Plan.
- 6.1.4 The contractor shall ensure BPM, as defined under Section 72 of the CoPA, at all times for all activities in order to minimise noise and vibration from the works.
- 6.1.5 The contractor shall assess, consider and implement mitigation measures in the form of BPM, including:
- noise and vibration control at source, eg, selection of quiet and low vibration equipment, review of construction programme and methodology to consider quieter methods, position of equipment onsite, control of working hours (see Section 5.2), provision of acoustic enclosures and use of less intrusive alarms, such as broadband vehicle reversing warnings
 - screening, eg, local screening of equipment, perimeter hoarding or the use of temporary stockpiles.
- 6.1.6 Where noise exposure is still predicted to exceed the criteria defined in the *Non statutory off-site mitigation and compensation policy*, the contractor shall propose noise insulation in the first instance and ultimately temporary

re-housing, or other mitigation as identified under the *Non statutory off-site mitigation and compensation policy*.

- 6.1.7 Typical generic noise and vibration suppression measures to be employed are set out in Section 6.4 and will be adopted on all sites, where applicable. Agreement of proposed measures will be sought from the local authority through Section 61 consent, dispensation or variation applications.
- 6.1.8 Notifying the start of works and providing advanced information to local stakeholders is a key part of mitigating the effects of noise and vibration, and the employer will ensure that the contractor carries this out.
- 6.1.9 The contractor shall take account of statutory requirements in respect of noise and vibration (see Section 6.8) as well as guidance set out in the Mayor's *Ambient Noise Strategy* (Greater London Authority, 2004).
- 6.1.10 A minimum of three months before the commencement of relevant works a Noise and Vibration Management Plan shall be submitted for approval by the relevant planning authority. The noise and vibration management plan will be developed and implemented for each worksite and shall include:
- a. an inventory and timetable of activities which may give rise to noise and vibration
 - b. alert system to be used (including notification process)
 - c. how and when information about noise and vibration will be communicated to local stakeholder's by cross-reference to the Community Liaison Plan
 - d. details of control measures to be included in Section 61 applications and draft timetable of applications (using the guidance at Appendix A of the CoCP)
 - e. details of noise and vibration monitoring arrangements, including the location of sensitive receptors, monitoring locations, monitoring durations, and monitoring equipment to be used
 - f. details of the noise and vibration reporting requirements
 - g. details of off-site mitigation to be brought forward (compliant with the *Non statutory off-site mitigation and compensation policy*).

6.2 Working hours

- 6.2.1 Regulating working hours is a fundamental means of controlling noise and vibration. The contractor shall carry out the works in such a way as to minimise adverse noise and vibration impacts from construction activities. Therefore, as far as practicable, works will be carried out during standard working hours (see Section 4.2 for further details).
- 6.2.2 Locations of works that are anticipated to require working outside of standard working hours were assessed in the *Environmental Statement* and defined in the *CoCP* Part Bs. Changes to working hours would be approved by a Section 61 consent, dispensation or variation.

Section 61 consents

- 6.2.3 Before any works which may generate noise effects are carried out, the contractor shall seek Section 61 consent from the relevant local authority. Section 61 applications will set out the specific method of working, the actual working hours required and the specific standards and measures that will be used at identified locations to minimise noise and vibration.
- 6.2.4 Section 61 applications for tunnel drive sites will include predictions and an assessment of ground borne noise and vibration from the tunnel boring machine and the temporary construction railway. Separate Section 61 applications are required for each local authority the tunnel passes through.
- 6.2.5 As part of preparing its Noise and Vibration Management Plan, the contractor shall engage in discussions with local authorities with respect to the information to be provided prior to submitting any Section 61 application. This will include a list of the activities/stages for which separate Section 61 applications will be required. This is to enable all parties to focus on and agree those activities that could give rise to noise complaints and the most efficient approach to the Section 61 consent, dispensation or variation.
- 6.2.6 As required by the CoPA, BPM will be employed and demonstrated through programme, method and noise predictions provided to the local authority in Section 61 consent applications.
- 6.2.7 Justification, detailed descriptions and assessments will be provided for activities outside standard working hours.

Section 61 consents: Dispensation/variation

- 6.2.8 In the event that works for which Section 61 consent has been applied for have to be rescheduled or modified (eg, method or working hours) for reasons not envisaged at the time of submitting the Section 61 consent application, the contractor shall apply for a dispensation or variation from the appropriate local authority, before commencing those works, at the time specified within the CoPA. The dispensation will be sought by means of an application to vary the agreed matters, setting out the revised construction programme or method and the relevant noise calculations. The guidance on use of dispensations and variations is included in Appendix A.
- 6.2.9 Where such rescheduling relates to work of a more urgent or critical nature (such as a key activity likely to delay other key activities), the contractor shall apply to the relevant local authority through the Section 61 process for a dispensation or variation to the agreed matters, where practicable seven days (but at least two working days) before commencing those works.
- 6.2.10 Where working outside standard hours has been discussed and approved in a Section 61 consent, dispensation or variation, the contractor shall inform occupiers of nearby residential or other sensitive properties who are likely to be affected of the works and, where appropriate, the likely

duration of works as soon as reasonably practicable after the grant of the consent (see Section 3).

- 6.2.11 The contractor shall maintain an up-to-date log of all relevant agreed hours and controls on working. This will incorporate any changes to working hours or practices set out in the CoCP Part Bs that have been agreed through the Section 61 process.

Unscheduled overruns

- 6.2.12 In the event that planned works not covered by a consent (either full Section 61 application or dispensation/variation) extend beyond the approved working hours and continue due to unforeseen circumstances that would affect safety or engineering practicability, the contractor shall notify the nature, time, location and reasons for the overrun to the relevant local authority and the employer as soon as reasonably practicable. The site management shall keep appropriate records of such overruns.
- 6.2.13 The local authority will be requested to provide a telephone number and nominate an officer to receive such notifications. Overruns and the reasons for these will be reviewed by the contractor, employer and relevant local authority, with the aim of reducing the potential for further unplanned overruns.
- 6.2.14 In the case of work required in response to an emergency (or to avoid damage or unsafe conditions), the contractor shall advise the relevant local authority as soon as is reasonably practicable of the reasons for, and likely duration of, such works.

6.3 Section 61 consent applications

- 6.3.1 For a Section 61 consent, before starting any construction activities which may cause noise and/or vibration, the contractor shall (using the format in Appendix A or as agreed with the local authority) prepare and submit to the relevant local authority information including:
- an outline of the proposed construction method, type and quantity of plant to be used
 - definition of the working hours required and, where these differ from the standard working hours detailed in Section 4.2, a justification for the working hours sought
 - a work programme which identifies the location and duration of each significant noise-generating activity
 - the sound power levels, or sound pressure level at 10m, for each item of plant for every relevant activity
 - appropriate justification (in terms of noise level, duration and working hours) that the method and plant proposed demonstrates BPM for controlling noise and vibration levels
 - predicted noise and vibration levels at specified locations supported by calculations as per the methodology in BS 5228 part 1 and part 2
 - all steps to minimise noise and vibration during the works

- h. assessment of cumulative noise arising from the works for which consent is being sought, any other works that the contractor already has consent for and other nearby project construction works
 - i. monitoring locations for noise (and where necessary, vibration) including continuous unattended stations and short term attended 'spot check' locations. These are to include as a minimum the assessment locations used in the *Environmental Statement*, where practicable.
- 6.3.2 The Section 61 submissions will be reviewed by the employer before submission to the local authority.
- 6.3.3 The number, extent (geographically and in terms of construction activities) and duration of Section 61 approvals will be the subject of timely consultation between the contractor and each local authority, and included within Noise and Vibration Management Plan.
- 6.3.4 Where works that are to take place in one borough are predicted to give rise to noise that could cause disturbance in a neighbouring borough, the Section 61 application will be made to the authority within which the construction activities are located and include a noise assessment carried out at locations that represent all neighbouring noise-sensitive receptors, and with a copy sent to the relevant neighbouring local authority/ies. Neighbouring local authorities will be consulted in advance of the application to determine the need for any additional measures.
- 6.3.5 In parallel with the draft Section 61 consent, the contractor shall:
 - a. demonstrate to the local authority that the consent application is consistent with the requirement at 2.1 of the CoCP, that is, to be not worse than the effects reported in the ES
 - b. confirm offsite mitigation relevant to the consent application, and as necessary the timing of its provision, as required by the *Non-Statutory Off-Site Mitigation and Compensation Policy*.
- 6.3.6 Where an individual site includes land within the administrative area of more than one local authority, an application will be made to each authority. The local authorities are requested to agree, through discussion, a common set of consent conditions to be issued from each authority.
- 6.3.7 Further information and good practice guidance for the preparation of Section 61 consent applications is provided in Appendix A.

6.4 Noise and vibration control measures

Noise

- 6.4.1 Generic measures to be considered in implementing BPM shall be consistent with the recommendations of BS 5228 and may include one or more of the following, as appropriate:
 - a. careful selection of construction plant, construction methods and programming

- b. equipment to be suitably sited so as to minimise noise impacts on sensitive receptors
- c. use of site enclosures and temporary stockpiles to provide acoustic screening
- d. choice of routes and programming for transporting construction materials, excavated material and personnel to and from sites (see also Section 5)
- e. careful programming of activities which may generate significant noise having regard to local occupants and sensitive receptors.

6.4.2 Specific measures to be employed at any particular site will be based on BPM and shall include consideration of:

- a. acoustic suppression systems
- b. operating equipment in a mode that minimises noise
- c. shutting down equipment when not in use
- d. selecting piling methods which minimise noise and vibration to acceptable levels (push piling where possible)
- e. breaking out concrete by means other than percussion
- f. handling materials in a manner which minimises noise
- g. minimising noise generated by river-based plant, vessels and transport.

6.4.3 Where there are noise sensitive receptors, the noise from river transport vessels is to be controlled by the following measures:

- a. Mains electricity supply to be provided where practicable to reduce noise from on-board generators
- b. Duration of tug or vessel movements to a berth and activities in the vicinity of the berth to be minimised.

6.4.4 The following items of fixed plant shall be contained within suitable noise enclosures: pumps, generators, compressors, concrete batching plant, water settlement and waste water plant, and grout plant. This measure will only be required where plant does not already have sufficient built-in noise attenuation:

- a. Conveyors:
 - i The mounting of underground conveyors used to remove excavated material from the tunnel face will be designed and installed so as to ensure that ground-borne noise and vibration to buildings above the tunnel are minimised.
 - ii A maintenance programme will be implemented to ensure that the noise generated by the conveyor does not increase over time.
 - iii The surface conveyor systems will be acoustically enclosed where they run through or adjacent to noise-sensitive areas.
- b. Temporary construction railway:

- i The alignment, jointing and mounting of temporary construction railways will be installed, maintained and operated in a manner that minimises the transmission of vibration and ground-borne noise from the passage of rail vehicles.
 - ii All diesel locomotives will be fitted with efficient exhaust silencers.
 - iii Track passing locations, joints and switches will be located away from sensitive surface receptors. Speed restrictions may also be required.
 - iv The ground borne noise from the temporary construction railway will be assessed for impacts on sensitive receptors and mitigation determined. The assessment, identification of sensitive receptors, and mitigation (including any limits) will be carried out in consultation with the local authority.
- c. Temporary tunnel ventilation:
- i All tunnel ventilation plant with connections to the atmosphere in any noise-sensitive location will be subject to mitigation measures appropriate to the local environment, including enclosures or screening.
- d. Reversing alarms:
- i The site layout will be designed to minimise and, where reasonably practicable, avoid the need for vehicles to reverse.
 - ii A banksman will be employed to avoid the use of reversing alarms.
 - iii Reversing alarms incorporating one or more of the following features or any other comparable system will be used: highly directional sounders, broad band signals, self-adjusting output sounders and flashing warning lights.
 - iv Reversing alarms will be set to the minimum output noise level to meet health and safety requirements.
- e. Noise barriers or enclosures for machinery for temporary working areas, including works within highways.

6.4.5 All noise and mitigation requirements within the *CoCP* Part A and Part Bs are subject to modification if accepted by the local authority under the Section 61 consents process.

Underwater noise and vibration

6.4.6 The contractor shall control vibration-generating activities (particularly 'in-river' works such as installing/removing piles and installing jetties, cofferdams and campsheds) in order to protect fish. A piling method statement will be provided and agreed with the employer, pursuant to the relevant protective provisions with the EA, and the PLA. The method statement will specify the type of piling technique proposed along with justification for selecting the technique, mitigation measures and timing of the piling works.

- 6.4.7 Any site-specific BPM shall be included in the relevant CoCP Part B. No formal regulatory standards exist in England and Wales to minimise underwater noise emissions or vibration and the EA's current informal policy is based on pragmatic use of noise predictions and evidence from relevant field studies. For vibro and percussive piling, the following measures will be applied:
- a. piling shall only occur during standard working hours. Avoiding piling at night also ensures windows of no disturbance within each 24-hour period
 - b. minimising noise and vibration levels at the midpoint of the navigable channel to leave part of the river passable at all times
 - c. taking noise and vibration measurements at prescribed points and intervals
 - d. where technically feasible, utilising low noise/vibration cofferdam or pile/pier installation techniques, such as pushing or vibro piling rather than impact/percussive piling.
- 6.4.8 Where vibro piling is used, the power of the driving will be increased slowly to enable fish to swim away before the full power of the pile driver is felt through the river.
- 6.4.9 In the event that in-river percussive piling is needed, prior approval from the employer will be required, in consultation with the EA and the PLA.
- 6.4.10 Toolbox talks will be used to raise the skill levels and competence of staff carrying out piling works and awareness of the need to consider noise and vibration impacts on aquatic ecology.
- 6.4.11 Where predictions indicate that best practice limits would not be achievable, underwater noise-generating activities will be confined to outside peak fish migration periods, unless otherwise agreed with the employer in consultation with the EA and the PLA.

Vibration

- 6.4.12 The contractor shall use BPM to minimise vibration generated by the works in order to:
- a. avoid adverse effects on vibration-sensitive equipment
 - b. minimise disturbance to residents and other users of buildings near the works
 - c. protect buildings from physical impacts where it is not reasonably practicable to avoid very high levels of vibration.
- 6.4.13 The contractor shall use BPM to minimise the effects of vibration on people, buildings and vibration-sensitive equipment. Appropriate control measures will be agreed with the local authority through the Section 61 consent process. In establishing criteria, controls and working methods, the contractor shall take account of guidance in BS 6472, BS 5228 and BS 7385. As a minimum, the criteria used for assessment in the *Environmental Statement* will be adopted.

- 6.4.14 Where activities that are likely to give rise to high levels of vibration are planned, the need to carry out vibration predictions in support of the relevant Section 61 consent, dispensation or variation will be agreed with the local authority in advance of submitting the consent application. The predictions will be used to guide the selection of steps to minimise vibration and other activities (such as advanced leafleting and, in extreme cases, building condition surveys) where it is not practicable to minimise vibration at source.
- 6.4.15 In order to protect buildings from damage, the contractor shall carry out vibration predictions and act on the results of the predictions and/or measurements.
- 6.4.16 Action to assess and, where necessary, minimise any adverse effects on vibration-sensitive equipment will be dealt with on an individual basis (as appropriate) within the relevant Section 61 application.

6.5 Off-site mitigation, including noise insulation and temporary re-housing

- 6.5.1 Noise insulation and temporary rehousing is now included for as part of the *Non statutory off-site mitigation and compensation policy*, and was developed to provide additional protection for residential property in the event that it is not practical to mitigate construction noise onsite to avoid significant observed adverse effectsⁱⁱ.

6.6 Noise and vibration monitoring

General statement

- 6.6.1 The need for noise and vibration monitoring, the monitoring methodology and monitoring locations will be identified first in the Noise and Vibration Management Plan and then detailed in Section 61 consent applications. Monitoring will be the subject of discussion between the contractor, the employer and the local authority prior to submission. Monitoring locations will include the assessment locations defined in the Environmental Statement, where practicable. Monitoring data will be made available to the local authority weekly, or at an agreed frequency.
- 6.6.2 The contractor shall adhere to any site-specific noise and vibration monitoring-related conditions imposed by the local authority.
- 6.6.3 Noise and vibration monitoring will take the form of:
- a. off-site noise and vibration monitoring to demonstrate compliance with levels in the Section 61 consent
 - b. onsite noise and vibration monitoring to demonstrate compliance with plant levels in the Section 61 consent

ⁱⁱ Refer to the emerging National Planning Policy Guidance for noise, and the Noise Policy Statement for England.

