national highways

Lower Thames Crossing

6.3 Environmental Statement Appendices
Appendix 2.2 – Code of Construction Practice including Register of Environmental Actions and Commitments (REAC), First Iteration of Environmental Management Plan (Clean version)

APFP Regulation 5(2)(q)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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6.3 Environmental Statement Appendices
Appendix 2.2 – Code of Construction Practice including Register of Environmental Actions and Commitments (REAC), First Iteration of Environmental Management Plan
(Clean version)

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1 Introduction and background to the Project

1.1 Background

1.1.1 The proposed A122 Lower Thames Crossing (the Project) is a new road that would provide a connection from the A2 and M2 in Kent, east of Gravesend, crossing under the River Thames through two bored tunnels, before joining the M25 south of junction 29.

1.1.2 The Project is a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008. Therefore, an application for development consent has been submitted to the Planning Inspectorate. This Code of Construction Practice (CoCP) is part of a suite of documents that accompanies the application. A full description of the Development Consent Order (DCO) Application Documents is provided within the 'Introduction to the Application' (Application Document 1.3) which also accompanies the application.

1.2 Description of the Project

1.2.1 The Project would provide a connection between the A2 and M2 in Kent and the M25 south of junction 29, crossing under the River Thames through a tunnel. The Project route is presented in Plate 1.1.

1.2.2 The A122 would be approximately 23km long, 4.25km of which would be in tunnel. On the south side of the River Thames, the Project route would link the tunnel to the A2 and M2. On the north side, it would link to the A13, M25 junction 29 and the M25 south of junction 29. The tunnel portals would be located to the east of the village of Chalk on the south of the River Thames and to the west of East Tilbury on the north side.

1.2.3 Junctions are proposed at the following locations:

a. New junction with the A2 to the south-east of Gravesend

b. Modified junction with the A13/A1089 in Thurrock

c. New junction with the M25 between junctions 29 and 30

1.2.4 To align with National Policy Statement for National Networks (NPSNN) (Department for Transport, 2014) policy and to help the Project meet the Scheme Objectives, it is proposed that road user charges would be levied in line with the Dartford Crossing. Vehicles would be charged for using the new tunnel.

1.2.5 The Project route would be three lanes in both directions, except for:

a. link roads

b. stretches of the carriageway through junctions

c. the southbound carriageway from the M25 to the junction with the A13/A1089, which would be two lanes

1.2.6 In common with most A-roads, the A122 would operate with no hard shoulder but would feature a 1m hard strip on either side of the carriageway. It would also feature technology including stopped vehicle and incident detection, lane control, variable speed limits and electronic signage and signalling. The A122 design outside the tunnel would include emergency areas. The tunnel would include a range of enhanced systems and response measures instead of emergency areas.

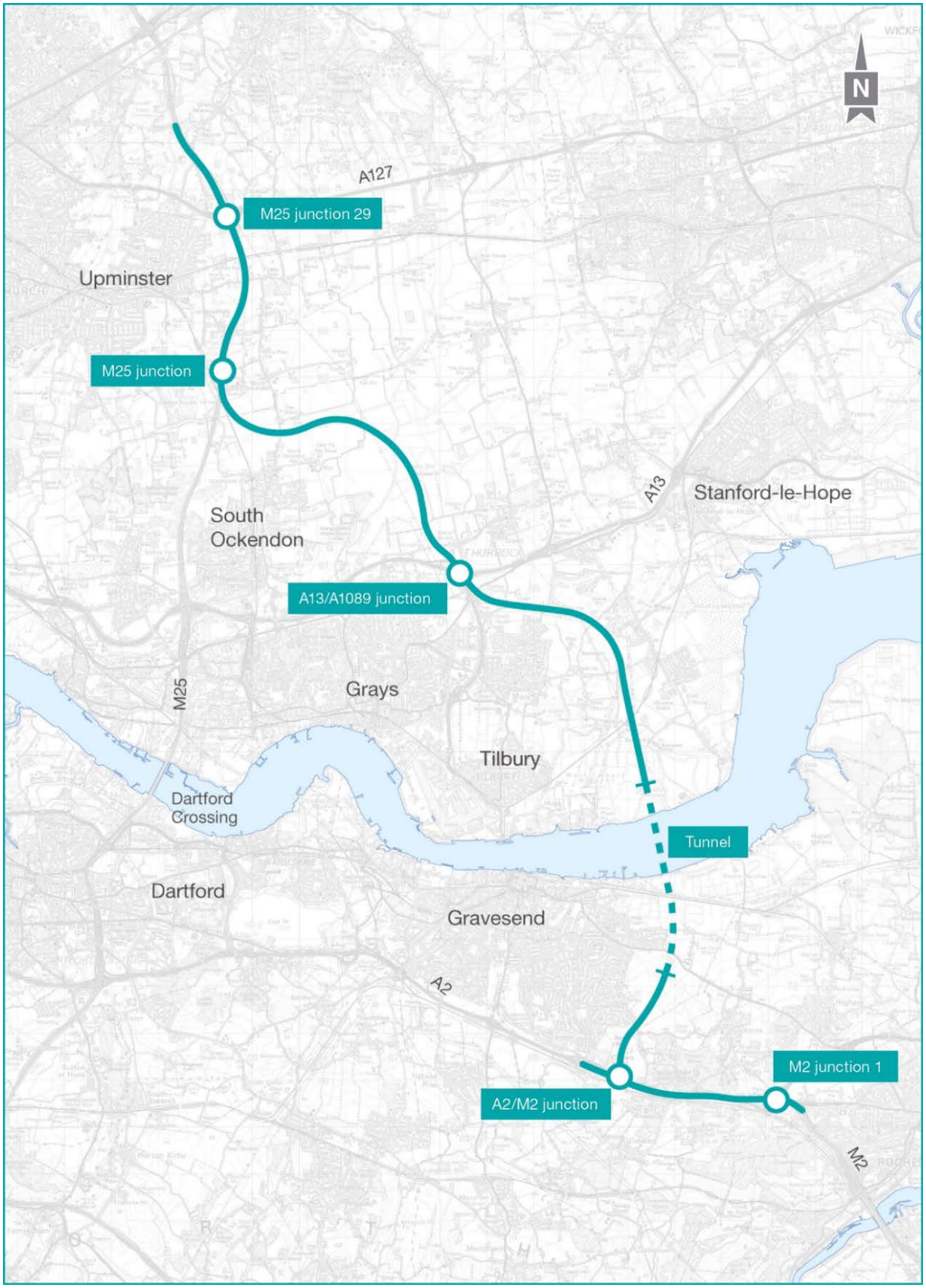
1.2.7 The A122 would be classified as an 'all-purpose trunk road' with green signs. For safety reasons, walkers, cyclists, horse riders and slow-moving vehicles would be prohibited from using it.

1.2.8 The Project would include adjustment to a number of local roads. There would also be changes to a number of Public Rights of Way (PRoW), used by walkers, cyclists and horse riders. Construction of the Project would also require the installation and diversion of a number of utilities, including gas pipelines, overhead electricity powerlines and underground electricity cables, as well as water supplies and telecommunications assets and associated infrastructure. Some of these works would be NSIPs in their own right and so consideration of the energy National Policy Statements has been undertaken for the purposes of this document, in addition to considering the NSPNN.

1.2.9 The Project has been developed to avoid or minimise significant effects on the environment. The measures adopted include landscaping, noise mitigation, green bridges, floodplain compensation, new areas of ecological habitat and two new parks.

1.2.10 A more detailed Project description is provided in Chapter 2: Project Description in the Environmental Statement (ES) (Application Document 6.1).

Plate 1.1 Lower Thames Crossing route



1.3 Scheme Objectives

1.3.1 The Scheme Objectives align with the National Highways' Sustainable Development Strategy.

1.3.2 Highways England's Sustainable Development Strategy (2017) (Highways England) sets out National Highways' approach and priorities to sustainable development. The strategy has particular regard for the following factors:

a. **Financial** – supporting national and local economic growth and regeneration.

b. **Human** – protecting and improving the safety of road users and road workers.

c. **Natural** – protecting, managing and enhancing the environment.

d. **Social** – seeking to improve the wellbeing of road users and communities affected by the network.

e. **Manufactured** – ensuring efficiency and value for money.

1.3.3 The Scheme Objectives developed specifically for the Project and agreed with the Department for Transport (DfT) are as follows:

a. To support sustainable local development and regional economic growth in the medium to long term.

b. To be affordable to government and users.

c. To achieve value for money.

d. To minimise adverse impacts on health and the environment.

e. To relieve the congested Dartford Crossing and approach roads, and improve their performance by providing free-flowing, north-south capacity.

f. To improve resilience of the Thames crossings and the strategic road network (SRN).

g. To improve safety.

1.4 Purpose and objectives of the document

1.4.1 This CoCP forms part of the DCO application for the Project. It includes the Register of Environmental Actions and Commitments (REAC) in Chapter 7. This document sets out a framework for how the mitigation and management of environmental effects will be delivered and maintained. As explained in more detail below, the document has been produced in accordance with the Design Manual for Roads and Bridges (DMRB) – LA 120 (Highways England, 2020a). The CoCP is the 'first iteration' of the Environmental Management Plan (EMP).

1.4.2 The CoCP, including the REAC, is an appendix to the ES. Following the DCO being granted, the CoCP and REAC will provide control over the construction and development of the Project. As explained in Section 2.3.1 of this document, the EMP (second iteration) (EMP2) must be substantially in accordance with this CoCP and must reflect the mitigation measures set out in the REAC. No part of the authorised development can commence until the EMP2 has been approved by the Secretary of State (SoS) (following consultation with specified bodies, as outlined in Table 2.1) for that part, although no approval is required in relation to the preliminary works (as set out in the DCO and the preliminary works section of this document in Chapter 3).

1.4.3 National Highways, being the party in whom the powers of the DCO are vested (unless otherwise transferred under the terms of the DCO), is responsible for the delivery of the Project. National Highways is responsible for all the works, which includes overseeing and assuring the Contractors.

1.4.4 The Contractors, including those carrying out the utilities works, will comply with applicable environmental legislation at the time of construction, together with any additional environmental controls required under the DCO, including those commitments set out in this CoCP and REAC relevant to the works. National Highways maintains the responsibility for ensuring all those commitments are met but it will also ensure that contracts awarded to Contractors do not conflict with the delivery of relevant commitments.

1.4.5 The purpose and objectives of this CoCP are to provide clear and concise information that states how the mitigation and management of environmental effects will be delivered and maintained during the construction and operational phases of the Project.

1.4.6 An Environmental Impact Assessment (EIA) has been undertaken for the Project, and an ES (Application Document 6.1) has been prepared in accordance with the Infrastructure Planning (EIA) Regulations 2017 ('the EIA Regulations'). The ES reports the findings of the EIA, which determines the likely significant environmental effects of the construction and operation of the Project. The EIA process has iteratively informed the design development of the Project, and the ES sets out the proposed mitigation measures that are needed to avoid, prevent, reduce or remediate potential impacts of the Project on the environment. The ES [Document References 6.1, 6.2 and 6.3] has been updated, and should be read with reference to the latest version of the ES Addendum [Document Reference 9.8].

1.4.7 The CoCP and REAC will be provided to Contractors and will be binding upon them. The REAC brings together in one document the good practice and essential mitigation commitments relied on in the ES (Application Document 6.1) and other DCO Application Documents.

1.4.8 In this context:

a. Good practice means standard and appropriate approaches and actions commonly used on infrastructure development projects to avoid or reduce environmental impacts, typically applicable across the whole Project.

b. Essential mitigation means any additional Project-specific measures needed to avoid, reduce or offset potential impacts that could otherwise result in effects considered significant in the context of the EIA Regulations. These are in addition to the embedded mitigation measures and design controls that form part of the Project design, which are secured by the Design Principles, and the Environmental Masterplan (Figure 2.4, Application Document 6.2).

1.4.9 Additionally, the CoCP and the REAC contain commitments developed in consultation with relevant stakeholders.

1.4.10 The Project is committed to avoiding, preventing, reducing or remediating for, as far as reasonably practicable, the adverse effects of the construction and operational activities of the Project on people, businesses and the natural and historic environment.

1.4.11 The latest standard for EMPs on National Highways projects, DMRB – LA 120 (Highways England, 2020a) applies to the first, second and third iterations of the EMP. Table 1.1, based on LA 120, shows how these named EMP documents relate to one another through the Project stages. This CoCP meets the requirements of LA 120 but goes beyond DMRB standard. This is consistent with Planning Inspectorate's steer, not to be restricted by DMRB and therefore the structure of this document does not mirror exactly the LA120 standard.

Table 1.1 Document relationships through the Project stages (based on LA 120)

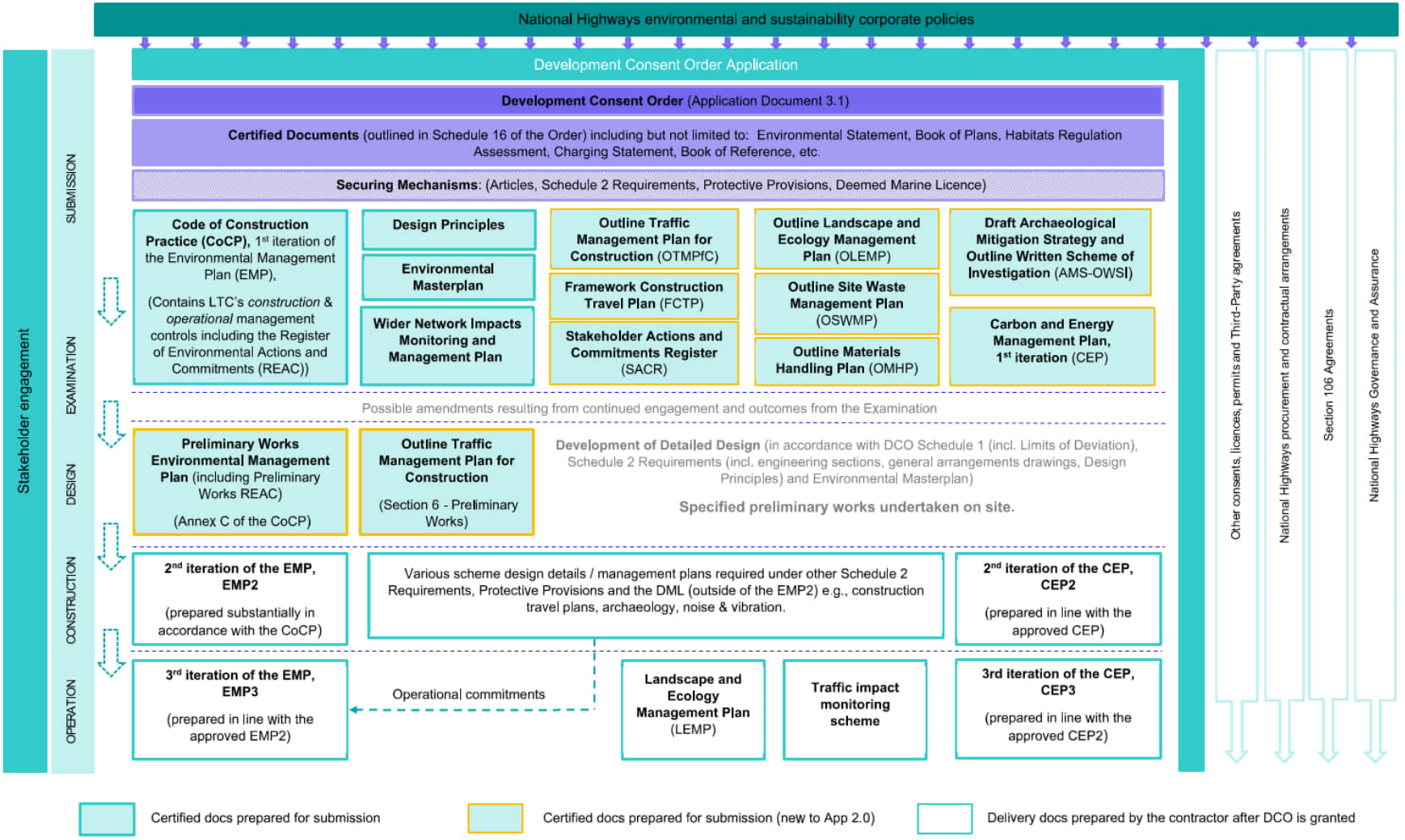
Project stage	Common terminology for plans	National Highways, DMRB – LA 120	Description	Terminology used in this document
Design	Code of Construction Practice (CoCP) or Outline Environmental Management Plan (OEMP)	First iteration of EMP	Produced during the design stage for the preferred route option.	CoCP
Construction	Construction Environmental Management Plan (CEMP)	Second iteration of EMP	Refined during the construction stage for the consented Project, in advance of construction.	EMP2

Project stage	Common terminology for plans	National Highways, DMRB – LA 120	Description	Terminology used in this document
End of construction	Handover Environmental Management Plan (HEMP)	Third iteration of EMP	Building on the construction EMP refined at the end of the construction stage to support future management and operation.	EMP3

1.4.12 This document should be read in conjunction with DMRB LA 120 – Environmental Management Plans (Highways England, 2020a), and the Highways England Strategic Road Network Concept of Operations (Highways England, 2015), which covers National Highways' 10 main operating principles.

1.4.13 The CoCP and REAC sit within a suite of documents known as the control plan, which is the framework for mitigating, monitoring and controlling effects of the Project. It is made up of a series of 'control documents' which present the mitigation measures identified in the application that must be implemented during design, construction and operation to reduce the adverse effects of the Project. The control plan is illustrated in Plate 1.2.

Plate 1.2 Control plan



1.5 Structure of the CoCP

1.5.1 Chapters 1-6 provide a general overview and approach to the management of environmental impacts from the construction of the Project.

Chapter 1: Introduction and background to the Project

Chapter 2: General environmental management principles

Chapter 3: Preliminary works

Chapter 4: Construction

Chapter 5: Communication and community engagement

Chapter 6: General construction and site management

1.5.2 These are followed by Chapter 7, the REAC. The REAC presents the good practice and essential mitigation commitments identified in the ES by environmental topic (or 'factor', as defined in DMRB – LA 104 Environmental Assessment and Monitoring (Highways England, 2020b)) as follows:

a. Air quality

b. Cultural heritage

c. Landscape

d. Terrestrial biodiversity

e. Marine biodiversity

f. Geology and soils

g. Material assets and waste

h. Noise and vibration

i. Population and human health

j. Road drainage and the water environment

k. Climate.

1.5.3 Additionally, the REAC contains mitigation measures identified in the Habitats Regulations Assessment Stage 1 and 2 (Application Document 6.5) and Appendix 14.7: Water Framework Directive (Application Document 6.3).

2 General environmental management principles

2.1 Procedures for the approval of EMP2

2.1.1 Requirement 4 in Schedule 2 (Part 1) of the DCO states that no part of the authorised development (the Project) is to commence until an EMP2 in accordance with this CoCP has been submitted to, and approved in writing by, the SoS, following consultation with the relevant stakeholders, to the extent that it relates to the matters relevant to its function. For the reasons set out below, this does not apply for certain specified preliminary works, as set out in Article 2 of the DCO (see Chapter 3).

2.1.2 Schedule 2 (Part 2) of the DCO identifies the formal procedure in relation to obtaining approvals from the SoS for those requirements in Schedule 2 (Part 1) to the DCO that require this approval. The requirements identify where consultation is required in advance of submission to the SoS, and also where consents, agreements and approvals are required from a body or individual other than the SoS, e.g. from the local planning authority.

2.1.3 Where the DCO Schedule 2 requirement identifies that consultation is required, the Contractors will provide a draft submission of the material to the identified consultee in advance of the submission. Consultees will be asked to provide comments in writing on the draft document unless otherwise agreed with the consultees. Any feedback received shall be considered in finalising documentation. Representations received from consultees will be provided to the SoS (see paragraph 20 of the DCO Schedule 2), as well as a written account of how any such representations have been taken into account in the submitted application.

2.2 Environmental management systems

2.2.1 National Highways is developing and will operate an Environmental Management System (EMS) aligned with and capable of certification to ISO 14001:2015. The EMS will be part of the Integrated Management System. The Lower Thames Crossing EMS will describe the Project process to assure the delivery of the commitments in the REAC during the delivery of the programme. The Contractors will develop an EMS relevant to their scope of works on the Project.

2.2.2 The Contractors' EMSs will be approved by a UKAS-accredited certification body to ISO14001:2015. It will establish procedures setting out:

a. All relevant environmental aspects of the work and how they will be managed.

b. Staff competence and awareness requirements and how these are achieved and maintained.

c. The approach to be implemented in the EMP2 (as defined in Section 1.4 above) to plan and monitor compliance with environmental legislation and environmental controls imposed in the DCO including, for the avoidance of doubt, the measures set out in this document and the REAC.

d. The measures to be taken to address change or non-compliance.

e. Engagement and consultation with local authorities, other statutory bodies and the local communities.

2.2.3 The Contractors' EMSs shall cover the Project activities of all their Subcontractors and hauliers. The Contractors will also be required to coordinate with other main works Contractors, utilities and relevant parties that may affect their works. This will be documented in their EMSs, as appropriate.

2.2.4 In addition to having management systems certified for environment (ISO14001:2015), the Contractors will have management systems certified for safety (ISO 45001:2018) and quality (ISO 9001:2015), and these will include requirements for procedures for responding to emergency events. Contractors will be required to comply with the law applicable at the time, along with any additional environmental controls imposed in the DCO. For that reason, the statutory requirements are not separately listed within this CoCP.

2.2.5 BREEAM Infrastructure, formerly the Civil Engineering Environmental Quality Assessment & Award Scheme (CEEQUAL), is an evidence-based sustainability assessment, rating and awards scheme for civil engineering, infrastructure, landscaping and public realm projects. The Contractors will achieve a BREEAM Infrastructure 'Very Good' standard by completion of their works and support National Highways in achieving a Project standard of 'Excellent'.

2.3 Environmental Management Plans

2.3.1 The Contractors responsible for the delivery of construction will each be required to develop an EMP2 (as defined in Section 1.4 above) specific to their part of the Project and in consultation and engagement with relevant stakeholders as listed in Table 2.1 on matters related to their functions. The EMP2(s) will be prepared substantially in accordance with this CoCP and will be specific to the location and scope of that part of the works to which the EMP2 relates. The EMP2 will include the implementation of appropriate industry-standard practice and control measures for environmental impacts during the relevant works. As a minimum, in accordance with Requirement 4 of Part 1 of Schedule 2 of the DCO, the EMP2 will be compliant with ISO 14001, be substantially in accordance with this CoCP and reflect the mitigation measures set out in the REAC. Where necessary, the EMP2 will be reviewed and revised within the scope of EMP2 or amended and submitted to the SoS for approval following engagement with the bodies in Table 2.1 (as per Schedule 2, paragraph 4 of the DCO).

Table 2.1 Relevant stakeholders

	Local planning authority	Highway authority	Other body
Brentwood Borough Council	X	-	-
Emergency Services (see below)	-	-	X
Environment Agency	-	-	X
Essex County Council	-	X	-
Gravesham Borough Council	X	-	-
Historic England	-	-	X
Kent County Council	-	X	-
Kent Downs AONB Unit	-	-	X
London Borough of Havering	X	X	-
Maidstone Borough Council	X	-	-
Medway Council	X	X	-
Natural England	-	-	X
Port of London Authority	-	-	X
Thurrock Council	X	X	-
Tonbridge and Malling Borough Council	X	-	-
Transport for London	-	X	-

2.3.2 In Table 2.1 Emergency services refers to Kent Police, Kent Fire and Rescue, Essex Police, Essex Ambulance, Essex County Fire and Rescue, South East Coast Ambulance Service, Metropolitan Police, London Fire Brigade and London Ambulance Service.

2.3.3 The EMP2s developed by the Contractors will set out their procedures for monitoring compliance with the mitigation measures set out in this document and the REAC relevant to the works. The EMP2s will include Contractor roles and responsibilities, together with appropriate control measures, training and briefing procedures, risk assessments, stakeholder engagement and monitoring systems to be employed.

2.3.4 The Contractors will produce Site Waste Management Plans, Materials Management Plans (which will be substantially in accordance with the outline Site Waste Management Plan and the outline Materials Handling Plan respectively, as presented in Annex A and Annex B of this document). These plans will form part of the EMP2.There will be additional topic management plans developed for environmental subjects that require further measures and controls to be implemented during the construction phase, and this will include air quality, ecology, noise and vibration, soils, contaminated land, substances hazardous to health and pollution prevention controls.

2.3.5 Once accepted by National Highways, the Contractors' EMP2s and topic management plans will be submitted to the SoS for approval as per Schedule 2,

Part 2 of the Order after engagement with the bodies in Table 2.1 on matters related to their functions.

2.3.6 During the final stages of the construction phase, the Contractors will each prepare an EMP3 in consultation with relevant stakeholders (on matters relevant to their respective functions only) as listed in Table 2.1, and subject to agreement by National Highways. The information contained within the EMP3 serves to inform the approach to environmental management during the Project's operational phase to be implemented by National Highways. The EMP3 will build on the EMP2 and Landscape and Ecology Management Plan (LEMP) and will provide the information on relevant environmental commitments and objectives that will need to be honoured and ongoing actions and risks that will need to be managed for that part of the Project. It will include as-built information and other details in a form that can be used by the organisation responsible for long-term operational management. The EMP3 must be developed and completed by the end of the construction, commissioning and handover stage. The EMP3 will be compliant with ISO 14001.

2.3.7 The outline Landscape and Ecology Management Plan (oLEMP) (Application Document 6.7) outlines the proposed management of the landscape and ecological elements of the Project. DMRB standards GM 701 Series 3000 and GS 801 Series 3000 establish the general maintenance and inspection requirements for motorways and all-purpose trunk roads. The oLEMP focuses on the management requirements for the land parcels that's primary function is to perform specific landscape and ecological mitigation functions for the Project. It details the management, regimes, maintenance expectation and monitoring requirements for each of those land parcel typologies. It should be read in conjunction with the Environmental Masterplan (Figure 2.4, Application Document 6.2).

2.3.8 A final version of the LEMP for the relevant part of the Project will be created by the Contractors for implementation during and after the establishment period. The LEMP will be substantially in accordance with the outline LEMP, including the habitat management requirements, targets and prescriptions set out in it. Once accepted by National Highways, the Contractors' LEMP will be submitted to the SoS for approval as per Schedule 2 of the Order after consultation with the relevant bodies identified in the oLEMP. As ecological and landscape matters are controlled (including in the operational phase) via the LEMP, they will not form part of the EMP3. The LEMP is secured under Requirement 5, and outside of EMP2/3.

2.3.9 The EMP2 will require that construction phasing plans are made available to the local authorities at least two weeks prior to works commencement.

2.3.10 As mentioned, Requirement 4(2) of the draft DCO requires the EMP2 to be developed substantially in accordance with this CoCP. There is a distinction between matters which are to be included as part of the EMP2 which is submitted to the SoS for approval and matters which are required under or pursuant to the EMP2 and which will be implemented following the approval of EMP2. This document non-exhaustively uses the phrase "EMP2 will require" to refer to the latter circumstance.

2.4 Management plans supporting EMP2

2.4.1 The following plans are required as part of the EMP2, in accordance with DCO Schedule 2, Requirement 4(3).

a. Site waste (substantially in accordance with the outline Site Waste Management Plan (Annex A))

b. Materials (substantially in accordance with the outline Materials Handling Plan (Annex B))

c. Noise and vibration

d. Air quality

e. Ecology

f. Soils

g. Contaminated land

h. Substances hazardous to health

i. Pollution prevention controls

2.4.2 The following plans are required by the draft DCO (and will therefore be secured). Although they will not form part of EMP2 (or be required under the terms of EMP2 following its approval), they will support the EMP2, in accordance with DCO Schedule 2.

a. Landscaping and ecology management plan (Requirement 5)

b. Detailed written scheme of investigation (Requirement 9)

c. Traffic management plan (substantially in accordance with the outline Traffic Management Plan for Construction) (Requirement 10)

d. Site Specific Construction Travel Plan (substantially in accordance with the outline Framework construction travel plan) (Requirement 11)

e. Carbon and Energy Plan (second iteration) (substantially in accordance with the Carbon and energy plan, first iteration) (Requirement 16)

2.5 Considerate constructors

2.5.1 In addition to a comprehensive EMS and EMP2, the Contractors shall sign up to and adhere to the Considerate Constructors Scheme (CCS).

2.5.2 The CCS is a national scheme that promotes good practice on construction sites through its codes of considerate practice; these commit registered sites to be considerate and good neighbours, as well as being respectful, environmentally conscious, responsible and accountable.

2.6 Employment and skills

2.6.1 Targets will be set by National Highways in relation to numbers of apprentices, workless job starts (these are new job starts, sustained for at least 12 weeks, where the candidate was workless prior to being employed), graduates and traineeships, work placements and training for local residents (individuals supported to attain accredited or non-accredited training relevant to the delivery of the works at no cost to the individual). Employment and Skills Plans will be prepared by Contractors prior to the commencement of their works, setting out how they will contribute to meeting these targets. The EMP2 must require the Contractors to submit an Employment and Skills Plan to the Project Employment and Skills Working Group and approved by National Highways.

2.6.2 The Project Employment and Skills Working Group includes representatives from the Project and each local authority.

2.6.3 The Project Employment and Skills Working Group will be responsible for engaging on employment and skills plans so as to ensure that opportunities are increased throughout the delivery phase in response to changing local needs and priorities. The Project Employment and Skills Plans will be updated on an annual basis. The Project Employment and Skills Working Group will be a key consultee in the update of these plans.

2.7 Enforcement and control procedures

2.7.1 This CoCP is proposed to be a certified document under Schedule 16 of the DCO. Requirement 4 of Schedule 2 (Part 1) of the DCO states that, '*No part of the authorised development is to commence until an EMP (Second Iteration), substantially in accordance with the Code of Construction Practice, for that part has been submitted to and approved in writing by the Secretary of State...*' and '*the EMP (Second Iteration) must … reflect the mitigation measures set out in the REAC...*'. Requirement 4 further states that, '*The construction of the authorised development must be carried out in accordance with an approved EMP (Second Iteration)*'.

2.7.2 As such, National Highways and Contractors involved with the construction of the Project will be required to comply with the provisions of this CoCP and EMP2. National Highways and Contractors involved with the operation of the Project will be required to comply with the provisions of the EMP3. These requirements would be subject to the enforcement provisions in Part 8 of the Planning Act 2008. To provide additional comfort that Contractors comply with these requirements, these commitments will be incorporated into their contracts and National Highways will take appropriate action to ensure compliance with those contracts.

2.7.3 Subcontractor performance is the responsibility of the Contractors and will be monitored by the Contractors, however, National Highways will not differentiate between Contractors and Subcontractors performance and will monitor both.

2.7.4 The Contractors and National Highways will clearly define the roles and responsibilities of key personnel. These will be defined within the EMP2 during the construction phase and the EMP3 during the operational phase. These definitions will need to be submitted for acceptance by National Highways.

2.7.5 The EMP2 will set out the arrangements and responsibilities for implementing, monitoring, auditing and enforcing the environmental mitigation set out in this CoCP and REAC.

2.7.6 The EMP2 will include details of a monitoring and audit programme to be delivered by the Contractors to confirm compliance with EMP2.

2.7.7 National Highways or its representatives will carry out site inspections and audits to verify the Contractors' compliance with EMP2. On request, relevant planning authorities, the Environment Agency, Natural England and the SoS, will be given access to the results of the site inspections and audits, along with the opportunity to attend and observe National Highways site inspections and audits. All non-conformances will be recorded and monitored through a Contractor's action plan within an agreed risk based timescale for resolution.

2.7.8 As the Project design submitted with the DCO application is preliminary, further approvals are required prior to commencing works, or undertaking specified activities. The Contractors will progress the detailed design and implement the mitigation measures proposed, submitting updated management plans to the SoS for approval prior to beginning works in accordance with the DCO. Plate 2.1 sets out where the various further approvals required, sit within the DCO.

Plate 2.1 Management and Mitigation Plan – Contractors' Environmental Management System

Development Consent Order (DCO)

Control documents that provide commitments which are submitted as part of the DCO application:

- Register of Environmental Actions and Commitments (REAC)
- Design Principles
- Environmental Masterplan
- Code of Construction Practice (CoCP) *(including the Preliminary Works Environmental Management Plan and Preliminary Works REAC)*
- Outline Site Waste Management Plan (OSWMP)
- Outline Materials Handing Plan (OMHP)
- Outline Landscape and Ecology Management Plan (OLEMP)
- Outline Traffic Management Plan for Construction (OTMPfC)
- Framework Construction Travel Plan (FCTP)
- Draft Archaeological Mitigation Strategy – Outline Written Scheme of Investigation (Draft AMS-OWSI)
- Wider Network Impacts Monitoring and Management Plan (WNIMMP)
- Carbon and Energy Management Plan (CEP (First Iteration))
- Stakeholder Actions and Commitments Register (SAC-R)

Article 61 Stakeholder actions and commitments register

Undertaker must take all reasonable steps to deliver the measures contained within the stakeholder actions and commitments register.

