Lower Thames Crossing

Outline Materials Handling Plan

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VERSION: 0.2

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List of contents

Page number

List of plates

Page number

List of tables

Page number

Cover Note

This document is a draft of one of a series of Control Documents that will form part of our planned DCO application. Following this consultation we will carefully consider your feedback as we finalise the documents for our planned submission of the DCO application for the Lower Thames Crossing later this year.

The outline Materials Handling Plan (oMHP) would be a companion document to the outline Site Waste Management Plan (oSWMP), providing further details on material movements associated with the road. It covers the flow of materials into the Order Limits and materials out of it, taking into consideration the proximity and capacity of existing transport infrastructure. Our contractor would produce a MHP in accordance with this document.

The following contains a draft copy of this document to provide an example of how mitigation and commitments would be secured within the DCO application when it is submitted.

The oMHP reflects the changes to the design described in this consultation. Updates will be made to this document to reflect feedback received from stakeholders ahead of submitting the document as part of the DCO application.

As this is a draft control document, there will be references to the upcoming Development Consent Order (DCO). Any documents referenced that will form the DCO will be mentioned with a (REF TBC).

1 Introduction

1.1 Purpose of this document

1.1.1 This outline Materials Handling Plan (oMHP) sets out the approach and high-level principles for handling construction materials and waste on the Lower Thames Crossing Project (the Project), both inside and outside the Order Limits. Securing mechanisms are covered in Section 2.

1.1.2 This oMHP considers the handling of excavated materials for reuse as well as excavated waste materials, and the delivery of large and/or frequent materials defined as 'bulk deliveries', which are considered to be the most logistically challenging types of deliveries and therefore potentially of most impact. Optimisation of deliveries and load capacities to minimise vehicle movements are key considerations.

1.1.3 Smaller less frequent deliveries, although not specifically addressed in this document, would also be required to meet the principles set out in this document (Section 2.3) to optimise deliveries and minimise vehicle movements.

1.1.4 It is relevant to all construction works required for the project. Construction traffic movements are considered in the Outline Traffic Management Plan for Construction (oTMPfC)

1.1.5 This document describes methods of transportation for bulk materials, taking into consideration the use and upgrading of existing infrastructure. Consideration of multimodal transport options includes the use of rail and river to minimise road miles, where reasonably practicable, and the utilisation of internal haul routes.

1.1.6 The Outline Site Waste Management Plan sets out the overarching principles and procedures that would be applied for the management of waste during the construction of the Project. This relates to the handling of excavated waste materials (Section 5.4).

1.2 The Project

1.2.1 The A122 Lower Thames Crossing (the Project) would provide a connection between the A2 and M2 in Kent, east of Gravesend, crossing under the River Thames through a tunnel, before joining the M25 south of junction 29. The Project route is presented in Plate 1.1.

1.2.2 The A122 road 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 and junction 29 of the M25. The tunnel entrances 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 NPSNN policy and to help the Project meet the Scheme Objectives, it is proposed that road user charges would be levied. 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