- c. onsite surveillance monitoring to demonstrate that the noise and vibration mitigation, methods and assumptions in the Section 61 consent are being adopted onsite.
- 6.6.4 Consent from landowners will be required for the erection of any monitoring equipment.
- 6.6.5 Any incidents of noise limits being exceeded will be reported by the contractor to the employer and the local authority as soon as is practical.
- 6.6.6 The contractor shall develop, agree as part of the noise and vibration management plan, and then implement a monitoring and reporting methodology to:
- a. allow monitoring results to be easily compared to forecast noise in the relevant Section 61 consents and the Environmental Statement
 - b. provide all necessary information to demonstrate compliance with the CoCP, DCO Requirements and relevant Section 61 consents
 - c. disaggregate the contractor's noise from other project contractors' noise and from all ambient noise sources
 - d. enable unusually high noise events to be identified.

Monitoring and control of instantaneous maximum (L_{Amax}) noise levels

- 6.6.7 The contractor shall identify, as part of its Section 61 consent applications, those construction activities that could give rise to significant impulsive noise events and the mitigation, or management processes, in accordance with best practicable means to minimise these impulsive noise events. Particular attention shall be given to the control of impulsive noise in the evening, and especially for any night-time works.
- 6.6.8 The contractor shall, as part of its assessments, provide forecasts for maximum noise levels for construction methods that are likely to generate loud and regular impulsive noise (eg, breaking concrete) where it is practicable to do so (ie, where source data are available to support calculations).
- 6.6.9 The contractor shall monitor and report instantaneous maximum noise levels (L_{Amax}) during the works in accordance with the monitoring requirements of the CoCP.
- 6.6.10 Where measured levels identify that high maximum noise levels are likely to occur regularly, and it is confirmed that the works being undertaken as part of the scheme, are the source of the noise, then the contractor shall be required to undertake a further review of the best practicable means employed for the activity to minimise noise.
- 6.6.11 At night, the contractor shall be required to investigate the exceedance or likely exceedance immediately, report this and the findings of the review to the employer and relevant local authority, and implement any further mitigation identified as being necessary as soon as is reasonably practicable. At other times (day end evening), the same actions will be taken except that the review will be reported within three days.

- 6.6.12 Where the exceedance coincides with a noise complaint, then the contractor will implement any additional mitigation identified by the investigation before the next shift when the relevant activity is scheduled to be undertaken again (eg, if the maximum level exceedance and complaint occur at night then the additional mitigation will be implemented by the contractor before the same works can be undertaken at night again).

6.7 Suitably qualified persons

- 6.7.1 The person(s) responsible for preparing applications for Section 61 consent or variation and for the associated noise and vibration calculations and/or monitoring shall demonstrate:
- a. a summary of training and education relevant to managing construction noise and vibration
 - b. experience of the Section 61 consent process and of monitoring noise and vibration
 - c. confirmation that the individual is, at minimum, an associate member of the Institute of Acoustics
 - d. a 'certificate of competence' from the Institute of Acoustics course, 'environmental noise measurement'.

6.8 References

Relevant acts of parliament/regulations

- a. Control of Pollution Act 1974, Section 61
- b. Construction Plant and Equipment (Harmonisation of Noise Emission Standards) Regulations 1989
- c. Control of Noise (Codes of Practice for Construction and Open Sites) (England) Order 2002
- d. Hazardous Waste (England and Wales) Regulations 2005, as amended
- e. Environment Act 1995, as amended
- f. Environmental Protection Act 1990, as amended
- g. Noise Act 1996
- h. Control of Noise at Work Regulations 2005 (SI 2005/1643)
- i. Pollution Prevention and Control Act 1999
- j. Environmental Permitting (England and Wales) Regulations 2010, as amended
- k. Railways and Other Guided Systems Regulations 1996
- l. Public Health Acts 1936 and 1961.

British standards

- a. BS 5228: 2009 (Parts 1 and 2) *Code of Practice for Noise and Vibration Control on Open Construction Sites*, British Standards Institution
- b. BS 4142: 1997 *Method for rating industrial noise affecting mixed residential and industrial areas*, British Standards Institution
- c. BS 6472: 2009 *Guide to evaluation of human exposure to vibration in buildings* (1 Hz to 80 Hz), British Standards Institution
- d. BS EN 60651: 1994 *Specification for sound level meters*.

General guidelines

- a. GLA 2004 *Souther City*. The Mayor's Ambient Noise Strategy. Greater London Authority (March 2004).

7 Air quality

7.1 General

- 7.1.1 Gaseous and particulate pollutant emissions to the atmosphere from vehicles and plant used on the site and dust from construction activities will be controlled and limited as far as is reasonably practicable. Potential sources and sensitive receptors will be identified and appropriate control measures applied.
- 7.1.2 Before commencing relevant works, an air quality management plan shall be submitted for approval to the relevant planning authority. The plan will be developed by the contractor and for each worksite shall include:
- a. an inventory and timetable of activities which may give rise to emissions or dust
 - b. alert levels
 - c. alert system to be used (including notification process)
 - d. details of control measures
 - e. details of dust monitoring arrangements, including the location of sensitive receptors, monitoring locations, and monitoring equipment to be used
 - f. details of the air quality reporting requirements.
- 7.1.3 The plan must include all appropriate dust and emissions mitigation measures, applicable to the circumstances of the relevant site, from the best practice guidance (BPG), *The Control of Dust and Emissions from Construction and Demolition* published by the Greater London Authority and London Councils in November 2006 (or the Supplementary Planning Guidance (SPG) when published).

7.2 Vehicle and plant emissions

- 7.2.1 The contractor shall ensure that the adverse effects of vehicle and plant emissions are controlled utilising the measures contained within the BPG/SPG. Measures to be employed for minimising emissions and avoiding nuisance will include the following as a minimum:
- a. ensuring that the engines of all vehicles and plant onsite are not left running unnecessarily
 - b. using low emission vehicles and plant (so as to comply with particle emission limits)
 - c. minimising movement of construction traffic around the site in both site layouts and routine operations
 - d. implementing operational procedures for tugs and other river transport that have regard to emissions and include methods to reduce them, where practicable.

7.3 Dust emissions

- 7.3.1 The contractor shall comply with the provisions of the Health and Safety at Work Act 1974, the Environmental Protection Act 1990, the Environment Act 1995, the Clean Air Act 1993 and the regulations made thereunder, including the Control of Substances Hazardous to Health Regulations (SI 2002/2677).
- 7.3.2 The contractor shall design and implement appropriate measures to minimise the impact of dust.

7.4 Dust control

- 7.4.1 The air quality management plan will include controls to minimise dust emissions. Two levels of control for dust impacts are required using techniques in line with the BPG/SPG and the Building Research Establishment's publication *Controlling particles, vapour and noise pollution from construction sites* (2003).
- 7.4.2 Emergency control arrangements will be adopted in the event of a pollution incident or complaint due to dust. This will include liaison with the local authority and will be consistent with relevant legislative requirements.
- 7.4.3 The contractor's dust control procedures shall consider periods of drought.

Standard dust control procedures on all sites

- 7.4.4 The standard dust control procedures will include (but not be limited to) the measures detailed within the BPG/SPG, as appropriate:
- measures to reduce dust formation
 - measures to reduce dust re-suspension
 - measures to control dust present
 - measures to reduce particulate emissions
 - measures to ensure road cleanliness (see Section 5.4)
 - monitoring and recording of dust-generating activities
 - site based training (eg, induction and toolbox talks to raise skill levels and competence of staff)
 - measures to control dust from demolition.

Additional dust control procedures on main tunnel drive sites

- 7.4.5 For main tunnel drive sites, the types of activities onsite and the duration of operations are likely to require more dust control. The dust control procedures adopted will include those detailed in the BPG for the most high risk sites (high risk refers to the likelihood of dust generation).

- 7.4.6 Additional dust control procedures will include, as appropriate, measures such as:
- a. additional screening of dust-generating activities
 - b. sealing of dust-generating surfaces
 - c. full-time road sweepers
 - d. any specific monitoring requirements (confirmed in the relevant *CoCP* Part B).
- 7.4.7 Techniques such as total enclosure of certain operations to protect vulnerable receptors will be implemented where necessary to avoid unacceptable impacts. The measures will be site-specific and proportionate to the risk.

7.5 Dust and particulate monitoring

- 7.5.1 The contractor shall ensure that dust and particulate monitoring is carried out on project construction sites. A risk-based approach will be used to identify the type of dust monitoring to be used at each worksite by looking at the details of the specific packages of work within the site boundaries and the receptors around the site. Monitoring locations will be agreed with the relevant local authority. Where works take place near to a boundary between local authorities, the monitoring locations will be agreed with each authority for their respective areas.
- 7.5.2 Passive deposition monitoring techniques will be adopted at appropriate locations (site boundaries/local receptors) according to specific site conditions.
- 7.5.3 The contractor will establish a baseline prior to commencing construction at all sites. This will be determined, where specifically required, for a 12-month period (or for a shorter period if agreed with the employer in consultation with the relevant local authority), derived from data sourced from local background PM₁₀ concentrations measured by the Automatic Urban and Rural Network monitoring sites and appropriate local authority automatic monitoring sites.
- 7.5.4 The contractor shall commence dust monitoring as soon as is reasonably practicable after gaining possession of relevant sites in order to provide localised data to augment the data obtained from the Automatic Urban and Rural Network/local authority sites.
- 7.5.5 During construction, continuous particulate (PM₁₀, PM_{2.5} and TSP, total suspended particles) monitoring will be carried out using appropriate survey instruments at locations agreed with the local authority. Instruments will be set up at relevant sites to operate an alert system when a predetermined site action level is reached. If the alarm is triggered, the following actions will be taken:
- a. The contractor, or a delegated representative, will as quickly as practicable investigate activities on the site to ascertain whether any visible dust is emanating from the site or activities are occurring that are not in line with dust control procedures.

- b. Any identified causes will be rectified, where practicable. Actions will be recorded in the site logbook and the relevant local authority notified of the event and actions by telephone or email, as soon as is practicable, after or during the dust event.
- c. If no source of the dust event is identified, other project sites and local authority or Automatic Urban and Rural Network monitoring sites will be contacted to establish whether there is an increase in particulate concentrations in the wider area.
- d. If the cause of the alert is not related to site operations, the outcome of any investigation will be recorded in the site logbook and reported to the relevant local authority at an appropriate time.

7.5.6 Dust monitoring will continue until the site is deemed to be low risk. The cessation of monitoring is subject to consultation with the local authority and agreement with the employer.

7.6 Construction odours

7.6.1 It is not anticipated that the works will give rise to any significant odour impacts but, if necessary, the contractor shall adopt appropriate measures to avoid creating a statutory nuisance or significant loss of amenity due to odours. The air quality management plan will include odour (in the emissions section).

7.6.2 Where connections are to be made to the existing sewer systems, in the contractor's method statement the contractor will consider the potential increase of odour to sensitive receptors and manage and control foul water flows, as appropriate.

7.7 References

- a. Air Quality Standards Regulations 2010 (SI 2010/1001)
- b. Air Quality Limit Values Regulations 2003 (SI 2003/2121)
- c. Environmental Protection Act 1990, as amended
- d. Clean Air Act 1993
- e. Pollution, Prevention and Control Act 1999
- f. Environmental Permitting (England and Wales) Regulations 2010, as amended
- g. Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Department for the Environment, Food and Rural Affairs (July 2007)
- h. Control of Substances Hazardous to Health Regulations 2002 (SI 2002/2677)
- i. *Controlling particles, vapour and noise pollution from construction sites, parts 1 to 5*, Building Research Establishment (2003)

- j. *The Control of Dust and Emissions from Construction and Demolition*, Greater London Authority and Mayor of London (2006)
- k. Control of Asbestos Regulations 2006 (SI 2006/2739)
- l. Asbestos (Licensing) Regulations 1983 (SI 1983/1649), as amended in 1998 (SI 1998/3233)
- m. *Asbestos: The survey guide* (HSG 264), Health and Safety Executive (2010)
- n. Hazardous Waste (England and Wales) Regulations 2005, as amended.

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8 Water resources

8.1 General

- 8.1.1 The framework of controls for matters related to water resources are set out within the DCO Requirements, Deemed Marine Licence Conditions, Protective Provisions, Environmental Permits and Land Drainage Consents. Specific controls include:
- a. relevant Requirements that control the effects on water resources include site-specific surface water drainage Requirements (eg, ACTST10)
 - b. Relevant Deemed Marine Licence Condition (*CoCP* and *CEMP*) include controls relating to the protection of the river environment
- 8.1.2 In addition to these controls, the contractor shall implement working methods to protect surface water and groundwater from pollution and other adverse impacts, including changes to flow, flood storage volume, water levels and water quality. The contractor shall protect the integrity of flood defences, in accordance with the EA's protective provisions and industry guidance.
- 8.1.3 Before commencement of any relevant works, the contractor shall prepare and implement a water management plan for each site, which shall take account of watercourses and underlying aquifers and have regard to guidance set out within the relevant pollution prevention guidelines (PPGs) issued by the EA and other Construction Industry Research and Information Association (CIRIA) documents. Specific receptors in the water environment will be listed in the plan. The plan will be approved by the employer and the EA for appropriate content relevant to the statutory remit of the EA, and in consultation with the MMO and the PLA.
- 8.1.4 The plan shall detail the practical measures that will be implemented to comply with the relevant legislation (including, but not limited to, the Water Resources Act 1991, the Environmental Permitting Regulations 2010 and the Land Drainage Act 1991). It will be used to support any applications for permits or consents from the EA for works that could affect any surface water, groundwater resource or any flood defences. These arrangements will include the discharge of water from construction sites to any watercourses as well as any works that are required within 16m of a flood defence asset.
- 8.1.5 The emergency preparedness plan and pollution incident control plan, detailed in Sections 4.9 and 4.10, will take account of effects on water resources. EA guidance on pollution incident response planning will be reflected in the emergency plans.

8.2 Site drainage

- 8.2.1 Site-specific Requirements are proposed to secure the detailed design of surface water drainage (eg, ACTST10 Surface water drainage).

- 8.2.2 In addition to these controls, sustainable methods will be utilised for discharges including site drainage, surface run-off and dewatering discharges. This includes discharge to watercourses subject to assessments of water quality, rates of discharge and scour. For discharges to mains foul or combined sewers, relevant permissions shall be obtained from the statutory undertaker. Discharge to watercourses will, insofar as not dealt with in the DCO, only be permitted where permits or other relevant approval has been obtained. Sufficient time will be allowed for the EA to issue permits in accordance with relevant legislation.
- 8.2.3 The contractor shall ensure that site drainage meets the effluent and flood risk standards required by the sewerage undertaker and EA, as appropriate, in accordance with the relevant permit and will provide and maintain holding or settling tanks, separators and other measures, as required. The contractor shall ensure that access is provided to the undertaker and EA so that samples of discharges can be obtained and analysed and flows verified, as required.
- 8.2.4 All temporary hardstanding on non-foreshore sites, as far as is reasonably practicable, will incorporate permeable surfacing unless there is a risk of ground/water pollution from contaminants.
- 8.2.5 Any discharge to sewers and controlled waters shall be in accordance with the DCO provisions, having regard to the relevant licensing body's requirements.
- 8.2.6 Water flows from sites will be limited during construction to existing run-off rates, unless otherwise agreed with the EA, in accordance with relevant legislation.
- 8.2.7 The relevant sections of British Standard 6031: *Code of Practice for Earthworks* for the general control of site drainage will be followed.

8.3 Protection of watercourses

- 8.3.1 The Deemed Marine Licence conditions provide the principal controls for the protection of watercourses, namely:
- a. Notification of Commencement of Works
 - b. *CoCP* and approval of marine elements of the CEMP
 - c. Concrete and Cement, control of discharges
 - d. Coatings and Treatment, suitability for use
 - e. Spills, protection and procedures.
- 8.3.2 In addition to these controls, the contractor shall seek to control flood risk to appropriate levels set by the EA, using mitigation measures, compensation and/or monitoring where required. Insofar as it is not dealt with in the DCO, approval will be obtained in advance from the EA for all crossings of, diversions to, and work affecting watercourses. Sufficient time will be allowed for the EA to issue land drainage consents. Insofar as it is not dealt with in the DCO, appropriate consent will be obtained from

the EA for works under, over or within a river channel and within 16m of a tidal river and 8m of a non-tidal river.