Schedule 14 Protective Provisions

Secondary consents to be approved by specified authorities, following provision of information / additional details as detailed in Schedule 14.

Schedule 15 Deemed Marine Licence†

Includes requirements for the provision of:

- Detailed method statements and programme
- Marine pollution contingency plan

Relationship between management plans and requirements (post DCO grant)

Schedule 2 Requirements

Requirement 3	Requirement 4			Requirement 5	Requirement 6	Requirement 7	Requirement 8	Requirement 9	Requirement 10	Requirement 11	Requirement 13	Requirement 14	Requirement 16	
Detailed Design	**Preliminary Works Environmental Management Plan**	**Second Iteration of the Environmental Management Plan (EMP2)**	**Third Iteration of the Environmental Management Plan (EMP3)**	**Landscape and Ecology Management Plan**	**Written scheme and programme for remediation of contaminated land**	**Written scheme of protection and mitigation of protected species**	**Written details of the surface and foul water discharge system.**	**Written Scheme of Investigation (WSI)**	**Traffic Management Plan for Construction (TMPfC)**	**Site Specific Construction Travel Plans**	**Details of layout and design of Travellers' site**	**Traffic Impact Monitoring Scheme**	**Second Iteration of the Carbon and Energy Management Plan (CEP2)**	**Third Iteration of the Carbon and Energy Management Plan (CEP3)**
		Prepared substantially in accordance with the CoCP, REAC, OSWMP and OMHP	Prepared in accordance with the CoCP and EMP2	Prepared substantially in accordance with the OLEMP, and Design Principles and Environmental Masterplan	Where contamination not previously reported in the Environmental Statement is identified.	Unless where a suitably qualified and experienced ecologist, holding the relevant licences determines a protected species licence is not required.		Prepared in accordance with the Draft AMS-OWSI	Prepared substantially in accordance with the OTMPfC	Prepared substantially in accordance with the FCTP	Prepared in accordance with the design principles and any plans, details or schemes approved by the SoS under Schedule 2.	Prepared substantially in accordance with the WNIMMP	Prepared substantially in accordance with the CEP (First Iteration)	Prepared substantially in accordance with the CEP (First Iteration) and CEP2

Includes plans for the management of:

- Site Waste
- Materials
- Noise and vibration
- Air Quality
- Soils
- Contaminated land
- Substances hazardous to health
- Pollution prevention controls

Plans/schemes (including sub plans) shaded dark green are to be approved by the Secretary of State following consultation with specified consultee(s)

Plans/schemes (including sub plans) shaded light green are to be approved by the relevant planning authority

Plans/schemes (including sub plans) with a † are to be approved by the Marine Management Organisation without consultation requirements

Requirements 1 (Interpretation), 2 (Time limits), 12 (Fencing) and 15 (Interaction with Thurrock Flexible Generation Plan) are excluded from this diagram as they do not require management plans or scheme to be approved.

Other applicable environmental legislation; further commitments made through permits and secondary consents required.

Other commitments made outside of the DCO, e.g. :

- contractual arrangements
- stakeholder agreements
- National Highways policies.

2.8 Materially new or materially different effects compared with the Environmental Statement

2.8.1 Where the Contractors propose a change to the design of the Project under article 6 or Requirements 3 or 8 of the DCO, they must follow the process described below insofar as the proposed change requires a consideration of whether there is a 'materially new or materially different' effect as compared with the ES. The Contractors shall engage a competent environmental specialist to consider the effects of the change.

2.8.2 The Contractors, together with the environmental specialist, will consider whether a proposed change gives rise to:

a. an effect that is 'materially new'– this is an effect that is significant in EIA terms and does not fall within the envelope of the scope of the environmental assessment contained in the ES certified by the SoS

b. an effect that is 'materially different'– this is an effect that was reported in the ES but in respect of which there is a material change in the significance attributed to the effect from that reported in the ES.

2.8.3 If the Contractors determine the proposed change does give rise to materially new or materially different effect, the change cannot be progressed under the terms of the DCO. If the Contractors determine the proposed change does not give rise to a materially new or materially different effect, they will notify National Highways. Once National Highways is satisfied the proposed change should be the subject of an application, the Contractors will prepare an application for the proposed change. Prior to submission of an application to approve a proposed change by the SoS, the Contractors will engage with the relevant bodies under article 6 or Requirement 3 of the DCO. The Contractors will be expected to provide information on how any application complies with the requirements of article 6 or Requirement 3 as part of that engagement.

2.8.4 The Contractors will comply with paragraph 20 of Schedule 2 to the DCO, which sets out further information about the process in connection with an application to the SoS.

2.8.5 If the proposed change does not give rise to a materially new or materially different effect and where the change is progressed, management plans will be amended to reflect the change, where required.

3 Preliminary works

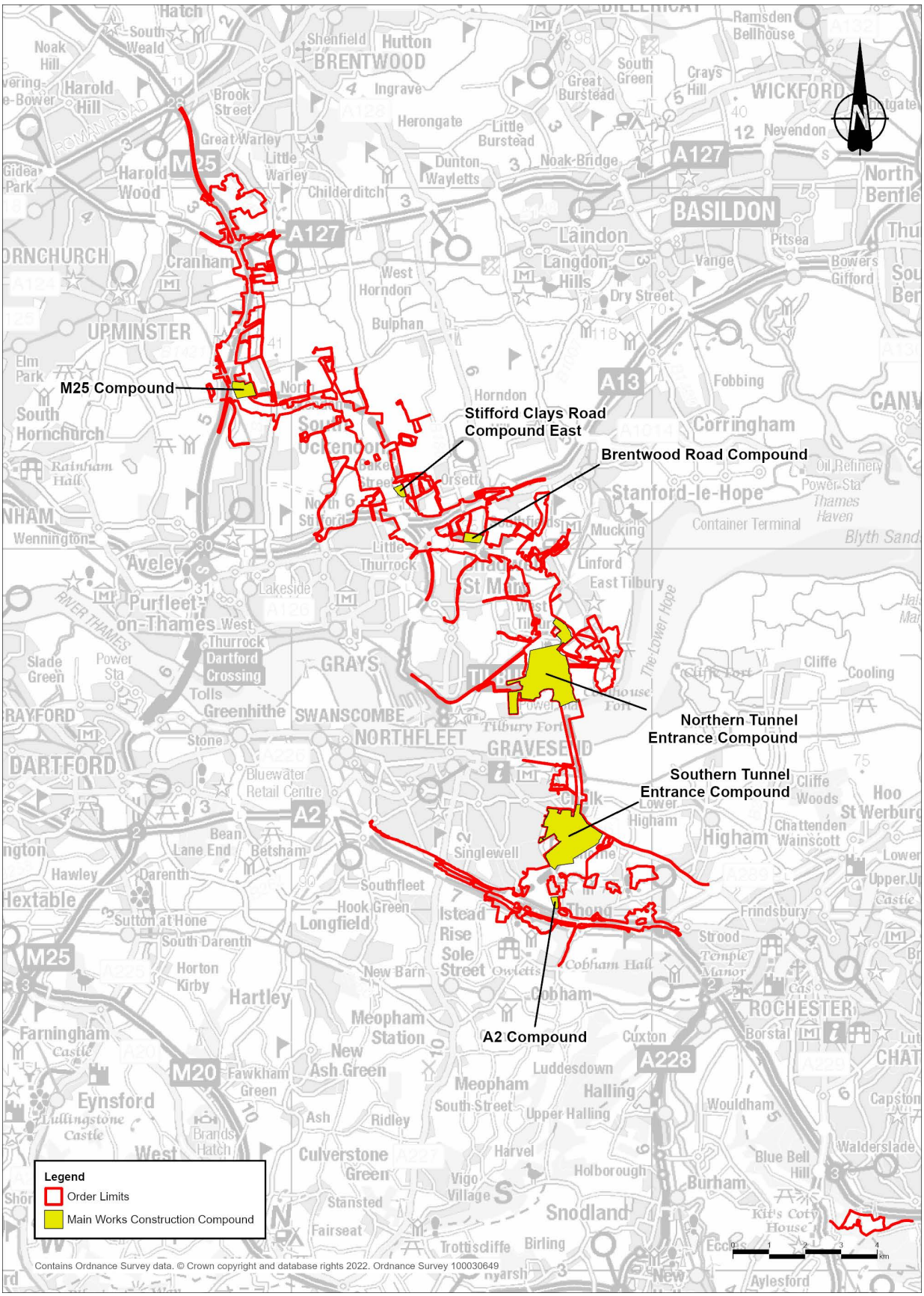
3.1 Preliminary works

3.1.1 Preliminary works are those that would be undertaken between the DCO being granted and commencement of construction as defined by the draft DCO. Paragraph 1 of Schedule 2 to the draft DCO (Application Document 3.1) provides a definition of commencement.

3.1.2 For ease of reference, this definition is included here: ‘commence’ means beginning to carry out any material operation (as defined in Section 56(4) (time when development begun) of the 1990 Act [The Town and Country Planning Act 1990]) forming part of the authorised development other than preliminary works. “Preliminary works” are in turn defined as operations consisting of archaeological investigations and pre-construction ecological mitigation (including vegetation clearance), environmental surveys and monitoring, investigations for the purpose of assessing and monitoring ground conditions and levels, erection of any temporary means of enclosure, receipt and erection of construction plant and equipment for advanced compound areas, diversion and laying of underground apparatus (except any excluded utilities works) for advanced compound areas, vegetation clearance and accesses for advanced compound areas, and the temporary display of site notices or information and ‘commencement’ is to be construed accordingly.

3.1.3 Advanced compound locations are shown in Plate 3.1.

Plate 3.1 Advanced compounds



3.1.4 The effect of this definition is that some works outside the scope of commencement can be carried out prior to the discharge of the requirements contained in Schedule 2 of the DCO and the approvals required therein. These works are described as preliminary works.

3.1.5 The preliminary works have been identified as works that may be carried out early in the construction programme and that would have negligible or relatively minor environmental impacts.

3.1.6 The only preliminary works that can be undertaken, and their locations, are listed in Table 3.1.

3.1.7 These preliminary works shall be undertaken in accordance with industry good practice and relevant commitments in the REAC (see Table 3.2). Ecology activities will also require protected species licences, thereby adding an additional layer of control.

3.1.8 The nature of the preliminary works will not affect the baseline monitoring.

Table 3.1 Preliminary works and locations

Preliminary work	Location
Archaeological investigations as set out in the outline Written Scheme of Investigation (OWSI) (Application Document 6.3)	Site-wide
Pre-construction ecological mitigation (preparation of ecological receiving site for reptiles)	Site-wide
Pre-construction ecological mitigation (preparation of ecological receiving site for great crested newts (GCN))	Site-wide
Pre-construction ecological mitigation (translocation of protected species)	Site-wide
Pre-construction ecological mitigation (installation of bat boxes and hibernaculum)	Site-wide
Pre-construction ecological mitigation (installation of dormouse boxes)	Site-wide
Pre-construction ecological mitigation (installation of artificial badger setts)	Site-wide
Pre-construction ecological mitigation (installation of bird boxes)	Site-wide
Pre-construction ecological mitigation (closure of badger setts)	Site-wide
Pre-construction ecological mitigation (installation of ecological exclusion fencing)	Site-wide
Pre-construction ecological mitigation (vegetation clearance)	Site-wide

Preliminary work	Location
Environmental surveys and monitoring, e.g. noise	Site-wide
Investigations for the purpose of assessing and monitoring ground conditions and levels	Site-wide
Erection of temporary means of enclosure in connection with other preliminary works	Site-wide
Receipt and erection of plant and equipment	Advance compound areas at A2 compound, southern tunnel entrance compound, northern tunnel entrance compound, Brentwood Road compound, Stifford Clays Road compound East, M25 compound, (Temporary Works Plans ((Application Document 2.17)).
Diversion and laying of underground apparatus (except for excluded utilities work)	Services to compounds A2 compound, southern tunnel entrance compound, northern tunnel entrance compound, Brentwood Road compound, Stifford Clays Road compound East, M25 compound, (Temporary Works Plans (Application Document 2.17)).
Vegetation clearance and construction of accesses for advanced compound areas	Advance compound areas at A2 Compound, Southern Tunnel Entrance Compound, Northern Tunnel Entrance Compound, Brentwood Road Compound, Stifford Clays Road Compound East, M25 Compound, (Temporary Works Plans (Application Document 2.17)).
Temporary display of site notices or information	Site-wide

3.1.9 All preliminary works will be carried out in accordance with the provisions of Requirement 7 of the draft DCO in relation to protected species.

3.1.10 The REAC has been reviewed to identify environmental commitments relevant to the preliminary works in Table 3.1. These primarily serve to provide for:

a. pre-condition surveys

b. measures for the protection of ecology, trees and agriculture

c. Section 61 controls over noise

d. a measure to protect ongoing site remediation work at a former petrol station near an access point to the A2 Compound.

3.1.11 Table 3.2 lists the commitments in the REAC identified to be relevant to preliminary works. These commitments will be implemented when carrying out the preliminary works identified in Table 3.1. Preliminary works commitments are detailed in Annex C, Table 2.1

3.1.12 These controls will be in place on the date the DCO comes into force to provide assurance that appropriate environmental controls apply to works which can be carried out prior to the discharge of requirements under the DCO (as per Requirement 4(1) of Schedule 2 to the DCO).

3.1.13 REAC reference numbers in Table 3.2 correspond to reference numbers and commitments in the REAC in Chapter 7 of this document. The detail of these commitments applicable to the preliminary works is presented in Annex C.

Table 3.2 REAC commitment references relevant to preliminary works

Topic	REAC Ref No.
Cultural heritage	CH001
Geology and soils	GS002, GS015, GS030
Landscape	LV028, LV030, LV031
Noise and vibration	NV002, NV004, NV005, NV007
Terrestrial biodiversity	TB002, TB003, TB004, TB005, TB006, TB008, TB009, TB010, TB011, TB012, TB013, TB014, TB015, TB016, TB017, TB018, TB020

3.1.14 Annex C of this document constitutes the Preliminary Works Environmental Management Plan and includes commitments in this chapter. The Preliminary Works Environmental Management Plan will provide control over the Preliminary Works.

4 Construction

4.1 Construction of the Project

4.1.1 The delivery of the Project has been split into several tranches of contracts in order to best serve the Project's requirements and programme. National Highways' contracting approach is outlined below, along with a brief description of each contract's purpose:

a. **Tunnels and Approaches Package**: This is a design and build contract that will deliver the crossing under the River Thames, the approach ramp on the north side and approach in cutting on the south side. This contract will include the diversion and protection of existing utilities.

b. **Roads North of the Thames Contract**: This is a design and build contract that will deliver the Project from the proposed Tilbury Viaduct (which commences just south of the Tilbury Loop line) up to the M25. This contract will include the diversion and protection of existing utilities.

c. **Kent Roads Contract**: This is a design and build contract that will deliver the Project from approximately 100m north of Thong Lane (over the Lower Thames Crossing) to the M2/A2/Lower Thames Crossing junction. This contract will include the diversion and protection of existing utilities.

4.2 Project team roles and responsibilities

4.2.1 National Highways is responsible for the delivery of the Project and its implementation. However, National Highways will appoint Contractors and agents to implement the Project, including a Project Manager/Director as well as additional specialist consultants to supervise, monitor or check the Contractors' environmental procedures. These bodies will take on day-to-day responsibility for managing the commitments in this document.

4.2.2 The responsibility of the Contractors and agents will be clearly identified within relevant documents and site files but will be in accordance with Table 4.1. It is anticipated that prior to the commencement of each main phase of the construction programme, individuals will be identified to fulfil the relevant roles.

4.2.3 National Highways will appoint a suitably qualified and experienced Environmental Manager who will be responsible for monitoring and assuring compliance of the Project's works with all environmental commitments set out in this CoCP, other Project documentation and relevant environmental legislation.

4.2.4 The National Highways Environmental Manager will be supported by other specialists as necessary (including air quality, geo-environmental, noise and vibration, landscape, ecological, arboricultural and archaeological specialists).

4.2.5 A management structure that includes an organisational chart encompassing all staff responsible for environmental work will be included within all EMP2s. This will set out the respective roles and responsibilities with regard to the environment

and identify the nominated Contractor Construction Environmental Manager. The envisaged key roles and responsibilities are set out in Table 4.1.

4.2.6 The Contractor Construction Environmental Manager will be supported by other specialists as necessary (including air quality, geo-environmental, noise and vibration, landscape, ecological, arboricultural and archaeological specialists).

Table 4.1 Envisaged roles and responsibilities for the Project construction phase

Role	Main environmental responsibility
National Highways Project Director	General responsibilities for the National Highways Project Director include the following: • Collate and provide Project information to prospective Contractors • Oversee implementation of the whole Project and the individuals undertaking specific roles and duties • Assume accountability for delivery of contract requirements and the EMS for the Project.
National Highways Environmental Manager	General responsibilities for the National Highways Environmental Manager include the following: • Monitor and ensure compliance of the Project's works with all environmental commitments set out in this CoCP, other Project documentation and relevant environmental legislation • Develop and maintain a Project EMS compliant with ISO 14001:2015 • Integrate with the Quality and Health Safety Security and Wellbeing (HSSW) teams for a joint assurance focus • Support and incorporate the digital strategy • Take overall responsibility for environmental audit and inspection programme based on risk and opportunities, including undertaking assurance activities • Coordinate a joined-up approach to environmental management and continual improvement across the Project, including Contractors • Monitor environmental complaints and their investigation and resolution • Report on Contractors' environmental performance • Support development of scope of works to incorporate environmental management requirements suitable for delivery and integration of potential works interfaces • Lead on developing appropriate and effective environmental processes to ensure compliance and stimulate high environmental performance • Consider Project legacy in all decision making in the same way as cost, risk and time • Encourage innovative thinking and Contractors' initiatives that deliver and improve the Project's legacy benefits • Uphold HSSW as key Project values and participate in the creation, development and implementation of HSSW strategies by the Project leadership team.

Role	Main environmental responsibility
National Highways Traffic Manager	General responsibilities for the National Highways Traffic Manager include ensuring that any traffic management required by the Project is planned, delivered, and managed collaboratively, and that the commitments of the Traffic Management Plan (TMP) to are adhered to, with a specific focus on the following: • Planning and delivery • Network occupancy • Delivering safely • Operations • Ensure that standards and best practices are applied in the planning and delivery of traffic management • Establish and chair the Traffic Management Forums, ensuring that all affected stakeholders are invited to attend • Review feedback from local highway authorities in terms of planned traffic management as well as the performance of key traffic management phases • Receive data from the main works Contractors as to the performance of traffic management in terms of the impact on the SRN and local authority roads • Represent the Traffic Management Forum at the Joint Operations Forum (JOF) to report on traffic management performance and to escalate issues of concern raised by stakeholders • Review the performance of incident management that occurs within the designated 'Works Zone' as set out in a TMP and any relevant Detailed Local Operating Agreements • Act as the interface between the Community Liaison Team and Traffic Management Forum • Generally, oversee the performance of the wider Lower Thames Crossing construction network in terms of the coordination, planning and delivery of traffic management on the SRN and local road network.
National Highways Historic Environment Manager	General responsibilities for National Highways Historic Environment Manager include the following: • Oversight of the archaeological mitigation programme, including quality assurance of archaeological work and deliverables. • Principal point of contact for Historic England, other key heritage stakeholders and the relevant local planning authorities. • Act as interface between the National Highways and the Contractor's archaeological contractors.
Contractor Project Director	General responsibilities for the Contractor Project Director include the following: • Management of the delivery of the construction phase related to their works package/contract • The environmental performance of the construction phase related to their works package/contract • Regular communication with National Highways and the relevant statutory environmental bodies on all environmental matters as they arise

Role	Main environmental responsibility
	• Implementation of the measures set out in the CoCP.
Contractor Construction Environmental Manager	General responsibilities for the Contractor Construction Environmental Manager include the following: • Ongoing liaison with the Contractors' site management team and general site workforce • Ensuring compliance with environmental legislation, consents, objectives, targets and other environmental commitments, including those arising from the ES • Maintenance of the environmental documentation and ensuring compliance with ISO 14001:2015, including updates • Management and coordination of environmental specialists and monitoring compliance of construction activities in line with the EMPs and the relevant environmental legislation/ licences • Acting as the focal point for all environmental matters on site • Liaising with Contractors' Contractor Construction Environmental Managers and the National Highways Environmental Manager • Liaising with the local authorities and statutory bodies • Liaising with the local authority archaeology advisers as well as statutory bodies • Liaising with National Highways Operations Division • Reviewing and developing the EMPs throughout the duration of the construction phase • Liaising with the statutory environmental bodies/consultees • Accompanying statutory environmental bodies/consultees on site visits • Compiling applications for unexpected authorisations where required • Leading investigations into environmental incidents, ensuring immediate actions following environmental incidents are implemented to negate or limit impacts • Identification of key environmental concerns onsite as the construction phase develops • Assisting with the delivery of environmental training to the workforce • Assisting in the review of method statements • Assessing and checking ongoing monitoring and survey results and updating relevant databases or management plans with any new information • Identifying cost savings and best practice activities.
Contractor Environmental Clerk of Works	General responsibilities for the Contractor Environmental Clerk of Works include the following: • Providing daily updates to the Contractor Construction Environmental Manager on site progress, compliance, issues, problems and successes • Ongoing liaison with the Contractors' site management team and general site workforce • Supporting the Project team in delivering the environmental components of the works during the construction phase • Delivering environmental training to the workforce

Role	Main environmental responsibility
	• Recording the progress of the environmental works • Monitoring and supervising construction activities in relation to environmental aspects • Walkover of activities on the site and ongoing monitoring of the works area to ensure compliance with key environmental legislation and EMPs • Assisting in the review of method statements • Identification of key environmental concerns onsite as the construction phase develops • Instruction and confirmation of key requirements of each section to site personnel as the job progresses • Monitoring and updating Contractor Construction Environmental Manager on the progress of pre-construction surveys • Assisting in monthly formal audits with Contractor Construction Environmental Manager • Assessing and checking survey results and updating databases and EMPs with new information • Identification of cost savings and best practice activities • Immediate reporting of incidents to the HSSW teams • Supporting the Contractor Construction Environmental Manager in liaison with the statutory environmental bodies/consultees • Accompanying statutory environmental bodies/consultees on site visits.
Contractor Environmental specialists	The Contractor Construction Environmental Manager and Clerk of Works will require ongoing support from several specialists including but not limited to archaeologists, landscape designers, ecologists, geotechnical engineers and hydrogeologists. Specialists would be responsible for undertaking activities such as pre-construction surveys, watching briefs and advising on specific issues as and when they arise throughout the construction phase, e.g. choice of materials and methodology.
Contractor Consents Manager	General responsibilities for the Contractor Consents Manager include the following: • Preparing, implementing, maintaining and updating the Consents Management Plan and Consents Register(s) • Providing the main point of contact for all consents matters and cooperating with National Highways in all matters relating to consents Applications, notifications and compliance • Facilitating the provision of drawings and other design or Project information required for the preparation and submission of consent application(s) • Managing and monitoring the status of all consents requirements such that the works or any part of the works for which consents are required are not commenced until consent is granted, notification given, and relevant conditions are complied with • Monitoring compliance with consents throughout the works to ensure the consents are complied with and discharged • Liaising with third parties, stakeholders and National Highways, including arranging and attending liaison meetings or telephone calls as necessary

Role	Main environmental responsibility
	as well as attending regular or standing meetings (or in both cases arranging for a deputy to attend, as agreed with National Highways from time to time) • Maintaining, managing and updating the Consents Register and minuting all meetings and calls • Notifying National Highways as soon as reasonably practical of a breach of consent(s) or a potential breach or dispute with a third party, or any situation where the Contractors consider that the third party is not facilitating the smooth progress of consents.
Contractor Community Liaison Officer (CLO)	General responsibilities for the Contractor CLOs include the following: • Deliver the Community Engagement Plan • Engage with those who may be affected by construction impacts, including local residents, community groups and local businesses • Provide information on the construction process to local stakeholders and be the first line of response to resolve issues of concern • In the case of emergency work, engage with and advise the local authority and local residents of relevant information as soon as reasonably practical • Ensure compliance with community engagement commitments, as defined in the CoCP • Maintain a correspondence register.

4.2.7 National Highways may transfer the benefit of the powers obtained under a DCO to a third party such as a Statutory Undertaker. Where this occurs, the powers would be subject to the same restrictions and liabilities as would apply to National Highways.

4.3 Interface management of construction works

4.3.1 It is anticipated that the construction works will be split into three packages across the Project (as described in Paragraph 4.4.1) to enable appropriate management. Some of these packages will proceed concurrently with ongoing construction activities in either the same or different locations under the control of other Contractors.

4.3.2 Therefore, activities by other Contractors will require coordination to manage this interface efficiently and increase opportunities for reducing the overall impact on the surrounding communities and environment. Contractors will work with National Highways in managing these interfaces. The Outline Traffic Management Plan for Construction (oTMPfC) includes the appointment of a National Highways Traffic Manager, whose role would include oversight of the various programmes so as to minimise the impacts on stakeholders , as described in Table 4.1. Additionally, the Framework Construction Travel Plan includes the appointment of a National Highways Travel Plan Manager, whose role would include the management of travel planning for the movement of personnel to and from the construction worksites and compounds (including the Utility Logistic Hubs (ULH)) during the construction phase of all works related to the Project, with the aim of minimising their impact on the road network.

4.3.3 To facilitate this interface, National Highways will establish and chair a JOF, attended by senior representatives from the Contractors. The forum will meet regularly to discuss the interface between the Contractors' areas of influence. There will be two-way communication between the JOF, the Project's community liaison team, the Traffic Manager, Chair of the Workers Accommodation Working Group (WAWG) and the Travel Plan Manager to ensure relevant information is shared. Chapter 5 provides more information on the Project's community liaison arrangements. Further information on the TMF, Travel Plan Liaison Group (TPLG), and WAWG's relationships with the JOF may be found in the respective forums' Terms of Reference in the Outline Traffic Management Plan for Construction and Framework Construction Travel Plan

4.3.4 The JOF will be required to coordinate several activities as well as the potential interaction with other schemes and external stakeholders. Some of the key coordination responsibilities will include the following, as appropriate:

a. Coordination of delivery to ensure mitigation and management of environmental effects will be delivered and maintained. This shall include the coordination and implementation of ecological mitigation.

b. Emergency response – maintaining communication and holding meetings with emergency services and other key stakeholders and ensuring that emergency response plans employed by the Contractors are coordinated (see also Section 6.9 and Section 6.10).

c. Coordination of construction phasing and logistics – working collaboratively to ensure that all Contractors' construction programmes are aligned.

d. Access to the sites – communication and collaboration in respect of logistics planning including arrangements for site access and abnormal loads with highway authorities and emergency services.

e. Construction workforce – monitoring the impact of the workforce on the community in its travel to and from work and its use of temporary accommodation.

f. Interface with other schemes – maintaining communication between the works on the Project and those of other relevant schemes in the area to help minimise the disruption on local communities.

g. Construction (Design & Management) Regulations 2015 (CDM) – cooperation, coordination and communication between Principal Designers and Principal Contractors to ensure discussion activities take place between the Contractors to deliver a consistent approach across the Project, reduce risk, share lessons learnt and agree commonality through design. Legal obligation to ensure there is cooperation and communication between Principal Contractors and Principal Designers.

h. Ensuring construction phasing plans have been made available to the relevant local authorities for information, prior to works commencing in that phase.

i. Security – ensuring consistency and sharing security issues across all sites. Security is discussed in more detail in Section 6.7.

4.3.5 The terms of reference of the respective forums within the Outline Traffic Management Plan for Construction and Framework Construction Travel Plan incorporate a dispute resolution process, with the JOF forming a key role within it. The JOF would be required to operate as an arbitration forum tasked with resolving issues raised by other fora including the TMF, TPLG, WAWG and the Security Partnership Working Group (SPWG) (see Section 6.7 for more information).

4.3.6 As representatives, the Chairs of the respective forums (or appropriate delegate) must attend the JOF when matters of dispute are presented.

4.3.7 The JOF must carefully evaluate all relevant information and views presented during the dispute settlement process, giving special weight to evidence and supporting documentation provided by the parties involved.

4.3.8 To avoid project or process delays, the JOF must make decisions within an appropriate time frame. Transparency is an essential principle of the dispute resolution process, which requires the JOF to accurately document their decisions and the underlying rationale.

4.4 Consents and permissions

4.4.1 A number of consents will be sought within the DCO, and in addition there will be further permission and consenting requirements. The Project's approach to consents and permissions is detailed within the Consents and Agreements Position Statement (Application Document 3.3).

4.4.2 The intent of the Planning Act 2008 and Government policy is to enable development and construction-related consents to be included within the DCO. Therefore, where possible and practicable, additional consents have been included within the DCO. This would minimise the need for any further approvals before the works covered by the DCO can commence, as most of the consents required for construction would be in place when the DCO is granted.

4.4.3 The Project has been, and will continue to be, developed based on strong collaboration between its stakeholders, and any additional consents and agreements will be secured at relevant stages of the Project's development, as necessary.

4.4.4 A summary of those consents and permissions that may be required, and which are not provided for in the DCO, is listed in Table 4.2. Further information can be found in the Consents and Agreements Position Statement (Application Document 3.3).

Table 4.2 Consents and permits that may be required

Issue	Consent / licence / agreement and legislation	Consenting authority	Requirement
Installation/ operation/ plant operation/ solvent emissions activities	Regulation 12 of the Environmental Permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended)	Environment Agency	Multiple permits are likely to be required for construction activities, e.g., storage and treatment activities such as materials crushing, concrete / bitumen plants, remediation plant, transfer stations, short-term (less than three years) material storage. Locations where such permits would be required are primarily construction compounds across the scheme. During construction, construction compounds would be located along the Project route. Larger compounds would be required at the North and South Portals to allow for tunnelling operations and materials management.
Water abstraction and impoundment	Water Abstraction: Licence under sections 24 and 25 of the Water Resources Act 1991	Environment Agency	Permits are likely to be required for construction activities, e.g., water abstraction for concrete processing; impoundment requiring changes to existing assets and de-watering. Locations where such permits would be required are primarily construction compounds across the scheme. During construction, construction compounds would be located along the Project route. Larger compounds would be required at the North and South Portals to allow for tunnelling operations and materials management.
Environmental permits (water discharge and / or groundwater activity)	Regulation 12 of the Environmental Permitting (England and Wales) Regulations 2016 (as amended)	Environment Agency	Permits will be required for dewatering, discharges to surface or groundwater from construction. At the Northern tunnel entrance construction compound, a permit will be required for dewatering and discharge of groundwater, as well as for discharging other construction effluents e.g., generated by operation of tunnel boring machinery. At the Southern tunnel portal construction compound, a permit will be required for discharge of surface water runoff from the construction compound due to the potential for entrainment of chalk fines. The discharge would be received by a ditch that would convey flows to the River Thames.

Issue	Consent / licence / agreement and legislation	Consenting authority	Requirement
			Additional permits may also be required for discharge of foul water to the sewage network under consent of the relevant utilities company.
Environmental Permit (using, treating, storing and disposing of waste)	Regulation 12 of the Environmental Permitting (England and Wales) Regulations 2016 (as amended)	Environment Agency	Permits will be required where treatment or storage of waste is proposed during construction or operation where it exceeds the provisions / requirements of an appropriate waste exemption. At the North Portal construction compound a permit(s) will be required where construction activities interact with the extant and currently permitted waste activities (operated by others).
European Protected Species licensing	Conservation of Habitats and Species Regulations 2017	Natural England	Required for the translocation of species in the Order Limits prior to the commencement of construction. Ecology surveys have identified that the Project may have an impact upon bats, great crested newts and dormice. These licences are therefore likely to be required prior to commencement of construction activities. The licences will be sought in full following detailed design and further programme development because survey information will be required that is specific to the timeframes and status of those undertaking the work.
Water voles	Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)	Natural England	Required for the translocation of species in the Order Limits prior to the commencement of construction.
Badger licence	Protection of Badgers Act 1992 (section 10(1)(d))	Natural England	Badger setts have been identified within the Order Limits and it may be necessary to undertake the closure and removal of confirmed badger setts during construction. This consent is therefore likely to be required prior to commencement of construction activities.
Noise, vibration and environmental impact of construction works	Section 61 consent under the Control of Pollution Act 1974	Local authority	For construction works and associated operations to approve further controls for potential disruption and impacts.