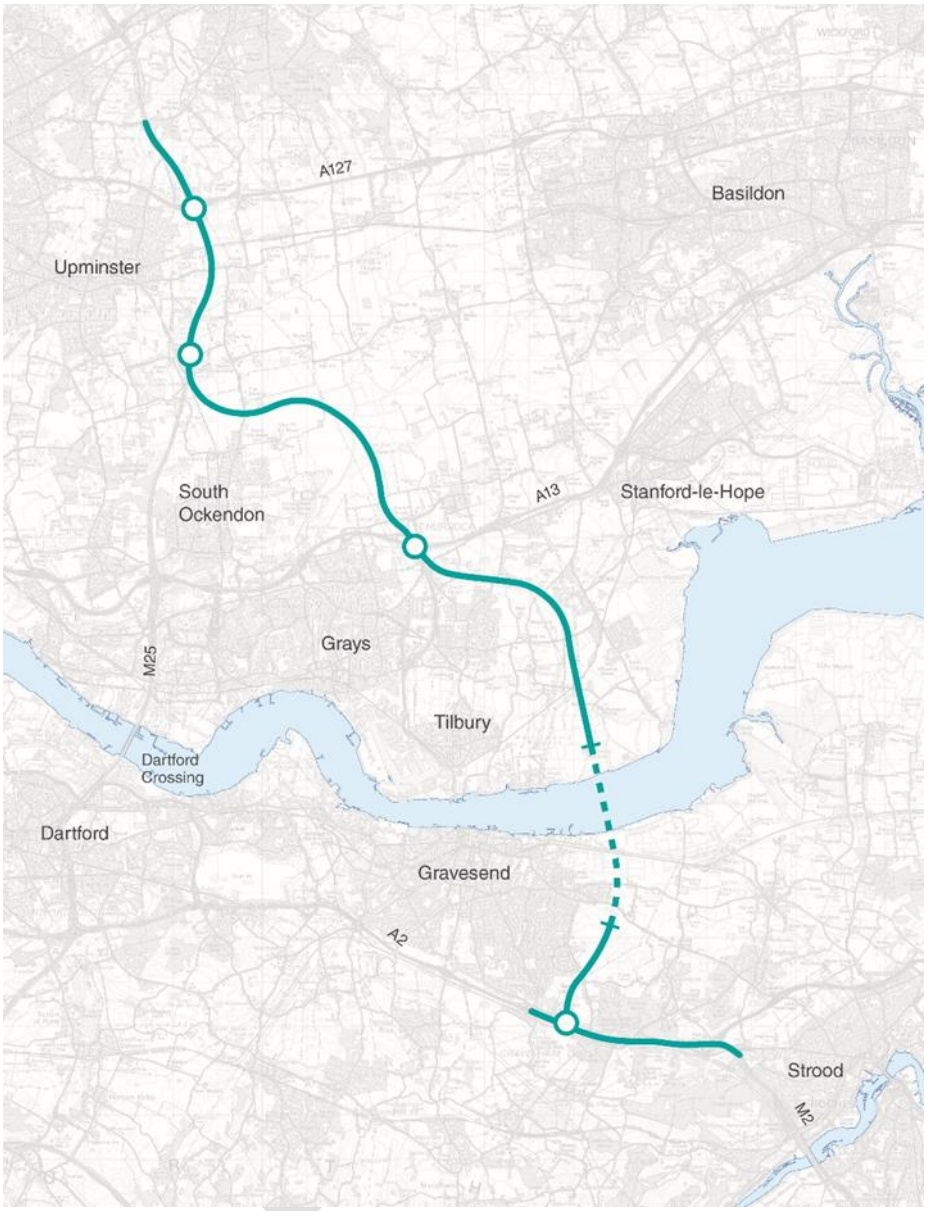
1.2.6 In common with other A-roads, the A122 would operate with no hard shoulder but would feature a 1m hard strip on either side of the carriageway. It would also feature technology including stopped vehicle and incident detection, lane control, variable speed limits and electronic signage and signalling. Our A122 road design outside of the tunnel includes emergency areas spaced at intervals between 800 metres and 1.6km (less than one mile). 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 the benefit of safety, 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 side roads. There would also be changes to a number of public rights of way, 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 power lines and underground electricity cables, as well as water supplies and telecommunications assets and associated infrastructure.

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

Plate 1.1 Lower Thames Crossing Route



Related Project documents

1.2.10 The DCO Application will include the following documents that should be read alongside the oMHP:

a. The Code of Construction Practice (CoCP), which includes the Register of Environmental Commitments (REAC)

b. Transport Assessment (REF TBC)

c. Assessments supporting the Environmental Statement (REF TBC), including:

   i. Environmental Statement Chapter 5: Air Quality

   ii. ES Appendix 11.1: Excavated Materials Assessment

iii. Environmental Statement Chapter 11: Material Assets and Waste

iv. Environmental Statement Chapter 12: Noise and Vibration

d. Outline Site Waste Management Plan

e. Outline Traffic Management Plan for Construction (oTMPfC)

f. Preliminary Navigational Risk Assessment (REF TBC)

g. Framework Construction Travel Plan (FCTP)