- 8.3.3 Protection measures for works in or adjacent to watercourses will be implemented in accordance with requirements set out by the EA.
- 8.3.4 Watercourses, including land and/or road drainage, within construction sites will be maintained.
- 8.3.5 Measures will be taken to prevent the deposition of silt or other material arising from work operations in any existing watercourse, canal, lake, reservoir, borehole, aquifer or catchment area. The measures will accord with the principles set out in industry guidelines, including the EA's note PPG 5 *Works in, near or liable to affect water courses* and CIRIA's report C532 *Control of water pollution from construction sites*. Measures include use and maintenance of temporary lagoons, tanks, bunds, silt fences or silt screens, as well as consideration of the type of plant used and the time of year for working in watercourses.
- 8.3.6 Other than in PLA-controlled water bodies, where the PLA guidelines will be applied, sediment plumes from dredging in inland waterways, including those under control of the Canal & River Trust, will be controlled by measures in accordance with the principles set out in industry guidelines such as CIRIA's report 169 *Inland Dredging – guidance on good practice*, and Section 6 of CIRIA's report C547 *Scoping the assessment of sediment plumes from dredging*. Contaminated dredged material will be managed as described in relation to other contaminated land materials in Section 9. In addition, relevant EA guidance will be followed, including:
- General guide to the prevention of pollution*: PPG 1
 - Pollution prevention guidance for working at construction and demolition sites*: PPG 6
 - Vehicle washing and cleaning*: PPG 13
 - Dewatering of underground ducts and chambers*: PPG 20
 - Incident response planning*: PPG 21
 - Storage and handling of drums and intermediate bulk containers*: PPG 26.
- 8.3.7 Measures will be taken with regard to 'in-river' works to minimise the release of suspended sediment and solids into the water column.
- 8.3.8 For works requiring materials to be loaded and unloaded on the river, the contractor shall establish suitable management arrangements and mitigation measures to prevent spillages during transfer. This includes design of conveyor systems, enclosures, conveyor belt scrapper locations and selection of other loading equipment. Monitoring methods and contingency arrangements shall be included in the river transport management plan (Section 5) and emergency preparedness plan (Section 4.9).

8.4 Control of pollution to surface water

- 8.4.1 The contractor shall ensure that protection measures to control the risk of pollution to surface water are adopted, including:
- a. Any containers of contaminating substances onsite shall be leak-proof and kept in a safe and secure building or compound from which they cannot leak, spill or be open to vandalism. The containers will be protected by temporary impermeable bunds (or drip trays for small containers) with a capacity of 110 percent of the maximum stored volume. Areas for transfer of contaminating substances (including refuelling areas) will be similarly protected.
 - b. Any permanent oil storage tanks and temporary storage of over 200 litres of oil in drums and mobile bowers, as well as ancillary pipe work, valve, filters, sight gauges and equipment require secondary containment, eg, bunding or drip trays (Control of Pollution (Oil Storage) (England) Regulations 2001). Also, any oil stored within 10m of a watercourse or within Source Protection Zone (SPZ) 1 or SPZ 2 requires secondary containment, eg, secondary bunding that is impermeable to water and oil, with no drainage valve fitted to drain rainwater.
 - c. The secondary containment must be sufficient to contain at least 110 percent of the maximum contents of an oil tank, mobile bowser or intermediate bulk container.
 - d. Above-ground pipework will be properly supported and underground pipework will be protected from physical damage and subject to adequate leakage detection. All mechanical joints on oil pipes must be easy to inspect. Oil and hydrocarbon underground pipes will not extend into the groundwater saturated zone, unless approved by the employer and the risk is acceptably mitigated.
 - e. All refuelling, oiling and greasing will take place above drip trays or on impermeable surfaces (eg, plant nappy) with sealed drainage or an oil interceptor, which provides protection to underground strata and watercourses, and away from drains as far as is reasonably practicable. Vehicles and plant will not be left unattended during refuelling.
 - f. Only construction equipment and vehicles free of oil/fuel leaks which could cause material contamination will be permitted onsite. Drip trays will be placed below static mechanical plant.
 - g. All washing down of vehicles (including wheel washing) and equipment will take place in designated areas and wash water will be prevented from passing untreated into watercourses and groundwater in accordance with PPG 13.
 - h. PPG 23 will be followed when carrying out maintenance of structures over water. Where practicable, only biodegradable hydraulic oils will be used in equipment working in or over watercourses.

- i. Appropriate measures shall be taken to protect erodible earthwork surfaces.

8.5 Control of pollution to groundwater

- 8.5.1 The contractor shall include protection measures to control the risk of pollution to groundwater within the pollution incident control plan, which will, in particular, be consistent with the Environmental Permitting (England and Wales) Regulations 2010. The plan will address following:
- a. Construction activities have potential to cause cross-contamination, either connecting the upper aquifer to the lower aquifer or by the movement of groundwater of different qualities, thereby affecting the lower aquifer.
 - b. The handling of material from the excavation of shafts and tunnels is another potential source of contamination. The contractor shall ensure that the handling of contaminated excavated material, any treatment processes required and the storage of excavated material does not affect the upper or lower aquifer. Measures will be put in place to prevent contaminated run-off reaching open ground.
- 8.5.2 In addition, the contractor shall avoid using materials in the permanent or temporary works that could result in direct or indirect discharge of hazardous substances or non-hazardous pollutants to groundwater, as defined under the Groundwater (England and Wales) Regulations 2009: *“The input of hazardous substances to groundwater will be prevented, and the input of non-hazardous pollutants will be limited to ensure that they do not pollute groundwater”*.
- 8.5.3 The materials to be used for construction within the lower aquifer will be agreed with the EA.
- 8.5.4 Personnel employed for hand excavation of aquifer materials or the handling of excavated material within a zone designated as an inner SPZ or 50-day time of travel zone (SPZ 1) will be required to undergo prestart and ongoing health screening to protect the water from potential contamination. Inductions for these workers will include the need for personal hygiene and the dangers of contamination to groundwater.

8.6 Management of impact on abstraction boreholes during construction

- 8.6.1 The previous sections describe the measures used to minimise the risk of groundwater pollution and adverse impact on water resource. However, at any particular abstraction point, there is a residual risk that the water quality may deteriorate such that the abstractor may no longer use the water for the current or licensed purposes. The following precautionary actions will be applied, where applicable, to limit and manage the residual risks:
- a. Where determined and agreed with owners/operators or other abstraction licence holders, the contractor will carry out targeted risk-

based audits and water quality monitoring at abstraction sources. The monitoring period will be appropriate to the timing and type of work and will include a period of baseline monitoring. The need for intermediate monitoring holes and procedures for water and contaminant testing during construction and operation will be discussed with owners/operators or other abstraction licence holders.

- b. The contractor shall arrange any monitoring of water levels in areas where dewatering of the deep aquifer is planned.
- c. Where water quality monitoring shows an adverse impact on water quality as a result of the works, the contractor shall contact the relevant abstractor (licence holder and operator) and the EA as soon as practicable. The contractor shall put in place appropriate emergency measures to overcome the adverse impact. These emergency measures may include transferring a potable water supply to another water source and informing the water users. Further monitoring and remediation will be arranged as appropriate.

8.6.2 The contractor shall recognise the rights of existing abstractors and consult them on measures to avoid or minimise loss or interruption of supply or provision of alternative supplies. The EA will also be consulted through the permitting of discharges for the required dewatering schemes (see Section 8.8). The Environmental Permitting (England and Wales) Regulations 2010, as amended, apply to discharges of water to controlled surface waters. Discharges to groundwater are generally excluded from these regulations.

8.7 Flooding

- 8.7.1 The contractor shall be responsible for obtaining updated modelled water levels from the EA (for the 1 in 200-year return period event including climate change) as well as updated information on the required standard of protection for flood defences.
- 8.7.2 The contractor shall ensure that flood risk is managed safely throughout the construction period and that all designs comply with the flood risk assessment in the *Environmental Statement* and include provision of a safe refuge for flood events. A flood risk compliance procedure will be included in the water management plan. This will take a risk-based precautionary approach, using the source-pathway-receptor concept, and will apply to temporary and permanent works.
- 8.7.3 The contractor shall be responsible for making and maintaining continuous flood defence provision for both the temporary and permanent works to the statutory flood defence level, as detailed within the flood risk assessment. This is a requirement of the Metropolis Management (Thames River Prevention of Floods) Amendment Act 1879 and is essential to ensure that the sites and third-party land and assets in the surrounding area are protected from flooding. Appropriate consents will be obtained from with the EA, in accordance with relevant legislation, for any works within 16m of the Thames tidal defence, under the Water Resources Act 1991 and the Thames Region Land Drainage Bylaws. The

existing standard of protection will not be reduced even if it is above the statutory defence level.

- 8.7.4 The contractor shall consider and implement appropriate measures to manage the potential risks of flooding from fluvial rivers, localised perched groundwater, overland surface water flows and sewer surcharging, in accordance with the details provided within the flood risk assessment. This will include consideration of potential flow paths within the site that could become active in the event of extreme rainfall and/or sewer surcharging, particularly during the temporary works. Overland flow paths will be determined by site topography, therefore vulnerable operations and materials will be positioned within elevated parts of the site, away from potential flow paths. Where this is not possible, other appropriate protection measures will be taken.
- 8.7.5 The existing flood defences shall be monitored for stability for surface construction, tunnelling, dewatering, filtration and river works. See Section 13 on third-party impacts and settlement for further details.
- 8.7.6 The contractor shall assess potential build-up of groundwater on the upstream side of below-ground structures, as this may lead to rises in groundwater levels and, in severe cases, groundwater flooding and implement mitigation measures where appropriate. At the end of construction where temporary supports, such as sheet piling and secant piles, do not form part of the operational structure, pile walls (where required) will be removed, cut-down or piped through routes provided to prevent the potential build-up of groundwater.

8.8 Dewatering

- 8.8.1 Monitoring arrangements for dewatering will be in accordance with the *Groundwater Environmental Management – Dewatering and Monitoring Strategy*, which is secured by DCO Requirement PW13.
- 8.8.2 Any site-specific monitoring arrangements outside of the limits of land to be acquired or used will be approved by the employer, the relevant planning authority and the EA as necessary, and such activities shall be carried out in accordance with the *CoCP* and other relevant provisions of the DCO.
- 8.8.3 Dewatering operations for cofferdams and in-river structures shall take account of fish rescue arrangements. To the extent that it is not dealt with in the DCO, prior written consent from the EA is required under the Salmon and Freshwater Fisheries Act 1975 to net, trap or introduce fish into a water course.
- 8.8.4 The following additional provisions will apply to groundwater dewatering activities:
- a. Records of water pumped (volume and quality to sewer and/or watercourse) will be kept at all dewatering sites where wells are constructed in the lower aquifer, or as required under the terms of a permit.

- b. Water quality at all dewatering sites will be monitored, applying a risk-based check and audit sampling approach appropriate to the location. Monitoring will comprise laboratory testing and field tests required under the conditions of a permit. Monitoring may need to be agreed at locations where a permit is not required. Any contamination observed will be recorded and notified and procedures for disposal agreed.
- c. Visual inspection of the discharged water at an agreed frequency will be carried out to ensure that excessive suspended solids are not present in the discharge. Pumping will cease immediately (without risk to site personnel and equipment) if polluted discharge is noted. The frequency will be approved by the employer and specified within the water management plan.
- d. Discharge rates and location of discharge points shall be approved by the employer and the regulatory river authorities through PW13 (for the EA), and the relevant PLA protective provisions in Schedule 16 of the DCO, to minimise the impact of scour within the receiving watercourse.

8.9 Ground treatment

- 8.9.1 Site-specific monitoring proposals for those sites where ground treatment will be required will be approved by the EA, in consultation with relevant stakeholders. This includes groundwater quality monitoring around grouting areas and visual inspection of adjacent watercourses, where relevant.
- 8.9.2 The ground conditions at sites principally in the central and eastern parts of the proposed development may require ground treatment techniques. Ground treatment may be required at both main tunnel sites and where connection tunnels connect to the main tunnel. The use of ground treatment techniques has the potential to affect both groundwater resources and water quality.
- 8.9.3 The effects of ground treatment on the stability and integrity of adjacent structures, such as river walls, shall be assessed.
- 8.9.4 Any materials and methods used for ground treatment will be approved by the EA before use. The contractor shall maintain a list of products that are authorised for use.

8.10 Monitoring

- 8.10.1 Where significant changes in water levels in the upper aquifer are expected, additional site investigations may be required. Water levels at selected observation piezometers will be monitored after dewatering or once construction of the cut-off is complete. The monitoring data will be analysed in relation to elevations of nearby basements and existing drains. Additional drainage will be provided as mitigation where necessary. Where appropriate, any existing monitoring from either the *Environmental Statement* or site investigation work will be adopted.

- 8.10.2 Where discharge to water courses is permitted, monitoring of groundwater levels and groundwater quality at appropriate down hydraulic gradient locations will be carried out.
- 8.10.3 Dewatering and other construction activities around certain sites have the potential to affect both the lower aquifer resources and a number of 'key' abstractors from the Chalk aquifer. The groundwater environmental monitoring programme will define baseline conditions and trigger levels using a risk-based approach. If any triggers are exceeded, emergency measures will be implemented to mitigate any significant effects.

8.11 Dredging

- 8.11.1 Dredging will be carried out in accordance with the relevant Deemed Marine Licence Condition (Dredging Activities) and relevant Protective Provisions with the PLA and EA.
- 8.11.2 To the extent that they are not dealt with in the DCO, appropriate Flood Defence Consents will be obtained from the EA for works within 16m of a tidal river and 8m of a non-tidal river.
- 8.11.3 The contractor shall follow PLA guidance for dredging in the tidal Thames and its tributaries. The critical period from June to August when juvenile fish are using nursery habitats will be avoided for dredging, unless agreed otherwise with the employer and the regulatory river authorities under the relevant protective provisions in Schedule 16 of the DCO or the DML in Schedule 15 of the DCO. This will be achieved by programming capital dredging outside this period and implementing a monitoring programme for future maintenance dredging. There will be sufficient monitoring of the river's morphology and maintained depths will be in place at any berths to avoid emergency dredging requirements within the critical period. Where practicable, the contractor shall undertake a single maintenance dredge prior to the critical period.
- 8.11.4 The contractor may need to undertake emergency dredging within the critical period of June to August. Emergency dredging is defined as dredging in response to an unforeseen event or occurrence which could not be reasonably expected or planned and which jeopardises the operation of barge loading facilities.
- 8.11.5 Dredging will be carried out using techniques that minimise the dispersal of intertidal sediments, such as a back hoe dredger. Where dredging could lead to exceedence of the probable effects level, it will be undertaken using methods that minimise sediment loss and mobilisation of contaminants, eg, an enclosed bucket on the backhoe.
- 8.11.6 Where sites that may require dredging lie within a stretch of the river known to support spawning habitat for smelt and dace, care will be taken to minimise any impact on biodiversity within the river in accordance with the Salmon and Freshwater Fisheries Act 1975.
- 8.11.7 The restricted period for dredging (ie, June to August) may need to be extended to include the spring period (ie, March to May) at sites lying

close to known spawning areas or areas frequented by fresh water riverine species. These sites are listed within the *Environmental Statement*.

- 8.11.8 Dredging works exclude local bed levelling for installation of and maintenance work on or around temporary campsheds areas. However, the contractor shall assess these activities for the potential to release sediment and shall select a construction method to control this, otherwise a dredging license will be required in accordance with relevant legislation (Port of London Act 1968 and Marine and Coastal Access Act 2009).