Issue	Consent / licence / agreement and legislation	Consenting authority	Requirement
Self-Service Marine Licence	Marine and Coastal Access Act 2009	Marine Management Organisation	For works that may be undertaken in the River Thames, or on the foreshore, which are not addressed through provisions made in the Deemed Marine Licence, a Self-Service Marine Licence would be required in addition to the Deemed Marine Licence. Such works would include: reprofiling, moving material, specific construction activities, maintenance, dredging, and the deposit or removal of any substance or object.
Permits for road works and street works	Schemes made under the Traffic Management Act 2004.	Local authority	To book road space, enable the co-ordination of works and put in place temporary traffic management on local roads.
Hyperbaric Working	The Work in Compressed Air Regulations 1996- Regulation 21 of the 1996 Regulation grants the Health and Safety Executive (HSE) the power to “exempt any person or class of persons from all or any of the requirements or prohibitions imposed by these [1996] Regulations.”	HSE	HSE to sign off a derogation from the regulations to authorise work above 3.45 Bar
Material Assets and Waste	The Control of Asbestos Regulations 2012	HSE	Required for any work with asbestos.
Discharging Waste	Trade Effluent Consent under the Water Industry Act 1991	Local water undertaker	For the purposes of discharging trade effluent from welfare facilities.

4.5 Protection of existing infrastructure and buildings

4.5.1 Powers related to the protection of existing infrastructure and buildings are included in the DCO.

4.5.2 The EMP2 will require the Contractors to take measures, including the carrying out of surveys, investigations, obtaining consents and agreements, to protect existing buildings and infrastructure and engage with the appropriate Statutory Undertakers and stakeholders. The Contractors will undertake the design and implementation of any repairs, strengthening, modifications (temporary or permanent) required in accordance with article 35 of the DCO.

4.6 Environmental asset data and as-built drawings

4.6.1 The environmental features of the Project are shown on Figure 2.3: Environmental Constraints Plan (Application Document 6.2).

4.6.2 Habitat and protected species surveys for the following species have been undertaken to inform the ES and subsequent delivery and management of mitigation measures identified in the REAC to control environmental effects:

a. Bats

b. Otters

c. Dormice

d. Great crested newts

e. Water voles

f. Common reptiles (grass snake, adder, common lizard, slow worm)

g. Breeding birds

h. Wintering and ‘on passage’ wetland birds

i. Barn owls (targeted surveys)

j. Invertebrates (terrestrial, aquatic and benthic – including tentacled lagoon worm)

k. Badgers

l. Species listed in accordance with the requirements of Section 41 of the Natural Environment and Rural Communities Act 2006 (specifically harvest mice and brown hares)

m. Marine mammals and eels (incidental observations only).

4.6.3 Surveys for the above species were undertaken to inform the ES.

4.6.4 Cultural heritage surveys were undertaken to inform the ES, including the following:

a. cultural heritage desk-based surveys

b. geophysical surveys

c. archaeological trial trenching

d. historic buildings assessment.

4.6.5 Environmental asset data and as-built drawings would be required for the operation of the Project.

4.6.6 The submission arrangements for providing as-built drawings and environmental asset data to National Highways are as follows:

a. The Contractors issue an electronic copy of all as-built drawings and environmental asset data to National Highways in a format agreed by National Highways, and compile and maintain a register of the date and contents of the drawings and data submitted.

b. Arrangement for the provision of information to the subsequent asset owner's stakeholders, including local authorities detailed in National Highways DMRB GG 182 Major Schemes: Enabling handover into operation and maintenance (Highways England, 2020c).

5 Communication and community engagement

5.1 Communication and community engagement

5.1.1 The EMP2 will require National Highways to develop a Communications Engagement Strategy (CES) that outlines the objectives and processes for engagement and communications with all stakeholders. The EMP2 will require the Contractors to each develop an Engagement and Communications Plan (ECP) in support of the CES that will ensure that stakeholders are informed of the works activities and to maintain good relationships with other parties.

5.2 Engagement and Communications Plan

5.2.1 The Contractors' ECP will be submitted to National Highways for review and will include the following:

a. The Contractor's processes and procedures that demonstrate how they will meet the requirements of scope of works and National Highways' CES

b. How the Contractors will distribute communications to stakeholders, local authorities, local residents and communities

c. The roles, responsibilities and contact information for the Contractors' staff involved in delivering the ECP

d. A programme of initial communication activities with stakeholders and communities

e. Key messages, communication channels and target audiences

f. Reporting metrics to be used to monitor and report on communications performance

5.2.2 The EMP2 will require the ECP to be submitted for acceptance by National Highways, following engagement with the local planning authorities about priority communities, timing, frequency content and channels of communication. The ECP will be provided to the relevant local authority before the authorised development is commenced. Experienced community relations personnel/CLOs will implement the plan, provide appropriate information and provide support to the Contractors to resolve community issues.

5.2.3 Communication with local authorities, councillors, parish councillors and the Project's 'neighbours' will be undertaken throughout the construction phase, including through Community Liaison Groups and the Traffic Management Forum (as detailed in the oTMPfC). The Contractors will engage with the local community, particularly focusing on those who may be impacted by construction, including local residents, businesses, landowners and the specific needs of protected groups (as defined in the Equality Act 2010).

5.2.4 The Project will provide information and feedback and respond to stakeholders and affected communities regarding upcoming construction activities.

5.2.5 The ECP will provide a detailed programme of community engagement, setting out how relevant planning authorities, communities, stakeholders and affected parties will be engaged with throughout the construction period. It will specify stakeholders, communities and affected parties (such as schools, places of worship, businesses and environmental organisations) and for each group, will identify the proposed methods and likely timing of engagement for each key stage of work. Such methods may cover, but are not limited to, community drop-in sessions, one-on-one meetings with key stakeholders as relevant, newsletters and leaflet drops explaining forthcoming works.

5.2.6 Other information to be described within the ECP includes the following:

a. Details of the enquiries and complaints procedure including information on the helpline and email addresses available for stakeholders to contact National Highways directly.

b. Details of how the needs of vulnerable groups will be met in terms of use of accessible media and appropriate formats for visually impaired people.

c. A detailed programme of community involvement through volunteering and educational activity (including Science Technology Engineering and Maths (STEM) programmes with local schools, colleges, and apprenticeship opportunities) as well as highlighting the risks associated with Plant/Construction Vehicles and People and major construction sites.

d. In engaging with the relevant local authorities, the Project will establish and maintain Community Liaison Groups (CLGs) in those communities likely to be most impacted by construction activities. The ECP will identify in which communities it will be appropriate to establish a CLG, in advance of construction commencing. The ECP will set out the process by which CLGs will be established and administered together with an initial schedule of planned meetings according to key work stages. CLGs will meet regularly before and during the construction period.

Community helpline, enquiries and complaints procedure

5.2.7 The National Highways Customer Contact Centre will be used to deal with enquiries and complaints from the public. This consists of a phone line, email and website contact facility. The information line is staffed by National Highways 24 hours a day, seven days a week. The relevant contact number, email and website addresses for the National Highways Customer Contact Centre will be displayed on signs around the construction site in locations easily accessible to the public. The National Highways Customer Contact Centre will provide a response to enquiries and complaints within 10 working days.

5.2.8 The procedure, which is already in place as a standard National Highways process, will:

a. log enquiries and complaints in a register

b. deal with enquiries and complaints appropriately, recognising that they may be due to the effect of construction works on people, their properties and other interests

c. direct the enquiry or complaint to the correct person for review and appropriate action if the person recording it cannot do so

d. take appropriate action and respond to enquiries or complaints

e. outline the process for National Highways to review enquiries and complaints regularly, to assess the adequacy, efficiency and effectiveness of the enquiries and complaints system and procedure, and the measures being taken to respond to any enquiries or complaints, and close out on resolution

f. identify clusters of enquiries and complaints by location and topic for further consideration by National Highways.

5.2.9 The extent of the action taken will depend on the nature of the enquiry or complaint. All complaints will be investigated to establish the cause and whether the works or issue complained about, complies with the Project's environmental requirements and other relevant requirements such as legislation, standards and codes of practice.

5.2.10 The Project will follow the National Highways complaints procedure, which includes a mechanism for referring complaints to the DfT's Independent Complaints Assessors, and the Parliamentary and Health Service Ombudsman (PHSO). This complaints process is used by National Highways on its other NSIPs.

Community Liaison Groups

5.2.11 National Highways will work closely with relevant stakeholders on the membership of the proposed CLGs, which will include representation from the local community. Attendance and membership will be published on the Project website.

5.2.12 The scope of the CLGs will be to ensure that local residents are appropriately informed and therefore prepared for forthcoming changes and construction activities.

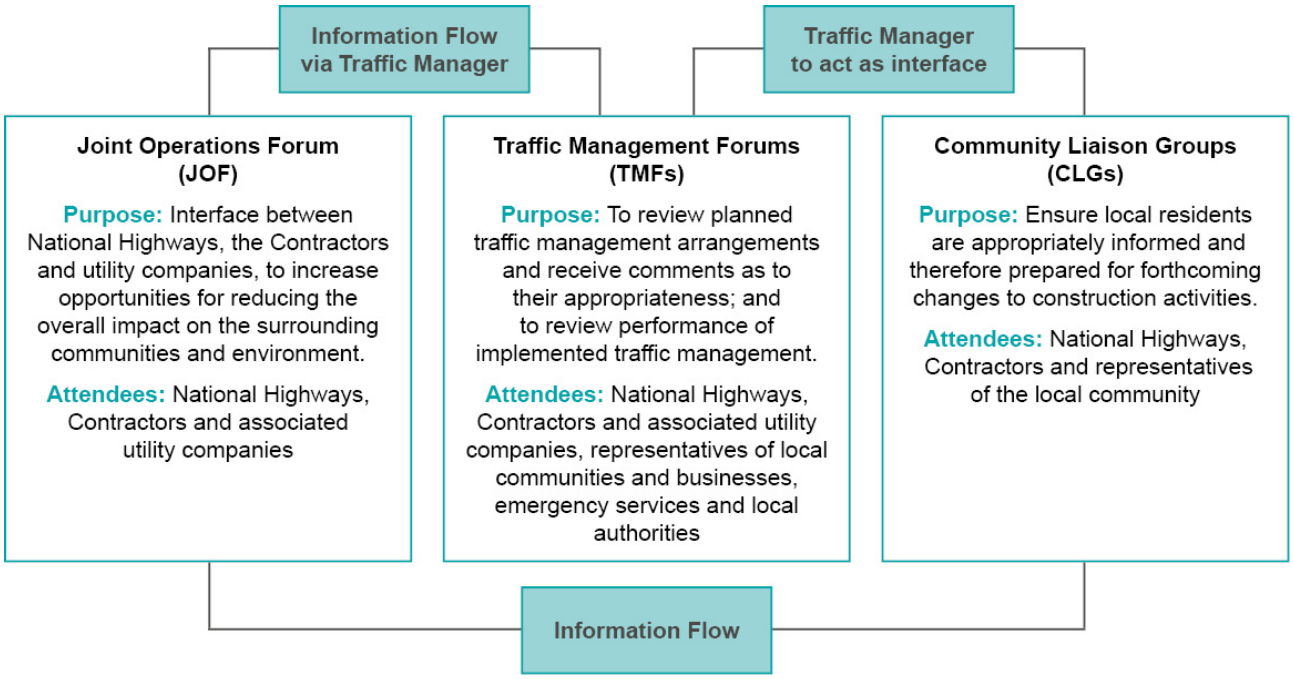
5.2.13 Initial Terms of Reference for the CLGs have been developed, covering matters such as purpose, membership and frequency of meetings / working methods. The Initial Terms of Reference are provided at Annex D: Community Liaison Groups – Initial Terms of Reference. Detailed Terms of Reference for the CLGs will be prepared with participants and agreed in advance of construction

commencing. It is anticipated that the Terms of Reference will then evolve as the Project progresses.

5.2.14 The local community leaders of the CLGs will be invited to the Traffic Management Forum.

5.2.15 Plate 5.1 illustrates the relationship between the JOF, CLGs and Traffic Management Forums (TMFs). TMFs are detailed in the oTMPfC.

Plate 5.1 Illustrating the connectivity between the Joint Operations Forum, Community Liaison Groups and the Traffic Management Forums



5.3 Notice of work

5.3.1 Contractors will notify occupiers of nearby properties in advance of works taking place if there is a possibility of their being impacted, taking account of the type and duration of the activity. This notification will be undertaken in accordance with the ECP (see Section 5.2). Such notices would be in addition to notices required under the temporary possession articles of the DCO.

5.3.2 At least two weeks before planned works are carried out, the Contractors will distribute information sheets relating to the programmed activities.
The information sheets will detail the expected disruptions and measures being taken to avoid, minimise or mitigate the adverse impacts of these works.
There may be circumstances where, for example, emergency works need to be carried out and notification may not meet the timeframe.

6 General construction and site management

6.1 Construction logistics

6.1.1 The EMP2 will require the Contractors to produce Construction Logistics Plans and will be required to implement directly, and through their Subcontractors and suppliers, the following or equivalent standards:

a. Construction Logistics Community Safety (CLOCS) – A national standard of planning the supply routeing and management of sites to reduce risk to vulnerable road users.

b. Fleet Operator Recognition Scheme (FORS) (Silver or above) – A national standard of managing vehicle fleets and driver training to reduce risk to vulnerable road users.

c. Driving for Better Business (National Highways Programme) – A national standard of reducing risk to professional drivers.

6.1.2 The Contractors will inform National Highways what their strategy is for implementing FORS Gold, or equivalent by assessment, where applicable, along with supporting their supply chain to gain FORS Silver or above. Equivalency, by assessment, is intended to open opportunity for local businesses who would otherwise be excluded due to an absolute requirement to achieve FORS accreditation which may be onerous to small businesses.

6.1.3 National Highways will monitor performance against compliance with FORS progression and publish results as part of the project performance reporting to the TMF. Strategies to address non-compliance will need to be prepared by the Main Works Contractors and utility contractors to be presented and agreed at the TMF.

6.1.4 Abnormal loads and transport movements from a European origin will be exempt.

6.1.5 All Contractors will have, and maintain, CLOCS champions throughout the programme.

6.1.6 The Contractors will investigate the use of multimodal transport including use of the River Thames via port facilities adjacent to the Project Order Limits – see Section 6.2 of the outline Materials Handling Plan. Contractors will be required to consider the impact of any multimodal transport options on the wider road network and environment and demonstrate the decision process used to select them.

6.1.7 Contractors will be encouraged to optimise the use of autonomous plant and equipment the use of hydrogen fuel, fuel cells, electric and hybrid plant and hydrotreated vegetable oil and a modernised fleet.

6.1.8 The Contractors' Construction Logistics Plans will be submitted to National Highways for review and approval.

6.2 Traffic management

6.2.1 An oTMPfC has been produced to provide outline concepts and principles that will be applied for the design and management of construction traffic management and transport logistics for the Project. This outline document provides a framework for discussion purposes with relevant authorities.

6.2.2 As required by Requirement 10 of Part 1 of Schedule 2 of the DCO, the Contractors will be required to produce TMPs for construction before commencing works. The TMPs must be substantially in accordance with the oTMPfC (for the avoidance of doubt TMPs will not be included in EMP2). Traffic management for construction will be dealt with via that document. The TMPs will focus on the following:

a. SRN traffic management, including lane closures, speed control and temporary road closures and diversions

b. Local road network, including temporary contraflows, road closures, diversions both online and offline, and weekend closures

c. Traffic management within the worksite, such as traffic routes and workforce pedestrian management, strategic and local road networks due to the different highway authorities

d. Management of construction traffic impacts on other road users, including motorised road users and walkers, cyclists and horse riders.

6.3 Journey planning

6.3.1 A Framework Construction Travel Plan (FCTP) (Application Document 7.13) has been produced to provide a framework with regard to the implementation of travel planning for the movement of personnel to and from the construction areas and compounds during the construction phase of the Project. The key aim of the FCTP is to minimise adverse local disruption or traffic impacts on the highway network from worker and visitor travel to and from construction areas and compounds, by reducing the number of single-occupancy vehicle trips and encouraging the uptake of sustainable and active modes of travel.

6.3.2 The FCTP sets out guidance for developing Site-Specific Travel Plans (SSTPs) for each construction compound, or compounds where these are closely located with similar levels of accessibility. This includes the Utility Logistic Hubs required for Statutory Undertakers to carry out the utility-specific works.

6.3.3 The need to produce SSTPs is secured within Requirement 11 (Part 1 of Schedule 2) of the draft DCO (Application Document 3.1) (and, therefore, for the avoidance of doubt will therefore not be included in EMP2). The SSTPs will be subject to review (and approval) by the SoS, with engagement with relevant local planning authorities.

6.4 Working hours

6.4.1 The working hours at the worksites will depend on the construction activities. Table 6.1 classifies the working hours that will apply and which will be secured by EMP2. The Contractor must ensure there is no contravention of the working hours in Table 6.1.

6.4.2 In some circumstances, the Contractors will need to undertake work under additional working hours, as defined in Table 6.1 below.

6.4.3 Activities outside normal working hours that could give rise to disturbance will be kept to a reasonably practicable minimum.

Table 6.1 Working hours

Classification	Description
Standard working hours: 07:00 to 19:00 weekdays 07:00 to 16:00 Saturday Plus, up to one hour before and/or after for mobilisation (start-up and close down) procedures.	These standard working hours will apply to all works authorised under the DCO unless they fall within the scope of the extended hours described in the rows directly below. Mobilisation period (I.e., the period up to one hour after and/or before the standard hours) is required in relation to daily start-up and close down procedures will include the following: • Deliveries and unloading • Workforce movement to place of work • Site briefings • Inspections, refuelling, maintenance • General preparation and housekeeping works. During the mobilisation period, activities will not include operation of plant or machinery and will be limited to activities that do not cause a disturbance to local residents, schools, businesses or other sensitive receptors.
Extended working hours for repair and maintenance hours (where required) 08:00 to 17:00 Sunday	Repair and maintenance activities will comprise general mechanical maintenance to construction machinery and plant, cranes, excavators, compressors, grouting equipment and dewatering pumps.
Extended working hours for concrete pours and Diaphragm walling 19:00 to 22:00 weekdays	Extended hours will apply to concrete pours and diaphragm walling. The Contractor must use reasonable endeavours to utilise the standard working hours for the purposes of these works. However, the ability to carry out these works in these extended working hours have been included where the standard hours are insufficient to safely complete the task and it is not considered reasonably practical to stop the works.
Extended working hours for Earthworks 07:00 to 22:00 Monday to Saturday (March to October inclusive, only)	Earthworks activities are covering, filling and cutting, placement of excavated material, onsite bulk movement of materials, excavations and compaction of fill. The Contractor must use reasonable endeavours to carry out such activities in the standard working hours. These extended working hours will not apply to any earthwork activities within 300m of

Classification	Description
	sensitive receptors which give rise to greater levels of noise than the levels recorded during pre-construction monitoring. Sensitive receptors are considered to be any occupied premises outside a site used as a dwelling (including gardens), place of worship, educational establishment, hospital or similar institution, or any other property likely to be adversely affected by an increase in noise level. The receptors/restriction zones are to be agreed with the local planning authority prior to construction works beginning as part of the S61 application.
Extended working hours for tunnelling, below-ground shaft works and portals 00:00 to 24:00 Monday to Sunday	The underground construction of the main tunnel drives and advance ground treatment tunnel, cross-passages, shafts and portals (the "tunnelling activities") and construction activities which are required to ensure the operation of the tunnel activities covering: • Dewatering, monitoring and surveying, excavated material handling, slurry treatment plant, pumps, maintenance workshops, general material (tunnel lining segments) supply to tunnelling operations (cross passages), ventilation fans and cranes, compressors • Onsite factory casting of the tunnel segments and other concrete elements and the batching of concrete for any underground activities, sprayed concrete lining or in-situ works • Works to distribute tunnel-arising spoil within the confines of the northern tunnel entrance compound, using a conveyor from the separation plant to the initial stockpile on Shed Marsh, from where it will be distributed and spread using standard earthmoving equipment • Import (via the neighbouring Port of Tilbury's private road) of aggregates from the port. • Onsite movement of materials in connection any of the above activities. For the avoidance of doubt, 24 hour working is not permitted for: • The tunnel approaches as shown in the tunnel area plan. • Off-site transport and deliveries to/from the tunnel compounds, outside of the Port of Tilbury, are restricted to standard working hours.
Extended working hours for specified activities in Table 6.2, Table 6.3 and Table 6.4 00:00 to 24:00 Monday to Sunday	Extended working hours will apply to the specific activities set out in Table 6.2, Table 6.3 and Table 6.4. The Contractor will only utilise these extended hours where it is not reasonably practicable to use the standard working hours. These activities have been specified because extended hours are necessary to (i) reduce the risk to the public transport or utility network users or (ii) reduce the risk associated with further works which would require works outside of standard working hours or (iii) to minimise the impact to existing infrastructure (e.g. railway assets, or utilisation of periods with low demand or flows for utility diversions).

Classification	Description
Extended working hours for emergency or short notice working 00:00 to 24:00 Monday to Sunday (as necessary)	These extended working hours will only apply in the case of work required in response to an emergency or which if not completed would be unsafe or harmful to the works, staff, public or local environment or would increase disruption to asset owners and customers of the utility network. This would cover the completion of operations and onsite movement of materials for: • The gas networks and all component parts thereof; • The electricity networks and all component parts thereof; • The water networks and all component parts thereof; • The foul water network and all component parts thereof; and • The telecommunications networks and all component parts thereof. These activities must have commenced in the AM and where it is not reasonably practical to obtain permission from the local authority in advance. These extended hours would also apply to completion of other emergency works which if not completed is likely to cause danger to persons or property or the environment. The Contractor must use all reasonable endeavours to carry out such activities in the standard working hours. The Contractor must ensure the period for such operations is kept as short as reasonably practicable. The local authority will be informed as soon as reasonably practicable of the reasons for, and (if not completed) the likely duration of, the works.
Extended working hours for tidal river working 00:00 to 24:00 Monday to Sunday (tide dependent)	Works in the tidal river must be undertaken according to tidal cycles and may therefore take place any time within a 24-hour period.
Extended working hours for abnormal loads and police escort loads 00:00 to 24:00 Monday to Sunday	Abnormal loads or those that require a police escort may be delivered outside standard working hours subject to the requirements and approval of National Highways with respect to the Strategic Road Network or where required outside of the DCO the local highway authority (with respect to the local road network). This could cover the delivery of tunnel boring machinery, heavy lift crane/equipment, prefabricated bridge beams or heavy plant.
Extended working hours for security 00:00 to 24:00 Monday to Sunday	Security personnel and monitoring will be operational on a continuous 24-hours, seven days a week basis.
Extended working hours for monitoring 00:00 to 24:00 Monday to Sunday	Non-intrusive environmental and construction monitoring will be operational on a continuous 24-hours, seven days a week basis.

Classification	Description
Other extended working hours as agreed with the local authority	In the case of work which falls outside of the standard working hours or extended working hours above, the Contractor will obtain the approval of the local authority for carrying out those works. The local authority will be provided the reasons for, and likely duration of, the works. This would include works which if not completed would be unsafe or harmful to the works, staff, public or local environment.

6.4.4 Table 6.2, Table 6.3 and Table 6.4 set out the activities for construction of Kent Roads, construction of roads north of the Thames and construction of utilities where extended hours will apply and 24-hour working may take place.

6.4.5 Durations of activities where 24-hour working may take place are detailed in Environmental Statement Appendix 2.1: Construction supporting information.

Table 6.2 24-hour construction working locations – Kent roads

Work No	Activity proposed to be undertaken as 24-hour construction	Location
2G	the construction of a new viaduct to carry the new link road between the southbound carriageway of the new A122 Lower Thames Crossing and the westbound carriageway of the improved A2	A2
1H	the construction of a new bridge to carry the realigned Thong Lane over both carriageways of the improved A2 mainline	Thong Lane over A2
1H	the demolition of the existing Thong Lane bridge over the existing A2 mainline	Thong Lane over A2
1D	the construction of a new bridge to carry the realigned Brewers Road over both carriageways of the improved section of the A2 mainline	Brewers Road over the A2
1D	the demolition of the existing Brewers Road bridge over the existing A2	Brewers Road over the A2
3B	Tie-in works for the construction of a new bridge to carry the realigned Thong Lane over the southbound and northbound carriageways of the new A122 Lower Thames Crossing	Thong Lane over Lower Thames Crossing
2F	Gravesend East Junction Slips & Marling Cross Widening Works & Henhurst Road Tie-in works for 2F	Gravesend East Junction Slips
2H	A2 tie-in works relating to the construction of a new highway, single carriageway, between the eastbound carriageway of the improved A2 mainline and the northbound carriageway of the new A122 Lower Thames Crossing	Lower Thames Crossing scope tie in points east of Henhurst road
2D	Tie-in works relating to the construction of a new highway, two-lane single carriageway, between the new westbound A2 link road and the westbound carriageway of the improved A2 mainline	Lower Thames Crossing scope tie in points east of Henhurst road

Work No	Activity proposed to be undertaken as 24-hour construction	Location
1M	A2 tie-in works for the construction of a section of the new local road between the new A2 and the realigned Brewers Road	A2 exit to Brewers Road
1A	Surfacing works for the construction of an improved section of the existing M2 and the improvement works to the A2	Order limit boundaries on A2

Table 6.3 24-hour construction working locations – Roads north of the Thames

Work No.	Activity proposed to be undertaken as 24-hour construction	Location
5C	Construction of a section of the Tilbury viaduct above Tilbury Loop railway line	Tilbury Loop railway line. At the point where the Project route passes over the railway line.
7D	Construction of a new bridge	A1013 over A1089 new proposed structure
7E	Demolishing of an existing bridge structure	A1013 over A1089 existing structure
7E	Construction of a new bridge	A1013 WB to Lower Thames Crossing NB viaduct over A1089
7C	Box jack under A13	A13 over Lower Thames Crossing east of A1089
7Z	Box jack under A13	A13 over Lower Thames Crossing west of A1089
7J	Demolishing of an existing bridge structure	Rectory Road over A13, existing structure
7J	Construction of a new bridge	Rectory Road over A13 new proposed structure
7H	Tie-in new link road with existing A13 westbound carriageway	A13
7E	Tie-in new link road with existing A13 westbound carriageway	A13
7F	Resurfacing of exiting dual carriageway A13 and over tie-ins between existing and new infrastructure and	A13
7F	Installing new gantries	A13
7D	Resurfacing of existing A013 and over tie-ins between existing and new infrastructure	A1013
7T	Resurfacing of existing A1089 and over tie-ins between existing and new infrastructure	A1089
7M	Tie-in new link road with existing infrastructure	Green Lane over Lower Thames Crossing

Work No.	Activity proposed to be undertaken as 24-hour construction	Location
7L	Tie-in new link road with existing infrastructure	Stifford Clays Road over Lower Thames Crossing
6B	Tie-in new link road with existing infrastructure	Muckingford Road over Lower Thames Crossing
6D	Tie-in new link road with existing infrastructure	Brentwood Road over Lower Thames Crossing
9A	Box jack under M25	M25 over Lower Thames Crossing
9M	Construction of a new bridge	FP252 over Upminster Railway
9O	Construction of a new bridge	FP230 over M25 and Lower Thames Crossing NB
9D	Construction of a new bridge	Lower Thames Crossing NB collector over the Shoeburyness railway line
9E	Modification of an existing bridge	Improved M25 southbound over Shoeburyness railway line
9G	Widening of Codham Hall Viaduct	Codham Hall Viaduct
9Z	Construction of a new bridge	Footbridge over A127
8D	Tie-in new link road with existing infrastructure	North Road – B186 Interface with Lower Thames Crossing
9E	Installing new gantries	M25
9E	Widening of existing infrastructure / tie-in existing with new infrastructure	M25

Table 6.4 24-hour construction working locations – utilities

Work No.	Activity proposed to be undertaken as 24-hour construction	Feature crossed and location
MU2	Trenchless installation of two water pipelines	A2 at Park Pale bridge
G1b	Trenchless installation of a gas pipeline	Thong Lane west of the Inn on the Lake
OH1 OHT1	Erection and removal of overhead powerline equipment	Network Rail Asset (HS1) east of Henhurst Road A2 south of Claylane Wood Thong Lane, north of Thong
G1b	Trenchless installation of a gas pipeline	Vicinity of Valley Drive and Hever Court Road roundabout
G1b	Installation of a tunnel as a conduit for a gas pipeline	The A122, west of Thong

Work No.	Activity proposed to be undertaken as 24-hour construction	Feature crossed and location
G3	Installation of a tunnel as a conduit for a gas pipeline	The A122, west of Thong
G4	Installation of a tunnel as a conduit for a gas pipeline	The A122, west of Thong
G3	Trenchless installation of a gas pipeline	Thong Lane, north of Thong
G4	Trenchless installation of a gas pipeline	Thong Lane, north of Thong
OH3 OHT3	Erection and removal of overhead powerline equipment	Station Road, at the A122 London, Tilbury and Southend Railway (LTSR) line east of the A122 Muckingford Road, east of the A122
OH4 OHT2	Erection and removal of overhead powerline equipment	Station Road, west of the A122 London, Tilbury and Southend Railway (LTSR) line west of the A122 Muckingford Road, at the A12 Buckingham Hill Road, north of Linford
MU29 MUT8	Trenchless installation of four water pipelines	LTSR line south of Church Road
MU28	Trenchless installation of electricity networks	LTSR line east of the A122
MUT6	Trenchless installation of two water pipelines	LTSR line west of East Tilbury
OH5	Erection and removal of overhead powerline equipment	Muckingford Road, west of the A122
OH6 OHT5 OHT6	Erection and removal of overhead powerline equipment	Brentwood Road, north of Chadwell St Mary Hornsby Lane, north of Chadwell St Mary Heath Road & the A1089, south of the A13 A1013 Stanford Road, west of the A1089 Long Lane, east of Grays A13 A1089 junction Stifford Clays Road, west of the A122 Green Lane, west of the A122
OH7 OHT4 OHT7	Erection and removal of overhead powerline equipment	Brentwood Road, north of Chadwell St Mary Hornsby Lane, north of Chadwell St Mary Heath Road & the A1089, south of the A13

Work No.	Activity proposed to be undertaken as 24-hour construction	Feature crossed and location
		A1013 Stanford Road, west of the A1089 Long Lane, east of Grays A13 A1089 junction Stifford Clays Road, west of the A122 Green Lane, west of the A122
MU47 MUT16	Trenchless installation of five utility networks	A1089, south of the A13
G6	Installation of a tunnel as a conduit for a gas pipeline	A13, east of the Orsett Cock roundabout A128 Brentwood Road, north of the Orsett Cock roundabout B188 High Road, west of Orsett
MU46	Trenchless installation of three utility networks	A13, Mill Lane
MU56 MU57	Trenchless installation of four utility networks	A13, west of the A13 A1089 junction
MUT23	Trenchless installation of two water pipelines	A13, Blackshots Lane
MU60	Installation of utility networks	A13 verge, Stifford Clays Road underpass
MU73	Trenchless installation of electricity networks	London, Tilbury and Southend Railway line, south of Ockendon Road M25, south of Ockendon Road
MU75	Trenchless installation of electricity networks	London, Tilbury and Southend Railway line, Ockendon Road
MU72	Trenchless installation of two water pipelines	London, Tilbury and Southend Railway line, north of Ockendon Road M25, south of St Marys Lane
OH8	Erection and removal of overhead powerline equipment	M25, east of the Thames Chase Forest Centre
MU78	Removal of overhead powerline equipment	M25, east of the Thames Chase Forest Centre
MU79	Trenchless installation of four utility networks	M25, south of St Marys Lane
MU80	Trenchless installation of electricity networks	M25, south of St Marys Lane
MU83	Trenchless installation of a gas pipeline	M25, north of St Marys Lane
MU84	Trenchless installation of electricity networks	M25, north of St Marys Lane
MU87	Trenchless installation of electricity networks	M25, south of M25 junction 29
MU88	Trenchless installation of a gas pipeline	A127 slip roads & M25 junction, at M25 junction 29
MU89	Trenchless installation of two utility networks	M25 J29, at M25 junction 29

Work No.	Activity proposed to be undertaken as 24-hour construction	Feature crossed and location
MU92	Trenchless installation of electricity networks	M25, Folkes Lane Woodland
G10	Installation of a tunnel as a conduit for a gas pipeline	M25, Folkes Lane Woodland

6.4.6 Some works, such as utility works, earthworks and ecological works, are dependent on agreed outages, weather conditions and seasonal variation.

6.4.7 When working close to live railways, to ensure the safety of construction personnel and railway operations, some activities may be required to be undertaken during closures, known as possessions, of the railway lines.

6.4.8 For all works required to be undertaken by the Contractors, an application will be made by the Contractors to the relevant local authority prior to undertaking the works under Section 61 of the Control of Pollution Act 1974, unless appealed. Any variations to the normal and additional working hours required will be agreed with the relevant local authority and National Highways.

6.4.9 In certain circumstances, it may be necessary for the Contractors to seek an extension to the standard working hours. If this is required, the Section 61 dispensation or variation mechanism for these works will be sought from the local authority prior to commencement of the works, subject to the appeal mechanisms under the draft DCO.

6.4.10 In the case of work required in response to an emergency, or overrunning works that if not completed will be unsafe or harmful to the works, staff, public or local environment, the relevant local authority will be informed as soon as reasonably practicable of the reasons for and likely duration of the works.

6.5 Construction site layout and good housekeeping

6.5.1 The Contractors will plan for construction sites to be organised, having due regard for nearby residential, commercial, environmental and other sensitive receptors, to reduce the likelihood of an environmental incident or nuisance occurring.