1.3 Assumptions and limitations

1.3.1 This oMHP has been developed having regard to the following assumptions and limitations, which are discussed throughout the document:

a. The geographical context and footprint of the Project, including practicalities and constraints of the road and tunnel alignment (geographical and environmental constraints) (Section 3), would not change.

b. Quantities of construction materials and waste are indicative (Section 5).

c. Transport and logistics constraints and opportunities would not change significantly. For example, train routes remain open (Section 5).

d. The condition of existing infrastructure to be used for material movement is adequate and appropriate. Condition surveys will be undertaken prior to Works commencement (Section 6).

e. There would be sufficient industry capacity in terms of materials and plant to supply the Project demands. Discussions with suppliers indicates that capacity does exist.

f. Transportation of excavated material is not currently planned between construction sites on opposite sides of the River Thames via the existing road network to reduce vehicle movements through the existing Dartford Crossing

g. Optimise material movement or transfer between two different construction compounds or construction sites (within the Order Limits) would be agreed and managed in accordance with the appropriate regulatory consents to be obtained by the appointed Main Works Contractor (MWC).

1.3.2 It should be noted that commercial and procurement elements, eg the potential for specific suppliers to support a multimodal transportation approach, have not been considered as part of the document.

2 Planning requirements and Project commitments

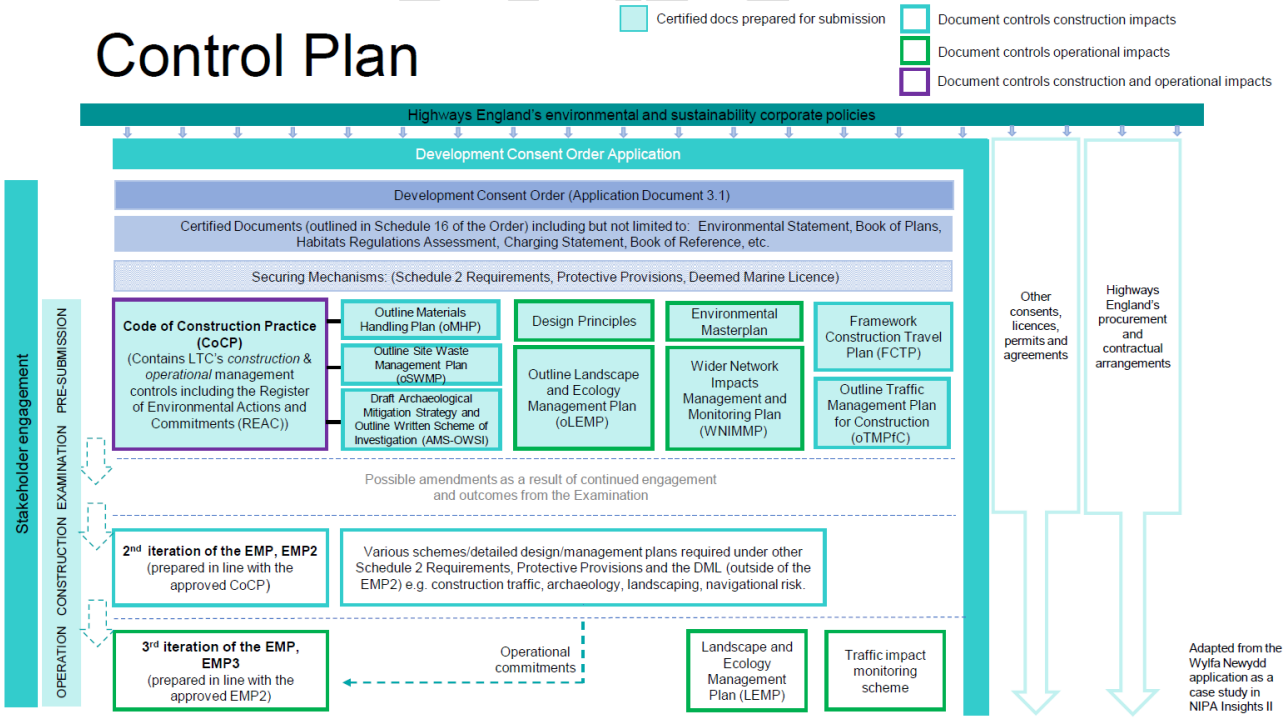
2.1 Planning requirements and the Development Consent Order