8.12 References

- a. Water Framework Directive
- b. Water Resources Act 1991, as amended by the Environment Act 1995
- c. Water Resources Act 1991
- d. Water Act 2003
- e. BS 6031:2009 *Code of Practice for Earthworks*.
- f. EA PPGs, including:
 - i PPG 1: *General guide to the prevention of pollution*
 - ii PPG 2: *Above ground oil storage tanks*
 - iii PPG 3: *Use and design of oil separators in surface water drainage systems*
 - iv PPG 6: *Pollution prevention guidance for working at construction and demolition sites*
 - v PPG 21: *Pollution incident response planning*
- g. CIRIA C532 *Control of water pollution from construction sites: Guidance for consultants and contractors*
- h. CIRIA/EA Joint Guidelines: *Concrete Bunds for Oil Storage Tanks*
- i. CIRIA/EA Joint Guidelines: *Masonry Bunds for Oil Storage Tanks*
- j. EA Guidance Note: *Piling into Contaminated Sites*
- k. Groundwater Regulations 1998 (SI 1998/2746)
- l. Control of Pollution (Oil Storage) (England) Regulations 2001 (SI 2001/2954)
- m. Control of Substances Hazardous to Health Regulations 2002 (SI 2002/2677)
- n. Groundwater (England and Wales) Regulations 2009, No. 2902
- o. Environmental Permitting (England and Wales) Regulations 2010, as amended
- p. Water Resources (Environmental Impact Assessment) (England and Wales) Regulations: SI 2003/164
- q. Environmental Protection (Prescribed Processes and Substances) Regulations: SI 1991/472

- r. Environmental Protection Regulations 2010
- s. Thames Region Land Drainage Bylaws 1981, as amended 1991
- t. Salmon and Freshwater Fisheries Act 1975.

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9 Land quality

9.1 General

- 9.1.1 Site-specific DCO Requirements provide the principal framework of control relating to land contamination. Before any works commence at a site, a remediation strategy must first be submitted and approved as per the Requirements (eg, ACTST3 Contaminated land).
- 9.1.2 In addition to these controls, the contractor shall assess contaminated land according to guidance contained within the Environmental Protection Act 1990 (Part IIA). This guidance, referred to as the 'Part IIA regime', came into force in England in April 2000 by enactment of Section 57 of the Environment Act 1995. The accompanying Contaminated Land (England) Regulations 2000 (SI 2000/227) state the conditions under which land is defined as contaminated. The contractor shall develop mitigation measures in accordance with these regulations and the HSSE requirements for contractors.
- 9.1.3 The main objective of the Part IIA regime is to provide a system for the identification of land where contamination is causing unacceptable risks to human health or the wider environment, with respect to the current use and designation set by the local authority. If contaminated land is identified, the guidance contained within the regime is intended to ensure that where it is reasonable to do so, mitigation is implemented so that the land no longer presents an unacceptable risk.
- 9.1.4 The contractor shall assess any invasive plants and follow associated guidance as detailed in Section 11.4.
- 9.1.5 The contractor shall review information set out in the *Environmental Statement* relating to contaminated land.

9.2 Site assessment and remedial practice

- 9.2.1 The contractor shall carry out site assessments, investigations and/or risk assessments in order to assess the potential for contamination in both soil and groundwater, in accordance with standard industry guidelines including model procedures for the Management of Land Contamination, Contaminated Land Report 11 and DCO Requirements on contaminated land. Any necessary measures will be approved by the employer and the relevant local authority in consultation with the EA, pursuant to the contaminated land site-specific Requirements.
- 9.2.2 Where appropriate, specialist site surveys will also include unexploded ordnance surveys which, as a minimum, shall include a site-specific desk study and recommendations for safe methods of work during construction.
- 9.2.3 A set of criteria for site investigations will be developed by the contractor in consultation with the local authority and the EA, prior to commencing any intrusive works. Where site investigations reveal the presence of contamination, an appropriate remedial strategy will be developed to

identify the most appropriate option for dealing with the presence of contamination. This strategy will include the following:

- a. The contractor shall liaise with the local authority, the EA and other relevant statutory bodies and will agree control or protection measures necessary to provide appropriate mitigation with the employer. This may involve sealing, excavating and disposing of soil or onsite remedial works.
- b. The consolidated European Waste Catalogue lists those wastes that are 'absolute entries' (hazardous waste regardless of their concentration) and 'mirror entries' (hazardous waste only if 'dangerous substances' are present above threshold concentrations). Contaminated soils are classed as 'mirror entries' in this catalogue. This means that contaminated soils may be classified as either hazardous or non-hazardous, depending on the concentrations of 'dangerous substances' in the soil. An assessment of the composition of the waste soil using appropriate techniques, which could include sampling and laboratory analysis, will be undertaken to determine whether the waste is classifiable as hazardous.
- c. The contractor shall also give consideration to alternatives to landfill disposal as the solution for treating contaminated soil. This may include the use of remedial technologies (*in situ* and *ex situ*) to reduce the quantity of soil requiring disposal and/or treatment of soils to a standard such that they can be reused at a site or be disposed of as non-hazardous waste. Onsite remedial works will be carried out under the Environmental Permitting (England and Wales) Regulations 2010, as amended. Re-use of excavated soils will follow the guidance given in the Definition of Waste Industry Code of Practice.
- d. All relevant information regarding the export of waste soils including anticipated volumes, Waste Acceptance Criteria testing results, trip notes, as well as information regarding volumes, chemical testing, and deposition of imported soils, will be retained to form part of the validation report.
- e. Contamination issues will be recorded in the project health and safety file and risk register, in accordance with the Construction (Design and Management) Regulations 2007, to protect affected parties.
- f. Excavation works will be monitored to check for unexpected or unusual materials with a contaminative potential. This material could consist of buried drums, tanks or containers, soil, groundwater or liquids with an unusual colour or odour, or other evidence of contamination. If this type of material is encountered, work will be stopped until the material has been properly identified and suitable precautions taken, including amending risk assessments and the remedial strategy, if appropriate.
- g. The contractor shall take specific precautions if materials containing asbestos are present or encountered during works, in order to comply with the Control of Asbestos Regulations 2012 and amendments and adhere to relevant guidance, including *Asbestos: Exposure Limits and*

Measurement of Airborne Dust Concentrations (EH10 and MDHS 39/4) and *Managing Asbestos in Workplace Buildings* (1988).

- h. The contractor shall ensure that there are designated areas onsite where contaminated materials can be separated from clean ones and stored in an appropriate environment. Storage of contaminated materials may require specific facilities to prevent contaminants from leaching into the ground, nearby watercourses or neighbouring properties.
- i. Guidance provided in the EA's PPGs in respect of water pollution, in particular PPG 1, PPG 2, PPG 5, PPG 6, PPG 21 and PPG 23, will be followed as far as is reasonably practicable. The contractor shall provide a watching brief carried out by an appropriately qualified person, throughout the investigation and remediation works.
- j. On completion of any remedial works, a record will be kept of the works carried out to comply with the remedial strategy. The contractor will issue a verification report to the employer, EA and the local authority.

9.3 Site works

- 9.3.1 During the site works, and in particular during the initial below-ground works, the contractor shall ensure that the works are routinely monitored for contamination, eg, the presence of odours and unusual staining, as well as oily, tarry or fibrous materials.
- 9.3.2 A specialist onsite watching brief will be carried out for potentially high risk activities and an 'on call' watching brief for all other activities. The specialist watching brief may include unexploded ordnances, contaminated land, occupational health, archaeological and ecological matters.
- 9.3.3 In the event that such contamination is suspected, works in the immediate area will be made safe and secure and the event reported via the defined reporting procedure (including the employer and the contractor). The contractor's contaminated land specialist will inspect the site and, where deemed necessary, arrange for further sampling and laboratory testing of soils or liquids. Further risk assessments to receptors will be carried out as necessary and reported to the employer, the local authority and the EA.
- 9.3.4 Should unacceptable risks be identified, the contractor shall submit to and agree a revised remediation method statement with the local authority, in consultation with the EA.
- 9.3.5 The site induction for construction workers (and visitors if necessary) will include a section on the potential for encountering contaminated materials onsite and the risks that such materials may pose to workers or others (including offsite receptors via dust generation). Training will be given on the identification of potentially hazardous materials and a clearly defined reporting procedure set up in the event that any suspect substances are encountered.

- 9.3.6 All staff and visitors will be made aware of the requirement to adopt the appropriate personal protective equipment, eg, dust masks, respirators, gloves, etc, and also to observe good hygiene practices and avoid hand to mouth contact.
- 9.3.7 All staff will be made aware of regulations governing storage, handling, treatment and disposal procedures for all wastes. In particular, staff will be made aware of the need to segregate and manage potentially hazardous/harmful materials which could pose an immediate risk to site workers or the wider environment.
- 9.3.8 Occupational monitoring, such as gas or vapour monitoring (either personal or work area) and health surveillance will be carried out. This will include consultation with health and safety/occupational health specialists.
- 9.3.9 Dust and air/vapour monitoring will be carried out to check that volatile contamination or construction dusts do not affect off-site receptors. Where appropriate, this will include a combination of onsite and boundary monitoring, involving either providing real time measurements or collecting samples for subsequent analysis. See Section 7, Air quality, for further guidance on measures to be carried out.

9.4 References

Contaminated land

- a. Environmental Protection Act 1990
- b. Contaminated Land (England) Regulations 2006 (SI 2006/1380)
- c. *A guide to safe working on Contaminated Sites*, Report 132, CIRIA (1996)
- d. *Contaminated Land Risk Assessment: A Guide to Good Practice*, Report C552, CIRIA (2001)
- e. *Investigation of Potentially Contaminated Sites. Code of Practice BS 10175*, British Standards Institute (2011)
- f. *Model Procedures for the Management of Land Contamination* (Contaminated Land Report 11), Department for Environment, Food and Rural Affairs/EA (September 2004)
- g. *Unexploded Ordnance (UXO): A guide for the construction industry* Report C681, CIRIA (2009)
- h. Environment Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, Department for Environment, Food and Rural Affairs (April 2012)
- i. *Assessing risks posed by hazardous ground gases to buildings* (revised), Report C665, CIRIA (2007).

Asbestos

- a. Control of Asbestos Regulations 2012 (SI 2012/2675)

- b. Asbestos (Licensing) Regulations 1983 (SI 1983/1649), as amended in 1998 (SI 1998/3233)
- c. Asbestos: Exposure Limits and Measurement of Airborne Dust Concentrations (EH10 and MDHS 39/4), Health and Safety Executive (1996).

Duty of care

- a. Waste (England and Wales) Regulations 2011.

Waste

- a. Landfill (England and Wales) Regulations 2002 (SI 2002/1559), including Schedule 1: Waste Acceptance Criteria
- b. Hazardous Wastes (England and Wales) Regulations 2005 (SI 2005/894)
- c. *Technical Guidance WM2: Interpretation and Classification of Hazardous Waste*, EA (April 2011)
- d. *Definition of Waste: Redevelopment Industry Code of Practice*, CL:AIRE (2011).

EA Pollution Prevention Guidelines

- a. PPG 1 General guide to the prevention of pollution
- b. PPG 2 Above ground oil storage tanks
- c. PPG 5 Works and maintenance in or near water
- d. PPG 6 Pollution prevention guidance for working at construction and demolition sites
- e. PPG 21 Pollution incident response planning
- f. EA Guidance Note: Piling into Contaminated Sites.

Other regulations

- a. Environmental Permitting (England and Wales) Regulations 2010
- b. EC Landfill Directive 1999 (Council Directive 99/31/EC)
- c. Landfill Tax (Qualifying Material) Order 2011 (SI 2011/1017)
- d. Landfill (England and Wales) Regulations 2002 (SI 2002/1559)
- e. Construction (Design and Management Regulations) 2007 (SI 2007/320)
- f. Water Resources Act 1991
- g. Groundwater (England and Wales) Regulations 2009 (SI 2009/2902)
- h. Animal Health Act 2002, Notifiable Disease Burial Sites
- i. Control of Substances Hazardous to Health Regulations 2002 (SI 2002/2677)
- j. Environmental Permitting (England and Wales) Regulations 2010.

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10 Waste management and resource use

10.1 Excavated material options assessment and excavated material and waste strategy

10.1.1 The employer's *Excavated Material and Waste Commitments* provides the controls for the management of materials and waste that will be produced throughout the construction and operational phases of the project and is secured by DCO Requirement PW12.

Site waste management plans

10.1.2 The contractor shall ensure that, for the relevant areas, waste is managed in accordance with local, regional and London-specific policies (eg, the *London Plan 2011*), as well as with the Site Waste Management Plan Regulations 2008.

10.1.3 An overarching project-wide plan will be produced by the employer and used to ensure a consistent approach to managing excavated materials and waste at individual construction sites. It will provide a central location for all project waste information. The plan will:

- a. specify the employer's responsible person and the responsible person for each site, provided by the contractor
- b. record the waste types generated by the entire project initially generated by the employer and, once the contracts are let, by the contractor
- c. provide the details of all waste minimisation actions initially generated by the employer and, once the contracts are let, by the contractor
- d. provide project-wide waste forecasts for each waste type initially generated by the employer and, once the contracts are let, by the contractor
- e. contain a complete register of all approved waste carriers and receptor sites for the project, provided by the contractor
- f. contain a summary of the information relating to waste transactions from each site, provided by the contractor.

10.1.4 The contractor is required to produce a site waste management plan for each site using the template given in the *Excavated materials and waste commitments* document. These plans will feed into the project-wide plan and provide a framework to facilitate good practice on construction sites and ensure that excavated material and waste is effectively managed. The plans will also record and monitor environmental performance, in terms of meeting regulatory control requirements and reducing waste disposal costs.

10.1.5 The project-wide plan and the site-specific plans will ensure that waste is managed in accordance with the waste hierarchy.

- 10.1.6 The site-specific plans will identify:
- a. the approach to excavated material and waste management, taking account of:
 - i the waste hierarchy
 - ii the CL:AIRE code of practiceⁱⁱⁱ to determine when treated excavated waste ceases to be waste for a particular use
 - iii waste and resource action programme aggregate quality protocol for construction and demolition material
 - iv the potential to reuse material from other projects in London to infill cofferdams on foreshore sites subject to meeting the delivery requirements in the *Transport Strategy*
 - v using local permitted and exempt sites that can accept, process and recycle construction materials
 - b. a dedicated area at each construction site for the handling and storage of excavated materials
 - c. recycling facilities for office waste
 - d. where the practicable opportunities to use material with recycled content during construction will be adopted
 - e. the types of excavated material and waste removed from site, descriptions and estimated quantities of waste generated
 - f. details of the authorised waste carrier and registration number
 - g. ways of maximising opportunities for the potential for reusing and recycling through segregation
 - h. the types of training that will be provided to all site workers on waste management and recycling procedures
 - i. disposal routes and permitting requirements
 - j. details of (planned and actual) sites to which waste and/or material was taken
 - k. details of the environmental permit or exemption held by the (planned and actual) receptor sites to which excavated material was taken.
- 10.1.7 The contractor shall ensure that waste materials are sorted into separate waste groups, as defined in the project-wide plan (according to the waste streams generated by the scope of the works), either onsite or offsite by a licensed contractor for recovery.
- 10.1.8 Onsite hazardous excavated material or waste will be kept separate from other materials and removed and managed in accordance with legislative requirements.

ⁱⁱⁱ The voluntary CL:AIRE *Definition of Waste Code of Practice* (CoP) provides a regulator approved framework to determine on a site by site basis whether excavated materials are classified as waste or not and determine when treated excavated waste can cease to be waste for a particular use.

- 10.1.9 The contractor shall produce an end-of-life plan to be agreed with the employer six months before demobilisation of all temporary site infrastructure in order to maximise reuse and recycling opportunities. Information on where temporary site infrastructure is reused and/or recycled will be included in the site-specific plans.
- 10.1.10 The site-specific plans will be updated (within three months of demobilisation) to include:
- a. comparisons between estimated waste and/or material and the actual waste and/or material levels produced
 - b. an explanation of any differences between the estimated and actual levels of waste and/or material produced
 - c. an estimate of the cost savings that were achieved through implementing the site-specific plans.

Demolition controls

- 10.1.11 Where the works require demolition, the contractor shall comply with the following:
- a. carry out a review of the existing buildings to establish whether asbestos is present (see Section 10.3)
 - b. complete a demolition reuse plan before demolition to maximise the recovery of material for subsequent high-grade/value applications
 - c. detail information from the demolition reuse plan in the site waste management plan, including:
 - i identification of the demolition materials
 - ii potential applications and any related issues for the reuse and recycling of the key demolition materials.