6.5.2 In addition to the measures in the REAC, the following principles will be implemented subject to local constraints:

a. General ‘good housekeeping’ arrangements will ensure the sites are safe, clean and tidy.

b. There will be effective preventative pest and vermin control and prompt treatment of any pest and vermin infestation, including arrangements for disposing of food waste or other attractive material. If infestation occurs, the Contractors will take immediate action to eliminate the infestation and prevent further occurrence.

c. Adequate welfare facilities will be provided for all working personnel and visitors.

d. Smoking areas will be provided at site offices and worksites, equipped with containers for smoking wastes, and located away from site entrances and residential areas.

e. There will be management of staff congregating outside the sites prior to commencing or leaving work.

6.6 Construction compounds and Utility Logistic Hubs (ULHs)

6.6.1 The construction compounds and ULHs will provide the following typical core facilities, as appropriate, with the type and number of facilities relevant to the number of personnel using the compound, ULH and associated nearby construction activities:

a. Appropriate water management

b. Materials and aggregates storage

c. Loading and unloading area

d. Parking for vehicles and bicycles

e. Plant management

f. Project offices

g. Recycling facilities

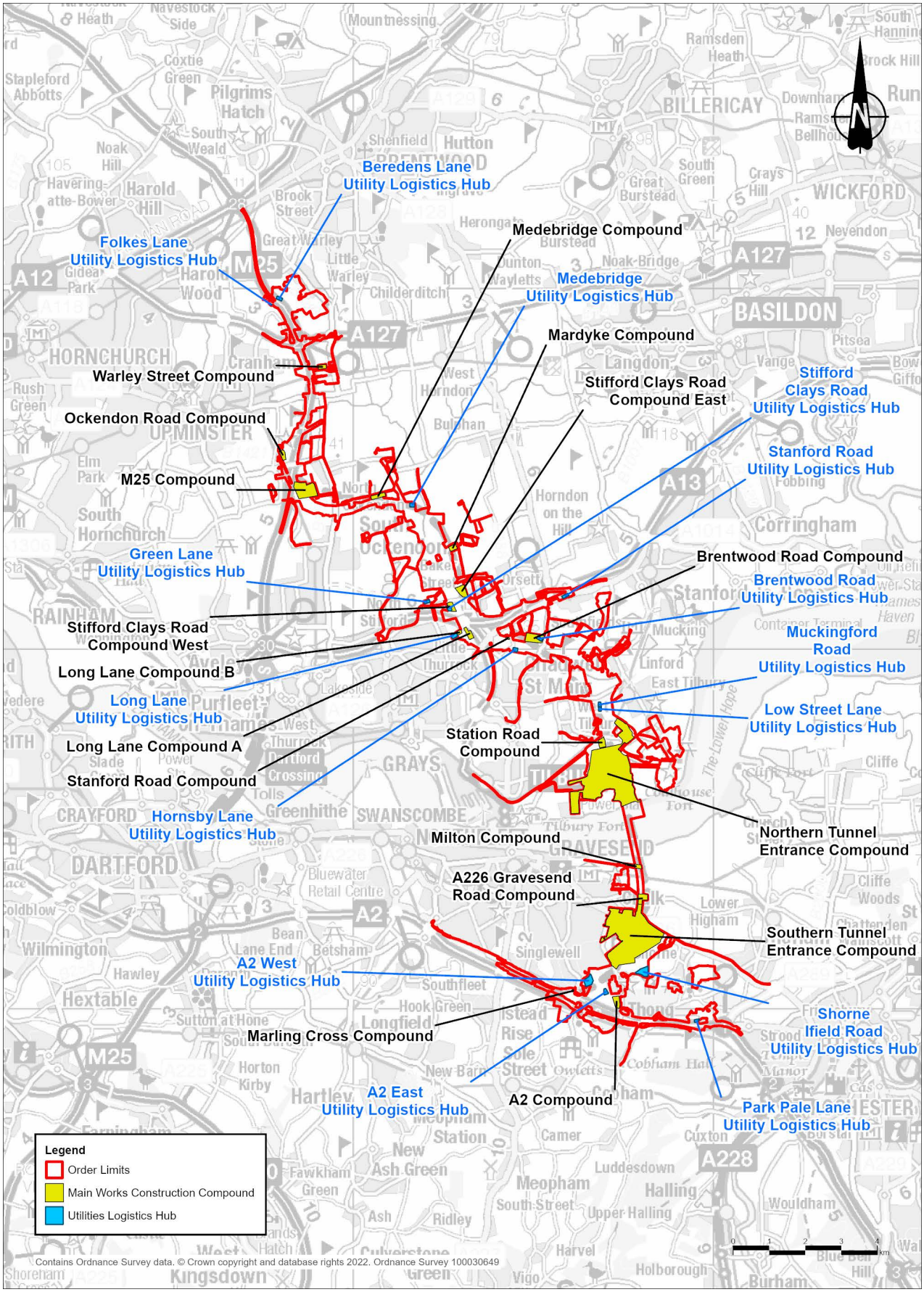
h. Refuelling

i. Security control

j. Vehicle/wheel wash

k. Welfare facilities.

Plate 6.1 Compounds and Utility Logistic Hubs



6.6.2 ULHs, construction compounds (including below-ground construction), viaduct launch sites and tunnels will receive and support specialist plant and equipment, and this will be sited within the compound and specific worksite as required.

6.6.3 Project offices, welfare facilities, sleeping accommodation and workshops will be constructed from a mix of single and modular units. Styles and calculations for the number of potential units are to be based on 12m x 3m x 3m units, stacked to minimise the surface area taken up at ground level. This includes sleeping accommodation.

6.6.4 The Project anticipates units being stacked up to an equivalent maximum height of five units (circa 15m), with potential for viewing areas at the top of some.

6.6.5 Site layouts for construction compounds will be made available to the relevant local authority for information, prior to works commencing in that phase.

Access to works, construction compounds and ULHs

6.6.6 Access to the works, compounds or ULHs from the strategic or local road network will be designed to meet the requirements for permanent access, as set out in the DMRB or equivalent standards. Any exceptions to this requirement will be discussed at the TMF.

Sleeping accommodation

6.6.7 The nature of the tunnelling means that specialist personnel will be required during construction, so it is anticipated that sleeping accommodation would be required within the northern tunnel entrance compound.

6.6.8 The Project currently assumes sleeping accommodation will be provided for up to 400 construction personnel at the northern tunnel entrance compound. During the tunnelling works there will also be a need for hyperbaric accommodation at the northern tunnel entrance compound for an additional 80 people who will remain under pressurised conditions for extended periods to facilitate emergency access to the tunnel head. No sleeping accommodation will be provided within the other compounds or ULHs. The locations of these accommodation units within the Northern Tunnel Entrance Compound will be confirmed once the Contractors have been appointed.

6.6.9 Access to accommodation and welfare facilities within the compounds will be managed by 24/7 security, allowing the movement of workers but ensuring construction vehicle movements do not occur outside working hours.

6.6.10 The Applicant would employ measures to reduce the impact on the local accommodation market and associated social services. The Applicant and its Contractors will implement travel plans to encourage sustainable travel from home. The Applicant will also help workers to find accommodation and would implement an accommodation helpdesk to align need with supply, therefore benefiting local accommodation providers and the local economy.

6.6.11 Further details on workers accommodation are detailed in the Workers Accommodation Report (Application Document 7.18).

6.7 Worksite security

6.7.1 Using guidance from the Centre for Protection of National Infrastructure (CPNI) website [www.cpni.gov.uk] and the Physical Security Execution Plan (SEP) document, the Contractors will develop a Security Management Plan (SMP). The SMP will be reviewed and approved prior to implementation by the Client to ensure it achieves both the security desired outcomes and appropriate impact mitigation procedures. Further details of the document SMP requirements are within the SEP.

6.7.2 Contractors will be responsible for the appropriate securing of sites, compounds, utility logistics hubs and work areas of all land and property which is under their control including the appropriate use of fencing, hoarding and/or security monitoring to reasonably ensure that both criminal activity and trespass is prevented. This applies to all areas of the site, irrespective of whether it is an active workspace, compound or other area of the Site.

6.7.3 Using guidance from the Centre for Protection of National Infrastructure (CPNI) website [www.cpni.gov.uk], the EMP2 will require the Contractor to develop a Security Management Plan (SMP). The SMP should also be based on CPNI guidance which articulates the following principles:

a. Deter: stop or displace the threat,

b. Detect: verify a security event, initiate the response,

c. Delay: prevent the adversary from reaching the asset,

d. Mitigate: minimise the consequences of a security incident and

e. Respond: actions to prevent the adversary achieving their aim.

6.7.4 The SMP will be reviewed and approved prior to implementation by National Highways to ensure it achieves both the desired security outcomes including:

a. all reasonable measures to reduce and negate any impact to the Project and/or programme due to security related incidents. Those measures are expected to be, as a minimum, the provision of appropriate fencing, hoarding, security personnel, CCTV and/or site boundary surveillance associated with the prevention of criminal and/or trespass related incursion

b. all reasonable measures to negate and minimise the likelihood of protester actions which require the mobilisation of specialist support removal teams or resources that would be required to prevent, deter or remove instances of direct protester action as defined in the SEP

6.7.5 Contractors will consult with the relevant emergency services on the production of the SMP. This consultation will take place through the Security Partnership Working Group (SPWG), the membership of which includes Essex Police, Kent Police, Metropolitan Police and the Port of Tilbury Police.

6.7.6 The Contractor will be responsible for non-specialised removal of protestors and trespassers from the site, its compounds, and other work areas under their control. This includes dealing with incursions involving large numbers of protestors.

6.7.7 The following measures will be used where appropriate by the Contractors to prevent unauthorised access to sites:

a. Use of high perimeter fencing or hoarding for site security and public safety, as determined by site-specific security risk assessments.

b. Maintenance of PRoWs assessed in the ES (Chapter 13, (Application Document 6.1)), where reasonably practical, or provision of an appropriate alternative where feasible.

c. Installation of secure gates and security provision outside working hours.

d. Security lighting around the site and site perimeters.

e. Adequate competent and accredited security guards and patrols.

f. Closed-circuit television (CCTV), infrared surveillance and alarm systems where required. The location and direction of view of security cameras or blocking software to prevent intrusion into residential properties will be considered.

g. Securing of site equipment and materials, such as fuel storage containers, outside working hours.

h. Immobilising of plant.

i. Securing of ladders and scaffolding to prevent unauthorised access to restricted areas and neighbouring properties.

Site fencing and hoarding

6.7.8 Site-specific security risk assessments carried out by the Contractors will determine the type of perimeter fencing or hoarding to be installed. This will be compliant with DCO Schedule 2, Part 1, Requirement 12, which references the Manual of Contracts Documents for Highways Works (MCHW). The form of fencing and hoarding will be fit for purpose, taking into consideration the location, construction activities and surrounding landscape. The Contractors will be responsible for obtaining hoarding licences for hoarding or fencing on the highway.

6.7.9 Locations for ecological and acoustic fencing requirements are identified on the Environmental Masterplan (Figure 2.4, Application Document 6.2).

6.7.10 The Contractors will be responsible for maintaining all their perimeter fencing and hoarding.

6.7.11 National Highways requires the Contractors to ensure that hoarding and other materials used are appropriate to the location and activities within the compound/worksite affecting noise levels at the boundary.

6.7.12 Fencing may be used in areas of low security risk to reduce visual impact on the environment and aid security patrol management of the area. The Contractors may use Heras™-type fencing, which will be double clipped as an interim measure to secure a site or adapted site boundary prior to installing permanent hoarding, or likewise when demobilising from an area.

6.7.13 Hoarding will be erected to the boundary of higher-risk activity sites or where visual screening is required. Hoarding will typically be 2.4m high but could be higher in the highest security risk areas.

6.7.14 The following measures will be applied when installing and maintaining the site perimeter fencing or hoarding, as appropriate:

a. Use of appropriate fencing or hoarding, which ensures the site is identifiable as a National Highways site, taking into consideration the outcomes of security risk assessment, construction activity and existing landscape.

b. Where possible, sustainable materials may be used for fencing, such equipment and solid wooden hoardings are to be attached to all highway-facing boundaries, including footways, bridleways and byways.

c. Hoardings may be topped with anti-climb measures, based on the risk assessment.

d. Hoardings to be of a type or design and managed so postering and graffiti is minimised.

e. Provision of information boards with key contact details such as National Highways' Customer Contact Centre number, enquiries and complaints procedure, out-of-hours contact details and information on the works.

f. Displaying notices on site boundaries to warn of hazards onsite, such as deep excavations, construction access and movements.

g. Sensitivity will be exercised in respect of visual intrusion impacts.

h. Hazardous zones for users will not be created.

6.8 Site lighting

6.8.1 Site lighting and signage will be provided by the Contractors to ensure the safety and security of the construction sites. It will be at the appropriate luminance required to provide safe working conditions. Where needed and appropriate, lighting to site boundaries will be provided, and illumination will be sufficient to provide a safe route for the passing public. Precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths,

roads and amenity areas. Where appropriate, lighting will be activated by motion sensors to prevent unnecessary usage.

6.8.2 Site lighting will comply with the Institute of Lighting Professionals' Guidance Notes for the Reduction of Obtrusive Light GN01/20 (2020) and the provisions of BS EN 12464-2:2014 Light and lighting – Lighting of workplaces Part 2: Outdoor workplaces (British Standards Institution, 2014), where applicable.

6.8.3 Lighting will also be designed, positioned and directed to prevent or minimise light disturbance to nearby residents, ecological receptors, as well as motorists and rail and marine operations. This provision will apply particularly to sites where night working or security lighting will be required.

6.8.4 Low-energy fittings shall be used unless otherwise accepted by National Highways. Any site-specific lighting controls will be described in Contractors' EMP2s.

Site lighting near the River Thames

6.8.5 The EMP2 must require a River Safety Lighting Management Plan (RSLMP) to be prepared by the Contractors for any lighting required during the construction phase for the northern tunnel entrance compound, the laying out of Tilbury Fields, the construction of the drainage outfall in the River Thames, and the construction of the water inlet with self-regulating valve at Coalhouse Point, insofar as that lighting is reasonably expected to adversely affect any vessels using the River Thames. The RSLMP must further include measures to minimise glare and sky glow by using, locating, aiming, and shielding luminaires demonstrating that any light spillage, insofar as that lighting is reasonably expected to adversely affect any vessels using the River Thames, will be minimised so far as is reasonably practicable.

6.8.6 As part of that RSLMP, the contractors will consider lighting of any such development alongside the bank of the River Thames in accordance with "A Guide to Good Practice on Port Marine Operations, Prepared in conjunction with the Port Marine Safety Code 2018 (Department for Transport, 2018)" so as to ensure that the night vision of mariners is not impeded, or that existing navigation lights, either ashore, on the foreshore or onboard vessels, are not masked or made less obvious. As is the case for the Project, the RSLMP must also confirm that lighting will comply with the Institute of Lighting Professionals Guidance Notes for the Reduction of Obtrusive Light GN01/20 (2020) and the provisions of BS EN 12464 2014 Light and lighting of workplaces – Part 2-outdoor workplaces, where applicable.

6.8.7 The RSLMP must be the subject of engagement with Port of London Authority, and Thurrock Council. The Contractor must have due regard to representations made by the Port of London Authority and Thurrock Council, including any substituted or new guidance or standards relating to river safety lighting.

6.9 Emergency preparedness

6.9.1 The Contractors will hold certifications for safety (ISO 45001:2018), environment (ISO 14001:2015), and quality (ISO 9001:2015), and these will include requirements to have procedures for responding to emergency events.

The EMP2 will require that Contractors will ensure that emergency preparedness procedures for each worksite are developed prior to works commencing, including the identification of helicopter landing areas in proximity to worksites. The procedures will be standardised as far as practical across the various worksites and will be appropriate to the anticipated hazards and specific layouts including the road network. The emergency procedures will be produced in consultation with the emergency services, Kent Resilience Forum and Essex Resilience Forum, and other relevant stakeholders including relevant local highway authorities and the Integrated Care Boards. The emergency procedures will also be discussed quarterly and, if necessary, amendments agreed at Community Liaison Groups. For works on the existing railway and highway networks, as well as the tunnelling works, they will be produced in accordance with established industry procedures. Further guidance is contained within Site Clearance Capability – A guide for effective local planning, response and recovery (Department for Communities and Local Government, 2016).

6.9.2 Emergency preparedness procedures will be reviewed quarterly or to reflect changes in procedure, whichever is sooner.

6.9.3 The Contractors will ensure that the requirements of the relevant fire authority will be followed for the provision of site access points. The accesses may vary over time and will be updated as required and should also be suitable for emergency services. This is particularly important in relation to the tunnel construction. Emergency radio channels are to be reserved and compatible with those used by Emergency Services.

6.9.4 Emergency preparedness procedures will include the following:

a. Notification procedures for emergency services in the event of an incident

b. Procedures in the event of the discovery of unexploded ordnance, including

   i. appropriate evacuation procedures and sites to accommodate a reasonable worst-case scenario.

   ii. requirements to notify relevant local authorities, the Port of Tilbury London Limited and the Port of London Authority in the event of an emergency or risk arising from unexploded ordnance.

   iii. other measures to be taken to reduce the risk to life, damage to property and use of the River Thames.

c. Flood emergency response procedures.

d. Requirement to run emergency rescue drill from an underground location(s) including collaborative planning and participation by relevant rescue authorities.

e. Emergency spill-response procedures to be developed with engagement with the Environment Agency and to take into account any specific requirements on incident response planning related to the worksite.

f. The emergency phone number and method of notifying the relevant local

authority, statutory bodies, contact numbers for National Highways and the Contractors' staff.

g. Management and communication of diversions/alternative routes during unplanned events/emergencies.

Emergency access

6.9.5 The Contractors will ensure that the reasonable requirements of the emergency services will be followed for the provision of site access points. The accesses may vary over time and will be updated as required and communicated to the services. Specific helicopter landing provision will be at the North Portal close to hyperbaric facilities. There will be specific helicopter landing provision at the South Portal if the tunnels are constructed using one tunnel boring machine. The Contractors will ensure the site in-tunnel communications link directly to the emergency services. Internal haul roads which might be used by the emergency services will be maintained fit for that purpose.

Fire prevention and control

6.9.6 The EMP2 will require that Contractors will ensure that all construction sites and associated accommodation and welfare facilities will have in place appropriate plans and management controls with the aim of preventing fire.

6.9.7 The EMP2 will require fire plans and controls to be developed by the Contractors following engagement with the local emergency services and local authority.

6.10 Environmental incident control

6.10.1 Contractors will develop and implement appropriate measures to control the risk of environmental incidents, such as pollution events, and contravention of ecological and archaeological legislation due to construction activities, materials and extreme weather events. The EMP2 will require that environmental incident control measures are set out in Environmental Incident Control Plans as appropriate in line with the nature and scope of works.

6.10.2 It will recognise the risk of pollution from construction activities and present proactive management practices to ensure that any foreseeable pollution incidents, such as diesel spillage, are prevented if possible or minimised, controlled, reported to relevant parties and remediated.

6.10.3 Emergency procedures will be produced with engagement with the emergency services, the Environment Agency and highway authorities, and in accordance with established industry procedures, including drills, exercises and scenarios.

6.10.4 In the event of an incident arising, National Highways will work with the Contractors, relevant statutory body and landowners to ensure that appropriate corrective and preventative action is taken.

6.10.5 If any emergency works are undertaken within, or with the potential to impact, a Site of Special Scientific Interest, the works will be undertaken in a way that minimises the amount of harm, and Natural England will be notified as soon as practicable; further guidance is available on the Natural England website,

'Sites of special scientific interest: public body responsibilities' [https://www.gov.uk/guidance/sites-of-special-scientific-interest-public-body-responsibilities].

6.10.6 The Contractors will put in place arrangements to investigate and provide reports on any potential or actual significant environmental incidents.

6.10.7 The following measures shall be adopted by Contractors to manage the risk of pollution incidents:

a. Emergency response drills will be run to simulate major environmental incidents.

b. Maps will be provided showing the locations, together with address and contact details, of local emergency services facilities such as police stations, fire authorities, medical facilities and other relevant authorities.

c. Site drainage plans and flood risk plans (as appropriate) will be available onsite and kept up to date.

d. Statement of appropriate information will be held onsite and provided immediately in the event of any incident such as a spillage or release of potentially hazardous materials.

e. Pollution shut-off valves will be used in compounds with positive drainage systems.

f. The appropriate number, location and type of pollution response kits will be defined for each worksite and located on worksite plans/maps.

g. Personnel will be competent in the use of pollution response kit and emergency response techniques. The level and evidence of competency will be documented.

h. An environmental training section will be included within EMP2s.

i. Personnel will have an awareness and understanding of the relevant plans relating to pollution response and emergency response techniques.

j. Clear protocols and communication channels will be implemented so that any spillages are dealt with as soon as they are identified. A process will be included for escalating an incident to emergency services and from site staff response to an Incident Response Team (or equivalent).

k. Contact details will be provided for the relevant authorities, such as the Environment Agency, and the persons responsible on the construction site and within the Contractors' organisation, for pollution incident response.

l. Contact details will be provided for a competent spill-response company which can be contacted at short notice for an immediate response, 24 hours, seven days a week.

m. Notification of pollution incidents will be given to relevant statutory bodies, environmental regulatory bodies, local authorities and local water and sewerage providers, where required.

n. Appropriate emergency services, authorities and personnel on the construction site notified of pollution incidents.

Extreme weather events

6.10.8 The Contractors will pay due consideration to the impacts of potential extreme weather events and related conditions during construction. The Contractors will use a short to medium-range weather forecasting service from an approved meteorological data and weather forecast provider as well as flooding information from the Environment Agency and tidal information from the Port of London Authority to inform short to medium-term programme management, environmental controls and impact mitigation measures.

6.10.9 The Contractors will ensure that the measures within this CoCP are implemented and will, as appropriate, consider additional measures to ensure the resilience of the proposed mitigation of impacts during extreme weather events is robust. As appropriate, method statements will also consider extreme weather events where risks have been identified.

Induction, training and briefing procedures for staff

6.10.10 The Contractors EMP2 will set out:

a. responsibilities for delivery and ongoing management of the induction programme

b. processes for monitoring attendance at the immersive induction experience and the site specific inductions which will include site-specific environmental risks. Everyone will receive a common induction which will include environmental risks and commitments from across the Project.

c. processes for developing and monitoring the delivery of site specific task briefings

d. minimum requirements for competence of personnel in pollution prevention and awareness of emergency response techniques and procedures in accordance with ISO 14001:2015.

6.10.11 Each member of staff undertaking a task in the programme will receive a specific task briefing before starting work on that task, which will include any relevant environmental risks and mitigation.

6.10.12 Competence of individuals for every task will be assessed by a member of the Project team with relevant experience.

6.10.13 There will be a training facility focusing on key risk aspects of the Project, which will reinforce site-specific training. The Contractors will provide all weather outdoor and indoor training facilities.

6.11 Unexploded ordnance

6.11.1 The Contractors will comply with the recommendations of the Appendix 10.10: Unexploded Ordnance Desk Study and Risk Assessment (Application Document 6.3). The Contractors will carry out pre-construction risk assessments and prepare and implement an emergency response procedure (including evacuation points and facilities to be used in the event of an incident) if unexploded ordnance is suspected or discovered within the construction area. This procedure will include consulting with relevant local authorities and port authorities (in accordance with Paragraph 6.9.1) as well as notifying the relevant authorities and emergency services.

6.12 Clearance and reinstatement of sites on completion

6.12.1 Sites will be reinstated, in accordance with article 35 (temporary possession) of the DCO and in line with the requirements in Schedule 2, Part 1 of the DCO.

6.13 Operation

6.13.1 By the end of the construction, commissioning and handover stage of any part of the Project, the Contractors will have developed the third iteration of the EMP (EMP3). EMP3 will comply with the latest National Highways standard (currently DMRB LA 120 (Highways England, 2020a)).

6.13.2 EMP3 will detail maintenance and monitoring activities throughout the operational phase having regard for the specific mitigation measures identified within the REAC as well as operating procedures of National Highways, the local authority and local highway authority.

6.13.3 During the implementation of the EMP2, the ongoing management commitments will be developed.

7 Register of Environmental Actions and Commitments

7.1 Introduction

7.1.1 The Register of Environmental Actions and Commitments (REAC) consolidates the mitigation commitments arising from the environmental impact assessment process for convenient reference. The REAC identifies the good practice and essential mitigation commitments that underpin the environmental assessments. These commitments would be legally secured through Requirement 4 of Schedule 2 to the Development Consent Order (DCO).

7.1.2 The REAC contains environmental commitments that will be implemented during the construction and operational phases of the Project if the DCO is granted. The commitments listed in the REAC will be incorporated in the Environmental Management Plans (EMPs) produced for construction and handover stages of the Project in accordance with Requirement 4 of Schedule 2 to the DCO.

7.1.3 In this context, good practice means standard approaches and actions commonly used on infrastructure development projects to avoid or reduce environmental impacts, typically applicable across the whole Project. Essential mitigation means any additional Project-specific measures needed to avoid, reduce or offset potential impacts that could otherwise result in effects considered significant in the context of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations). These are in addition to the embedded mitigation measures that form part of the Project design, which are secured by the Design Principles (Application Document 7.5) and the Environmental Masterplan (Figure 2.4, Application Document 6.2). In addition, mitigation to reduce carbon emissions in accordance with Requirement 16 of Schedule 2 to the DCO is presented in the Carbon and Energy Management Plan (Application Document 7.19) and not duplicated in this REAC.

7.2 Guide to the REAC table

7.2.1 The REAC is presented in Table 7.1 with headings set out as follows:

a. Topic of Environmental Statement (ES) chapter from which the commitment originates

b. Unique identifier to facilitate cross-reference with the ES and other DCO documentation

c. Name for the commitment

d. Origin of the commitment, e.g. ES assessment chapter

e. Details of the commitment, including a clear and specific description of the action, the objective of any essential mitigation and any relevant commitments relating to monitoring

f. Achievement criteria that define successful implementation of the action

g. Identification of the party responsible for the action

h. Whether the commitment relates to the construction or operational stage of the Project

i. How the commitment is secured in the DCO e.g. through a Requirement.

7.2.2 Where the achievement criteria are self-explanatory, the phrase 'implementation of commitment actions' is used. As with all commitment items in the REAC, the procedures to implement these measures will be developed during detailed design or handover and documented in the EMPs produced in accordance with Requirement 4 of Schedule 2 to the DCO.

7.2.3 Where the word "would" is used in the REAC, this is a positive obligation and should not be construed as implying any optionality.

Table 7.1 REAC table

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Air Quality	AQ001	Vehicle and plant emissions	ES 5.5.8	1. All on-road heavy vehicles would comply with the standards set within the London Low Emission Zone (LEZ) across all sites within Order Limits for the relevant class of vehicle. 2. All Non-Road Mobile Machinery (NRMM) net power 37kW to 560kW would comply with the engine emission standards set by London's LEZ for NRMM across all sites within the Order Limits. From 1 September 2020, NRMM used on any site would therefore be required to meet emission standard Stage IIIB as a minimum. From 1 January 2025, NRMM used on any site would be required to meet emission standard Stage IV as a minimum. 3. Ensure all vehicle engines, mobile and fixed plant stationed on site are not left running or idling unnecessarily. 4. Use low emission vehicles and plant fitted with catalysts, diesel particulate filters or similar devices where reasonably practicable. 5. Use ultra-low sulphur fuels in plant and vehicles. 6. Keep vehicles and plant well maintained, with routine servicing to be completed in accordance with the manufacturer's recommendations and records maintained for the work undertaken.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Air Quality	AQ002	Demolition	ES 5.5.9	Implement good practice measures to reduce dust during demolition works such as: 1. Soft strip inside buildings before demolition (i.e. retain external walls and windows where safe, to provide a screen against dust). 2. Use water suppression for dust control during demolition operations. 3. Avoid explosive blasting, using appropriate manual or mechanical alternatives. 4. Bag and remove any biological debris or damp down such material before demolition.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Air Quality	AQ003	Earthworks and construction	ES 5.5.10	Implement good practice controls to reduce dust during works such as: 1. Cover with topsoil and re-vegetate earthworks and exposed areas including soil stockpiles to stabilise surfaces. 2. Use a cover such as hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil. 3. Ensure that the specification of the seeding mix used to re-vegetate stockpiles is such that no undesirable or non-target species are introduced to the seedbank. 4. Remove the cover systematically during work to reduce exposure of areas that are not being worked on. 5. Avoid scabbling of concrete from structures by compressed air powered machines, where reasonably practicable. 6. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process, in which case ensure that appropriate additional control measures are in place to prevent escape. 7. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored with suitable emission control systems to prevent escape. 8. For small supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Air Quality	AQ004	Dust from trackout	ES 5.5.10	1. Use of water-assisted dust sweepers on the access and local roads to remove any material tracked out of the site. 2. Avoid dry sweeping of large areas. 3. Ensure vehicles entering and leaving worksites are securely covered to prevent escape of materials during transport. 4. Inspect haul routes for integrity, instigate necessary repairs and record in site logbook. 5. Access gates to be sited at least 10m from receptors, e.g. residential properties, where reasonably practicable. 6. Apply dust suppressants to locations where large volumes of vehicles enter and exit the construction site.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Air Quality	AQ005	Dust management good practice	ES 5.5.10	1. Undertake onsite and offsite inspections to monitor dust. 2. Plan site layout so that machinery, stockpiles, mounds and dust causing activities are located away from receptors, as far as this is reasonably practicable. 3. Erect suitable solid screens or barriers around dusty activities or the site boundary. 4. Avoid site runoff of water or mud, having regard for the drainage maintenance requirements set out in RDWE002. 5. Remove waste materials that have a potential to produce dust from site as soon as reasonably practicable. 6. Cover, seed or fence stockpiles to prevent wind whipping. 7. Cutting/grinding/sawing equipment to use water as dust suppressant or suitable local extract ventilation. 8. Ensure an adequate water supply on the site for effective dust/particulate matter suppression, using recycled water, where reasonably practicable. 9. Use enclosed chutes, conveyors and covered skips to reduce escape of dust. 10. Reduce drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment to a practicable minimum and use fine water sprays on such equipment where appropriate. 11. Ensure equipment is readily available on site to clean up spillages as soon as reasonably practicable after the spill is identified. 12. Reuse and recycle waste to reduce dust from waste materials.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Air Quality	AQ006	Air quality monitoring during construction	ES 5.5.10	The Contractors shall determine the level of any dust and particulate monitoring, including airborne asbestos, carried out on Project construction sites by means of a risk-based approach. This will identify the type of monitoring that is required on each worksite by looking at the details of the specific packages of work within the site boundaries and the location of receptors around the site. Should monitoring be required, the monitoring locations will be approved by the Secretary of State (SoS) in consultation with the relevant local authorities.	Approval of air quality monitoring programme by the SoS in consultation with relevant local authorities	Contractor	Construction	EMP2 – Requirement 4
Air Quality	AQ007	Baseline dust monitoring	ES 5.5.10	Should dust monitoring be required in accordance with the requirements of AQ006, it would begin at least six months prior to the commencement of the construction works to allow a suitable pre-construction baseline to be established unless otherwise agreed by National Highways following consultation with the relevant local authorities.	Approval of baseline dust monitoring programme by the SoS in consultation with relevant local authorities	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Air Quality	AQ008	Actions in case of air quality monitoring exceedance	ES 5.5.10	If required during construction, continuous particulate monitoring for PM_{10}, $PM_{2.5}$ and TSP (total suspended particles) will be carried out using appropriate survey instruments at locations approved under REAC item AQ006, in consultation with the relevant local authorities Instruments will be set up at relevant sites to operate an alert system when a predetermined site action level approved by the SoS in consultation with the relevant local authorities is reached. If the alarm is triggered, the following actions will be taken: • The Contractor, or a delegated representative, shall promptly 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. The specific time period shall be a matter which forms part of the air quality monitoring plan which is subject to consultation with the relevant local authorities under REAC item AQ006. • Actions taken to resolve the situation will be recorded in a site logbook and the relevant local authorities notified of the event and actions by telephone or email, as soon as is reasonably practicable, after or during the dust event. • If no source of the dust event is identified, other project sites and local authorities 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. • If the cause of the alert is not related to site operations, the outcome of any investigation will be recorded in a site logbook, which would be made available to the relevant local authorities on request. • Dust monitoring will continue until that part of the construction works has been completed, or earlier, if the site is deemed to be low risk in consultation with National Highways and the relevant local authorities.	Compliance with the approved air quality monitoring programme	Contractor	Construction	EMP2 – Requirement 4
Climate	CC001	Resilience to climate change	ES 15.5.32	The Contractors would design the permanent works in accordance with the design standards identified in Tables 2.1 and 2.2 of ES Appendix 15.3 Climate Resilience Impacts and Effects (Application Document 6.3) and use construction materials and products that would be resilient to the effects of projected future climate change in line with UK Met Office UKCP18 projections.	Design and specification of materials resilient to the effects of future climate change	Contractor	Construction	EMP2 – Requirement 4
Cultural Heritage	CH001	Physical damage to heritage assets	ES 6.5.17	The draft Archaeological Mitigation Strategy and Outline Written Scheme of Investigation (AMS-OWSI) presented in ES Appendix 6.9 (Application Document 6.3) includes details of specifically identified measures to mitigate the impact to known heritage assets and a range of generic mitigation measures from which appropriate mitigation would be applied for currently unknown heritage assets that could be physically damaged by construction. The AMS-OWSI will be updated as further information from archaeological evaluation becomes available. The AMS-OWSI sets out the scope of Written Schemes of Investigation (WSIs) to be prepared. The WSIs would define the details of specific mitigation measures for protection or recording of heritage assets that would be implemented before or during construction at locations identified within the AMS-OWSI.	Implementation of mitigation measures set out in the AMS-OWSI approved by the SoS, including measures specified in the WSIs and in accordance with Requirement 9 of the DCO	Contractor	Construction	Requirement 9

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Cultural Heritage	CH002	Limiting land take for archaeologi-cal investigations	ES 6.5.17	The spatial extent of intrusive archaeological investigations shall not extend beyond the limits of deviation, as defined in ES Table 2.2, for the works proposed in the DCO application.	Implementation of commitment actions	Contractor	Construction	Requirement 9
Cultural Heritage	CH003	Cropmark complex scheduled monument at Orsett and the associated non-designated area of cropmarks identified at Greygoose Farm (247)	ES 6.5.17	The Contractors shall follow the Management of Research Projects in the Historic Environment (MoRPHE) procedural model (Historic England, 2015) to prepare a detailed project design for the archaeological investigation of the cropmark complex at Orsett (SM1) and the non-designated area of cropmarks identified at Greygoose Farm (247). This design will inform the WSI and the development of archaeological mitigation. After completion of the archaeological works, as specified in the WSI, the relevant archaeological contractor shall apply to Historic England for removal of the designated Orsett cropmark complex (SM1) from the official list of protected historic sites.	Implementation of mitigation measures set out in the AMS-OWSI approved by the SoS, including measures specified in the WSIs and in accordance with Requirement 9 of the DCO. Submission of application to Historic England for delisting of the scheduled monument.	Contractor	Construction	Requirement 9
Cultural Heritage	CH004	Grade II listed buildings	ES 6.5.17	The WSIs will require Level 4 Historic Building Recording (Understanding Historic Buildings: A Guide to Good Recording Practice (Historic England, 2016)) of the three listed buildings at 1 and 2 Grays Corner (LB89), Thatched Cottage (LB58) and Murrells Cottage (LB96). This would include an intrusive watching brief prior to the demolition of the properties, focusing on areas of previously hidden structure. After completion of the historic buildings recording works, the relevant archaeological contractor shall apply to Historic England for removal of the three buildings from the official list of protected historic sites.	Implementation of mitigation measures set out in the AMS-OWSI approved by the SoS, including measures specified in the WSIs and in accordance with Requirement 9 of the DCO. Submission of application to Historic England for delisting of the listed buildings.	Contractor	Construction	Requirement 9
Cultural Heritage	CH005	Fencing of heritage assets	ES 6.5.17	Fencing for the protection of heritage assets required as mitigation in any WSI shall be securely installed prior to commencement of that part of the works. The Contractors shall prepare a method statement for all fencing works required for the protection of heritage assets, having regard for the mitigation measures set out in the WSIs for that part of the works, for consultation with the relevant local planning authorities and, in the case of scheduled monuments and listed buildings, Historic England, prior to installation.	Implementation of mitigation measures set out in the AMS-OWSI approved by the SoS including measures specified in the WSIs and in accordance with Requirement 9 of the DCO.	Contractor	Construction	Requirement 9
Cultural Heritage	CH006	Covering of heritage assets	ES 6.5.17	Where potentially sensitive archaeological remains would be buried or sealed beneath fill material to ensure they are not disturbed during construction, in accordance with mitigation to be identified in the site-specific WSIs, the Contractors shall prepare a method statement for consultation with the relevant local planning authorities and, in the case of designated sites, Historic England, prior to construction of that part of the works. The method statement will describe: • measures to preserve *in situ* sensitive archaeological remains and prevent deformation of topsoil or subsoil horizons • measures for monitoring the continued protection of *in situ* archaeological remains • how the measures would be reversed at the end of construction at locations where the ground surface is to be restored to its original shape and condition in accordance with mitigation to be identified in the site-specific WSIs.	Implementation of mitigation measures set out in the AMS-OWSI approved by the SoS including measures specified in the WSIs and in accordance with Requirement 9 of the DCO.	Contractor	Construction	Requirement 9

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Cultural Heritage	CH007	Surveillance of heritage mitigation	ES 6.5.17	The WSIs shall set out the arrangements and responsibilities for implementing, monitoring and auditing the mitigation measures identified in the WSIs for the protection of heritage assets (including site 247) during the construction phase. The findings shall be reported to National Highways and made available to the relevant local planning authorities and Historic England.	Demonstration of implementation of mitigation measures set out in the AMS-OWSI approved by the SoS, including measures specified in the WSIs and in accordance with Requirement 9 of the DCO.	Contractor	Construction	Requirement 9
Cultural Heritage	CH008	Management of heritage assets	ES 6.5.15	Cultural Heritage Asset Management Plans would be implemented by National Highways in accordance with DMRB LA 116 Cultural heritage asset management plans, (Highways England, 2019b) for any heritage assets that remain within its ownership following construction of the Project.	Ongoing preservation of relevant heritage assets	National Highways	Operation	EMP3 – Requirement 4
Cultural Heritage	CH009	Deep Palaeolithic deposits		Where there is a high potential for survival of Palaeolithic land surfaces and other significant deposits, a two-stage approach to mitigation will be adopted as set out under 'Palaeolithic and Holocene intrusive fieldwork', within Section 6.4 of the dAMS-OWSI. Stage 1 includes four general locations where test pits with minimum dimensions of 10m x 10m will be excavated to the depth to which the Project has potential to impact these deposits, with protection of walls to allow safe sampling and recording at depth. Stage 1 will inform Stage 2 techniques at this point and could include further excavation at depth, additional sampling and analysis of deposits, or a process for the sampling of bulk material and retrieval of any archaeological or palaeoenvironmental material as may be set out in the site-specific WSI developed in accordance with the AMS-OWSI.	Implementation of mitigation measures set out in the AMS-OWSI	Contractor	Construction	Requirement 9
Cultural Heritage	CH010	LPA access to archaeological mitigation sites		Local Authority Archaeological Advisors and Historic Buildings Advisors will be afforded access to the archaeological mitigation sites to monitor the mitigation works and sign-off completed work in accordance with Section 7 of the dAMS-OWSI.	Access to site for monitoring by local authority advisors	Contractor	Construction	Requirement 9
Geology and Soils	GS001	Ground investigation	ES 10.5.8 a	Supplementary ground investigations would be undertaken to assess residual contamination risks as detailed in the Remediation Options Appraisal and Outline Remediation Strategy (ES Appendix 10.11, Application Document 6.3). The Contractors would provide a scheme of ground investigation design for acceptance of National Highways in consultation with the Environment Agency and relevant Local Authorities prior to commencement of the works. Where supplementary intrusive ground investigations are required in areas underlain with contaminated soils, these shall be undertaken in line with the latest versions of BS 5930:2015 Code of practice for ground investigations (British Standards Institution, 2020) and BS 10175:2011 Investigation of potentially contaminated sites – Code of Practice (British Standards Institution, 2017) (e.g. use of environmental seals) to reduce the risk of creating pollutant pathways.	Acceptance of method statement by National Highways in consultation with the Environment Agency and relevant Local Authorities	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS002	Pre-construction surveys	ES 10.5.8 b	Prior to any construction compound area being prepared, a pre-condition survey would be undertaken to determine the current land quality across the compound area. A repeat survey would be done after the compounds have been removed to confirm that the area has been restored in line with article 35 of the draft DCO.	Completion of surveys	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Geology and Soils	GS003	Managing geotechnical risks	ES 10.5.8 c	To proactively manage the potential impacts from geohazards, such as land instability, during detailed design and construction activities the Contractors would carry out further ground investigation and establish a programme of instrumentation and monitoring in line with Section 7 of Appendix 10.2 (Application Document 6.3). A geotechnical risk register would continue to be maintained and updated throughout the development of the Project, in line with the requirements set out in DMRB CD 622.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS004	Chemical and fuel storage	ES 10.5.8 d	Construction compounds where chemical, waste oils or fuel storage and refuelling activities take place would be managed in line with the following measures: • Within the construction compounds, specific areas would be designated for the storage of chemicals, waste oils and fuel and refuelling activities. • These designated areas shall not be located within Source Protection Zone 1 (both published SPZ1 and default or bespoke SPZ1 (in agreement with the Environment Agency where a potable water abstraction is identified). These are presented on Figure 14.2 (Application Document 6.2). • These designated areas would be bunded to provide capacity for at least 110% of the largest container and placed on hardstanding to prevent downward migration of contaminants. • These designated areas would be designed with drainage to include measures for isolating spillages. • Any transfer of fuel or other potentially contaminated liquids would only take place within a designated transfer area. • Drip trays would be provided and procedures for emptying developed to reduce the risk of spillages.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS005	Plant refuelling	ES 10.5.8 e	Due to the transient nature of the Project construction works, refuelling activities would have to take place on worksites outside of construction compounds. To reduce the risk of a pollution event caused by spillages, the following measures would be followed when refuelling on worksites outside of construction compounds: Only construction equipment and vehicles free of oil/fuel leaks will be permitted on worksites. Drip trays will be placed below static mechanical plant and procedures for emptying developed. All refuelling activities would take place above drip trays or on an impermeable surface (e.g. plant nappy) and at an appropriate distance from watercourses and sensitive areas. Spill kits would be made available during all refuelling activities either at the worksite or on the refuelling vehicle. No refuelling activities shall take place within a Source Protection Zone (SPZ) 1 (both published SPZ1 and default or bespoke SPZ1 (in agreement with the Environment Agency where a potable water abstraction is identified). These are presented on Figure 14.2 (Application Document 6.2).	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Geology and Soils	GS006	Materials management	ES 10.5.8 f	All excavated materials and soils proposed for reuse under a Materials Management Plan would be required to meet risk-based acceptability criteria applicable to its intended use. The procedures and criteria to be used would be set out in the Materials Management Plan (REAC ref. MW007) prior to commencement of that part of the works.	Compliance with the Materials Management Plan	Contractor	Construction	EMP2 – Requirement 4
	GS007			NOT USED				
	GS008			NOT USED				
Geology and Soils	GS009	Soil management	ES 10.5.8 g	Soils would be handled and stored to allow their sustainable reuse in line with the DEFRA Construction Code of Practice for the Sustainable Use of Soil on Construction Sites (2009) and the MAFF Good Practice Guide for Handling Soils (2000). Full details of the soil resources present and the procedures for soils management (covering vegetation clearance, setting out haul routes, soil stripping, stockpile creation and management, soil reconditioning (where required) and soil reuse) would be set out prior to any soil stripping works commencing, covering all proposed end uses (e.g. agricultural land, woodland or other habitat types).	Approval of the procedures for soils management by National Highways	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS010	Soil management	ES 10.5.8 h	Characterisation of the existing soil to determine its resilience to handling and stripping depths would be based on detailed soil surveys. Where information is not available (i.e. from the detailed Agricultural Land Classification (ALC) surveys), pre-construction soil surveys would be undertaken to inform the development of appropriate soils management procedures.	Implementation of the procedures for soils management approved by National Highways	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS011	Soil management	ES 10.5.8 i	Soil on land identified on ES Figure 2.4, the Environmental Masterplan, which is used during construction, will be profiled to support the land use identified on the Environmental Masterplan (Figure 2.4, Application Document 6.2). The soil will be fully restored, in accordance with the soil reuse requirements in the soils management procedures (REAC ref. GS009), and will be recreated in the correct sequence of horizons, in such a manner that there are good fissures to facilitate soil profile drainage and plant root development.	Implementation of the procedures for soils management approved by National Highways	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS012	Soil management	ES 10.5.8 j	Reinstatement of soils affected by temporary works would aim to avoid any reduction in soil function. For agricultural land this will be measured by the quality of the land as defined by the ALC system (with a soil profile recreated to 1.2m below ground level where this was the pre-construction soil depth). For areas of landscape planting or habitat creation, this will be measured by the successful restoration of the soil profile (both physical and chemical characteristics) defined for that particular habitat in the soils management procedures suitable to allow the establishment and long-term health of the habitat.	Implementation of the procedures for soils management approved by National Highways	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Geology and Soils	GS013	Soil management	ES 10.5.8 k	• Procedures for the management of soil resources would include provisions for: • ensuring soils are stripped and handled in the driest condition reasonably practicable • ensuring topsoil and subsoil resources are stripped and stockpiled separately • keeping records of excavated and stored soils • confining vehicle movements to defined haul routes until all the soil resource has been stripped • protection of stockpiles from erosion through establishment of a grass cover unless the soil materials are to be reused in a short timeframe (<60 days) in which case alternative erosion control measures may be required, such as silt fencing or the use of geotextile blankets • protection from tracking over using signage or fencing • ensuring the physical condition of the replaced soil profile to at least 1.2m below ground level and that it is sufficient for the post-construction use • the use of toolbox talks to inform all those working on the site of the requirements for soil handling, storage and reuse.	Implementation of the procedures for soils management approved by National Highways	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS014	Soil management	ES 10.5.8 l	Following soil reinstatement there would be a five-year aftercare period. The Contractors would prepare and present to National Highways for acceptance a schedule of aftercare monitoring, maintenance and correction. This would include soil testing, appropriate to the target specification (e.g. land grade where restoration is to agricultural use or specific characteristics where restoration is to support habitat creation or re-provision). Implementation of the aftercare monitoring, maintenance and correction will be overseen by an Environmental Clerk of Works.	Implementation of commitment actions	National Highways	Construction	EMP2 – Requirement 4
Geology and Soils	GS015	Soil management	ES 10.5.8 m	The Contractors would have in place an agricultural liaison officer or named deputy who shall be contactable by telephone 24 hours a day, seven days a week during construction activities on agricultural land.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS016	Contamination verification	ES 10.5.8 n	A verification report would be prepared by the Contractors after completion of work to remediate contamination at each site where this is undertaken. This would identify the locations of the remediation works undertaken and the final tested ground quality. These reports would be provided to the relevant local authorities and Environment Agency as a record.	Submission of verification reports to the relevant local authorities and Environment Agency	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS017	Contamination verification	ES 10.5.9 a	The findings of the verification report (REAC ref. GS016) would be available for inclusion within the operations Health and Safety file or equivalent.	Implementation of commitment actions	National Highways	Operation	EMP3 – Requirement 4
Geology and Soils	GS018	Gas management	ES 10.5.8 o	The ground gas regime across the Project and especially in close proximity to landfill sites would be investigated to inform design of enclosed and confined spaces (e.g. service ducts/boxes) to reduce the risk to human health (asphyxiation) and buildings or structures (explosion). No confined spaces associated with the Project would be accessible to the public.	Implementation of commitment actions	Contractor	Construction	EMP2 - Requirement 4
Geology and Soils	GS019	Contamination	ES 10.5.9 b	If any incident were to occur which resulted in localised contamination, soils which had become significantly affected would be assessed and, if necessary, removed to reduce the risk of contamination migrating across a wider area or entering controlled waters.	Implementation of commitment actions in accordance with standard National Highways operating procedures	National Highways	Operation	EMP3 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Geology and Soils	GS020	East Tilbury access road	ES 10.5.12 a	A temporary access route would be created across East Tilbury Landfill site. The temporary access route would be designed to safeguard the capping layer on the landfill and minimise the risk of liquid waste being brought to the surface by the consolidation of the ground along the temporary access route. The design would be agreed with the Environment Agency in consultation with Thurrock Council unless otherwise agreed with the Secretary of State prior to installation. Vehicle movements and the type of vehicles (tonnage) would be restricted to further reduce the risk of damaging the integrity of the cap and the wider environment. The temporary access route will be removed as soon as it is no longer required.	Design of the temporary access route would be agreed with the Environment Agency unless otherwise agreed with the SoS	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS021	North Portal	ES 10.5.12 b and c	Potential contaminants from historical land uses and saline water have the potential to be drawn towards the construction area of the North Portal and ramps due to the level of groundwater control required during excavation works. This would be mitigated through the construction of a deep barrier around the excavations to reduce groundwater ingress. The depth of the barrier walls would be informed by the results of modelling and consultation with the Environment Agency and Thurrock Council prior to the commencement of excavation works to construct the North Portal box structure and ramps. The need for any supplementary mitigation measures and any necessary monitoring would be informed by the results of modelling and consultation with the Environment Agency prior to the commencement of excavation works. Technical solutions would be developed by the Contractors following further investigation and assessment. Potential solutions could include: • Ground treatment such as grouting to form a low permeability plug below the depth of excavation to reduce the risk of water inflow and uplift pressure. • Ground improvements (for example a low permeability barrier) to decrease the permeability of the ground to lessen the risk of contaminant mobilisation. • Potential to reduce the footprint of the structure by optimising the tunnel bore spacing and layout of tunnel boring machinery launch structures.	Implementation of measures to prevent mobilisation of leachate and saline intrusion in consultation with the Environment Agency and Thurrock Council	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS022	North Portal	ES 10.5.8 q	Dewatering may be required during excavation works which could potentially cause waterborne contaminants to mobilise and flow in the groundwater towards the excavation. If dewatering is required, then the Contractors would treat groundwater from dewatering works to standards agreed with the Environment Agency before discharge.	Compliance with the terms of the Environment Agency Environmental Permit	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS023	North Portal	ES 10.5.12 d	The North Portal is located within an area historically used for landfill. Groundwater control during the excavation and construction activities for launch of tunnel boring machinery may cause an increased volume of gases to escape, as soils, made ground and underlying alluvium become unsaturated. In addition, drilling through the area of historic landfill could lead to a build-up of gases behind tunnel boring machinery. These factors would be considered during the detailed design to establish appropriate and safe procedures and working methods to construct the tunnel and North Portal. Gas monitoring will be undertaken during the construction phase for the launch and use of tunnel boring machinery to detect changes in the gas regime as a safeguard to protect construction workers.	Compliance with relevant Health and Safety legislation and the Construction Design and Management Regulations	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Geology and Soils	GS024	Ground protection tunnel	ES 10.5.12 e	The design of the main crossing tunnel boring machinery may require the construction of a ground protection tunnel beneath the Thames Estuary and Marshes Ramsar site. The Environment Agency would be consulted on measures to reduce the risk of blow-out and spreading of grout during tunnelling if a ground protection tunnel is required.	Agreement of risk control procedures with National Highways in consultation with the Environment Agency	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS025	Northern tunnel entrance compound. Ground gas	ES 10.5.8 r	Accommodation and welfare facilities are proposed within the northern tunnel entrance compound which would service the North Portal construction activities. Ground gas associated with the historic landfill sites which may be present in the area could pose a risk to health. Prior to the accommodation being constructed, a gas assessment (investigation and monitoring) would be undertaken in the area to determine the need for appropriate gas protection measures.	Acceptance by National Highways of the gas assessment report	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS026	Foundation works risk assessment	ES 10.5.8 s	Construction of foundations (including piling and ground improvement works) has the potential to create pollution pathways and mobilise contaminants. The Contractors would prepare a detailed foundation risk assessment report in line with ES Appendix 10.11 (Application Document 6.3), during detailed design specific to structures and ground conditions. This would be submitted to the Environment Agency for review prior to commencement of that part of the works to which the report relates.	Acceptance of foundation risk assessment report by National Highways in consultation with the Environment Agency	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS027	Remediation strategy	ES 10.5.8 t	Where supplementary investigation is undertaken to assess residual contamination risks in accordance with GS001, appropriate assessment in accordance with LCRM (Environment Agency, 2021) would be undertaken and the reports provided to the relevant local authorities. Where unacceptable risks are identified, taking into account any representations received following the provision of the reports, the Contractors would develop proposals for site-specific remediation strategies and implementation plans in consultation with the relevant local authorities prior to implementation. The Contractors would have regard for ES Appendix 10.11, Remediation Options Appraisal and Outline Remediation Strategy (Application Document 6.3), which identifies techniques that could be implemented by the Contractors for the remediation of contamination.	Acceptance of site remediation proposals by National Highways in consultation with the relevant local authorities	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS028	Remediation of contamination	ES 10.5.8 u	Unforeseen contamination has the potential to be discovered during the construction of the Project. • During earth movement works, a watching brief protocol would be implemented under the supervision of the Environmental Clerk of Works in accordance with the Remediation Options Appraisal and Outline Remediation Strategy (ES Appendix 10.11, Application Document 6.3). • Site workers would be vigilant to ensure visual or olfactory signs of contamination are noted and that contaminated soil is kept separate from other materials. • Appropriate analysis and assessment would be undertaken by a suitably qualified person on suspected contaminated soils to establish the action required.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Geology and Soils	GS029	Long-term temporary stockpiles	ES 10.5.12 f	Surplus clean chalk soils generated from construction works south of the River Thames may be stockpiled to facilitate control of offsite Heavy Goods Vehicle traffic. Stockpiles of surplus clean chalk would be designed to safeguard the underlying soils and groundwater and the design would be agreed by the SoS in consultation with the Environment Agency prior to stockpiling commencing.	Implementation of environmental management measures agreed with the SoS in consultation with the Environment Agency	Contractor	Construction	Protective Provisions – Schedule 14
Geology and Soils	GS030	Temporary and permanent road location	ES 10.5.12 g	Construction work (both temporary and permanent) is proposed across the former Esso petrol station (HLU0214) on the eastbound side of the LTC/A2/M2 junction. The former petrol station is identified in ES Appendix 10.6, Preliminary Risk Assessment Report (Application Document 6.3) as a low-risk site as remediation has taken place and been signed-off by the regulators. Prior to the construction of both the temporary and permanent works, the Environment Agency would be consulted on the works to ensure that potential disturbance of residual contamination present in this area is avoided so as not to disturb remediation works in this area.	National Highways to agree temporary and permanent road alignment in consultation with the Environment Agency	Contractor	Construction	EMP2 – Requirement 4
Geology and Soils	GS031	Low Street Pit potential local geological site	ES 10.5.12 h	Low Street Pit has been identified as a potential local geological site due to the presence of Mucking Gravels (now known as the Taplow Gravel Member). The Project has the potential to impact the Mucking Gravels during the construction of the Tilbury viaduct and the associated embankment earthworks and drainage, as well as due to the required diversion of statutory undertakers' impacted apparatus, which are located within the Low Street Pit. Construction activities on the eastern side of Low Street Pit, where an area of Mucking Gravels is present, would be restricted to prevent any excavations of the Mucking Gravels in this area and retain the existing eastern quarry slope. Figure 4 Proposed restricted area of Annex 1 to ES Appendix 10.3, Site Walkover Factual Report, of the Environmental Statement, (Application Document 6.3) shows the area that would be subject to these restrictions.	No excavation of Mucking Gravel in the identified area unless otherwise approved by the SoS.	Contractor	Construction	EMP2 – Requirement 4
HRA	HR001	Seasonal constraints to construction of discharge from construction of the South Portal	HRA 7.1.13	Works to construct the infrastructure for the new South Portal construction drainage discharge would not take place within the Thames Estuary and Marshes Ramsar, and any work within functionally linked land, as shown on HRA Figure 2 (Application Document 6.5) would only be undertaken during April, May, June and July to avoid disturbance to passage and overwintering birds associated with European designated sites unless otherwise agreed with SoS in consultation with Natural England.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
HRA	HR002	Seasonal constraints to works at the northern tunnel entrance compound drainage pipeline and outfall	HRA 7.1.14	Works within the intertidal area to construct or decommission the northern tunnel entrance compound temporary drainage pipeline and outfall would be undertaken during April, May, June, July and August only, to avoid disturbance to passage and overwintering birds associated with European designated sites unless otherwise agreed with SoS in consultation with Natural England.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
HRA	HR003	Response to extreme weather	HRA 7.1.20	To avoid impacts to wintering birds during prolonged periods of sub-zero temperatures, activities potentially causing disturbance to wintering bird qualifying interests of the Thames Estuary and Marshes Special Protection Area (SPA)/Ramsar the Joint Nature Conservation Committee's 'Scheme to reduce disturbance to waterfowl during severe winter weather' [**https://jncc.gov.uk/our-work/severe-weather-scheme/**] will be adopted.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
HRA	HR004	Noise barriers for compounds in or adjacent to Ramsar functionally linked land	HRA 7.1.9	Noise attenuation measures shall be incorporated within the northern tunnel entrance compound, A226 Gravesend Road compound and Milton compound as shown on HRA Figure 24 (Application Document 6.5) and having regard for HR005 & HR006 to ensure that the construction activities do not result in noise levels within the Thames Estuary and Marshes SPA/Ramsar or any land functionally linked to it as shown on HRA Figure 2 (Application Document 6.5) that would cause disturbance to the wintering bird qualifying interests. The measures shall be in place prior to the operation of those compounds (or areas of compounds) and shall remain until the end of the compound operation.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
HRA	HR005	Protection of birds from activities at the northern tunnel entrance compound	HRA 7.1.10	The earthworks area (Tilbury Fields landform) in the southern part of the northern tunnel entrance compound will include a 3m high bund (including any temporary barrier or equivalent required) constructed 75m north of the existing field boundary (indicative location shown on HRA Figure 24 (Application Document 6.5)) to delimit the extent of works from the functionally linked land associated with the Thames Estuary and Marshes SPA/Ramsar and avoid disturbance of birds in the passage and winter period. Construction of the 3m high bund will be carried out during April, May, June and July, and the 3m bund (including any temporary barrier or equivalent required) will be functional to mitigate noise and visual disturbance by the end of July, so that completion of the bund does not disturb (as monitored through HR009) the wintering bird qualifying interests. Any earthwork movements required to complete the Tilbury Fields landform south of the bund will only be carried out during April, May, June and July.	I Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
HRA	HR006	Seasonal constraints to works to form noise barriers at compounds	HRA 7.1.16	Erection of noise attenuation measures at the boundaries of compounds identified in HR004 will be carried out in April, May, June and July only, to avoid disturbance of birds in the passage and winter period.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
HRA	HR007	Habitat enhancement in functionally linked land	HRA 7.1.24	To provide enhanced functionality of functionally linked land associated with the Thames Estuary and Marshes SPA/Ramsar during the construction period, the management of the three fields in the plot south of the Metropolitan Police firing range and adjacent to the SPA/Ramsar (Land Registry ref. K794941) will consist of either a standing ripe crop ready to be harvested, winter stubbles or grass ley from 1 October to 1 March each year throughout the construction and operation of the A226 Gravesend Road and Milton compounds.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
HRA	HR008	Groundwater surveillance	HRA 6.2.19 & 7.3.2	Surveillance of groundwater levels will be carried out within the Thames Estuary and Marshes Ramsar in the vicinity of the tunnelling works for the duration of the construction period at borehole locations to be agreed with SoS in consultation with Natural England and the Environment Agency. The Contractors will complete an annual review, for the period of construction and the first five years of operation, of the groundwater levels and consult on any implications for qualifying features of the Ramsar site, and any necessary remedial measures with Natural England and the Environment Agency.	Results of groundwater surveillance of agreed boreholes reported to Natural England and the Environment Agency	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
HRA	HR009	Bird behaviour surveillance	HRA 7.3.3	Between 1 July and 30 April inclusive during each year of construction, the Contractors will undertake monthly bird survey surveillance visits from fixed vantage points to observe functionally linked land associated with the Thames Estuary and Marshes SPA/Ramsar as identified on Figure 2 of the HRA (Application Document 6.5) that lies within 300m of the Order Limits of the Project. The surveys will record numbers of waterfowl present and any behaviours in response to disturbance stimuli (including no response) to a specification developed in consultation with Natural England. If the bird surveillance visits show a change in bird behaviour, the Contractors will investigate if this is attributable to construction activities, and if this is agreed with SoS, after consultation with Natural England, the Contractors will review mitigation measures in consultation with Natural England.	Bird survey results reported to Natural England	Contractor	Construction	EMP2 – Requirement 4
HRA	HR010	Habitat enhancement in functionally linked land	HRA 7.1.26	The habitat creation at the land adjacent to Coalhouse Point, indicated on the Environmental Masterplan (Figure 2.4, Application Document 6.2) and described in Clause S9.13 of the Design Principles (Application Document 7.5) will be carried out prior to the commencement of works at the Northern tunnel entrance compound. The water required to maintain a range of depths within the habitat consistent with the guidance in “Manage lowland wet grassland for birds” (DEFRA, 2021) will be secured prior to completion of the habitat creation works and will, unless otherwise agreed with the Secretary of State, be sourced from the River Thames by means of a water inlet with self-regulating valve or equivalent structure, passable by eels, constructed (in accordance with HR011) in the sea wall, at approximately TQ686761, to allow regulated tidal exchange, unless a formal agreement with Thurrock Council to release water on request from the Coalhouse Fort moat system is secured.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
HRA	HR011	Constraints to works to form the water inlet with self-regulating valve	HRA 7.1.27	Works to construct a water inlet with self-regulating valve or equivalent structure (Work No. 5X, referred to in HR010) would be undertaken with the following constraints: • All works requiring access to the inter-tidal zone will be completed to suit tidal cycle and at periods of low water. • All piling works will be completed during periods of low water to avoid transmission of underwater noise. • All piling works will utilise soft start piling and other best practice techniques, as per the JNCC 2010 guidance (Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise), to help avoid noise and vibration impacts. • Excavated arisings will be retained within the coffer dam or stored on a support barge. • Construction of the water inlet and associated works to excavate scrapes and ditches will be undertaken between 1st April and 30th August where reasonably practicable. Where these works are undertaken outside of these months they shall be undertaken within a localised area over the shortest reasonably practicable time period. .	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
HRA	HR012	Seasonal constraints to works to construct operational tunnel drainage outfall	HRA 7.1.17	The construction of the permanent outfall for the operational tunnel drainage will be carried out in April, May, June and July only. This is to avoid disturbance of birds in the passage and winter period.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV001	Trees and vegetation retention	ES 7.5.18	Detailed design for the Project, including diverted utilities, will aim to reduce the removal of trees and vegetation as far as reasonably practicable, and in accordance with the LEMP and the Environmental Masterplan (Figure 2.4, Application Document 6.2).	Acceptance by National Highways of tree removal drawings prior to the commencement of works and approval of SoS of the LEMP	Contractor	Construction	LEMP – Requirement 5
Landscape	LV002	Land reinstatement	ES 7.5.13	Land temporarily impacted by works to divert utilities would be reinstated to its former condition and composition upon completion, as far as reasonably practicable, unless otherwise specified in the Environmental Masterplan (Figure 2.4, Application Document 6.2) or under the terms of article 35 of the draft DCO, which sets out the temporary possession powers.	Successful reinstatement of vegetation at these locations within 12 months for grassland, 24 months for hedgerows, and five years for trees and woodland	Contractor	Construction	LEMP – Requirement 5
Landscape	LV003	Landscape maintenance	ES 7.5.14	The first five years of vegetation establishment would be overseen by an Environmental Clerk of Works. Vegetation that has failed to establish would be replaced as soon as identified within the next available planting season. At the end of the establishment period, subsequent landscape management would be undertaken in accordance with the LEMP.	Successful establishment of planting within five years to serve its mitigation purpose as identified on the Environmental Masterplan	Contractor	Construction	LEMP – Requirement 5
Landscape	LV004	Planting	ES 7.5.13	Where guards are used to protect seedlings and whips, the use of plastic tree guards would be avoided in favour of biodegradable options where available. In the event that plastic guards are used, these will be removed within five years of installation.	Avoidance of litter from broken or abandoned tree guards	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV005	Siting of construction compounds	ES 7.5.18	No main compounds, as defined in the Project description presented in ES Chapter 2, (Application Document 6.1), would be located within the Kent Downs Area of Outstanding Natural Beauty (AONB).	National Highways acceptance of construction compounds locations	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV006	Marling Cross compound, views, Valley Drive, Mackenzie Way	ES 7.5.18	Construction compound facilities greater than 6m in height would be located as southerly as is reasonably practicable to maximise the distance from residential properties on Valley Drive and Mackenzie Way and minimise visual prominence.	National Highways acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV007	A2 compound, construction compounds facilities	ES 7.5.18	Construction compound facilities greater than 6m in height would be located as south-westerly as is reasonably practicable to maximise distance from nearby residential properties on Thong Lane and from the adjacent boundary of the Kent Downs AONB.	National Highways acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV008	Southern tunnel entrance compound, bund	ES 7.5.13	Earth bunds of approximately 2-3m in height formed from material excavated onsite would be sited along the boundary of the compound, as material becomes available to facilitate visual screening for residential properties on Thong Lane and Rochester Road (A226) during construction. The phasing of the works would be planned so that the bunds are in place before the main compound activities commence, subject to excavated material availability.	National Highways acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Landscape	LV009	Southern tunnel entrance compound, stockpile slopes	ES 7.5.18	Softening the appearance of temporary earthwork stockpiles adjacent to the Kent Downs AONB by phasing the works to be such that south-east facing slopes are retained as grass seeded slopes for visual screening purposes for as long as reasonably practicable.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV010	Southern tunnel entrance compound, construction compound facilities	ES 7.5.18	Construction compound facilities greater than 6m in height would be located to maximise distance from residential areas of Chalk and adjoining Thong Lane, and Polperro, Horseshoe Meadow and Viewpoint Place on the Rochester Road (A226), together with Thamesview School, as far as reasonably practicable.	National Highways acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV011	A226 Gravesend Road compound, bunds	ES 7.5.13	Earth bunds of 3m in height would be formed from material excavated and retained onsite, as material becomes available to facilitate visual screening for residential properties on Castle Lane, Chalk.	National Highways acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV012	A226 Gravesend Road compound, construction compound facilities	ES 7.5.18	Construction compound facilities greater than 6m in height would be located as south-easterly as reasonably practicable to maximise distance from residential properties on Castle Lane, Chalk.	National Highways acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV013	Designated/ protected trees and hedgerows, utilities	ES 7.5.18	Where excavation for installation of utilities would require the removal of ancient woodland, trees subject to tree preservation orders or hedgerows subject to the Hedgerows Regulations 1997, trenchless installation methods will be used to avoid removal where reasonably practicable, unless this would give rise to new or materially different environmental effects.	Acceptance by National Highways of tree removal drawings prior to the commencement of works and approval of SoS of the LEMP	Contractor	Construction	LEMP – Requirement 5
	LV014			NOT USED				
Landscape	LV015	Station Road compound, bunds	ES 7.5.13	Where soil is excavated and retained on site temporarily, it would be stockpiled in the form of earth bunds to facilitate visual screening for residential properties along Church Road and Station Road.	National Highways acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV016	Station Road compound, construction compound facilities	ES 7.5.18	Construction compound facilities greater than 6m in height would be located at the south of the compound, adjacent to the northern tunnel entrance compound, where reasonably practicable, to maximise distance and visual screening from residential properties on Church Road and Station Road.	National Highways acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV017	Brentwood Road compound, bunds	ES 7.5.13	Where soil is excavated and retained onsite temporarily, it would be stockpiled in the form of an earth bund on the southern boundary of the compound to facilitate visual screening for residential properties within Chadwell St Mary where reasonably practicable.	National Highways acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV018	Brentwood Road compound, compound construction facilities	ES 7.5.18	Construction compound facilities greater than 6m in height would be located at the north of the compound, as far as reasonably practicable, to reduce visibility from residential properties at Chadwell St Mary.	National Highways acceptance of the layout of buildings and concrete batching plant within construction compounds	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Landscape	LV019	Stifford Clays Road compound East, construction compound facilities	ES 7.5.18	Construction compound facilities greater than 6m in height would be located as westerly as reasonably practicable, to maximise distance from residential properties on Stifford Clays Road and Fen Lane.	National Highways acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV020	Mardyke compound, construction compound facilities	ES 7.5.18	Construction compound facilities of greater than 6m in height would be located as westerly as reasonably practicable to minimise visibility from residential property (Hobletts).	National Highways acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV021	Mardyke compound, bund	ES 7.5.13	Where soil is excavated and retained on site temporarily, it would be stockpiled in the form of earth bunds to facilitate screening for Hobletts to the north-east.	National Highways acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV022	M25 compound, construction compound facilities	ES 7.5.18	Construction compound facilities of greater than 6m in height would be located along the southern boundary of the compound to maximise the distance from the North Ockendon Conservation Area and local residents, as indicated on Page 43 of ES Figure 7.8 - ZTV - 5km DTM Analysis of Main Construction Compounds (2 of 2).	National Highways acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV023	M25 compound, construction compound facilities	ES 7.5.18	It is anticipated that a concrete batching plant would be located within this compound. This facility would be located along the southern boundary of the compound, to maximise distance from the North Ockendon Conservation Area and local residents, as indicated on Page 44 of ES Figure 7.8 - ZTV - 5km DTM Analysis of Main Construction Compounds (2 of 2).	National Highways acceptance of the layout of buildings and concrete batching plant within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV024	M25 compound, bunds	ES 7.5.13	A 2-3m high bund would be formed from excavated soil along the northern and eastern edges of the M25 compound, including around the soil storage area. The phasing of the works would be planned so that the bunds are in place before the main compound activities commence, subject to excavated material availability. The bund would be seeded with a grass mix suited to the local context. Where further soil is excavated and retained onsite temporarily, it would be stockpiled up to 6m high in the north-eastern part of the compound. These measures would facilitate visual screening for the North Ockendon Conservation Area and local residents.	National Highways acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV025	Ockendon Road compound, construction compound facilities	ES 7.5.18	Construction of compound facilities of greater than 6m in height would be located as north-westerly as is reasonably practicable to minimise visibility from residential properties within the static caravan park located off Ockendon Road.	National Highways acceptance of the layout of buildings within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV026	Ockendon Road compound, bunds	ES 7.5.13	Where soil is excavated and retained onsite temporarily, it would be stockpiled in the form of earth bunds on the south and west boundaries of the compound, where required to facilitate screening for Ockendon Road and the nearest residential properties at the static caravan park.	National Highways acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV027	Warley Street, construction compound facilities	ES 7.5.18	Construction compound facilities of greater than 6m in height would be located adjacent to the M25, as far as is reasonably practicable.	National Highways acceptance of the layout of buildings within construction compounds.	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Landscape	LV028	Protection of retained woodland, trees and hedges	ES 7.5.18	An Arboricultural Method Statement and Tree Protection Plan would be prepared in accordance with BS 5837:2012, identifying measures for the protection of retained woodland, trees and hedges prior to the commencement of site clearance works. All works to woodland, trees and hedges and vegetation removal would be implemented under the supervision of the Environmental Clerk of Works having regard for the commitment to reduce the removal of trees and vegetation as far as reasonably practicable as set out in LV001.	Implementation of measures for the protection of retained vegetation and avoidance of harm to retained vegetation	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV029	Landscape planting	ES 7.5.19	Planting identified on the Environmental Masterplan (Figure 2.4, Application Document 6.2) would be undertaken at the earliest practicable opportunity. Where planting is being undertaken to landscape or provide environmental mitigation on land used temporarily for the authorised development, planting for the implementation of environmental mitigation would be undertaken at the earliest practicable planting season after completion of that part of the construction works and in accordance with the LEMP. Planting on land taken solely for environmental mitigation purposes would be undertaken at the earliest practicable planting season following commencement of authorised development and in accordance with the LEMP.	Planting to serve its mitigation purpose as identified on the Environmental Masterplan in accordance with timetables set out in the LEMP	Contractor	Construction	LEMP – Requirement 5
Landscape	LV030	Veteran and ancient tree fencing	ES 7.5.18	In accordance with standing advice prepared by Natural England and the Forestry Commission (2022), the following measures would be developed to protect retained veteran trees and trees in ancient woodland identified on the Environmental Masterplan (Figure 2.4, Application Document 6.2): 1. Screening barriers would be provided to protect retained ancient trees, ancient woodland and veteran trees from dust and pollution from nearby works. Locations of barriers will be defined in accordance with the requirements set out in REAC item LV028. 2. A buffer zone would be defined to avoid impact on root zones. These would be as follows: – For ancient or veteran trees the buffer would be a minimum of 15 times the diameter of the tree trunk or 5m beyond the canopy, where practicable, whichever is the greater. – For ancient woodland, a buffer of at least 15m from the boundary of the woodland would be maintained between the proposed construction activity and the asset where practicable. These measures would be followed by the Contractors unless specifically agreed by National Highways, following the advice of a qualified arboriculturist, and following assessment which demonstrates that the implementation of other mitigation measures would permit a smaller buffer whilst still maintaining the viability of the tree or woodland. The above measures shall not apply to those trees shown to be removed on Figure 7.24 of the Arboricultural Impact Assessment (ES Appendix 7.12, Application Document 6.3) or if the Secretary of State certifies that not implementing such measures would not result in new or materially different environmental effects to those reported in the ES.	Clearly defined approach to deliver successful establishment of vegetation as set out in the Environmental Masterplan	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Landscape	LV031	Relocating lost veteran trees and trees within ancient woodland	ES 7.5.18	Where removal of veteran trees is required, the intact hulks of felled veteran trees would be relocated in close proximity to a nearby veteran tree or placed within a parkland area. Where tree removal is required within ancient woodland, then timber will be retained and placed in log piles and left to decompose naturally. These measures accord with standing advice prepared by Natural England and the Forestry Commission (2022). These measures would provide opportunity for invertebrates and fungi resident within the tree to relocate and will promote habitat formation. The location and method for the placement of tree hulks and timber will be identified following liaison with the relevant local planning authorities shall be informed by arboricultural and ecological assessment.	Relocation of intact tree hulks in accordance with Natural England and Forestry Commission guidance	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV032	Veteran tree replacement	ES 7.5.18	A minimum of 30 individual specimen trees would be planted as replacement for lost veteran trees. Fifteen such trees would be planted to the south of the River Thames and 15 to the north of the River Thames. The location, stock size and species selection would be agreed with the SoS following consultation with the relevant local planning authorities. Suitable species could include a combination of oak (*Quercus robur*) and sweet chestnut (*Castanea sativa*). This would be undertaken during the construction phase within locations selected to allow sufficient open space for establishment of an open crown, whilst being as close as reasonably practicable to the location of the lost existing veteran trees to provide some ecological connection with other veterans nearby.	Implementation of the LEMP approved by the SoS	Contractor	Construction	LEMP – Requirement 5
Landscape	LV033	Long Lane compound A, bunds	ES 7.5.18	Where reasonably practicable, stockpiles formed from material excavated onsite would be sited along the eastern boundaries of Long Lane compound A, as material becomes available. This is to reduce visual impacts for the caravan site off Gammonfields Way and its subsequent relocation site immediately to the west.	National Highways acceptance of the location of stockpiles within construction compounds	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV034	Vegetation protection at The Wilderness		No woodland within The Wilderness will be removed in connection with the installation of Work No MUT27	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV035	Southern tunnel entrance compound, phasing		Reducing the impact on residential properties on Thong Lane and Rochester Road (A226) during construction, by phasing the works in the following order of preference: • Excavating material and then directly placing it in its permanent position within Chalk Park where reasonably practicable • Where direct placement is not reasonably practicable, using the central part of the western soil storage area shown on Plate 1.3 of Appendix 2.1 Construction Supporting Information to temporarily store material • Where temporary storage in the central part of the western soil storage area shown on Plate 1.3 of Appendix 2.1 Construction Supporting Information is not reasonably practicable, extending material storage to the northern part of the soil storage area.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Landscape	LV036	Southern tunnel portal compound, haul road		The route of the proposed haul road, which is intended to join the Rochester Road (A226) at points immediately to the west and east of the Horseshoe Meadow and Viewpoint Place traveller sites, shall be located as far from the traveller sites as is reasonably practicable, taking account of the need to ensure safety and having regard to the location of other sensitive receptors. So far as reasonably practicable, acoustic solid barriers will be provided between the Horseshoe Meadow and Viewpoint Place traveller sites and the haul road.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV037	Screening of views in Kent Downs AONB		In order to reduce visual effects in the opening year in the Kent Downs AONB to the north of Park Pale, the following mitigation measures would be implemented: • Existing trees and hedgerow plants along the northern boundary of Park Pale (north-west of the Park Pale overbridge) would be retained as far as reasonably practicable during the installation of utilities associated with Work No. MU1. Existing trees and hedgerow plants situated south of the Harlex Haulage access track (Work No. 1C) and on both sides of the proposed diverted footpath NS161, extending up to the Park Pale overbridge and utility works (Work No. MU1), would also be retained as far as reasonably practicable. The protection of retained trees would be achieved through the implementation of an Arboricultural Method Statement (AMS) in accordance with LV028. The AMS will specify the tree protection measures which will be applied during construction. Protection measures may include access facilitation pruning, the erection of tree protection barriers and the arboricultural supervision of work that has the potential to cause damage to roots. • Proposed planting within the ancient woodland compensation site north of Park Pale and Harlex Haulage identified on the Environmental Masterplan (Sheet 2 and 4 of Section 1, Figure 2.4, Application Document 6.2) would be undertaken, in part, at the earliest practicable planting season following commencement of authorised development. Early planting would be outside of the land required for construction and would maximise early screening, as well as being in accordance with the LEMP. The early planting would not be in areas identified as being suitable for ancient woodland soil receptor sites where prior translocation of soil is required.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Landscape	LV038	M25 compound, phasing		The management of stockpile operations within the soil storage area will be phased, with storage of materials starting in the southern part of the compound as far as reasonably practicable to maximise the distance from the North Ockendon Conservation Area and adjacent residents. If temporary material storage exceeds the capacity of the southern section of the soil storage area, the material storage would be extended to the northern part of the soil storage area.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Marine Biodiversity	MB001	Construction of northern tunnel entrance compound drainage pipeline and outfall	ES 9.5.11d	Works to construct the temporary drainage pipeline and outfall from the northern tunnel entrance compound, including any piling, must where reasonably practicable be undertaken in the dry in accordance with the conditions set out by the Marine Management Organisation (MMO) in the Deemed Marine Licence.	Compliance with conditions of the Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence – Schedule 15