10.2 Duty of care

- 10.2.1 The contractor shall comply with all legal 'duty of care' requirements to protect the interests and safety of others from the potential effects of handling, storing, transporting and depositing excavated materials and demolition/construction wastes arising from the project. Such compliance will include implementing and monitoring accepted industry practices for the control of dust, mud and other debris onsite. The guidance set out in the *Waste Management – The Duty of Care, Code of Practice* (Her Majesty's Stationery Office March 1996) (except where superseded by changes to waste law made since issue of this Code of Practice in 1996) will be followed, in addition to obligations under the Waste (England and Wales) Regulations 2011.
- 10.2.2 The site waste management plan will include detailed procedures for compliance with the requirements for waste transfer notes, in accordance with the Waste (England and Wales) Regulations 2011, and arrangements for auditing the actions of other parties in the waste handling chain. A sample waste transfer note document, together with details of

administrative arrangements for record keeping, will be included in the site waste management plan.

- 10.2.3 The arrangements for registering the site, consigning, handling and transporting hazardous wastes will be followed in the context of duty of care and the specific consignment note procedures applicable under the Hazardous Waste (England and Wales) Regulations 2005 (SI 2005 No.894) or any succeeding relevant legislation.

10.3 Asbestos waste management

- 10.3.1 Managing the risk of release of asbestos during alteration, demolition works and excavation works will be carried out in compliance with the relevant regulations and codes of practice and in accordance with the *HSSE Standard*.
- 10.3.2 The Control of Asbestos Regulations 2012 (SI 2012/632) and associated approved codes of practice will be complied with and inspection, survey sampling and analysis of asbestos will be carried out in accordance with *Asbestos: The Survey Guide Health & Safety Executive guidance*, HSG264 (2010).
- 10.3.3 Measures for managing asbestos in alteration, demolition and excavation works will include:
- a. employing competent specialist contractors to carry out alteration and demolition works
 - b. following a procedure for dealing with potentially suspect materials exposed that require sampling and analysis by an independent specialist consultant
 - c. clearly labelling the location of all asbestos containing materials
 - d. formally exchanging information before commencing works, including relevant information from the Asbestos Register to clearly identify the location of asbestos containing materials
 - e. providing method statements for any works in the vicinity of asbestos containing materials to avoid any disturbance to such materials.
- 10.3.4 Measures for managing work involving asbestos containing materials encountered in construction will include:
- a. appointing a specialist consultant independent of the asbestos treatment contractor
 - b. clearly labelling all locations of asbestos containing materials
 - c. ensuring any work with asbestos containing materials is notified to the Health and Safety Executive
 - d. ensuring any work with asbestos containing materials is carried out by licensed specialist asbestos treatment contractors in accordance with the Control of Asbestos Regulations 2012 (SI 2012/632)

- e. requiring method statements defining detailed control measures to be produced by the specialist asbestos treatment contractor and approved by the employer
 - f. air sample monitoring of work to ensure that required air quality standards are achieved.
- 10.3.5 Asbestos containing materials will be transported in accordance with Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009/1348), and disposed of to licensed waste sites in accordance with the Hazardous Waste (England and Wales) Regulations 2005, as amended (SI 2005/894).

10.4 Resource use

General

- 10.4.1 Resources will be controlled by the contractor by means of the following management plans.

Water use

- 10.4.2 The contractor shall produce a water management plan (see Section 8), which will include measures to manage and (where possible) minimise water usage during construction. The plan will include:
- a. measurements of potable water consumption
 - b. targets and procedures for reporting water consumption
 - c. measures for improving the water efficiency of site facilities.
- 10.4.3 Alternatives to the use of potable water onsite will be considered.

Energy and carbon

- 10.4.4 The contractor shall produce an energy management plan containing measures to minimise energy consumption and carbon emissions during construction. The plan will also include ways to:
- a. measure and reduce energy usage
 - b. monitor, report and set targets for carbon dioxide arising from site activities and from transportation to and from sites.
- 10.4.5 The contractor shall demonstrate consideration of energy efficiency in the procurement, maintenance and use of construction plant.
- 10.4.6 The contractor will also consider and assess energy from renewable and/or low emission sources used during construction.

Material use

- 10.4.7 The contractor shall produce a materials management plan, which will include measures to manage material usage during construction. The plan will include ways to:

- a. use sustainably sourced materials (eg, Forest Stewardship Council or Programme for the Endorsement of Forest Certification certified timber)
- b. use recycled or secondary materials
- c. minimise the use of unhealthy materials that have the potential to harm human health or the natural environment.

10.5 References

Waste

- a. Environmental Protection Act 1990
- b. Waste (England and Wales) Regulations 2011
- c. Environmental Permitting (England and Wales) Regulations 2010
- d. Site Waste Management Plans Regulations 2008, SI 2008 No. 314
- e. *Site Waste Management Plans – Guidance for Construction contractors and Clients - Voluntary Code of Practice*, Department of Trade and Industry (July 2004)
- f. Hazardous Waste (England and Wales) Regulations 2005 (SI 2005 No. 894)
- g. *Waste Management – The Duty of Care, Code of Practice*, Her Majesty's Stationery Office (March 1996)
- h. CIRIA guidance
- i. *London Plan, Spatial Development Strategy for Greater London* (July 2011).

Asbestos

- a. Control of Asbestos Regulations 2006 (SI 2006/2739)
- b. *Asbestos: The Survey Guide Health & Safety Executive guidance*, HSG264 (2010)
- c. Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009/1348)
- d. Hazardous Waste (England and Wales) Regulations 2005, as amended (SI 2005/894).

11 Ecology (aquatic and terrestrial)

11.1 General

- 11.1.1 The contractor shall ensure that procedures are implemented to control and minimise disturbance and damage to areas of conservation interest and legally protected and notable species, in accordance with the control measures set out below and relevant legislation.

11.2 Procedures

- 11.2.1 The contractor shall prepare a site-specific ecology and landscape management plan for each site using a suitably qualified ecologist, in consultation with the relevant stakeholders and for approval by the employer, and the EA for appropriate content relevant to the statutory remit of the EA. The plan will be developed in accordance with the landscape schemes approved pursuant to site-specific Requirements (eg, ACTST5 Landscaping works), which will detail how the mitigation assumed in the *Environmental Statement* and *Design Principles* will be implemented. It shall also incorporate mitigation measures set out in the *CoCP* Part B and, where relevant, comply with relevant legislation and nature conservation policy and guidance, including the Mayor's Biodiversity Strategy and local biodiversity action plans.
- 11.2.2 Where species are protected by specific legislation, approved guidance will be followed and sufficient time allowed to obtain the required licences or consents.
- 11.2.3 The contractor shall employ a suitably qualified ecologist to carry out site supervision works during activities that affect sensitive habitats and species to ensure that the procedures and provisions in the ecology and landscape management plan and the *CoCP* in respect of terrestrial and aquatic ecology are followed. The ecologist will also identify any potential new ecological constraints onsite.
- 11.2.4 A suitable qualified ecologist will also carry out site checks for notable and protected species immediately prior to site clearance. The contractor shall provide watching briefs to be carried out by the ecologist during site clearance activities to ensure that any unanticipated discoveries of notable flora and fauna are appropriately dealt with and to ensure legal compliance. In the event of an unanticipated discovery, the ecologist/contractor shall seek advice from Natural England and the local authority, and agree a mitigation strategy with the employer.
- 11.2.5 The contractor shall implement a programme of monitoring to review the status of ecological issues during construction, including the monitoring and maintenance of any measures implemented as part of advanced mitigation works. The programme will be included in the ecology and landscape management plan.

- 11.2.6 The contractor shall be responsible for reporting to the employer any incidents that conflict with agreed procedures.

11.3 Detailed provisions

- 11.3.1 The contractor shall protect habitats including terrestrial, foreshore and river wall habitats, as detailed within the *Environmental Statement*. This includes measures such as site fencing/hoarding to prevent works encroaching into sensitive habitat areas. The contractor shall carry out landscape works at the end of construction pursuant to site parameter plans and site-specific Requirements (eg, ACTST5 Landscaping works), which will set out details to reinstate or restore habitats that are lost during construction and enhance habitats.
- 11.3.2 For provisions relating to the control of potential noise and vibration effects on aquatic ecology, see Section 6.4.

11.4 Habitat and species considerations

Invasive and noxious plants

- 11.4.1 Construction may involve works within areas containing invasive species and may disturb and potentially spread them. Invasive species, such as Japanese Knotweed, Himalayan Balsam and Russian Ivy, are listed on Schedule 9 of the Wildlife and Countryside Act 1981 which makes it illegal to cause them to grow or spread.
- 11.4.2 The contractor shall carry out detailed surveys to determine and map the extent of invasive species at each site, where present (with reference to baseline surveys within the *Environmental Statement*). The contractor shall subsequently produce and implement a site-specific management and eradication plan as part of the ecology and landscape management plan, depending on the works at the site and the timescale for these works. For this activity the contractor's ecologist will be present.
- 11.4.3 It is likely that an advanced herbicide application regime prior to construction works will be recommended in relevant locations in order to eradicate invasive species from areas where works will take place. A detailed protocol will be developed for this regime.
- 11.4.4 The methodology to be used will be selected from avoidance (fencing off areas from the works), barrier (to prevent the spread and enable the use of the area) or removal options and will consider the application of herbicide to treat and prevent spread. The contractor shall follow this approach to ensure that the spread of Japanese Knotweed is controlled. The EA will be notified for operations using herbicide alongside any watercourses.

Birds

- 11.4.5 Construction where areas of habitat likely to be used by nesting birds may be lost will need to take account of the Wildlife and Countryside Act 1981, as amended. All species of wild bird, their nests and eggs are protected by law. It is an offence to intentionally (recklessly) take, damage or

destroy the nest or eggs of any wild bird while the nest is in use or being built.

- 11.4.6 The contractor shall clear bird nesting habitats onsite, such as trees, scrub, buildings and grassland, between October and February inclusive, which is outside of the bird nesting season. This will ensure that no birds are nesting onsite at the start of construction. If clearance is not possible outside of the bird nesting season, then suitable nesting habitat will be checked by the contractor's ecologist immediately prior to its removal. Where active nests are present, no works to or in the vicinity of the nests will be carried out until the nest becomes inactive. If no active nests are present then the clearance can continue under the watching brief of the ecologist. For any clearance activities, the contractor's ecologist will be required to gain the employer's acceptance.

Schedule 1 Bird species

- 11.4.7 Certain uncommon species of bird are afforded additional protection from disturbance; it is an offence to intentionally or recklessly disturb any such bird while it is building a nest, any such bird at a nest containing eggs or young or the dependent young of such a bird. These species are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and, of these, the Black Redstart and Barn Owl are the most likely to be encountered in association with the project. The contractor's ecologist will propose protection measures specific to any Schedule 1 species present onsite, which will be included in the ecology and landscape management plan for the site.
- 11.4.8 In order to minimise the risk of disturbing any Schedule 1 bird species nest, the following approach will be taken in accordance with the Conservation of Habitats and Species Regulations 2010:
- a. Habitats with the potential for use by Schedule 1 bird species (in particular, structures that are to be demolished) will be identified and surveyed by the contractor's ecologist prior to site clearance.
 - b. In the event that a Schedule 1 bird species is found during the nesting season, Natural England will be consulted in order to identify and agree appropriate measures to be undertaken in respect of that species.
 - c. Should a Schedule 1 species be discovered within an area to be disturbed, the contractor shall implement the general measures set out above for birds (see para. 11.4.6) with the added requirement that any Schedule 1 species or its dependent young must not be disturbed while at or building a nest. Therefore, additional exclusion/protective measures may be required.
- 11.4.9 The contractor should note that there is no legal provision under the Wildlife and Countryside Act 1981 (as amended) to obtain a licence to facilitate development which would disturb a Schedule 1 species.

Bats

- 11.4.10 Construction works may involve the removal, damage or disturbance of structures and trees that have some potential to be used by bats as roosting sites. All species of bat in the UK are protected by law under the Wildlife and Countryside Act 1981 and the Conservation of Habitats and Species Regulations 2010. It is an offence to intentionally (or recklessly) kill, injure, capture or disturb bats or to damage, destroy or prevent access to roost sites (even when bats are not present).
- 11.4.11 Bat survey information is provided within the *Environmental Statement*. The contractor's ecologist will carry out an updated bat roost potential survey of the buildings and trees onsite and any necessary detailed surveys to determine whether a bat roost is present. No site clearance works or construction activities that could affect a potential bat roost can be carried out until the ecologist confirms that no such roost is present. Where a bat roost is present or suspected, the ecologist will prepare a method statement to protect bats and ensure that the works are legally compliant. Where required, Natural England will be consulted to agree the method statement and to obtain licenses for works that may affect bat roosts such as a European Protected Species Licence - Bat licence, in accordance with relevant legislation (the Conservation of Habitats and Species Regulations 2010).
- 11.4.12 The *Environmental Statement* identifies areas used by bats for commuting and foraging and any lighting required in these areas will be implemented in accordance with prescribed guidance. The contractor shall consider lighting levels during night time activities and, where required, minimise lighting in line with Section 4.6. Where practicable, lighting will be positioned as low to the ground as possible. It will be capped, cowled and directional, with the light directed away from transit routes and foraging habitat (See guidance produce by the Bat Conservation Trust: *Bats and Lighting in the UK* (2009) or the latest version).

Reptiles

- 11.4.13 All British native reptile species are afforded at least some level of protection under the Wildlife and Countryside Act 1981. Common lizards, grass snakes, adders and slow worms are protected from killing and injury only; protection is not extended to their habitats.
- 11.4.14 Reptile survey work carried out for the *Environmental Statement* to establish the presence of reptiles will be referenced. Where construction works take place in areas that have potential to support common reptile species, the contractor shall implement a watching brief to ensure that no unlawful activities in respect of reptiles take place during site clearance and construction. Any individual reptiles found will be relocated to the nearest safe, suitable habitat. In the unlikely event that large numbers of reptiles are found, a programme of trapping and translocation will be agreed with Natural England in accordance with relevant legislation (the Conservation of Habitats and Species Regulations 2010) before works in that area proceed.

Animal welfare

- 11.4.15 Badgers are protected under the Protection of Badgers Act 1992 from death, injury, damage or destruction to their setts (underground tunnel and chamber network) and disturbance while occupying their setts. The contractor shall implement specific measures to manage the risk of impacts on badgers from the works. Such measures are likely to include site hoardings that prevent badgers from accessing worksites.
- 11.4.16 Construction works will take place in areas where wild mammals, such as foxes, hedgehogs and rabbits, may be present. The Animal Welfare Act 2006 protects such animals from unnecessary suffering. Where pest control measures are to be implemented, the contractor shall appoint an appropriately qualified person to carry out this work. Although not legally protected, hedgehogs are of conservation interest and are likely to be present in the vicinity of some of the construction sites. Measures to prevent hedgehogs from falling into open excavations will be implemented at relevant sites identified in the *Environmental Statement*. Such measures are likely to include site hoardings that prevent hedgehogs from accessing worksites.

11.5 Aquatic ecology receptors (marine mammals, fish and invertebrates)

- 11.5.1 All aquatic ecology receptors are vulnerable to the effects of water pollution. Measures to protect watercourses from pollution, including sediment deposition, are set out in Section 8.3 and include following the relevant EA PPGs. General measures to control the risk of pollution to surface waters are described in Section 8.4.
- 11.5.2 The following section sets out measures to control impacts on specific aquatic ecology receptors.

Habitats

- 11.5.3 In constructing temporary cofferdams, the contractor shall avoid any mixing of fill material with underlying substrate by installing a membrane between the existing river bed and the backfill material.
- 11.5.4 The measures described in Sections 8.2 to 8.4 in relation to site drainage, protection of watercourses and control of pollution to watercourses will be adopted to ensure that surrounding habitats are protected from contaminated surface run-off and dewatering effluents.
- 11.5.5 The locations of barges resting on the foreshore and riverbed will be controlled to reduce the extent of potential environmental impacts. The design of facilities such as campsheds will address the need to minimise environmental impacts and the use of lattice structure barge grids will be considered where appropriate.
- 11.5.6 In-river structures, including campsheds, will be removed on completion of the works as agreed with the MMO (pursuant to relevant Conditions of the Deemed Marine Licence), the EA and the PLA (pursuant to the relevant

protective provisions). Where concrete is used, a membrane will be required to protect the underlying riverbed.