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Marine Biodiversity	MB002	Piling below mean high water springs	ES 9.5.11d	Techniques such as soft start/ramp-up would be used for the first 20 minutes of piling operations and should piling activities cease for more than 10 minutes, the soft start/ramp-up technique be repeated. Vibro-piling will be used until first refusal; thereafter impact piling being used to toe in the piles. Hammer energy would be reduced once an acceptable drive rate is observed.	Compliance with conditions of the Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence – Schedule 15
Marine Biodiversity	MB003	Lighting during construction below mean high water springs	ES 9.5.11d	Prior to the commencement of works below mean high water springs, proposals for lighting of marine construction works subject to the Deemed Marine Licence that require 24-hour working will be developed and submitted to the MMO. This would include an assessment of the effects of measures such as directional lighting and controls on lux levels to mitigate effects on waterfowl during 24-hour operations.	Compliance with Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence – Schedule 15
	MB004			NOT USED				
	MB005			NOT USED				
Marine Biodiversity	MB006	Implementation of invasive species introduction controls	ES 9.5.11f	A marine biosecurity plan will be prepared and implemented in line with best practice UK guidance (Payne *et al*, 2015) ahead of any marine works, to prevent the introduction and spread of Invasive Non-Native Species (INNS). Where a risk of introducing INNS is identified, then suitable control measures will be implemented, and may include control measures as per the International Maritime Organisation's (IMO) Convention for the Control and Management of Ships' Ballast Water and Sediments (2017). For example, where vessels servicing the development originate from high-risk origins, IMO ballast water exchange and sediment disposal measures would be implemented.	Implementation of commitment action	Contractor	Construction	Requirement 4(2)
Material Assets and Waste	MW001	Preferentially avoiding use of primary materials	ES 11.5.13	Where design specification permits, key construction materials used would include a measurable recycled or secondary content. In line with the target set out in DMRB LA 110 Material assets and waste (Highways England, 2019a), 31% of aggregates used in construction would be recycled or secondary, for those applications where it is technically and economically feasible to substitute these alternative materials for primary aggregates. To facilitate compliance with this target, the Contractors would calculate the total aggregate required to achieve the detailed design, and the total where design specification dictates only primary aggregate is used. During construction, the Contractors would record the amount of primary and secondary/recycled aggregate by weight and calculate compliance with the target (offsetting the amount excluded by design specification). Use of primary materials would be minimised, during detailed design, by specification of materials that are renewable, reclaimed or have a recycled content: In line with the target set out in DMRB LA 110 Material assets and waste (Highways England, 2019a), 70% of suitable, uncontaminated concrete from demolition activities would be recycled and reused within the Order Limits to substitute use of primary material. Suitable uncontaminated concrete from demolition and construction activities would be processed to achieve non-waste status in accordance with the Aggregates from Inert Waste Quality Protocol (WRAP, 2013).	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Material Assets and Waste	MW002	Responsible sourcing	ES 11.5.13	1. Priority would be given to sourcing primary, secondary and recycled aggregates from Kent, Essex and Greater London whenever the design specification permits and supply is available to comply with the proximity principle. 2. The Contractors would use the BRE Framework Standard for Responsible Sourcing (BES 6001) (BRE, 2008), to verify imported materials are sustainably sourced and managed, to reduce the impacts throughout the supply chain.	Implementation of commitment action	Contractor	Construction	EMP2 – Requirement 4
Material Assets and Waste	MW003	Components standardisation	ES 11.5.13	The Contractors would be required to review the design and investigate opportunities to standardise (where reasonably practicable) construction aspects, for example, beam depths, abutment sizes and piers to increase efficiency of materials use in production and reduce waste production. This initiative would be progressed through detail design and documented in a material efficiency design report submitted to National Highways prior to construction.	Acceptance by National Highways of the material efficiency design report for works under the control of National Highways and its Contractors	Contractor	Construction	EMP2 – Requirement 4
Material Assets and Waste	MW004	Design for offsite construction	ES 11.5.13	The Contractors would be required to review the design to investigate the use of prefabricated structures and components; and encourage a process of assembly rather than no construction onsite where economically and technically feasible.	Contractors to submit reports for National Highways review and acceptance prior to construction for works under the control of National Highways and its Contractors	Contractor	Construction	EMP2 – Requirement 4
Material Assets and Waste	MW005	Pre-demolition surveys	ES 11.5.13	During construction, it will be necessary to demolish various buildings, concrete structures and steel gantries. Pre-demolition surveys of these structures and buildings would be undertaken. Demolition materials would be identified and quantified and potential opportunities for the reuse (with or out without treatment) and use within the Project identified; this would include hazardous materials such as asbestos.	Completion of pre-demolition surveys	Contractor	Construction	EMP2 – Requirement 4
Material Assets and Waste	MW006	Site waste manager	ES 11.5.14	During both detailed design and construction, Contractors would appoint a materials and waste manager to ensure that the waste hierarchy is implemented and opportunities are identified and implemented to reduce waste generation or improve reuse, recycling and/or recovery rates. The materials and waste manager would be responsible for ensuring compliance with waste mitigation requirements set out in the REAC and that measures or plans for the management of site waste in accordance with Requirement 4(3) are written and implemented.	Acceptance by National Highways of the manager for materials and waste nominated by the Contractors for works under the control of National Highways and its Contractors	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Material Assets and Waste	MW007	Excavated materials and soils	ES 11.5.14	Excavated material (and all wastes) would be managed in line with the waste hierarchy. Preference would be given to appropriate reuse, recycling and/or recovery before disposal where feasible and permitted by the design. Where excavated materials and soils are to be reused, recycled and/or recovered within the Order Limits this would be subject to the relevant regulatory controls. For example: Directive 2008/98/EC on Waste (Waste Framework Directive), Article 2, environmental permit (as per the Environmental Permitting (England and Wales) Regulations (2016)), exemption and/or a Materials Management Plan (as per the Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011). Where excavated materials and soils cannot be reused, recycled and/or recovered within the Order Limits opportunities would be sought within schemes or facilities outside of the Order Limits. The final option would be disposal and it would be reported in the Site Waste Management Plan that no practicable alternative management route was available.	Compliance with relevant regulatory controls	Contractor	Construction	EMP2 – Requirement 4
Material Assets and Waste	MW008	Characterisation of excavated fill	ES 11.5.13	The Contractor shall use the information and data available to identify what site won excavated materials can be used as Class I-IV material or aggregate. Should it be required, supplementary data and information shall be obtained in order to assess the potential availability and suitability of excavated materials to meet the relevant material specifications.	Acceptance by National Highways of the assessment of suitability and volume of site won materials that could be used as Class I-IV or aggregate report for works under the control of National Highways and its Contractors	Contractor	Construction	EMP2 – Requirement 4
Material Assets and Waste	MW009	Servicing the tunnel boring machinery		The tunnel boring machinery will be serviced from the North Portal. Material excavated by the tunnel boring machinery will be generated as a slurry and this will be transferred by pipeline through the tunnel to the North Portal for placement. Similarly, tunnel segments and major services required to operate the tunnel boring machinery and erect the tunnel segments will be supplied from the North Portal where major services comprise slurry feed and return pipelines, main and auxiliary power cables, cross passage dewatering wastewater pipeline, fire mains and the temporary tunnel lighting system.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

Material Assets and Waste	MW010	Construction site waste management	ES 11.5.15	Contractors would implement the following, where practicable, in order to reduce the quantities of waste requiring offsite management, enhance reuse, recycling and recovery rates and minimise the generation of hazardous waste: 1. All waste arisings would be characterised. All waste arisings would be monitored using the Site Waste Management Plan (SWMP) (or equivalent in substance) during construction. 2. All wastes would be classified with relevant European Waste Catalogue (EWC) codes and, in the case of mirror entry codes, the wastes would be sampled to determine classification in line with the prevailing technical guidance (currently Waste Classification: Guidance on the classification and assessment of waste, WM3 (Scottish Environment Protection Agency, Natural Resources Wales and Environment Agency, 2021). 3. Waste management off-site would be completed under relevant UK waste regulation. 4. Satisfy the need under the Waste (England and Wales) Regulations 2011 (as amended) for pre-treatment of waste and confirm this in a written declaration on the associated waste documentation. 5. Demonstrate and document that sufficient space has been allowed within the construction working areas for stockpiles for topsoil, material not suitable for reuse on site, materials to be reused, excess clean material and imported materials for construction. This would enable the segregation of waste types, prevent the mixing of hazardous and non-hazardous wastes and enhance recovery rates by minimising degradation, damage and loss. 6. Segregate hazardous and non-hazardous waste, separating waste at source by type, where practicable, providing separate skips for general waste, metal, dry recycling and timber as a minimum at each compound. Suitable provision would also be made for common hazardous wastes, e.g. used absorbents, aerosol cans, oily rags and waste electronics. 7. Provide impermeable surfaces with sealed drainage for remediation, quarantine and hazardous waste storage areas to minimise cross-contamination of other waste streams and surrounding ground. 8. Label stockpiles and skips with contents, to prevent the mixing of hazardous and non-hazardous wastes. 9. Comply with any specific waste storage and handling requirements required by the prevailing legislation, e.g. for asbestos or waste electronics. 10. Re-use of vegetation waste within the Order Limits wherever possible, e.g. for ecological mitigation (unless contaminated by invasive species). 11. Where possible, agree with material suppliers to reduce the amount of packaging on materials or to participate in a packaging take-back scheme. 12. Implement a material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste. 13. Monitor material quantity requirements to avoid over-ordering to reduce opportunity for oversupply and damage onsite that would generate waste materials. 14. Prioritise off-ground storage, e.g. on pallets, retention of materials in original packaging, protection from rain and collision by plant or vehicles.	Implementation of site waste management procedures to be submitted to National Highways	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
				15. Ensure that the storage of lightweight or liquid/sludge waste materials will prevent dispersion by wind and precipitation. 16. Prohibit the burning of waste and unwanted materials within the Order Limits. 17. In line with the requirements of DMRB LA 110 Material assets and waste (Highways England, 2019a), or as amended, enhancement opportunities would be identified, reported and implemented during detailed design and construction to minimise the demand for material and the amount of waste sent for final disposal in landfill.				
Material Assets and Waste	MW011	Diversion of inert excavated, construction and demolition waste materials from landfill	ES 11.5.19	Through a combination of one or more of reuse, recycling and/or recovery the Contractors would divert a minimum of 95% (by weight) of inert excavation wastes and a minimum of 95% (by weight) of inert construction and demolition waste destined for offsite waste management outside the Order Limits from final disposal in landfill.	No more than 5% (by weight) of inert excavated waste and no more than 5% (by weight) of inert construction and demolition wastes to be placed in landfill. Demonstrated through SWMP records.	Contractor	Construction	EMP2 – Requirement 4
Material Assets and Waste	MW012	Offsite facilities	ES 11.5.19	The Contractors would use the methodology described in ES Appendix 11.1, Excavated Materials Assessment (Application Document 6.3), to identify offsite facilities and/or schemes that score positively against a sustainability scoring system agreed with National Highways. Sites would be considered acceptable where they perform no worse than those sites on the detailed assessment list (at the time of submission of the DCO application).	Implementation of commitment actions for works under the control of National Highways and its Contractors	Contractor	Construction	EMP2 – Requirement 4
Material Assets and Waste	MW013	Diversion of excavated, construction and demolition non-hazardous waste from landfill	ES 11.5.19	Through a combination of one or more of reuse, recycling and/or recovery the Contractors would divert a minimum of 90% (by weight) of non-hazardous excavated wastes and a minimum of 90% (by weight) of non-hazardous construction and demolition waste that are destined for off-site waste management outside the Order Limits from final disposal in landfill.	Achievement of specified target for works under the control of National Highways and its Contractors	Contractor	Construction	EMP2 – Requirement 4
Material Assets and Waste	MW014	Monitoring operational phase	ES 11.8.6	The road operator would provide a summary of materials used and waste generated during the first year of operation in line with requirements of DMRB LA 110 Material assets and waste (Highways England, 2019a). This information would be reviewed against the forecast presented in ES Chapter 11 Material assets and waste (Application Document 6.1) and used to update the Environmental Management Plan for future operational years.	Reporting of first year operational demand for materials and waste generation	National Highways	Operation	EMP3– Requirement 4
Material Assets and Waste	MW015	Hazardous construction, demolition and excavation waste	ES 11.5.19	The Contractors would seek to achieve a target of 70% (by weight) of hazardous construction, demolition and excavation (CDE) waste to be diverted from landfill. It is anticipated that this would be achieved by undertaking remediation or treatment within the Order Limits or off-site at third-party facilities. It is acknowledged that the nature of some hazardous construction waste may preclude this. Where a hazardous construction waste cannot be diverted from landfill, the justification and evidence will be provided to National Highways and logged by the Contractors in the SWMP.	Achievement of specified target for works under the control of National Highways and its Contractors	Contractor	Construction	EMP2 – Requirement 4