- 11.5.7 The method for reinstating temporary works areas in the foreshore will be subject to a method statement that will consider impacts on aquatic ecology. The method statements for approval by the employer, and through the protective provisions and Deemed Marine Licence where relevant, will include, but not be limited to, details of the following:
- a. timing of the works
 - b. measures to minimise the environmental impact of the works
 - c. the materials or substrates used for reinstatement works
 - d. methods of reinstatement
 - e. any necessary pollution protection measures.

Fish

- 11.5.8 Measures to control the impact of underwater noise and vibration on fish are described in paras. 6.4.6 to 6.4.11.

11.6 Protection of trees

- 11.6.1 Tree protection measures will be included within the ecology and landscape management plan. Trees will be removed or pruned as approved on the relevant demolition and site clearance plan. Where trees are not shown on the plan require pruning or removal, this will require approval from the relevant planning authority. The method for these works is detailed below.
- 11.6.2 The contractor shall submit a request for removal of or alterations to protected trees for approval by the employer, in consultation with the local planning authority and the relevant stakeholders. Any essential remedial or protective work to trees adjacent to construction activity will be carried out by suitably trained or qualified personnel, using recognised methods in accordance with BS5837: *Trees in relation to design, demolition and construction: recommendations*. Any such work in a conservation area or park, shall be approved by the local authority (in consultation with TfL in respect of street trees).
- 11.6.3 All tree surgery will comply with BS3998: *Tree Work: Recommendations*, as far as is reasonably practicable. This approach includes:
- a. Lower branches will be selectively removed in an approved manner to reduce mechanical damage by construction plant.
 - b. Retained trees will be protected with tree protective fencing to BS5837, *Guide for trees in relation to construction*, if working conditions allow
 - c. Tree protection will be installed before any materials or machinery are brought onto the site and before any stockpiling commences. Special attention will be paid to ensuring that barriers remain rigid and intact.

- d. Matting will be installed around root zones to minimise soil compaction.
- e. Notwithstanding the above, construction activities will be controlled to minimise compaction of the ground beneath a tree's entire canopy. No heavy plant or materials or plant will be stored within canopy footprints and construction movements will be controlled by fencing or other means to minimise vehicle movements in these areas.
- f. Existing ground levels will not be altered within canopy footprints, unless agreed by an arboriculturalist in relation to tree pruning requirements.
- g. No ploughing, ripping, storage of materials or soil tipping, etc, will take place within canopy footprints.
- h. All works to ground within canopy footprints will be undertaken by hand, unless agreed otherwise with the contractor's arboriculturalist.
- i. Any works to tree canopies will be carried out by a qualified tree surgeon.

11.6.4 Works within trees' root protection areas will be avoided wherever practicable. However, where works within this area cannot be avoided, eg, for access or stockpiling, it is possible (if agreed with the local authority's tree officer) to use cellular confinement systems to minimise/avoid compaction of the ground. Protection will still be required to avoid physical damage to the tree (ie, trunk, branches or crown). In addition, if works within the root protection area are deemed essential, the duration of the impact will also be minimised.

11.7 Reinstatement landscape scheme

11.7.1 The contractor shall carry out landscape work following construction, in line with details approved pursuant to relevant DCO Requirements, where relevant, in accordance with the DCO article 35 on temporary use of land (eg, Requirements ACTST5 Landscaping works), and any relevant Section 106 agreement.

11.8 References

- a. Wildlife and Countryside Act 1981
- b. Habitats and Species Regulations 2010
- c. Protection of Badgers Act 1992
- d. Animal Welfare Act 2006
- e. *Guide for trees in relation to construction: BS5837*
- f. *Recommendations for Tree Works: BS3998.*

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12 Historic environment

12.1 General

- 12.1.1 The contractor shall carry out the works in accordance with the DCO Requirements relating to listed buildings and archaeology. Relevant Requirements include details approved pursuant to project-wide Requirement PW8 Monitoring of and protective works to listed buildings and structures, PW9 Built heritage recording and the relevant site-specific Requirements (eg, ACTST4 Archaeology).
- 12.1.2 If any work is required outside of the order limits, the contractor shall comply with all relevant legislation and have regard to guidance and best practice, as outlined below and on the HBMCE's Historic environment: local management website (www.helm.org.uk).
- 12.1.3 The historic environment includes all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity (whether visible, buried or submerged) and landscaped, planted or managed flora.
- 12.1.4 Any significant heritage assets to be retained *in situ* will be suitably protected from the contractor's plant and operations during construction.
- 12.1.5 Works directly affecting listed buildings and structures will be carried out in accordance with approved details and method statements. Archaeological works will be carried out in accordance with the *Overarching Archaeological Written Scheme of Investigation*.

12.2 Procedures

- 12.2.1 The procedures detailed in the *Environmental Statement* and *Heritage Statement* apply to all heritage assets, whether or not they are subject to any statutory or other designation.
- 12.2.2 The contractor shall prepare a site-specific heritage management plan that sets out how the historic environment will be protected in a consistent and integrated manner, co-ordinated with all other relevant environmental topics. Protection for heritage assets onsite may take the form of physical protection and/or working practices.
- 12.2.3 The plan will set out how the contractor will discharge the DCO Requirements in relation to heritage, in consultation with HBMCE and the local authority. The plan will be submitted to the employer for approval.
- 12.2.4 The plan will address all construction-related temporary and permanent works including demolition, utility diversions, access routes, works compounds and dredging. It will also address potential effects on heritage assets from third-party impacts, vibration, settlement and dewatering.
- 12.2.5 The contractor shall provide HBMCE and the local authority with sufficient contact, programme, and site access and safety information to facilitate inspections.

- 12.2.6 The plan will indicate how the *Overarching Archaeological Written Scheme of Investigation* and site-specific written schemes of investigation (where applicable) will be implemented, defining in general terms the procedures and mitigation measures to be applied for preservation *in situ* and preservation by record.
- 12.2.7 The plan will include a detailed methodology for the dismantling, removal, storage and reinstatement of any identified historic elements of heritage assets during construction.
- 12.2.8 The contractor shall define procedures for unexpected archaeological discoveries during the works in the heritage management plan and emergency preparedness plan. These procedures will include ceasing work in the vicinity, making safe and notifying the employer, HBMCE and the local authority in order to implement suitable mitigation as per the site-specific schemes.

12.3 Detailed provisions

- 12.3.1 Works affecting statutorily protected assets will be carried out in accordance with the DCO Requirements. Any works proposed outside the DCO will be carried out in accordance with all legislatively required consents and licences, such as the Planning (Listed Buildings and Conservation Areas) Act 1990, the Ancient Monuments and Archaeological Areas Act 1979 and the Burial Act 1857.
- 12.3.2 Mitigation measures are detailed in full in the *Overarching Archaeological Written Scheme of Investigation* and site-specific schemes. The measures will include (as appropriate) archaeological investigation, excavation and/or a watching brief during the works.
- 12.3.3 Mitigation measures for the permanent removal or demolition of heritage assets will include an appropriate level of analysis, reporting, publishing and public dissemination of the results. The resulting archive of records, data and finds will then be transferred to a suitable receiving body in the public domain, such as a local museum. The Greater London Historic Environment Record will also be updated. The full approach to recording and dissemination is detailed within the *Overarching Archaeological Written Scheme of Investigation*.
- 12.3.4 During the works, the contractor shall also give HBMCE and the local authority adequate notice before implementing measures defined in the site-specific written schemes of investigation. Representatives of the HBMCE and local authority may wish to monitor the works for compliance.
- 12.3.5 Methods for protecting the historic environment will include the following (where appropriate):
- a. protective measures such as temporary support, hoardings, barriers, screening and buffer zones around heritage assets and archaeological mitigation areas within and adjacent to worksites
 - b. advance assessment to inform the types of plant and working methods for use where heritage assets are close to worksites or attached to structures that form part of worksites

- c. separation of any elements to be demolished that are attached to listed structures being retained, where practicable, prior to demolition, using non-vibratory techniques such as diamond sawing
- d. care in operating jack-up barges, piling or borehole rigs, mechanical excavators or other plant over areas of the river channel or foreshore known to be particularly archaeologically sensitive (including within cofferdams); in exceptional cases (eg, nationally significant remains) exclusion zones may apply and in the remaining cases safeguards may include appropriate methods for installing and operating such plant. Subject to any necessary consent, suitable protective materials may also need to be added onto the foreshore during construction in order to prevent damage (eg, mats, blinding or aggregate to spread the load)
- e. condition surveys to define settlement and vibration limits for heritage assets potentially affected by the works, which will include monitoring regimes and provision for cessation of works (where feasible) should settlement and vibration levels exceed the specified limits
- f. procedures under the emergency preparedness plan for the emergency repair of damage to listed buildings; where there is damage that does not require emergency repair, repairs will be made as making good as part of the construction process and final repairs to significant finishes will be 'like for like'
- g. security procedures to prevent unauthorised access to heritage assets and archaeological investigations and damage to or theft from them, including by the use of metal detectors
- h. procedures in the event of the discovery of human remains
- i. procedures under the Treasure Act Code of Conduct 1997 to address the discovery of any artefacts defined in the Treasure Act 1996.

12.4 References

- a. Planning (Listed Buildings and Conservation Areas) Act 1990
- b. Ancient Monuments and Archaeological Areas Act 1979
- c. Burial Act 1857
- d. Treasure Act Code of Conduct 1997
- e. Treasure Act 1996.

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13 Third-party impact and asset protection process

13.1 Protection of existing infrastructure and buildings

General provisions

- 13.1.1 The following provisions set out the additional measures that shall be implemented alongside those measures set out in the Settlement Information Paper. The Settlement Information Paper is secured through Legal Agreements and a Section 106 Unilateral Undertaking with the relevant local authorities. Monitoring and protective works to listed buildings and structures are secured through DCO Requirement PW8. Provisions for the protection of specified undertakers are provided in Schedule 16 of the Development Consent Order.
- 13.1.2 The employer has assessed the existing infrastructure and buildings potentially impacted by construction of the works as part of the development of the scheme for planning purposes. Assessment reports and 'approval in principle' documents were prepared and submitted to the relevant third-parties for discussion and acceptance, where possible.
- 13.1.3 The contractor shall be responsible for reviewing and validating the identified interfaces and assessments and completing any necessary calculations, documentation and revisions to take account of the contractor's proposed design and methods of construction. Before carrying out any construction works, the contractor shall be responsible for carrying out the impact assessments, designing any mitigation works and obtaining final approval to proceed (where required) from the asset owners. The contractor shall comply with all infrastructure asset protection agreements that the employer has agreed with asset owners.
- 13.1.4 For listed buildings and structures (nationally designated heritage assets) located within the zone of influence, the contractor shall ensure that the design of the works does not cause damage that is materially worse than that identified and assessed in the *Environmental Statement* for those listed buildings and structures.
- 13.1.5 All third-party impact and asset protection processes, methods and condition surveys that involve flood defence structures (ie, flood defence consent) shall also be approved by the EA.
- 13.1.6 A pre-construction condition survey of the relevant infrastructure and buildings within the zone of influence will be undertaken prior to commencing any works that could potentially have an adverse impact on them. For buildings, this will be carried out by an independent chartered building surveyor and for infrastructure by a suitably qualified engineer, and will be agreed with the asset owner. Where the building or infrastructure is listed, the surveys for buildings will be undertaken by an independent chartered building surveyor who shall be conservation accredited and have at least 5 years' experience in surveying historic

buildings. For listed infrastructure the survey shall be undertaken by an independent professional, who shall be conservation accredited or have at least five years' experience in surveying historic infrastructure.

- 13.1.7 Post-condition surveys, which, where agreed, may take the form of an exception report, shall, where possible, be carried out by the same parties as the pre-condition surveys to determine any issues and establish the level of impact associated with the project.
- 13.1.8 A condition survey of highway access routes immediately adjacent and connecting to the strategic road network and the Transport for London Road Network will be carried out by the contractor before works commence and prior to completion (see Section 5.5).

Protection measures

- 13.1.9 The contractor shall design and carry out construction of the project in a manner that minimises impacts on third-party infrastructure and buildings from ground movement and other construction-related activities. The contractor shall utilise best practice methods to reduce, control and limit ground movement, including the selection of suitable tunnelling techniques including 'in-tunnel' measures and the selection and operation of high performance tunnel boring machines.
- 13.1.10 The contractor shall design and implement necessary protective and mitigation measures for buildings and infrastructure. The design and method of implementation of these measures will be agreed with the asset owner and/or relevant consenting body prior to the works being carried out.
- 13.1.11 The contractor shall prepare assessment reports and pre-construction condition survey reports for all listed structures within the zone of influence. The contractor shall liaise with HBMCE to agree a list of listed buildings and structures which may be affected by the works. The contractor will also prepare method statements for any works to be carried out, including works to listed structures. Copies of the assessment reports, pre-construction condition survey reports, method statements and protective measures relating to listed structures will be provided to HBMCE for review at least two months prior to carrying out the construction works, and the contractor will take account of HBMCE's requirements when carrying out the works.
- 13.1.12 HBMCE have identified the following listed buildings and structures that may be vulnerable to impacts due to construction of the works, and the contractor shall take this into account when completing the impact assessments:
- a. Tower Bridge (grade I)
 - b. St Paul's Church Deptford – (grade I)
 - c. Battersea Road Bridge (grade II*)
 - d. Putney Bridge (grade II)
 - e. Lots Road Pumping Station (grade II)

- f. Limehouse Library (grade II)
 - g. 777 – 783 Commercial Road (grade II)
 - h. Greenwich Pumping Station (grade II)
 - i. 227 Deptford High Street (grade II).
- 13.1.13 When tunnelling towards and under Tower Bridge for a distance of 75m upstream and downstream of the bridge centreline, the contractor shall:
- a. adopt a design alignment for the tunnel matching the tunnel centreline shown on plan no. DCO-WP-000-ZZZZZ-010040
 - b. control tunnelling ground volume loss to not exceed 0.85% and use reasonable endeavours to not exceed 0.5%.

13.2 Monitoring and action plans

- 13.2.1 The contractor, in consultation with the employer, will design and install instrumentation and monitoring to confirm that ground movements and construction impacts are as predicted and acceptable and to provide advance warnings where significant deviation occurs. Where appropriate and when potentially affecting any listed building or structure, monitoring will be carried out for a minimum of three months prior to commencing construction work to establish base-line values and monitoring will continue until it demonstrates that settlement due to the works has effectively ceased.
- 13.2.2 The contractor shall develop an emergency preparedness plan for London Underground Ltd assets and an emergency preparedness plan or emergency response plan (depending on their requirements) for other asset owners, where necessary, to deal with any residual risks. Where this requires any actions to be undertaken on behalf of the asset owner, this will be agreed with the asset owner in advance of construction. The emergency preparedness plans and emergency response plans will include relevant contingency plans and trigger levels for action (including mitigation) and will be approved with relevant stakeholders or asset owners, as appropriate (if the stakeholder is a regulatory body, this will be for approval, otherwise it will be for agreement). For listed buildings and structures the emergency response plan shall be sent to HBMCE at the same time as the asset owner.
- 13.2.3 Trigger levels will typically be set at 50 percent, 75 percent and at 100 percent of allowable movement. The emergency preparedness/response plan shall establish predetermined actions in response to any breach of a trigger level. Unless otherwise agreed with the asset owner in the plan, at 100 percent of allowable movement, construction will be stopped in accordance with a planned 'safe stop' procedure.