Material Assets and Waste	MW016	Site waste management	ES 11.5.16	In line with REAC item MW010, good practice waste management procedures would be implemented as part of maintenance, repair and replacement activities during the operational phase. Contractors would implement the following, where practicable, in order to reduce the quantities of waste requiring offsite management, to enhance reuse, recycling and/or recovery rates, and minimise the generation of hazardous waste: 1. All waste arisings would be characterised. All waste arisings would be monitored using a SWMP (or equivalent in substance) during construction projects undertaken during the operational phase. 2. All wastes would be classified with relevant European Waste Catalogue (EWC) codes and, in the case of mirror entry codes, the wastes would be sampled to determine classification, in line with the prevailing technical guidance (currently Waste Classification: Guidance on the classification and assessment of waste, WM3 (Scottish Environment Protection Agency, Natural Resources Wales and Environment Agency, 2021). 3. Waste management off-site would be completed under relevant UK waste regulation. 4. Satisfy the need under The Waste (England and Wales) Regulations 2011 (as amended) for pre-treatment of waste and confirm this in a written declaration on the associated waste documentation. 5. Demonstrate and document that sufficient space has been allowed within the construction working areas for stockpiles for topsoil, material not suitable for reuse on site, materials to be reused, excess clean material and imported materials for construction. This would enable the segregation of waste types, prevent the mixing of hazardous and non-hazardous wastes and enhance recovery rates by minimising degradation, damage and loss. 6. Segregate hazardous and non-hazardous waste, separating waste at source by type, where practicable, providing separate skips for general waste, metal, dry recycling and timber as a minimum at each compound. Suitable provision would also be made for common hazardous wastes, e.g. used absorbents, aerosol cans, oily rags and waste electronics. 7. Provide impermeable surfaces with sealed drainage for remediation, quarantine and hazardous waste storage areas to minimise cross-contamination of other waste streams and surrounding ground. 8. Label stockpiles and skips with contents, to prevent the mixing of hazardous and non-hazardous wastes. 9. Comply with any specific waste storage and handling requirements required by the prevailing legislation, e.g. for asbestos or waste electronics. 10. Re-use of vegetation waste within the Order Limits wherever possible, e.g. for ecological mitigation (unless contaminated by invasive species). 11. Where possible, agree with material suppliers to reduce the amount of packaging on materials or to participate in a packaging take-back scheme. 12. Implement a material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste. 13. Monitor material quantity requirements to avoid over-ordering to reduce opportunity for oversupply and damage on site which would generate waste materials.	Implementation of site waste management procedures to be submitted to National Highways.	National Highways	Operation	EMP3 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
				14. Prioritise off-ground storage, e.g. on pallets, retention of materials in original packaging, protection from rain and collision by plant or vehicles. 15. Ensure that the storage of lightweight or liquid/sludge waste materials will prevent dispersion by wind and precipitation. 16. Prohibit the burning of waste and unwanted materials within the Order Limits. 17. In line with the requirements of DMRB LA 110 Material assets and waste (Highways England, 2019a) or as amended, enhancement opportunities would be identified, reported and implemented during detailed design and construction to minimise the demand for material and the amount of waste sent for final disposal in landfill.				
Material Assets and Waste	MW017	Storage of tunnel segments at the southern tunnel entrance compound.		There will be no storage of concrete tunnel segments on the ground surface at the southern tunnel entrance compound.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV001	Noise and vibration level controls	ES 12.5.13 a i	Noise and vibration levels would be controlled in accordance with BS 5228: Code of practice for noise and vibration control on construction and open sites, to reduce disturbance to the environment and communities in the vicinity of the construction works, including Thames Estuary and Marshes SPA/Ramsar and associated functionally linked land.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV002	Noise and Vibration Plan	ES 12.5.13 b i	A Noise and Vibration Management Plan (NVMP) or equivalent would be prepared for each part of the construction works subject to Section 61 control for consideration by the relevant planning authorities.	Preparation of an NVMP or equivalent for consultation with the local planning authorities	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV003	Conveyor systems	ES 12.5.13 c i	A maintenance programme that includes inspection of the conveyor equipment would be implemented to reduce noise and vibration.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV004	Section 61 consents	ES 12.5.13 d i	Where appropriate, consents would be obtained from the relevant local authorities under Section 61 of the Control of Pollution Act 1974 (which may include noise and vibration limits where relevant) for the proposed construction works.	Compliance with the terms of Section 61 consents	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV005	Baseline noise levels	ES 12.5.13 e i	Pre-construction baseline noise levels would be submitted to the relevant planning authorities to establish a pre-construction baseline for monitoring compliance with construction noise limits.	Receipt by the EHO for relevant planning authorities on baseline levels to inform Section 61 consents	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV006	Noise and vibration assessment	ES 12.5.13 f i	Construction works would be assessed in accordance with BS 5228 using specific manufacturer's data and proposed position of equipment. Results of the assessment would be presented to the Environmental Health Officers of the relevant planning authorities prior to commencement of that part of the construction works, as appropriate, to inform consideration of Section 61 agreements.	Agreement with the EHO for relevant planning authorities on the terms of Section 61 consents	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Noise and Vibration	NV007	Best Practicable Means	ES 12.5.13 g	Best Practicable Means as defined under Section 72 of the Control of Pollution Act 1974 would be employed during the construction phase to reduce noise and vibration nuisance. These would include measures such as: • installing and maintaining hoarding around the construction areas likely to generate noise • keeping site access routes in good condition with condition assessments on site to inspect for defects such as potholes • turning off plant machinery when not in use • maintaining all vehicles and mobile plant such that loose body fittings or exhausts do not rattle or vibrate • using silenced equipment where available, in particular silenced power generators and pumps • no music or radios would be played for entertainment purposes outdoors on-site • planning site layout to ensure that reversing is kept to a reasonably practicable minimum • reversing manoeuvres would be supervised by a trained banksman/vehicle marshal to ensure they are conducted safely and concluded quickly • non-percussive demolition techniques would be adopted where reasonably practicable to reduce noise and vibration impact.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV008	Community Engagement	ES 12.5.13 h i	Residents would be notified of particularly noisy and vibration-generating work such as percussive piling and concrete breaking prior to their commencement. The mechanisms for notification will be detailed in the Engagement and Communications Plan. Effective communication would be established, keeping local residents informed of the type and timing of works involved, paying particular attention to potential evening and night-time works and activities that may occur in close proximity to receptors.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV009	Noise and vibration monitoring	ES 12.5.13 i i	During the construction phase, day and night-time noise and vibration monitoring would be undertaken at locations identified in consultation with the relevant local planning authorities to ensure that the mitigation measures suggested are working effectively.	Compliance with the terms of Section 61 consents	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV010	Haulage routes	ES 12.5.13 j i	A maintenance programme that includes inspection of all haul routes and infill of potholes and other surface irregularities would be implemented to reduce noise and vibration.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Noise and Vibration	NV011	Acoustic barriers	ES 12.5.24	Acoustic barriers, of the dimensions presented in ES Table 12.29, would be installed prior to road opening at the locations identified on ES Figure 12.6, Operational Road Traffic Noise Mitigation (Application Document 6.2). The performance of these acoustic barriers would be compliant with the specifications and requirements of DMRB LD 119 Roadside environmental mitigation and enhancement – Appendix A (Highways England 2020e).	Installation of acoustic barriers	Contractor	Operation	EMP2 – Requirement 4
Noise and Vibration	NV012	Conveyor systems	ES 12.5.13 c ii	An acoustic insulation cover would be installed to reduce noise from conveyor systems that are operating within 300m of noise sensitive receptors, as defined in ES Section 12.3, including the Thames Estuary and Marshes SPA/Ramsar and associated functionally linked land.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Noise and Vibration	NV013	Road surfacing	ES 12.5.15	• For the locations identified on ES Figure 12.6, a surfacing system that has a reported noise Road Surface Influence (RSI_H) of -7.5dB(A) or better in accordance with the Highway Authorities Product Approval Scheme certification system shall be installed. • For the locations identified on ES Figure 12.6, a 'Level 3' (i.e. RSIH -3.5 dB(A) or better), very quiet surfacing material, as defined by Manual of Contract Documents for Highway Works Volume 1 - Specification for Highway Works, Series 0900, Table 9-17, shall be installed on all other new and altered trunk roads and associated slip roads forming part of the Project. • For the locations identified on ES Figure 12.6, a 'Level 2' (i.e. RSIH -2.5dB(A) or better), quieter than Hot Rolled Asphalt surfacing material, as defined by Manual of Contract Documents for Highway Works Volume 1 - Specification for Highway Works, Series 0900, Table 9-17, shall be installed on all new and altered local roads forming part of the Project. • Surface renewal will be undertaken using replacement road pavement on the strategic road network that has a no worse noise emission performance (Highway Authority Product Approval Scheme certification values) than that laid for the Project's opening.	Implementation of commitment actions	a), b) and c) Contractor d) National Highways	Operation	a), b) and c) EMP2 – Requirement 4 d) EMP3 – Requirement 4
Noise and Vibration	NV014	Operational fixed plant at tunnel service buildings	ES 12.5.16	The $L_{Ar,Tr}$ (rating level) noise emitted from operational fixed plant and associated with any noise generating element of the tunnel service buildings shall not result in exceedance of the existing $L_{Ar,Tr}$ (rating level) background level by more than 0dB(A) at the nearest residential or sensitive receptors or measurement location during either night-time or day-time periods when assessed in accordance with BS 4142: 2014 (+A1:2019), Methods for rating and assessing industrial and commercial sound.	Implementation of commitment actions	Contractor	Operation	EMP2 – Requirement 4
Noise and Vibration	NV015	Actions in case of noise and vibration monitoring exceedance	ES 12.5.13 l i	In the event that noise and vibration monitoring (as provided for in NV009) identifies that noise and vibration limits (as provided for in NV004) have been exceeded, the Contractors shall, at the earliest reasonably practicable opportunity, investigate to confirm that works being undertaken as part of the Project are the source of the noise and/or vibration. If this is confirmed, then the Contractor shall immediately undertake a further review of the best practicable means (as defined under the Control of Pollution Act, 1974) employed for the activity to minimise noise and/or vibration and agree additional or modified mitigation with the relevant local authorities unless otherwise agreed with the SoS. The specific time period shall be a matter which forms part of the Noise and Vibration Management Plan (NV002) and, where appropriate, subject to consent by the relevant local authorities under Section 61 of the Control of Pollution Act 1974 (NV004). In the event that best practicable measures are not sufficient to attenuate noise and/or vibration impacts from the Project in line with the limits agreed in the Section 61 consent, a scheme for the installation of noise insulation or the reasonable costs thereof, or a scheme to facilitate temporary rehousing of occupants, as appropriate, will be implemented.	Agreement with the EHO for relevant planning authorities on revisions to the terms of Section 61 consents unless otherwise agreed with the SoS	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Noise and Vibration	NV016	Noise from pylon fittings	ES 12.5.17	Noise from pylon fittings, such as dampers, spacers, clamps and insulators, will be controlled through technical specifications: TS2.04 '*Generic Design Principles for Overhead Lines'*, (Issue 6 July 2021); TS 3.04.35 '*Components for Overhead Lines'*, (Issue 5 April 2021); TS 3.04.36 '*Insulators and Insulator Sets for Overhead Lines'*, (Issue 7 February 2022) and TS 3.04.37 '*Conductors and Conductor Systems for Overhead Lines'*, (Issue 8 January 2022), which include requirements for wind tunnel testing and/or corona extinction tests to minimise the occurrence of both corona and wind induced noise, and PS(T)134 '*Operational Audible Noise Policy of Overhead Lines (New Build, Reconductoring, Diversion and Uprating)'* (Issue 2, June 2021) and TGN(E)322 '*Operational Audible Noise Assessment Process for Overhead Lines (New Build, Reconductoring, Diversion and Uprating*)', (Issue 2, June 2021). In accordance with the technical specifications, policy and guidance document listed above, good practice environmental and quality control processes to control audible noise generated by the operation of the new and refurbished sections of OHL shall include: • Pylon fittings designed and procured in accordance with National Grid's functional and performance requirements. • Compliance with performance requirements for corona inception and audible noise on all fittings • Wind tunnel testing of insulators for audible tones generated by Aeolian mechanisms • Sample testing to ensure each fitting type conforms to the specification • Care taken during installation to ensure conductors are kept clean and free of surface contaminants during stringing	Pylon design compliant with relevant technical specifications	Contractor	Construction	EMP 2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Noise and Vibration	NV017	Vibration from construction activities	ES 12.5.13 m i	Any construction works with the potential to generate discernible levels of ground borne vibration outside of the site boundary including piling and the use of vibratory compaction rollers and located within 100m of any Vibration Sensitive Receptor as defined under DMRB LA111 may require further specific mitigation and control measures to reduce the level of vibration from construction activities within the specified distance beyond Best Practicable Means (BPM) defined under BS 5228-2. Where significant effects on Vibration Sensitive Receptors are identified in ES Figure 12.1, the contractor shall as part of the Noise and Vibration Management Plan (NVMP) (REAC item NV002) set out the measures beyond BPM to minimise those effects as a result of the Project's construction works. The NVMP must set out details of a risk assessment of each building which is a Vibration Sensitive Receptor to determine susceptibility to damage from vibration and define acceptable vibration limits that the works must comply with to avoid physical or structural damage. The NVMP should also contain details of reasonable practicable measures and methods adopted to reasonably minimise noise and vibration impacts on buildings which remain occupied during the works. This NVMP would be provided to the relevant local planning authorities as part of an application submitted under the Control of Pollution Act (CoPA) 1974 Section 61 (REAC item NV004) which is relevant to the works caught by the NVMP. Following the implementation of these control measures, compliance with vibration limits will be monitored, reported and managed in accordance with REAC commitments NV009 and NV015.	Compliance with the terms of Section 61 consents	Contractor	Construction	EMP 2 – Requirement 4
Noise and Vibration	NV018	Noise Insulation Regulations Assessment	ES 12.6.202	A final assessment and verification of possible eligibility under the Noise Insulation Regulations 1975 will be undertaken within six months of the Project opening.	Implementation of commitment actions	National Highways	Operation	EMP3 – Requirement 4
Noise and Vibration	NV019	Performance specification of specific operational mitigation measures at preopening stage	ES 12.8.7	The performance specification of specific operational mitigation measures would be confirmed prior to opening of the road. This would consider issues such as the following: • Visual surveys to ensure that mitigation secured through REAC Ref. NV011 are implemented appropriately and correctly installed onsite (length, height and position), and fitment is to a good quality of workmanship. • Review of installation specifications (Highway Authority Product Approval Scheme Certification, sound reduction index performance certification) to ensure the performance assumptions in the ES assessment, secured under REAC commitment NV013, are achieved by the products installed onsite, including consideration of deterioration. • Ongoing maintenance and upkeep of acoustic mitigation measures to ensure that performance does not deteriorate outside of allowable tolerances from DMRB LD 119 through ongoing maintenance programmes associated with the Project.	Implementation of commitment actions	a) and b) Contractor c) National Highways	a) and b) Construction c) Operation	a) and b) EMP2 – Requirement 4 c) EMP3 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Population and Human Health	PH001	PRoW	ES 13.5.19	Construction works would be planned to reduce the durations that footpaths, cycleways and bridleways would need to be closed. For such PRoW, identified in ES Tables 13.66 and 13.69 the following mitigation measures would be adopted: • Early engagement with members of the public and relevant stakeholders (for example, local walking groups), to ensure they are fully appraised of any closures and diversions as far in advance as reasonably practicable. • Clear and concise signposting would be used to clearly outline any temporary diversions as and when they are necessary. This would be carried out in consultation with the local highways authorities, PRoW officers and other relevant stakeholders. • Social media would be used to update members of the public of any closures and diversions that are in place.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4 and the Traffic Management Plan under Requirement 10
Population and Human Health	PH002	Worker healthcare	ES 13.5.33	The Contractor will provide an appropriate range of medical and occupational healthcare services (including on-site facilities) to meet the physical and mental health needs of the construction workforce. The range of services will be agreed with the Secretary of State, following engagement with and having regard for the views of the Integrated Care Boards (ICBs). The Contractor will share information relating to uptake of services by the construction workforce and relevant incident data with ICBs on a six-monthly basis.	Provision of healthcare services for Project construction workers.	Contractor	Construction	EMP 2 – Requirement 4
Road Drainage and Water Environment	RDWE001	Construction flood risk	ES 14.5.10	The contractor shall prepare a construction phase flood risk assessment (FRA). The scope of the construction phase FRA shall consider all construction phase activities and temporary works necessary to deliver the Project. The construction phase FRA shall consider on-site and off-site flood risk and include climate change allowances up to the opening year in accordance with Flood risk assessments: climate change allowances (Environment Agency, 2022)	Approval by the SoS of construction phase FRA and construction site drainage systems following consultation with the relevant planning authorities	Contractor	Construction	Requirement 8
Road Drainage and Water Environment	RDWE002	Temporary drainage design	ES 14.5.10	Work site drainage systems would be inspected and maintained to ensure they continue to operate to their design standard, safeguarding surface and groundwater quality.	No pollution of surface or groundwater from site drainage	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE003	tunnel boring machinery water supply	ES 14.5.14	Water supplied to the tunnel boring machinery may be groundwater abstracted from a Northumbrian Water borehole at Linford. If this is the case, then extraction rates would be agreed with Northumbrian Water prior to commencement of main tunnelling works and the supply of groundwater would be within the limits of the groundwater abstraction licence.	Compliance with agreed extraction rates	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE004	Construction water management	ES 14.5.10	Water use efficiency and leakage reduction measures would be adopted during the construction phase, such as use of water-efficient fittings (taps, toilets) in site offices and welfare facilities, use of misting/atomising systems for dust suppression, drive-on recirculating systems for wheel washing, and sub-metering to help in detecting leaks where reasonably practicable.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE005	Construction water management	ES 14.5.10	Wastewater generated from the compound welfare facilities would be discharged to sewer, subject to the agreements with the utility providers, or in locations where a sewer connection is not reasonably practicable, collected and taken off site by tanker for disposal at a licensed treatment facility.	Compliance with sewer discharge consents	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE006	Construction water management	ES 14.5.10	The Contractor shall develop a construction phase drainage plan. The plan shall demonstrate how the Contractor would manage surface water runoff across the worksite, including details of how offsite impacts would be managed and mitigated. The surface water drainage design for temporary works shall include climate change allowances up to the opening year in accordance with Flood risk assessments: climate change allowances (Environment Agency, 2022) Work site drainage systems would incorporate pollution control systems designed in line with Control of Water Pollution from Construction Sites C532 (CIRIA, 2001) or as agreed with the Secretary of State. Surface watercourses and waterbodies (as identified in Table 14.9 of ES Chapter 14 (Application Document 6.1)) near work sites would be regularly inspected for signs of siltation or other forms of pollution in line with CIRIA C741 guidance (CIRIA, 2015) and pumped groundwater, process effluents and construction site runoff would be tested to ensure compliance with discharge consent requirements. Rainfall runoff from areas where there is a risk of contamination would be managed using temporary drainage systems and would be subject to treatment prior to discharge. Rainfall runoff from areas of low contamination risk would be captured and reused where reasonably practicably to reduce consumptive water use (e.g. to supply wheel wash facilities or for dust suppression). The Contractor shall consult with the Environment Agency on any proposed work site discharge to ground in Source Protection Zone 1 and Source Protection Zone 2.	SoS approval of construction phase drainage plan details following consultation with the relevant planning authorities	Contractor	Construction	Requirement 8
Road Drainage and Water Environment	RDWE007	Protection of flood defences from ground movement	ES 14.5.10	The potential for an impact on the integrity of the River Thames flood defences due to ground movement during tunnelling would be reduced by adopting good tunnelling practice, such as: continuous working, erecting linings immediately after excavation, grouting, management of tunnel face pressures and the measurement of excavated material quantities. In line with the requirements of the Environment Agency, flood defences would be monitored to establish a pre-construction baseline and for a period of at least two years after completion of works to construct the tunnel to enable detection of any effects on the structural integrity/condition of the assets during construction of the Project. The monitoring methodology would be agreed with the Environment Agency, unless otherwise agreed with the SoS, and would continue until the annual rate of settlement is less than a rate identified agreed with the Environment Agency, unless otherwise agreed with the SoS.	Avoidance of settlement that may affect the integrity of flood defences	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE008	Protection of watercourses during utility works	ES 14.5.10	Where below-ground utilities diversions are required, watercourses would be crossed using trenchless techniques in order to avoid disturbance to channel form, flow regimes and riparian habitats and species, unless other techniques are agreed with the Environment Agency or Lead Local Flood Authorities, where relevant, unless otherwise agreed with the SoS.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE009	Reinstatement of bankside vegetation	ES 14.5.10	Bankside vegetation would be reinstated at culvert entries and exits following the completion of construction works as soon as conditions are suitable for planting.	Successful reinstatement of vegetation at these locations within 12 months.	Contractor	Construction	LEMP – Requirement 5

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE010	Bank protection	ES 14.5.10	Where bank protection is required during construction work, this would take the form of soft or natural riverbank protection, such as coir or other biodegradable geotextiles.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE011	Operational drainage design	ES 14.5.11	To reduce the potential for scour and associated hydromorphological change, highway drainage outfall headwall arrangements would be set back from the banks of the receiving watercourses and outfall designs would accord with DMRB CD 529.	SoS approval for details of drainage system following consultation with the relevant planning authorities	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE012	Operational drainage maintenance	ES 14.5.11	Drainage infrastructure and treatment systems would be maintained in accordance with the National Highways' DMRB GS 801 Asset Delivery Asset Inspection Requirements (Highways England, 2020g) and DMRB GM 701 Asset Delivery Asset Maintenance Requirements (ADAMr) (Highways England, 2020f), as applicable, to ensure they continue to operate to their design standard to safeguard surface and groundwater quality.	No pollution of surface or groundwater from site drainage	National Highways	Operation	EMP3 – Requirement 4
Road Drainage and Water Environment	RDWE013	Culvert design	ES 14.5.11	Where culverting cannot be avoided, new culverts would be sized to maintain the current land drainage regime and to convey flood flows, inclusive of an allowance for climate change, as detailed in Part 10 of ES Appendix 14.6, Flood Risk Assessment (Application Document 6.3).	Approval of the flood risk alleviation measures by the Secretary of State in consultation by the Environment Agency	National Highways	Operation	Requirement 8
Road Drainage and Water Environment	RDWE014	Maintenance of culverts and hydraulic structures	ES 14.5.11	Culverts and hydraulic structures would be inspected and maintained, in accordance with National Highways' DMRB CS 450, DMRB GS 801 Asset Delivery Asset Inspection Requirements (Highways England, 2020g) and DMRB GM 701 Asset Delivery Asset Maintenance Requirements (ADAMr) (Highways England, 2020f), as applicable. Where there are any additional specific inspection or maintenance requirements these would be documented in the Maintenance and Repair Statement.	Correct operation of culverts and hydraulic structures	National Highways	Operation	EMP3 – Requirement 4
Road Drainage and Water Environment	RDWE015	Replacement of existing reservoir at Low Street	ES 14.5.14	An existing well and reservoir at Low Street used by a landowner to pump and store groundwater to feed irrigation systems would be crossed by the Project. Prior to works for the construction of the viaduct crossing that may impact this well and reservoir, this water supply system would be reconfigured, as agreed with the landowner, unless otherwise agreed with the SoS, to maintain continuity of supply during construction and operation of the Project.	Continued provision of irrigation water at this location	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE016	Protection of landowner irrigation supply infrastructure at North Ockendon	ES 14.5.14	An existing ditch network / water main network in North Ockendon, illustrated in Appendix 14.2, Water Features Survey Factual Report (Application Document 6.3), forming part of a landowner irrigation supply system would be disconnected by the alignment of the Project road. A new supply route across the Project road would be provided, unless otherwise agreed with the landowner.	Continued provision of irrigation water at this location	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE017	Ground protection tunnel	ES 14.5.14	The Contractors would stabilise the ground to reduce ground movement, facilitate construction of relevant cross passages and operation of tunnel boring machinery and maintenance of the cutterheads using a ground protection tunnel or other suitable methods accepted by National Highways that would avoid the need for surface excavations/penetrations within areas designated for protection of wildlife.	Avoidance of surface excavation associated with tunnel boring machinery operation in areas on the southern shores of the River Thames designated for wildlife protection	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE018a	Ground protection tunnel	ES 14.5.14	Ground protection tunnel and shafts, if used under REAC ref. RDWE017, would be constructed using methods to control groundwater pumping and ingress such as: • wet excavation and grout plug placement to form the shafts • use of mud pressure balancing tunnel boring machinery to form a lined tunnel with a specified maximum leakage rate compliant with the Lower Thames Crossing tunnelling specification. Water and flow monitoring within the tunnel would be undertaken for the periods that the ground protection tunnel is being used for construction purpose, in consultation with Environment Agency, to verify compliance with the tunnels design specification regarding maximum permissible rates of water ingress.	Prior acceptance of methods by National Highways and implementation of monitoring in consultation with the Environment Agency	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE018b	Ground protection tunnel	ES 14.5.14	Ground protection tunnel and shafts, if used under REAC ref. RDWE017, would be decommissioned by backfilling with suitable materials to ensure the ground protection tunnel and shafts are completely filled. No temporary works would be left in the upper 2m of ground. Shaft sites would be returned to their current land use.	Prior acceptance of methods by National Highways and implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE019	Ground treatment, trenchless installation and tunnelling	ES 14.5.14	Chemicals and materials, such as cement, grout and lubricants used during construction would be stored, transported and used in a suitable manner to safeguard potable water supply, source protection zones and the water environment. Prior to commencement of ground treatment, tunnelling or trenchless installation, the Contractor would be required to agree the use of any chemical additives proposed for the works with the Environment Agency.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE020	Ground treatment	ES 14.5.14	Construction of cross passages between the main tunnels would use groundwater control techniques, such as grouting or ground freezing, to reduce the requirement for dewatering and therefore local groundwater drawdown.	Working methods to be approved by National Highways prior to construction	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE021	Bankside reinstatement	ES 14.5.14	Bankside vegetation reinstatement and planting at the entrances to the West Tilbury Main culvert (reference X-EFR-2-01 identified in Part 10 of ES Appendix 14.6: Flood Risk Assessment, (Application Document 6.3) would be designed to ensure no sharp light/dark interface to encourage continued fish passage. This would be achieved by planting with a scrub mix that will include alder. Root barriers would be installed to protect structural integrity of the bank as appropriate.	Successful establishment of suitable scrub mix within 24 months to provide diffuse shading	Contractor	Construction	LEMP – Requirement 5
Road Drainage and Water Environment	RDWE022	A226 Gravesend Road, Milton, northern tunnel entrance, Station Road and Mardyke compounds. Construction flood risk	ES 14.5.14	In line with RDWE001 and in accordance with the requirements of the National Planning Policy Framework regarding development and flood risk, the northern tunnel entrance compound and Station Road compound to the north of the River Thames and the southern tunnel entrance compound and Milton compound to the south of the River Thames, which are partially sited within Flood Zones 2 and 3, would be laid out in accordance with a site-specific flood risk assessment (as required by RDWE001), where facilities at highest vulnerability to flooding, e.g. sleeping accommodation, medical and welfare and principal office facilities, are located in the lowest flood risk zone (Zone 1). Only low vulnerability and water compatible uses would be situated in the high-risk Flood Zone 3.	Acceptance by National Highways of the layout of buildings and facilities within construction compounds	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE023	Drainage discharge to River Thames	ES 14.5.14	To mitigate potential effects on water quality and hydrodynamics within the River Thames, the discharge arrangement described in REAC ref. RDWE028 would be constructed and operational in advance of the excavation of the North Portal and tunnelling works, and would be used for the discharge of treated construction phase effluents. All effluents would receive treatment prior to discharge into the Thames to ensure compliance with the Environmental Permitting (England and Wales) Regulations 2016.	Compliance with the Deemed Marine Licence and Environment Agency Environmental Permit	Contractor	Construction	Deemed Marine Licence – Schedule 15
Road Drainage and Water Environment	RDWE024	Maintenance and decommissioning of marine structures	ES 14.5.14	Potential effects arising from the maintenance, use and decommissioning of marine structures would be controlled by the measures agreed with the MMO as detailed in the Deemed Marine Licence.	Compliance with the Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence – Schedule 15
Road Drainage and Water Environment	RDWE025	Operational drainage design	ES 14.5.9	Drainage design would include treatment measures for highway runoff designed in accordance with DMRB CG 501 and CD 532 to meet the requirements specified for each outfall to surface watercourses identified in ES Appendix 14.3, Operational Surface Water Drainage Pollution Risk Assessment. Further survey and sampling to define the flow regime and water quality of receiving watercourses would be carried out at proposed points of discharge to inform the detailed design of treatment measures.	SoS approval for details of drainage system following consultation with the relevant planning authorities	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE026	Tunnel operational drainage design	ES 14.5.15	The tunnel drainage system would include provision for the capture and isolation of contaminated waters to prevent pollution of the receiving watercourse. The design would ensure that discharges would be restricted to high tide conditions to maximise available dilution and mixing and to prevent scour/erosion of the intertidal zone.	SoS approval for details of drainage system following consultation with the relevant planning authorities	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE027	Tunnel lining specification	ES 14.5.15	Water infiltration into the tunnel bores and cross passages during operation would be reduced by measures including gaskets (for segmentally lined tunnels) and membranes (for sprayed concrete lined tunnels), compliant with the tunnelling specification for the Project.	Acceptance of detail design by National Highways	National Highways	Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE028	Northern tunnel entrance compound drainage discharge design	ES 14.5.14	Drainage from the northern tunnel entrance compound is proposed to outfall from the north side of the River Thames. The design of the discharge pipeline and outfall to the River Thames would provide for a subtidal mid-water discharge for effective dilution and dispersal, and to reduce disturbance to the intertidal zone. The discharge infrastructure would be designed in accordance with measures agreed with the MMO as detailed in the Deemed Marine Licence (DCO Schedule 15).	Compliance with Deemed Marine Licence	Contractor	Construction	Deemed Marine Licence – Schedule 15
Road Drainage and Water Environment	RDWE029	Flood protection	ES 14.5.15	Flood protection would be provided around the North Portal to reduce the risk of inundation of the tunnel. The flood protection will comprise flood walls, bunds and targeted earthworks. The portal protection would be designed to accommodate a 1 in 1,000 year River Thames extreme tide level event with climate change allowances up to 2132 and a freeboard (residual uncertainties) allowance of 1,000mm. The portal protection would be as described in Part 6 of ES Appendix 14.6, Flood Risk Assessment (Application Document 6.3 and as shown on Drawing No. 00180 of ES Appendix 14.6, Flood Risk Assessment (Application Document 6.3).	Approval of the flood risk design measures incorporated in the drainage system by the Secretary of State in consultation by the Environment Agency	Contractor	Operation	Requirement 8

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE030	Culverting of Tilbury Main and maintaining fish passage	ES 14.5.14	The West Tilbury Main culvert (reference EFR-2-01, identified in part 10 of ES Appendix 14.6: Flood Risk Assessment (Application Document 6.3) would integrate a fish pass aid designed for eels and elvers, incorporating some form of matrix, such as bristles, to assist their migration by crawling/climbing instead of swimming.	National Highways acceptance of the detailed design after consultation with the Environment Agency	Contractor	Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE031	Culverting of Tilbury Main and maintaining fish passage	ES 14.5.14	The West Tilbury Main culvert (reference EFR-2-01, identified in Part 10 of ES Appendix 14.6, Flood Risk Assessment (Application Document 6.3) would be partially submerged at its downstream end to prevent perching and a resting pool for coarse fish would be provided immediately downstream of the culvert, with a minimum depth of 0.30m.	National Highways acceptance of the detailed design after consultation with the Environment Agency	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE032	Potable groundwater protection	ES 14.5.15	The proposed road drainage attenuation and treatment pond located at Chadwell St Mary, as indicated on the Environmental Masterplan (Figure 2.4, Application Document 6.2), is situated within a groundwater Source Protection Zone 1. The entire pond would include an impermeable lining in order to prevent seepage of drainage discharges into the ground to safeguard potable groundwater quality.	SoS approval for details of drainage system following consultation with the relevant planning authorities	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE033	Discharge from construction of South Portal	ES 14.5.14	Water discharged into the Thames Estuary and Marshes Ramsar western ditch from the southern tunnel entrance compound would be treated to the standard specified within the discharge consent granted by the Environment Agency and released at greenfield runoff rates. The runoff collection and management system would be operated until full reinstatement of the compound area is complete. The water quality standards for the discharge into the western ditch will include (but not be limited to) the following parameters and would not exceed these values unless otherwise agreed by the Environment Agency as part of any relevant Environmental Permit (such agreement not to be unreasonably withheld or delayed) which would be set following consultation with Natural England and other consultees: Discharge rate of no more than the one in two-year greenfield rate or 2ls^{-1}, whichever is greater; chemical composition of: pH, biochemical oxygen demand, dissolved oxygen, total ammonia, unionised ammonia, suspended solids, total phosphorus, turbidity, salinity, cover of filamentous green algae (Enteromorpha), water levels (depth) , with standards not environmentally worse than those recorded during the pre-construction survey.	Compliance with Environment Agency Environmental Permit	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE034	Operational drainage – infiltration basins	ES 14.5.15	Infiltration basins shall be provided at the locations identified on the Environmental Masterplan (Figure 2.4, Application Document 6.2). Infiltration basins shall be designed as vegetated drainage systems in accordance with the relevant provisions of DMRB CD 532 and will be constructed prior to being required to serve the development. Pollution control measures for infiltration basins shall comprise the treatment systems as identified in Part 7 of Appendix 14.6 of the ES, Flood Risk Assessment (Application Document 6.3). Pollution control measures on existing infiltration basins shall be decommissioned (e.g. oil separators) and replaced with equivalent alternatives. Where included, infiltration ponds would incorporate a lined sediment forebay with sufficient capacity to accommodate the first flush. Where sediment forebays cannot be accommodated, a vortex grit separator shall be installed upstream of the basin inlet. Infiltration basins would accommodate runoff from the Project road for all events up to and including the 1% AEP rainfall event with climate change. Overland flow paths shall be established to manage exceedance flows from infiltration basins, guided by the prevailing topography and based on existing overland flow routes. Exceedance flow rates and volumes would not be appreciably greater than under existing conditions.	SoS approval for details of drainage system following consultation with the relevant planning authorities	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE035	Operational drainage – retention ponds	ES 14.5.15	Retention ponds shall be provided at the locations identified on the Environmental Masterplan (Figure 2.4, Application Document 6.2). New retention ponds shall be designed as vegetated drainage systems in accordance with the relevant provisions of DMRB CD 532 and will be constructed prior to being required to serve the development. The ponds will be sized to ensure no increase in flood risk outside of the highway boundary by providing for discharge that is attenuated to the 1 in 1 year greenfield runoff rate (or 1 litre per second, whichever is higher) for all events up to and including the 1 in 100 year rainfall event with climate change. Attenuation would be by means of vortex controls, orifice plates or a combination thereof. Discharge rates from existing retention ponds shall be reduced by at least 50% on current discharge rates. Overland flow paths shall be established to manage exceedance flows from retention ponds, guided by the prevailing topography and based on existing overland flow routes. Exceedance flow rates and volumes would not be appreciably greater than under existing conditions. Pollution control measures for retention ponds shall comprise the treatment systems as identified in Part 7 of Appendix 14.6 of the ES, Flood Risk Assessment (Application Document 6.3). Retention ponds would incorporate a lined sediment forebay with sufficient capacity to accommodate the first flush.	SoS approval for details of drainage system following consultation with the relevant planning authorities	Contractor	Operation	Requirement 8
	RDWE036			NOT USED				

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE037	Compensatory flood storage areas	ES 14.5.14	Compensatory flood storage areas (CFSA) would be formed to offset any loss of floodplain storage attributable to the Project. The form of CFSA used for the Project would comprise: • Areas that allow flood water to freely flow in and out of them (conventional CFSA). • Areas where flood water is temporarily retained in upstream catchments (flow retention CFSA). All CFSA would be designed to accommodate a 1 in 100 year fluvial event with climate change allowances up to 2132 (The Department for Levelling Up, Housing and Communities, 2021) (Environment Agency, 2022). CFSA would be as described in Part 6 of Appendix 14.6, Flood Risk Assessment and as shown on Drawing Nos. 00180, 00181 and 00182 of ES Appendix 14.6 (Application Document 6.3).	Compliance with a Flood Risk Activity Permit developed in consultation with the Environment Agency	Contractor	Operation	Part 8 of Schedule 14
Road Drainage and Water Environment	RDWE038	Avoiding impacts on groundwater resources at the Thames Chase Forest Site of Importance for Nature Conservation (SINC), Hall Farm moat, paddock, and St Mary Magdalene Churchyard SINC	ES 14.5.14	Findings from groundwater modelling of the A122 Lower Thames Crossing/M25 junction cutting shows that, without mitigation, there could be up to 0.7m groundwater drawdown at St Cedd's Holy Well, at the Hall Farm moat, and up to 1.1m groundwater drawdown at Hobbs Hole and the southern edge of Thames Chase Forest Centre. These features are illustrated in ES Appendix 14.5, Annex 12 (Application Document 6.3). Therefore, during detailed design, having regard for ground investigation data and monitoring (groundwater levels, surface water levels and, where feasible, flows), the need for measures to reduce groundwater drawdown beyond the M25 cutting, for example through the implementation of seepage control, would be confirmed in consultation with the Environment Agency and the London Borough of Havering and, if confirmed to be necessary, the detail of such measures would be agreed by the Secretary of State following consultation with the Environment Agency and the London Borough of Havering.	No detriment to groundwater supply at the Thames Chase Forest SINC, Hall Farm moat, paddock, and St Mary Magdalene Churchyard SINC	Contractor	Construction and Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE039	Flood bund at Orsett Fen	ES 14.5.15	A raised bund would be constructed to prevent the formation of a new flow path from Golden Bridge Sewer to the Mardyke in Orsett Fen. The bund would be designed to prevent the formation of a new flow path for a 1 in 100 year storm event with climate change allowances up to 2132 and a freeboard (residual uncertainties) allowance of 600mm (The Department for Levelling Up, Housing and Communities, 2021) (Environment Agency, 2022) (DMRB, CD 356). The bund would be as described in Part 6 of ES Appendix 14.6, Flood Risk Assessment and as shown on Drawing No. 00181 of ES Appendix 14.6 (Application Document 6.3).	Approval of the flood risk alleviation measures by the Secretary of State in consultation by the Environment Agency	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE040	Maintaining floodplain flow connectivity	ES 14.5.15	A drainage channel, illustrated in Drawing No. 00181 of ES Appendix 14.6 (Application Document 6.3), would be provided between the Mardyke and the viaduct abutment immediately to the west of the river. The channel would be designed to manage the intercepted floodplain flows for or a 1 in 100 year storm event with climate change allowances up to 2132 (The Department for Levelling Up, Housing and Communities, 2021) (Environment Agency, 2022).	SoS approval for details of drainage system following consultation with the relevant planning authorities	Contractor	Operation	Requirement 8