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Glossary

Term	Description
abnormal load	This is also known as 'Abnormal indivisible load vehicles' (AILV) and is defined in para. 2 of Schedule 1 (abnormal indivisible load vehicles) to the Road Vehicles (Authorisation of Special Types) (General) Order 2003 (SI 2003/1998). Such a load cannot be divided to be carried on a road without undue expense or risk of damage.
ambient	Surrounding. For noise, for example, it is the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.
anchor piles	Anchor piles are required to construct a line of sheet piles, as part of a cofferdam for example, using the 'push' piling method. These piles have to be the first piles installed and once in place provide an anchor against which the push piling rig can start to drive the next piles. The number of anchor piles required will vary site-to-site depending matters such as ground conditions and pile depth. Anchor piles have to be vibro-driven or, if necessary after sustained refusal, impact driven.
ancient monument	A monument protected under the Ancient Monuments and Archaeological Areas Act 1979.
aquifer	A permeable geological stratum or formation that is capable of both storing and transmitting water in significant amounts.
Automatic Urban and Rural Network (AURN)	The AURN is the UK's largest automatic monitoring network and is the main network used for compliance reporting against the Ambient Air Quality Directives.
baseline	The situation against which the potential impacts due to the proposed development are assessed.
best practicable means (BPM)	<p>This entails the use of best practicable means to achieve a particular objective. The component words of BPM are further explained as (definition as per that given in the Control of Pollution Act 1974):</p> <p>'Best means the most effective technique for achieving a particular objective.</p> <p>'Practicable' indicates that the 'means' under consideration should only be selected following an optimisation process that includes consideration of the technical viability including comparable processes, facilities or methods of operation which have recently successfully tried out and takes into account social and economic costs and benefits.</p> <p>'Means' includes technology, the design, build, maintenance, operation and wider management arrangements.</p> <p>Regard will be had, in construing references to BPM to any relevant provision of a code of practice.</p>
biodiversity	Biological diversity – or 'biodiversity' – is the term given to the variety of life on Earth and the natural patterns formed as a result. Biodiversity is defined in article 2 of the Convention on Biological Diversity (CBD), signed in 1992, as:

Term	Description
	<i>"The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."</i>
borehole	A hole driven into the ground to obtain geological information.
bund	An embankment which acts as a visual or noise screen or impermeable structure around an oil tank to contain oil if it should spill or leak.
Chalk	In the project area, chalk is firm, white, fine-grained limestone with conspicuous semi-continuous nodular and tabular flint seams.
<i>Code of Construction Practice (CoCP)</i>	Document setting out control measures to be adopted during the project construction period.
combined sewer overflow (CSO)	A structure, or series of structures, designed to allow spillage of excess wastewater from a combined sewer under increased rainfall conditions. Flows may discharge by gravity or by pumping.
condition survey	A survey of an asset undertaken prior to construction works that could affect the asset. A further survey can also be carried out after construction is completed, if required.
conservation area	This is defined in the Planning Listed buildings and Conservation Areas Act 1990 as <i>"an area of special architectural and historic interest, the character or appearance of which it is desirable to preserve or enhance."</i>
contractor	Any contractor carrying out works associated with the construction of the project.
Deemed Marine Licence	This means the marine licence proposed to be deemed by Article 50 of the DCO to have been issued by the MMO to Thames Water and included in the DCO as Schedule 15.
development consent order (DCO)	An order under the Planning Act 2008 approving a development that is or forms part of a Nationally Significant Infrastructure Project. The order can grant planning permission and compulsory purchase powers. The order is granted by the Secretary of State.
dewatering	Construction dewatering is a term used to describe removal or draining groundwater or surface water from a riverbed, construction site, caisson or mine shaft by pumping or evaporation.
drive site	A site containing the shaft from where the TBM is 'driven' forward. Excavated material is removed from and segments are fed into the tunnel via the shaft at the drive site.
dust	Coarse particulate matter (between 1µm and 75µm in diameter) produced as a result of abrasive activities during the construction phase of the development/project.
ecology	The relationship between organisms and their environment.
effect	The result of an impact on a particular resource or receptor.
effluent	The treated wastewater discharged from the sewage treatment works.

Term	Description
emergency preparedness plan	A plan prepared for each asset where required, which will detail actions to be taken at each trigger level and will link directly to the outcomes of the risk workshops.
environmental impact assessment (EIA)	An assessment of the possible positive or negative impact that a proposed project may have on the environment, consisting of natural, social and economic aspects. The purpose of the assessment is to ensure that decision makers consider the ensuing environmental impacts when deciding whether to proceed with a project.
<i>Environmental Statement</i>	Environmental Statement” means the <i>Environmental Statement</i> for the Project (January 2013) together with the Errata to the Environmental Statement (February 2014), and the Environmental Statement Update Report (February 2014), all submitted by Thames Water Utilities Limited to support its application for development consent.
excavated material	The earth/soil/ground material removed when shafts, other structures and tunnels are excavated. Excavated material can be either topsoil, subsoil or other material, such as rock, etc.
flood risk assessment	An assessment of the likelihood of flooding in a particular area to enable careful consideration of development needs and mitigation measures.
fluvial	The processes associated with rivers and streams and the deposits and landforms created by them.
foreshore	Ground uncovered by the river when the tide is low.
greenfield sites	Land not previously developed, can include agricultural land.
ground treatment	A range of measures to improve the properties of the naturally occurring ground, or counter the potential pore water pressure changes arising from underground working/excavations, so as to facilitate tunnel or shaft construction and/or reduce ground movement caused by the works.
groundwater	Water located beneath the ground surface in soil pore spaces and in the fractures of rock formations.
groundwater body	A column of water beneath the water table or a unit volume of ground that is saturated.
haul roads	Temporary roads provided within the contractor’s site area to allow the transportation of material around the site.
impact	A physical or measurable change to the environment attributable to the project.
impermeable surface	Surfaces or ground unable to absorb rainfall, eg, concrete, most tarmac surfaces and hardstanding.
impossible	<p>Push piling of sheet piles is impossible where, even with interventions including near surface obstruction clearance, preauguring or water jetting, the pile cannot be driven to its required depth and/or would not fulfil its function (eg, dam to water, load bearing capacity).</p> <p>Removal of piles from the river bed is impossible where on application of the confirmed minimum crane pull of 40 tonnes the pile</p>

Term	Description
	cannot be removed.
$L_{Aeq(T)}$	Equivalent continuous sound level is a notional steady sound level which would cause the same A-weighted sound energy to be received as that due to the actual and possibly fluctuating sound over a period of time (T). It can also be used to relate periods of exposure and noise level. Thus, for example, a halving or doubling of the period of exposure is equivalent in sound energy to a decrease or increase of 3dB (A) in the sound level for the original period.
L_{Amax}	The maximum sound level measured on the A-weighted scale occurring during an event.
listed buildings	Buildings or other built structures included in the statutory list of buildings of special architectural or historic interest of national significance, which is compiled by the Secretary of State for Culture, Media and Sport. Buildings are graded and are protected both internally and externally. Listed building consent is required for almost all works to a listed building.
<i>London Plan 2011</i>	The <i>London Plan 2011</i> is the strategic spatial planning document for London produced by the Mayor of London.
main tunnel	The tunnel from Acton Storm Tanks to Abbey Mills Pumping Station.
main tunnel site	A site from which the main tunnel is built. Each site needs to provide enough space for all the construction related activities, which vary depending on the type of tunnel boring machine used and whether the site is a drive site, a double drive site or a reception site.
method statement	Under Health and Safety at Work Act and Management of Health and Safety Regulations, a method statement must be prepared for each task prior to work on site. The statement is to give details of how the task will be carried out and include possible risks/dangers, along with methods of control to be established which will ensure safety.
minimise	Reduce as so far as is reasonably practicable.
mitigation measures	Actions proposed to moderate adverse impacts and to enhance beneficial impacts arising from the whole or specific elements of the development.
modelling	Simulation of the proposed design (eg, hydraulic modelling of the drainage network, physical modelling of drop shafts or odour modelling, etc).
monitoring	Monitoring, recording and collection of data (eg, CSO spill frequency, vehicle/pedestrian traffic movements or building settlement monitoring pre/during/post construction).
oil interceptor	Underground tank, split into sections and connected into the drainage system, which contains oil and prevents it being discharged into rivers and streams, etc.
piezometer	A small-diameter observation well used to measure the hydraulic head of groundwater in aquifers; a standpipe, tube, vibrating wire piezometer or manometer used to measure the pressure of a fluid at a specific location in a column.
PM ₁₀	PM ₁₀ is any particulate matter with an aerodynamic diameter equal to

Term	Description
	or less than 10µm. Particulate matter of this size can be respired.
protective provision	provisions within Schedule 16 of the DCO which provides protection for the assets and regulatory regimes of specified bodies.
push piling	push piling, or press piling is a method for installing sheet piles which uses hydraulic rams to push the pile into the ground. The reaction force to install the pile utilises the reaction from previously installed piles, with the installation equipment gripping these piles.
receptors	People (both individually and communally) and the socio-economic systems they support.
reception site	A tunnel site containing the shaft from where the tunnel boring machine is 'received', ie, ends up. The machine is removed from the tunnel via the shaft at this reception site.
recreational water users	People who use the river for leisure, eg, rowers.
relevant stakeholder	This means any of the following organisations which may be relevant in the opinion of the local planning authority depending on the nature of any proposed amendment to the <i>Code of Construction Practice</i> , to be considered for approval by the local planning authority: the Environment Agency, the local highway authority, Transport for London, the Port of London Authority, the Marine Management Organisation or the Historic Buildings and Monuments Commission for England.
regulatory river authorities	This means the Port of London Authority, the Environment Agency and the Marine Management Organisation or any of them.
sewerage undertaker	The statutory undertaker for sewerage – responsible for sewerage maintenance.
shaft	Duct/pipe/vertical tunnel; a vertical normally circular chamber.
silt	Granular material of a grain size between sand and clay derived from soil or rock. Silt may occur as a soil or as suspended sediment (also known as suspended load) in a surface water body. It may also exist as soil deposited at the bottom of a water body.
sites and monuments record	A resource and repository of information about the archaeology and historic landscapes under the care of an organisation such as the National Trust and local authorities.
source protection zone (SPZ)	A source protection zone is an area designated by the Environment Agency to show the risk of contamination from potentially polluting activities around groundwater sources such as wells, boreholes and springs used for public drinking water supply.
sound level meter	An instrument for measuring the sound pressure level.
special loads	This is defined in para. 10, Part 2 (Part 2 Vehicles and Part 2 vehicle-combinations: recognised categories and defined terms) to the Road Vehicles (Authorisation of Special Types) (General) Order 2003 (SI 2003/1998).
strategic road network (SRN)	This is the strategic network of roads used to move people and freight around the country, and includes motorways and major trunk

Term	Description
	roads.
suspended solids	The small solid particles that remain in suspension within a liquid.
temporary works	All works required to facilitate the execution of the design, including any left in place after completion, as required under the Construction (Design and Management) Regulations 2007.
Thames Tideway Tunnel project	The Thames Tideway Tunnel project including all associated works undertaken by the contractor or members of its supply chain. It is intended to capture and store unacceptable discharges from combined sewer overflows (CSOs) along the route of the tidal Thames.
topography	The study of Earth's surface shape and features or those of planets, moons, and asteroids. It is also the description of such surface shapes and features (especially their depiction in maps).
Transport for London Road Network (TLRN)	The 580km network of major roads that is administered by Transport for London. It accounts for five percent of London's roads but carries 33 percent of its traffic.
tree preservation orders	The designation of trees that contribute significantly to the amenity value of an area. A tree preservation order designation requires an application is made before any works are carried out to them, including routine maintenance.
trigger level	A predetermined value that can be measured (eg, by survey processes) from a stable baseline, due to construction works. When a trigger level is exceeded, there will be preset actions that should be followed. Trigger levels and preset actions are normally set out in safety case assurance documentation, related to the construction works.
tunnel boring machine (TBM)	A machine used to excavate and line tunnels with a circular cross-section through a variety of ground conditions.
ventilation shaft/column	A vertical pipe or conduit which allows air to move in or out of the system.
works	All construction work associated with the construction of the Thames Tideway Tunnel project.
zone of influence	An area contained by a 1mm vertical movement contour defined in the <i>Environmental Statement</i> .

Appendix A: Section 61 application guidance

A.1 Guide to making a Section 61 application

- A.1.1 The *CoCP* requires the contractor to apply for consent under Section 61 of the *CoPA* to relevant local authorities for all construction activities which may generate noise effects. This appendix provides guidance on the process of applying for a Section 61 consent and recommendations for liaising with local authorities.
- A.1.2 For clarity and consistency with the *CoPA*, the term ‘noise’ includes vibration.
- A.1.3 This appendix provides a sample form for making a Section 61 application. In the event that changes are required to the planned works due to circumstances not foreseen at the time of making an application, the contractor must take a number of steps. These steps are outlined in the sections following the guidance relating to making the initial Section 61 application.

Section 61 application

- A.1.4 The contractor shall submit applications for Section 61 consents, variations and dispensations under the *CoPA* for all construction activities which may generate noise effects, including tunnelling, unless the relevant local authority requires otherwise. Activities that may not require a Section 61 consent include those which do not create significant noise and vibration impacts such as utility connections, existing sewer modifications, footpath crossovers and traffic management schemes.
- A.1.5 The required level of information in the Section 61 application is dependent on local circumstances, ie, the proposed work and the area in which it is to be carried out.
- A.1.6 The Section 61 consent process must be ‘owned’ by the contractor’s construction team as the consents apply to the method of work and mitigation measures (including constraints on hours of working and potentially other significant cost items) and therefore senior level construction management must be responsible for the processes for developing such applications and ensuring compliance with the approved methods.
- A.1.7 The *CoCP* Part Bs define which of the different types of working hours (see Table 4.1) apply to the various activities at each site. Except for continuous working hours (including river and rail transport hours), all other categories of working hours outside of standard working hours will be intermittent or required for defined periods of time. The period of application of these types of working hours will be notified within the Section 61 application.
- A.1.8 Noise calculations and development of steps to minimise noise will focus on significant noisy activities, and will include all construction activities agreed with the local authority. Quiet activities will simply be listed as

items in the method statement. Quiet and noisy activities will be defined in consultation with the local authority before submission of Section 61 applications.

- A.1.9 The screening process will also consider the extent of each Section 61 application, which should avoid covering a very large or very small number of activities. The former can result in excessive consent development time and cost. The latter is also inefficient as it involves too much paperwork for both the contractor and local authority. It may be acceptable for the duration of standard working hours Section 61 consents to be longer than consents for works outside of standard working hours.
- A.1.10 The duration of consents will be considered carefully. Seeking consent for future activities that have yet to be fully developed can lead to significant and unnecessary work for the contractor and local authority in agreeing subsequent amendments. Some local authorities may make consents on large projects subject to a time limit (eg, six months) to allow for regular review (eg, complaints).
- A.1.11 Consideration will also be given to the content of applications. There are two typical approaches: covering all activities for a fixed period or seeking consent for activities/groups of activities. The latter approach can often fit better with the development of the construction programme and placement of subcontracts.
- A.1.12 The contractor shall keep a list of all activities and durations for separate Section 61 applications and routinely review and update the lists.
- A.1.13 Early discussions shall take place between the contractor and the local authorities to ensure that all parties are familiar with the issues associated with the planned construction works to be covered by a Section 61 application. A draft application will be submitted to the local authority at least one month before the intended submission date. The draft can then serve as a basis for more detailed discussions between the parties with respect to the works and any alterations to the information provided in the application can be identified with sufficient time to implement changes.
- A.1.14 In advance of the formal submission of the initial Section 61 application (and no less than 28 days), the contractor shall provide to the local authorities information (names and sample signatures) on the personnel authorised on behalf of the contractor to sign off Section 61 applications and requests for changes to such applications. In the event that the authorised signatories change, the contractor shall inform the local authority as soon as possible.
- A.1.15 The draft Section 61 application could include the following information:
- a. scheme of work (including description of the works to be carried out, working methods and duration of the works)
 - b. details to demonstrate that BPM will be used to control noise and vibration
 - c. location of identified noise-sensitive receptors for which noise predictions will be made

- d. predicted noise levels for identified noise-sensitive receptors
 - e. sufficient information for the local authority to validate predictions (information on calculations may be provided as a spread sheet for ease, both in submission and for validation):
 - i. plant: number and types selected, sound power levels of that plant (and the source of the information, eg, BS 5228)
 - ii. noise sources and receptor heights
 - iii. information used in BS 5228 calculations, ie, angle of view corrections, percentage of equipment 'on' time
 - iv. screening calculations
 - v. façade corrections
 - f. a plan showing proposed noise monitoring locations
 - g. details of activities within start-up/close-down periods
 - h. a plan showing the working area, main plant locations and named nearby noise-sensitive receptors.
- A.1.16 For packages of works which are required to be carried out outside of standard working hours and/or are predicted to generate noise levels in excess of the noise insulation trigger level, additional information will be incorporated within the Section 61 application, including:
- a. the number of days for which the thresholds for noise insulation/ temporary rehousing will be met or exceeded (see Section 6.4)
 - b. a detailed BPM assessment of possible quieter alternative methods and full justification of why these are not reasonably practicable
 - c. particular emphasis on the consideration of specific mitigation measures over and above the general measures discussed in Section 6.4
 - d. for proposed works outside of standard working hours, full justification for why these works cannot be completed within standard working hours.
- A.1.17 The Local Authorities will be requested to provide the contractor with a written record of their comments on each draft submission within 21 days of receipt (thereby allowing the contractor a minimum of 7 days to incorporate these and finalise each submission).
- A.1.18 Following this the formal application will be made. 'Standard working hours' applications must be submitted at least 28 days before commencing any works onsite. Applications for works outside of standard working hours and/or predicted to generate noise levels above noise insulation trigger levels will need to be submitted with sufficient time between the consent being granted and works commencing to allow any additional mitigation measures to be implemented. For example, where noise insulation is to be provided, the associated Section 61 application may need to be submitted four months or more before commencing the works that give rise to the need for the insulation.

Details of noise levels to be provided

Period L_{Aeq}

- A.1.19 The range of times over which noise predictions will be required is dependent on the hours of work needed for the particular construction site. Predictions are required for whichever of the periods of work set out in Table A.1 is expected, including works within start-up/close-down periods.

Table A.1 L_{Aeq} period hours of work

Day	Works between these hours	Period for L_{Aeq} (hours)
Monday to Friday	07:00 to 08:00	1
	08:00 to 18:00	10
	18:00 to 19:00	1
	19:00 to 22:00	1
Saturday	07:00 to 08:00	1
	08:00 to 13:00	5
	13:00 to 22:00	1
Sunday/Bank/Public holidays	07:00 to 22:00	1
Any day	22:00 to 07:00	1

- A.1.20 Where works outside of standard working hours are required, the worst case L_{Aeq} (1 hour) between 18:00 and 22:00 hours and between 22:00 and 07:00 hours will be provided. Worst case L_{Aeq} (1 hour) values may need to be provided for other times, depending on local sensitivities. The need for these predictions will be discussed with the local authority as part of consultation prior to the application.

Maximum noise levels

- A.1.21 In the event that percussive operations are required near receptors that could be sensitive to noise, maximum noise level (L_{AMax}) and peak particle velocity vibration predictions are required. Any planned percussive operations will be discussed with the local authority as part of the consultation prior to submission of the Section 61 application. Where these types of activity are required, it is necessary to give careful consideration to BPM noise and vibration control measures (eg, equipment selection, screening and/or working hours).

Management of changes to proposed works

- A.1.22 Changes may be required to planned works between the time of submitting a Section 61 application and the works being carried out onsite. Changes shall fall into four categories, as described below.

Dispensation for significant change

- A.1.23 The dispensation procedure will be used when a change to works is required that was not foreseen at the time of submitting the Section 61

application. A dispensation will be applied when the change may alter the predicted disturbance to noise-sensitive receptors, eg, different noise levels, working hours or duration of works.

- A.1.24 An application for a dispensation shall be made to the local authority at least 14 days before the works to which the change relates are due to commence. Where works of a critical or urgent nature need to be rescheduled, the application will normally be made seven days (but at least two working days) before commencing the works.

Minor change (variation)

- A.1.25 Minor changes that would not alter predicted noise levels may be required to the scheme of works described in the Section 61 application. The contractor may apply to the local authority for a variation of these circumstances. The procedure for this may also be followed where additional activities are required which do not alter the predicted noise levels. It is not anticipated that extensive supporting information would be required for applications for variation.

- A.1.26 Applications for variation shall be filled out by the contractor and e-mailed to the local authority. If the local authority is satisfied that the variation will not give rise to additional effects on local noise-sensitive receptors, a nominated officer (normally the environmental health officer) will sign and return the application via e-mail. The local authority may attach conditions to the variation.

Overrun

- A.1.27 Overruns may occur on occasion particularly where, for health and safety reasons or due to engineering requirements, a specific work item needs to be completed urgently. A notification will be e-mailed to the local authority by the contractor. The local authority will be requested to acknowledge receipt and return the application to the contractor. The notification system for overruns is not an approval process.
- A.1.28 The local authority may follow up notifications of overruns. If no valid reason for the overrun and consequent notification can be demonstrated, the local authority may wish to consider enforcement action.

Emergency deviation

- A.1.29 Where an emergency change to works set out in the Section 61 application is required, the contractor must notify the local authority within one hour of the event that necessitated the change. The notification must detail:
- a. the time, location and duration of the event
 - b. mitigation measures implemented to control noise and vibration
 - c. reason for the deviation
 - d. name and contact details for the person controlling the works onsite for the contractor
 - e. any required notification to the public
 - f. how the contractor will prevent the incident from reoccurring.

Appendix B: Construction Environmental Management Plan Template

Construction environmental management plan

B.1 Part 1: General issues

- B.1.1 Amendment record
- B.1.2 Policy statements
- B.1.3 Project profile and scope of works
- B.1.4 Project duration
- B.1.5 Management structure and responsibilities
 - a. Responsibilities of the environmental team
 - b. General environmental responsibilities
- B.1.6 Points of contact
- B.1.7 Environmental aims, key performance indicators and targets
 - a. Objectives and targets
 - b. Key performance indicators
- B.1.8 External permission or notification to residents
- B.1.9 Identification and management of environmental requirements and legislative constraints
 - a. Environmental constraints (eg, ecology)
 - b. Permits/consents/licences
- B.1.10 Selection and appointment of contractors/designers
- B.1.11 Coordination, communication and liaison
 - a. Internal communication
 - b. External communication
 - c. Environmental records
 - d. Community relations
- B.1.12 Induction, competence and training
 - a. Training of the environmental team
 - b. Specific training and awareness.

B.2 Part 2: Environmental management

- B.2.1 Environmental condition of site
- B.2.2 Aspects and impacts register
- B.2.3 Environmental notices
- B.2.4 Site rules
- B.2.5 Identification of materials to be used
- B.2.6 Environmental incident reporting and investigation
 - a. Environmental incident recognition/characterisation
 - b. Emergency plan
 - c. Emergency procedures
 - d. Notification and reporting
 - e. Arrangements to mitigate environmental incidents
- B.2.7 Environmental monitoring and reporting
- B.2.8 Performance monitoring and reporting
 - a. Monthly reports
 - b. Considerate Constructors Scheme
- B.2.9 Inspection and audits
 - a. Responsibilities
 - b. Schedule, frequency and planning
- B.2.10 Procedures in the event of failure to comply with this plan
- B.2.11 Review and close out reports
- B.2.12 Record keeping and archiving
- B.2.13 Management review

B.3 Part 3: Appendices and supporting documentation

- B.3.1 Appendix 3.1: Topical environmental management plans
 - a. Pollution incident response plan
 - b. Lighting management plan
 - c. Traffic management plan
 - d. River transport management plan
 - e. Noise and vibration management plan
 - f. Air quality management plan
 - g. Water management plan
 - h. Land quality
 - i. Site waste management plan

- j. Ecology and landscape management plan
- k. Heritage management plan
- l. Materials management plan
- m. Community liaison plan
- n. Resource management plans (water, energy, materials)
- B.3.2 Appendix 3.2: Additional environmental guidance/supportive documentation
- B.3.3 Appendix 3.3: Schedule of permits, licenses and consents
- B.3.4 Appendix 3.4: Policies
- B.3.5 Appendix 3.5: Environmental aspects layout drawings
- B.3.6 Appendix 3.6: Legal register

B.4 Part 4: Site-specific construction environmental management plan

- B.4.1 This section shall set out the site-specific matters and could be supported by the contract-wide topical management plan and includes:
 - a. Introduction
 - b. Key regulators: local authority, Environment Agency, Historic Buildings and Monuments Commission for England, the Port of London Authority, the Marine Management Organisation, Natural England, etc
 - c. Site activities (one-year look ahead)
 - d. Key issues and sensitive receptors
 - e. Licences and consents schedule
 - f. Environmental aspects and mitigation measures
 - g. Location of the key sensitive receptors in relation to the environmental aspect
 - h. Specific mitigation measures implemented
 - i. Compliance checks for all environmental aspects
 - j. Resources
 - k. Environmental resources for the worksite
 - l. Emergency procedure/contacts for the worksite.

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Appendix C: Highway works approvals process

C.1 Process

- C.1.1 The highway works approvals process consists of five main phases. Throughout the process, there is a strong emphasis on engagement with all affected parties.
- C.1.2 The process is for approval of traffic management plans (TMPs) and traffic management schemes (TMSs) (see Section 5).
- C.1.3 The five phases are as follows:
- a. Early consultation and coordination
 - i Traffic liaison groups (TLGs) are to be held. The frequency of TLGs shall be held quarterly up to contract award, thereafter to be held monthly. The TLG's will consist of a project wide strategic group and area sub groups.
 - ii The employer shall use the Electronic Transfer of Notices (EToN) system on approval of the DCO to give advance notice to highway authorities of known highway works, intended locations and nature of works.
 - iii The employer shall provide a project-wide construction phasing programme of planned highway works and TMSs to relevant stakeholders and update it on a quarterly basis.
 - iv Where there are concerns by the Highway Authority on the planned timing of the works or technical approval issues these will be reviewed as part of the escalation process detailed below.
 - v The employer shall provide to TFL and local highway authorities project-wide traffic assessments, including any traffic modelling, as required.
 - vi The employer shall co-ordinate highway works proposals and activities between the appointed contractors to minimise potential impacts.
 - b. Construction traffic management plans
 - i The contractor shall consult in the preparation of site-specific traffic management plans with the local highway authority and TfL in advance of submission to the local planning authority for approval in accordance with Section 2.7. This shall be at least four weeks before submission. The submission shall include a list of the comments received and how they have been addressed.
 - c. Traffic management scheme (TMS) development
 - i During development of the TMS, details will be presented for review at the TLGs. The TLGs shall confirm principles and their requirements for the formal submission of the TMS, including

details of traffic modelling, road safety audits and Traffic Regulation Orders (TROs).

- ii The TMS shall be formally submitted to the relevant highway authority for technical approval.

d. Technical approval

- i The approval periods for formal consideration and approval from the highway authority are 28 days for roads on the Transport for London Road Network (TLRN) and borough roads not on the strategic road network (SRN)⁴, and 42 days for borough roads on the strategic road network⁵.
- ii Commencement, duration and completion dates shall be included in the submission.

e. Final notice and commencement

- i Formal notice to take possession of the highway (or part of the highway) shall be given a minimum of ten days in advance.

C.1.4 TLGs are to include the following attendees and other parties determined by the TLG:

- a. the employer (chair)
- b. Transport for London including London Buses, London River Services and other relevant divisions,
- c. the local highway authority
- d. the local planning authority
- e. the contractor(s)
- f. police and representatives of the emergency services
- g. prominent utility companies
- h. representatives of other major works in the vicinities
- i. community relations representatives.

C.1.5 TLG role and responsibilities:

- a. TLGs shall be chaired by the employer and the chairperson shall invite the organisations listed in C.1.4 to attend the TLGs.
- b. The objective of the TLGs shall be to achieve agreement and outline approval on TMS' which will affect the highway and traffic; as well as local residents and businesses.
- c. The remit of the TLGs shall be:

⁴ These notice periods clarify the timescales where not specified in Articles 10, 12-18 of the DCO and is clarified as being applicable to TLRN and Borough roads for works specified in Article 11

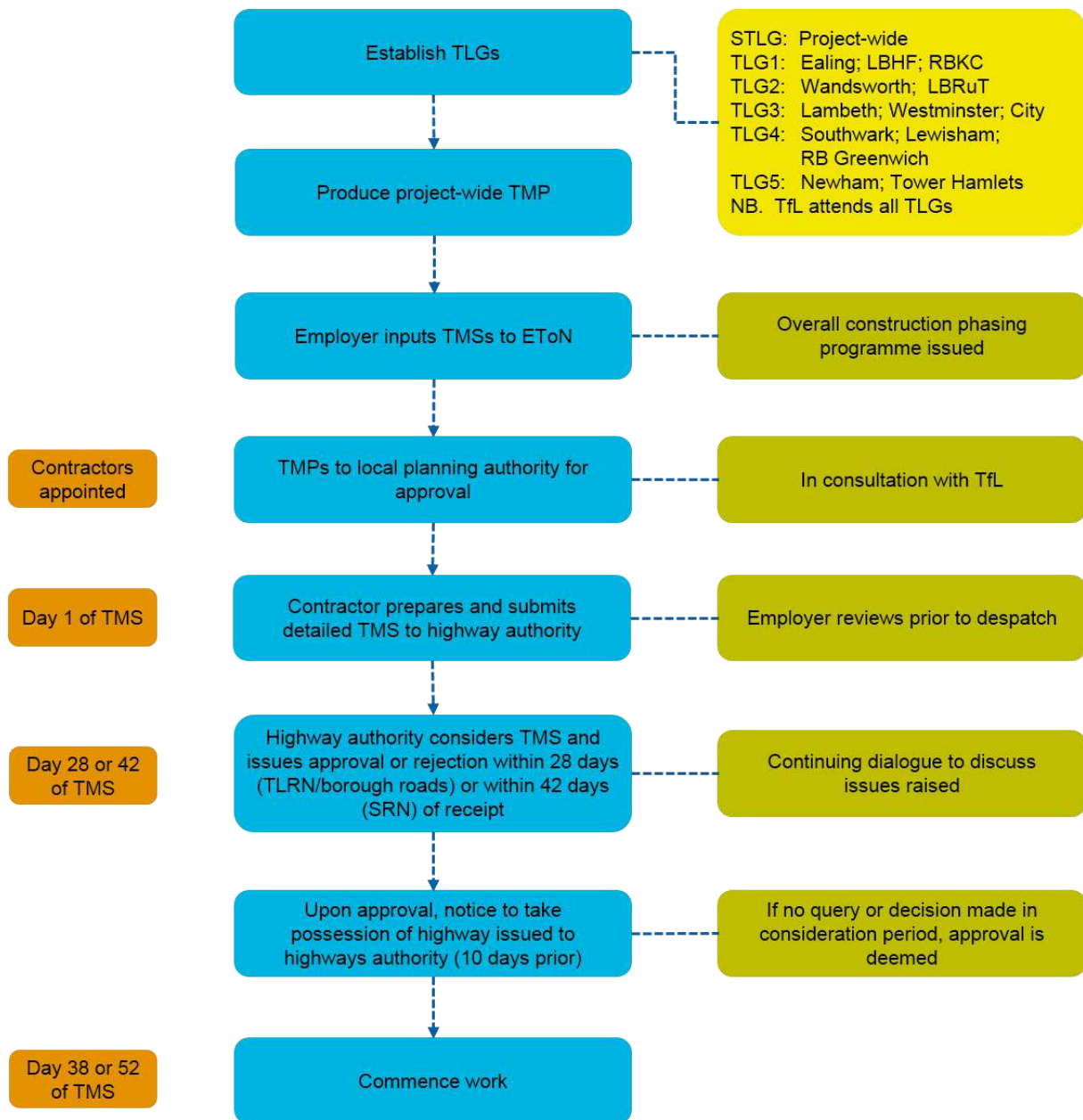
⁵ This notice period is referenced in Article 11 of the DCO and is clarified as being applicable to SRN roads where no timescale is given in Articles 10, 12-18

- i to enable communication and co-ordination with all affected parties
- ii to review all proposed traffic management schemes, including methods of implementation duration, operation, and examination of technical details, depicting all phases of any proposed highway (or part highway) possessions
- iii to be advised of and to accommodate as far as is practicable the highways works of other parties
- iv to review the constraints that may exist in all affected local authority areas in terms of the obligation on the part of the highway authority to manage its network
- v to consider the timings of established or *ad hoc* significant street events and to understand and manage the associated implications
- vi to understand the role of the police in supervising the network and the need for emergency services in terms of priority
- vii to manage the interface with London Buses and assist in its duty to provide a public transport service
- viii to review how any proposal may affect local residents and businesses.

C.1.6 The escalation resolution process regarding the technical approval and timing of the TMS submissions is as follows and could involve the following stages:

- a. the strategic TLGs and the employer's project manager
- b. the employer's area delivery manager and the London Road Network Management Group or the Traffic Manager at the local highway authority
- c. the employer's project construction director and the London Road Network Priorities Group or the Head of Traffic and Transportation at the local highway authority
- d. the employer's project director and the Head of TfL Surface Transport or the Head of the local authority (or equivalent)
- e. Thereafter, the appeals mechanism as referred to in part 1.1.14 of the CoCP Part A and as detailed in Schedule 17 Part 4 of the DCO, shall apply.

Figure C.1 Highway works approval process



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