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE041	Avoiding scour protection works in the River Thames	ES 14.5.14	The main tunnels, including cross passages, would be constructed so that the crown of the tunnel is at sufficient depth below the bed of the River Thames to avoid the need for any works within the river to provide tunnel scour protection.	No works within the River Thames channel to provide tunnel scour protection	Contractor	Construction	EMP2 – Requirement 4
	RDWE042			NOT USED				
Road Drainage and Water Environment	RDWE043	Managing construction drainage	ES 14.5.10	In order not to compromise their function, existing drainage attenuation features (ponds and infiltration basins) on the A2/M2 and M25 highways affected by the Project, as illustrated on the Environmental Masterplan (Figure 2.4, Application Document 6.2), would not be used to receive construction work site runoff. The contractor would renovate any retention pond used for construction phase drainage that is to form part of the operational drainage system (silt removal). Infiltration basins to form part of the operational drainage system shall only be used to receive runoff from completed sections of highway; general site runoff shall not be discharged to these infiltration basins. Pollution control measures shall be in place before any retention pond or infiltration is brought into service. This applies both to temporary storage facilities and the storage provided for the operational phase of the Project.	SoS approval for details of drainage system following consultation with the relevant planning authorities Use of construction site drainage systems, that do not use the existing drainage attenuation features on the A2/M2 and M25 highways	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE044	Mammal passages in culverts	ES 14.5.9	Culverts would incorporate ledges or underpasses to ensure continued passage of mammals. The location and design of mammal ledges and underpasses would be as detailed in Part 10 of ES Appendix 14.6, Flood Risk Assessment (Application Document 6.3).	Implementation of commitment actions	Contractor	Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE045	Monitoring of groundwater resources at the Thames Chase Forest SINC Hall Farm moat, paddock, and St Mary Magdalene Churchyard SINC	ES 14.8.3	Groundwater monitoring would be undertaken to confirm the effectiveness of the mitigation RDWE038. The monitoring regime would be developed in consultation with the Environment Agency and to validate the Contractors' final design solution.	Results of groundwater surveillance shared with the Environment Agency	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE046	Maintaining West Tilbury Main floodplain flow path	ES 14.5.15	The Project road would intercept an overland flow path running east to west across East Tilbury marshes. To offset the loss of the flood flow path, three existing culverts would be removed and one enlarged replacement culvert would be added (ref X-EFR-2-02, see Part 10 of ES Appendix 14.6, Flood Risk Assessment, Application Document 6.3). A flow control structure (ref S-EFR-2-01, see Part 10 of ES Appendix 14.6, Flood Risk Assessment, Application Document 6.3) would be constructed in West Tilbury Main. This structure would manage flooding levels in East Tilbury marshes. Watercourse structures would be altered as described in Part 10 of ES Appendix 14,6, Flood Risk Assessment and as shown on Drawing 00180-00182 (ES Appendix 14.6, Application Document 6.3).	Compliance with a Flood Risk Activity Permit developed in consultation with the Environment Agency	Contractor	Operation	Part 8 of Schedule 14

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE047	Maintaining West Tilbury Main floodplain flow path	ES 14.5.15	To ensure continued functionality of the West Tilbury Main, an existing blockage of the culvert where Station Road crosses the West Tilbury Main would be cleared and the section of West Tilbury Main running northward from Station Road would be re-established as a flowing watercourse. The culvert and watercourse maintenance would be as described in Part 10 of ES Appendix 14.6, Flood Risk Assessment and as shown on Drawing No. 00180 (ES Appendix 14.6, Application Document 6.3).	Compliance with a Flood Risk Activity Permit developed in consultation with the Environment Agency	Contractor	Operation	Part 8 of Schedule 14
Road Drainage and Water Environment	RDWE048	Detention basin design criteria	ES 14.5.15	A detention basin shall be provided at the location identified on the Environmental Masterplan (ES Figure 2.4, Application Document 6.2). The detention basin shall be designed as a vegetated drainage system in accordance with the relevant provisions of DMRB CD 532 and will be constructed prior to being required to serve the development. The basin will be sized to ensure no increase in flood risk outside of the highway boundary by providing for discharge that is attenuated to the 1 in 1 year greenfield runoff rate for all events up to and including the 1 in 100 year rainfall event with climate change Attenuation would be by means of vortex controls, orifice plates or a combination thereof. Overland flow paths shall be established to manage exceedance flows from the detention basin, guided by the prevailing topography and based on existing overland flow routes. Exceedance flow rates and volumes would not be appreciably greater than under existing conditions. Pollution control measures shall comprise the treatment systems as identified in Part 7 of the FRA (Appendix 14.6 of the ES). The detention basin would incorporate a lined sediment forebay with sufficient capacity to accommodate the first flush.	SoS approval for details of drainage system following consultation with the relevant planning authorities	Contractor	Operation	Requirement 8
Road Drainage and Water Environment	RDWE049	Water supply and water level control at Coalhouse Point wetland	ES 14.5.15	A new structure in the existing tidal flood defence fronting the Coalhouse Point HRA mitigation area, shown on the Environmental Masterplan (ES Figure 2.4, Application Document 6.2) may be constructed to facilitate passage of water from the River Thames as a source of water supply to the mitigation area, consistent with the commitment in HR010. The structure would be self-regulating and allow for water ingress to be prevented when the desired water level within the created ditches and scrapes is achieved consistent with the commitment in HR010.	Provision of self-regulating water supply to the wetland	Contractor	Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE050	Water level control structures at Coalhouse Point and Mardyke wetlands	ES 14.5.15	Water level control structures (weirs) shall be provided to facilitate operation of the wetland areas, all as detailed in Part 10 of ES Appendix 14.6, Flood Risk Assessment (Application Document 6.3). One level control structure shall be constructed at the northern end of the watercourse running south to north through Coalhouse Point Wetland (see Drawing No. 00180 of ES Appendix 14.6, Flood Risk Assessment, Application Document 6.3). Two level control structures shall be constructed where the Mardyke is connected to the watercourses in the proposed Mardyke Wetland (see Drawing No. 00181 of ES Appendix 14.6, Flood Risk Assessment, Application Document 6.3).	Maintain water levels within the wetland in accordance with FRA	Contractor	Operation	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE051	Utilities – control of groundwater impacts from Work number G1b	ES 14.5.15	The medium pressure gas pipeline (Work number G1b) is proposed to cross beneath the A122 Lower Thames Crossing by construction of deep shafts and a microbore tunnel. The works are above the Chalk aquifer water table. However shallower Lower London Tertiary aquifers (Thanet Formation) may be present at shaft locations for Work number G1b. Should perched groundwater be encountered then the shafts shall be sealed after construction to prevent ingress of groundwater and potential permanent draining of any perched groundwater.	No groundwater draining effect caused by the shafts and tunnel.	Contractor	Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE052	Utilities – control of groundwater impacts from various utilities next to New Fish Pond	ES 14.5.15	Multi utilities corridors and gas pipelines are proposed close to New Fish Pond beside the Inn on the Lake, Shorne. It is not known whether the pond is lined and there is potential hydraulic connection between the pond and the Lambeth Group aquifer and the Harwich Formation aquifer. Perched groundwater could be present. There is a potential for utility trenches to act as a permanent drain where the base of a trench slopes downwards away from the pond. In addition, crossings of utility corridors may require locally deeper trenches which could increase the draining effect if extended down slope. Should New Fish Pond be unlined then, where within 50m distance of the pond, gas pipeline Work number G1b (western section), multiple utility Work number MU12 and temporary multiple utility Work number MUT2 shall be constructed to reduce the potential draining effect away from the pond area.	Approval of the pond drainage reduction measures by the Secretary of State in consultation with the Environment Agency	Contractor	Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE053	Utilities – control of groundwater impacts from Work number MU26	ES 14.5.14	There is a requirement to replace an approximately 100 metres long section of existing water pipeline on Lower Higham Road. This utility diversion, Work number MU26, would be approximately 10m distance south of the South Thames Estuary and Marshes SSSI and Thames Estuary and Marshes Ramsar. Any pumped water removal and subsequent disposal of water from the utility works shall be subject to approval from the Environment Agency and comply with Environment Permitting Regulations (England and Wales) 2016 to protect the adjacent areas of nature conservation.	Compliance with Environment Permitting Regulations (England and Wales) 2016	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE054	Utilities – control of groundwater impacts at the irrigation reservoir at Low street	ES 14.5.15	The irrigation reservoir at Low Street is groundwater fed. Utility corridors are proposed to the east, west and north of the reservoir (Work numbers MU28, MU33 and MUT6) and have the potential to form a barrier to groundwater flow, cause draining of groundwater that would otherwise flow towards the unlined reservoir or cause direct drainage from the reservoir. The spatial arrangement of the utility corridors and the below ground materials shall be designed to prevent drainage from the reservoir or barrier effects reducing groundwater flow to the reservoir.	Approval of the irrigation reservoir protection measures by the Secretary of State in consultation with the Environment Agency	Contractor	Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE055	Utilities – control of groundwater impacts at Chadwell St Mary link area due to groundwater barrier effects	ES 14.5.15	Shallow groundwater conditions are expected at land in the small valley feature near where Hoford Road would cross the A122 Lower Thames Crossing and at the continuation of the valley feature where Brentwood Road would cross the A122 Lower Thames Crossing, near Brook Farm. Multiple utility corridors Work numbers MU37, MU38 and MU40 would be aligned perpendicular to the valley and could cause a barrier to groundwater flow. The design of the utility corridors, where at the topographical low, shall consider the depth to formation level and below ground materials to reduce barrier effects to groundwater flow.	No groundwater flooding upgradient of the utility corridors that would cross the Chadwell St Mary link shallow valley feature perpendicularly	Contractor	Operation	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Road Drainage and Water Environment	RDWE056	Utilities – control of groundwater impacts at local SINCs due to Work number MU72	ES 14.5.15	Complex layered superficial geology at the proposed A122 Lower Thames Crossing/M25 junction area is water bearing and may contribute base flow to unlined surface water bodies such as Hobbs Hole, part of the Thames Chase Forest Centre SINC. Multiple utility corridor Work number MU72 is a proposed trenchless installation of a multi-utility corridor beneath the London, Tilbury and Southend railway. The utility diversion would require works beneath groundwater. Temporary groundwater level lowering outside of the Order Limits shall be reduced by total or partial temporary exclusion of water flow into the shafts. On completion of placing the utility diversion, the shaft walls shall be removed, and the pits shall be backfilled with soil arisings in the same order as excavated in order to reduce change of the layered geology. Any groundwater removal during the works shall be subject to approval by the Environment Agency and comply with the Environmental Permitting Regulations (England and Wales) 2016.	Approval of the SINC protection measures by the Secretary of State in consultation with the Environment Agency and compliance with the Environmental Permitting Regulations (England and Wales) 2016	Contractor	Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE057	Utilities – control of groundwater impacts at local SINCs due to Work number MU73	ES 14.5.15	Complex layered superficial geology at the proposed A122 Lower Thames Crossing/M25 junction is water bearing and may contribute base flow to unlined surface water bodies such as the ponds at Hall Farm moat, paddock and St Mary Magdalene Churchyard SINC and Fields south of Cranham Marsh SINC. Multiple utility corridor Work number MU73 is a proposed trenchless installation of a multi-utility corridor from west of the London, Tilbury and Southend railway, under the proposed cutting of the A122 Lower Thames Crossing, to east of the M25. The construction method shall reduce the depths of the temporary launch pit and reception pit so that the pits are above the groundwater level and the trenchless equipment is launched from above groundwater. After completion of the utility works, the pits shall be backfilled with soil arisings in the same order as excavated in order to reduce change of the layered geology. Should the temporary launch pit and reception pit be required to be excavated to below groundwater level then temporary groundwater level lowering outside of the Order Limits shall be reduced by temporary total or partial exclusion of water flow into the pits. On completion of placing the utility diversion, the pit water exclusion measures shall be removed and the pits shall be backfilled with soil arisings in the same order as excavated, unless otherwise agreed with the Environment Agency. Any groundwater removal during the works shall be subject to approval by the Environment Agency and comply with the Environmental Permitting Regulations (England and Wales) 2016.	Approval of the SINC protection measures by the Secretary of State in consultation with the Environment Agency and compliance with the Environmental Permitting Regulations (England and Wales) 2016	Contractor	Operation	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE058	Utilities – control of groundwater impacts at Linford abstraction well	ES 14.5.14	The temporary water pipeline for the Lower Thames Crossing supply to tunnel boring machine (Work number MUT6) would cross Gobions Sewer, within the SPZ1 area of the Linford groundwater source. Should the crossing be below ground, such as by means of a trenchless methodology, the design, implementation and subsequent removal of the underground sections of the utility corridor within the SPZ1 shall be conducted in consultation with Northumbrian Water and the Environment Agency.	Approval of the Linford abstraction well measures by the Secretary of State in consultation with the Environment Agency and Northumbrian Water	Contractor	Construction	EMP2 – Requirement 4
Road Drainage and Water Environment	RDWE059	Closed-face tunnelling		Construction of the bored section of the highway bored tunnels Work No 4A(i) shall be undertaken using closed face tunnelling techniques.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB001	Hedgerow replacement	ES 8.5.30	Hedgerow habitat lost during construction would be compensated by creating new hedgerows at locations shown on the Environmental Masterplan (Figure 2.4, Application Document 6.2), using native species of local provenance. Planting would be undertaken as early in the construction programme as reasonably practicable, having regard for the completion of potentially damaging construction activities within and adjacent to the planting area, and seasonal requirements for planting.	Successful establishment of new hedgerow	Contractor	Construction	LEMP – Requirement 5
Terrestrial Biodiversity	TB002	Maintaining integrity of important habitats adjacent to works	ES 8.5.21	Temporary fencing would be used to demarcate important and protected habitats, preventing construction access to protect them from accidental damage. Important and protected habitats include ecological translocation sites and retained woodland, trees and hedges shown on the Environmental Masterplan (Figure 2.4, Application Document 6.2), except where the SoS has agreed to vary the demarcation of such retained woodland, trees and hedges having consideration for REAC commitment TB003. Fencing would be installed under the supervision of the Environmental Clerk of Works and in accordance with good practice guidance. It shall include tree protection measures specified in the Arboricultural Method Statement.	Successful retention of important habitats	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB003	Maintaining integrity of important habitats adjacent to works	ES 8.5.22	Work compounds, access tracks, haulage routes, material storage areas, generators and other construction activities would not be located within areas of retained woodland, trees and hedges shown on the Environmental Masterplan (Figure 2.4, Application Document 6.2) unless the SoS agrees that any variation does not result in new or materially different significant environmental effects to those reported in the ES.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB004	Breeding birds	ES 8.5.24	Disturbance, and incidental mortality, of breeding birds would be avoided by timing vegetation clearance and structure removal outside of the bird nesting season (March to August inclusive) wherever possible. Where this is not possible, appropriate measures would be taken to avoid harming birds or their nests (such as temporary fencing around nesting sites where they are immediately adjacent to construction works), under supervision by a suitably experienced Environmental Clerk of Works.	Compliance with the Wildlife and Countryside Act 1981 (as amended)	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB005	Invasive species	ES 8.5.26	Invasive species would be identified prior to construction and, if recorded during the construction phase, would be removed or treated to prevent their spread, following the Construction Industry Research and Information Association's guidance in Wade et al. (Invasive Species Management for Infrastructure Managers and the Construction Industry, 2008).	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB006	Environmental Clerk of Works	ES 8.5.21	Employment of suitably qualified and experienced Environmental Clerk of Works throughout the construction phase of the Project to supervise implementation of environmental mitigation and protection commitments.	Acceptance by National Highways of the Environmental Clerks of Works nominated by the Contractor	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB007	Habitat management	ES 8.5.28	Retained and new habitats would be managed having regard for Natural England's The Mosaic Approach: Managing Habitats for Species (2013) to improve both priority habitats and species.	Implementation of procedures for long-term management of habitat created under the LEMP	National Highways	Operation	EMP3 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB008	Badger setts	ES 8.5.43	Badger setts identified within the Order Limits for closure would be closed by permanently excluding badgers and then removing the empty setts. The setts would be closed under licence from Natural England outside of the badger breeding season (breeding season takes place between 1 December and 30 June). For any main setts that will be closed with no suitable naturally occurring alternative sett, an artificial sett will be constructed in a suitable location.	Compliance with requirements of Natural England licences	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB009	Bat roosts	ES 8.5.45	Bat roosts that would be lost or heavily disturbed due to construction or operational activities would be removed under licence and alternative roosting structures would be provided in areas indicated on the Environmental Masterplan (Figure 2.4, Application Document 6.2).	Compliance with requirements of Natural England licences	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB010	Barn owl breeding sites (direct loss)	ES 8.5.47	Barn owl breeding sites that would be lost due to construction would be removed while not in active use. Alternative breeding sites (nest boxes) would be provided >1.5km away from the Project boundary and other major roads, within an appropriate setting and in compliance with Barn Owl Trust advice (2015). A replacement ratio of two boxes for one lost site would be provided. The number of boxes required would be informed by pre-construction surveys. A minimum of 12 artificial nest boxes would be installed.	Provision of barn owl breeding sites	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB011	Barn owl breeding sites (disturbance)	ES 8.5.48	Barn owl breeding sites that would not require closure, but that may be subject to disturbance due to proximity to works, as identified in ES Figure 8.18, Ornithology Route Transects, (Application Document 6.2), would be screened by acoustic fencing to prevent disturbance during the breeding season under the supervision of the Environmental Clerk of Works.	Implementation of commitment actions in accordance with Natural England guidance	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB012	Breeding birds (temporary loss of nesting habitat)	ES 8.5.49	Bird nest boxes would be provided within areas of retained woodland, trees and hedges shown on the Environmental Masterplan (Figure 2.4, Application Document 6.2) to supplement the habitat creation by offsetting the loss of nesting opportunities whilst newly created habitats establish. A ratio of 10 assorted small nest boxes and one medium open fronted nest box per hectare of lost woodland/scrub would be adopted in accordance with BTO Field Guide No. 23, where it is reasonably practicable to erect this number of nest boxes. For hedgerows, a ratio of 10 assorted small nest boxes per kilometre of hedgerow would be adopted, where it is reasonably practicable to erect these numbers within retained vegetation. The measures would be implemented under the supervision of the Environmental Clerk of Works.	Implementation of commitment actions in accordance with BTO guidance	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB013	Displacement of protected/ notable species	ES 8.5.27	Where habitats are known or assumed to support protected or notable species, as identified on ES Figure 8.1 to 8.31 (Application Document 6.2) or referred to in ES Appendices 8.1 to 8.14 (Application Document 6.3), clearance would take place in a phased, directional manner towards areas of contiguous retained habitat. This would encourage mobile species to actively move from the construction site into the wider landscape. These measures would be implemented under the supervision of the Environmental Clerk of Works.	Compliance with requirements of Natural England licences	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB014	Natural England licences	ES 8.5.51	All required Natural England licences and associated working practices and method statements would be in place prior to any related construction works starting in areas where licensable species occur.	Compliance with requirements of Natural England licences	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB015	Monitoring of pre-existing protected species and important habitats	ES 8.5.54	Monitoring of protected species during and post-construction would be in line with the requirements of the protected species mitigation licence.	Compliance with requirements of Natural England licences	Contractor during construction and National Highways during operation	Construction and Operation	EMP2 – Requirement 4 for construction EMP3 – Requirement 4 for operation
Terrestrial Biodiversity	TB016	Translocation of protected species	ES 8.5.50	Where the approach to habitat clearance referred to in REAC ref. TB013 is not considered appropriate by the Environmental Clerk of Works to avoid potential mortality of protected species, a programme of trapping and translocation would occur to move animals away from the construction site and to established receptor sites with sufficient carrying capacity prior to habitat clearance occurring. Species or groups that may be subject to trapping and translocation are GCN (and all other native amphibian species found during this process), water voles and dormice.	Compliance with requirements of Natural England licences	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB017	Translocation of notable species	ES 8.5.52	Where protected species licences are not required, the approach to habitat clearance and the potential need to trap and translocate non-licensable species (reptiles and/or native amphibians species excluding GCN) to established receptor sites with sufficient carrying capacity would be determined and undertaken by the Environmental Clerk of Works. Where translocation occurs, species will be only be translocated to receptor sites with established habitat.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB018	Translocation of habitat features of value to protected / notable species	ES 8.5.53	Habitat features of value to protected species that can themselves be moved to mitigation areas/receptor sites (for example dead-wood features for terrestrial invertebrates, and refugia for amphibians and reptiles) would be translocated where appropriate, to be determined by the Environmental Clerk of Works.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB019	Translocation of acid grassland	ES 8.5.56	An area (approximately one hectare) of priority Biodiversity Action Plan acid grassland in Low Street Pit, as indicated on ES Figure 8.1, Designated Sites (Application Document 6.2), would be salvaged and translocated to a receptor site. The receptor site is an area of grassland located between the sea wall and the Parish Church of St. Catherine (centred on Grid Reference TQ 69011 77146), approximately 100m to the north of Coalhouse Fort. This would be achieved by salvaging turf from the acid grassland and replanting it on the receptor site shown on the Environmental Masterplan (Figure 2.4, Application Document 6.2).	Successful re-establishment of acid grassland at the donor site within 24 months of planting	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB020	Translocation of important lichens	ES 8.5.55	Where important lichen species, *Usnea* cf. *esparantiana*, present within woodland south-west of the M25 junction 29, and *Physconia distorta* and *Fellhaneropsis vezdae*, present within The Wilderness woodland, are found on trees being felled or pruned to accommodate works, any timber hosting these species would be retained and moved immediately after felling into retained areas of the same woodland as shown in the Environmental Masterplan (Figure 2.4, Application Document 6.2). Timber would be placed on the woodland floor immediately adjacent to a tree of the same host species. All works would be supervised by the Environmental Clerk of Works.	Plot reinstated with habitat enhancements to satisfaction of landowner.	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB021	Watercourse diversion planting	ES 8.5.42	During construction works, it would be necessary to permanently divert a number of watercourses, particularly around the Mardyke and the North Portal area as identified on the Environmental Masterplan (Figure 2.4, Application Document 6.2). Where this occurs, the new watercourses would be planted to ensure they have a greater floral diversity to benefit a wider range of species than the existing watercourses.	Successful reinstatement of vegetation at these locations within 12 months.	Contractor	Construction	LEMP – Requirement 5
Terrestrial Biodiversity	TB022	Biodiversity enhancement at the Milton compound	ES 8.5.59	The land parcel within/adjacent to the south of the Metropolitan Police firing range (Land Registry refs. K825598 and K815371) shall be reinstated (after use as a construction compound) for habitat enhancement. The land will be reinstated to create additional slow-flowing ditch, pond and grassland with scrub habitats for use by species such as water vole and great crested newt as well as providing suitable bird foraging and nesting habitat. Final design will be agreed with the landowner, unless otherwise agreed by the Secretary of State.	Plot reinstated with habitat enhancements to satisfaction of landowner.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB023	Reducing adverse effects on ditches and extant water vole population from the aggregate conveyor	ES 8.5.46	The footings of the Tilbury 2 aggregates conveyor will be carefully sited during installation to avoid existing wetland habitat within this area. Footings will be a minimum of 5m from bank tops. Any temporary crossings of ditches required during the conveyor's installation and decommissioning will be managed using a Bailey bridge (or similar), which will be removed from site once installation is complete. The exact location of the footings and the bridge will be agreed with the Environmental Clerk of Works prior to installation.	Avoidance of impacts to ditch structure and extant water vole population.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB024	Reducing adverse effects on sensitive ecological receptors from construction lighting.	ES 8.5.18	In line with the obligations within the CoCP regarding lighting, construction site lighting will comply with the Institute of Lighting Professionals' Guidance Notes for the Reduction of Obtrusive Light GN01/20 (2020) and the provisions of BS EN 12464-2:2014 Light and lighting – Lighting of workplaces Part 2: Outdoor workplaces (British Standards Institution, 2014), where applicable. The contractor will consult the Environmental Clerk of Works over the application of these guidance and standards to avoid adverse effects on sensitive ecological receptors including retained bat roosts and watercourses.	Avoidance of impacts to sensitive ecological receptors from construction lighting.	Contractor	Construction	EMP2 - Requirement 4
Terrestrial Biodiversity	TB025	Mitigation of nitrogen deposition along part of the M2	ES 8.5.16	Appropriate technology and infrastructure would be installed to enable the enforcement authority to enforce the speed limit in both directions between junctions 3 and 4 of the M2 to reduce nitrogen deposition. Reasonable and appropriate funding would be provided to the enforcement authority to undertake enforcement activities in relation to nitrogen deposition, in addition to existing enforcement measures. This technology and infrastructure would be developed through detailed design, in consultation with the enforcement authority and approved by the Secretary of State. It would be in place prior to road opening. This would remain in place as a minimum during the first fifteen years of operation, unless otherwise agreed with the Secretary of State based on reviews undertaken in consultation with Natural England and the enforcement authority.	Provision of speed enforcement technology and infrastructure as agreed with the enforcement authority.	National Highways	Operation	EMP3 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB026	Site clearance and landscaping	ES 8.5.52	The plans for the management of ecology required in EMP2 (under Requirement 4(2) and 4(3)) shall ensure that site clearance and landscaping during construction would not conflict with the Outline LEMP in order to ensure that the measures proposed to be delivered in accordance with Requirement 5 would not be prevented or incapable of delivery.	Approval of the EMP2 by SoS and Approval by SoS of LEMP in accordance with Requirement 5	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB027	Construction of replacement air raid bunker	ES 8.5.45	An air raid bunker within Shorne Woods containing a hibernation bat roost would be heavily disturbed as a result of the Project. A replica bunker would be constructed, prior to disturbance of the existing structure, within land between Shorne Woods and Great Crabbles Wood at a location to be agreed with Natural England. The bunker would be constructed from brick with blockwork covering, designed to provide similar internal temperatures and humidity levels to the existing air raid bunker. Internally, there would be additional brickwork and timber boarding approximately 150 x 75mm in size, on angles within the bunker allowing access behind them for bats. There would be 20 bat bricks installed in the internal walls.	Construction of bunker to meet design specifications and to provide similar internal temperature/ humidity levels to existing air raid bunker	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB028	Ancient Woodland soil translocation	ES 8.5.33	Areas identified on the Environmental Masterplan (Figure 2.4, Application Document 6.2) for compensatory ancient woodland planting to offset the loss of ancient woodland would be inoculated, where reasonably practicable, with soils from ancient woodland sites within Order Limits, as indicated on ES Figure 8.1, Designated Sites (Application Document 6.2), that would be disturbed by construction activity. The suitability of the soil from the donor sites would be determined by a soil scientist prior to commencement of works in those areas, with consideration for existing ground flora composition and diversity and potential contamination. The soils would be translocated in advance of construction activities commencing at the donor sites, avoiding weather constraints e.g. heavy rainfall; timing conflicts with protected species licensing activities (e.g. capture and translocation of dormice); and only once any essential mitigation required for buried archaeology identified within the receptor sites has been completed. Soils would typically be stripped to approximately 300mm, disturbing the soil structure as little as reasonably practicable and carefully placed within the prepared adjacent receptor sites, following guidance from CIRIA within Habitat Translocation - A Best Practice Guide (C600).	Evidence of establishment of typical ancient woodland ground flora indicator species within 60 months of soil translocation and tree planting in compensatory area.	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB029	Bowater sluice scrub clearance		Any scrub clearance required to facilitate the upgrade of Footpath 200 at Bowater sluice would be minimised as far as reasonably practicable and would only be taken from south of the existing footpath route rather than from the scrub habitat to the north of the route. This would ensure the extent of continuous habitat north of the footpath remained intact.	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4
Terrestrial Biodiversity	TB030	Biodiversity Net Gain		The Applicant will run the Biodiversity Net Gain calculations using Metric 3.1 for the detailed design and issue the results to Natural England to provide a comparison between that and the outline design calculations submitted with the DCO application.	Issue updated Biodiversity Net Gain calculations to Natural England for the detailed design.	Contractor	Construction	EMP2 – Requirement 4

Topic	REAC ref. no.	Name	Origin	Commitment	Achievement criteria	Party responsible	Stage	Securing mechanism in DCO
Terrestrial Biodiversity	TB031	Incorporation of additional information at detailed design		In line with Natural England advice that the Project should take into account any available third party data where data resolution allows greater accuracy to inform detailed design, a heat map showing areas of high value habitat for terrestrial invertebrates within the Order Limits has been produced in discussion with Natural England (see Annex E: Heat map showing areas of high value habitat for terrestrial invertebrates within the Project Order Limits, to the Code of Construction Practice). This heat map will be used by the Applicant to inform detailed design with a view to avoid and/or minimise impacts as far as reasonably practicable, an approach which aligns with REAC Ref. LV001 and Clause LSP.01 within the Design Principles (Document Reference 7.5).	Implementation of commitment actions	Contractor	Construction	EMP2 – Requirement 4

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Glossary

Term	Abbreviation	Explanation
Area of Outstanding Natural Beauty	**AONB**	Statutory designation intended to conserve and enhance the ecology, natural heritage and landscape value of an area of countryside.
Considerate Constructors Scheme	**CCS**	A not-for-profit, independent organisation founded in 1997 to raise standards in the construction industry.
Construction Environmental Management Plan	**CEMP**	The primary environmental management document that defines the procedures for achieving the objectives set out in the environmental policy. It incorporates environmental performance targets set for the Project.
Communications and Engagement Strategy	**CES**	n/a
Community Liaison Group	**CLG**	n/a
Construction Logistics Community Safety	**CLOCS**	This is a national Standard which defines the primary requirements placed upon key stakeholders associated with a construction project.
Code of Construction Practice	**CoCP**	Contains control measures and standards to be implemented by the Project, including those to avoid or reduce environmental effects.
Development Consent Order	**DCO**	Means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects (NSIP) under the Planning Act 2008.
Department for Transport	**DfT**	The government department responsible for the English transport network and a limited number of transport matters in Scotland, Wales and Northern Ireland that have not been devolved.
Design Manual for Roads and Bridges	**DMRB**	A comprehensive manual (comprising 15 volumes) which contains requirements, advice and other published documents relating to works on motorway and all-purpose trunk roads for which one of the Overseeing Organisations (National Highways, Transport Scotland, The Welsh Government or the Department for Regional Development (Northern Ireland)) is highway authority. The DMRB has been developed as a series of documents published by the Overseeing Organisations of England, Scotland, Wales and Northern Ireland. For the Lower Thames Crossing the Overseeing Organisation is National Highways.
Environmental Impact Assessment	**EIA**	A process by which information about environmental effects of a proposed development is collected, assessed and used to inform decision making. For certain projects, EIA is a statutory requirement, reported in an Environmental Statement.
First iteration of the Environmental Management Plan	**EMP1**	First iteration of the Environmental Management Plan as defined by the Design Manual for Roads and Bridges, LA 120.

Term	Abbreviation	Explanation
Second iteration of the Environmental Management Plan	**EMP2**	Second iteration of the Environmental Management Plan as defined by the Design Manual for Roads and Bridges, LA 120.
Third iteration of the Environmental Management Plan	**EMP3**	Third iteration of the Environmental Management Plan as defined by the Design Manual for Roads and Bridges, LA 120.
Environmental Management System	**EMS**	n/a
Environmental Statement	**ES**	A document produced to support an application for development consent that is subject to Environmental Impact Assessment (EIA), which sets out the likely impacts on the environment arising from the proposed development.
Habitats Regulations Assessment	**HRA**	A tool developed by the European Commission to help competent authorities (as defined in the Habitats Regulations) to carry out assessment to ensure that a project, plan or policy will not have an adverse effect on the integrity of any Natura 2000 or European sites (Special Areas of Conservation, Special Protection Areas and Ramsar sites), (either in isolation or in combination with other plans and projects), and to begin to identify appropriate mitigation strategies where such effects were identified.
	HS1	A 109km high-speed railway between London and the UK end of the Channel Tunnel. The line carries international passenger traffic between the UK and continental Europe; it also carries domestic passenger traffic to and from stations in Kent and east London, as well as Berne gauge freight traffic.
ISO 9001:2015		International Organisation for Standardisation's standard for quality
ISO 14001:2015		International Organisation for Standardisation's standard for environment
ISO 45001:2018		International Organisation for Standardisation's standard for health and safety
Joint Operations Forum	**JOF**	n/a
Landscape and Ecology Management Plan	**LEMP**	A document which provides details on the delivery and management of the landscape and ecology elements identified in the Environmental Masterplan for the Project, including their success criteria.
Nationally Significant Infrastructure Project	**NSIP**	Major infrastructure developments in England and Wales, such as proposals for power plants, large renewable energy projects, new airports and airport extensions, major road projects etc.
Outline Landscape and Ecology Management Plan	**oLEMP**	n/a

Term	Abbreviation	Explanation
Register of Environmental Actions and Commitments	**REAC**	The REAC identifies the environmental commitments that would be implemented during the construction and operational phases of the Project if the Development Consent Order is granted, and forms part of the Code of Construction Practice (Application Document 6.3, Appendix 2.2).
Secretary of State for Transport	**SoS**	The Secretary of State has overall responsibility for the policies of the Department for Transport (DfT).
Special Protection Area	**SPA**	A designation under the European Union Directive on the Conservation of Wild Birds.
Unexploded ordnance	**UXO**	Explosive remnants of war that did not explode when they were deployed and may still pose a risk of detonation. Sometimes referred to as UXBs.

Annexes

Annex A Outline Site Waste Management Plan

Submitted as separate document, see Examination Library for latest version.

Annex B Outline Materials Handling Plan

Submitted as separate document, see Examination Library for latest version.

Annex C Preliminary Works Environmental Management Plan

Submitted as separate document, see Examination Library for latest version.

Annex D Community Liaison Groups – Initial Terms of Reference

Submitted as separate document, see Examination Library for latest version.

Annex E Heat map

Submitted as separate document, see Examination Library for latest version.

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