2.1.1 This oMHP should be read alongside Requirement 4 of the Schedule 2 Requirements to the Development Consent Order (DCO), which requires plans for the management of materials to be in place prior to commencing construction. Plate 2.1 provides an extract from the Project Control Plan, which illustrates the securing mechanisms.

2.1.2 Requirement 4 to the Schedule 2 Requirements state that no part of the authorised development is to commence until an Environmental Management Plan (Second Iteration), formed substantially in accordance with the CoCP has been submitted to and approved in writing by the Secretary of State, following consultation by the undertaker with the relevant planning authority and/or Natural England (as appropriate). Under Requirement 4(3), the EMP (second iteration) must include a plan for the management of materials, which must be in accordance with this document.

2.1.3 This oMHP provides the framework and principles that the contractor must adhere to when developing a more detailed plan – the Materials Handling Plan (Second Iteration), which would be required as part of the Environmental Management Plan (Second Iteration).

Plate 2.1 Extract from the Project Control Plan



2.2 Construction phase Materials Handling Plan

2.2.1 This oMHP sets out the principles for material movements and handling during the construction phase of the Project, providing the framework for a more detailed Materials Handling Plan (MHP) to be produced for the construction phase of the Project (see Control Plan flow diagram in Plate 2.1).

2.2.2 The construction phase MHP will set out a detailed approach for material movement and handling, aligning to the principles set out in this oMHP. It will require information from a number of Project elements developed during the construction stage, including the following:

a. Detailed design

b. Detailed construction programme

c. Detailed ground investigation

d. Detailed written scheme investigation

e. Excavated material mass haul strategy

f. Traffic management plan

g. Environmental Management Plan and Site Waste Management Plan

2.2.3 Information which will be required to form part of the construction phase MHP is shown in Table 2.1 below.

Table 2.1 Detail required in the construction phase MHP

Information topic	Details
Project Information	• Roles and responsibilities of involved parties in the transportation and handling of material • Location of compounds and worksites
Construction details	• Summary of the appointed contractors construction programme, • Modularisation and off-site manufactured plan and • Excavated materials plan, including tracking record of when and where material is excavated and placed for use within the Order Limits or management offsite
Site layout plans	• Welfare and office space plan • Parking, loading and unloading and laydown area plan • Plant and materials storage • Excavated ad demolition material storage and processing plan • Vehicle and pedestrian routes • Haul road crossings • Emergency and first aid points • Waste management areas • Wheel wash facilities and

Information topic	Details
	• Equipment charging and fuelling areas.
Traffic management (in accordance with the oTMPfC)	• Access plans to each Compound • Parking arrangements for delivery vehicles • Pedestrian, cyclist, bus and general traffic considerations • Vehicle swept path analysis modelling.
Delivery and transport management	• Details of how the Contractor implements a delivery management system • Trip demand forecasting • Proposed timing windows for vehicle movements to and from Site, taking local conditions into consideration • Details of abnormal load requirements, including appropriate planning and notification to relevant stakeholders e.g. local authorities, emergency services etc

2.3 Commitments to secure mitigation of impacts

2.3.1 As part of the planning process and in line with industry best practice, the Project has made commitments to secure mitigation of its construction materials handling operations. These will be secured in the DCO through Schedule 2 Requirements via the CoCP and REAC. This oMHP reflects those commitments.

2.4 Principles to optimise materials logistics

2.4.1 A number of principles will be applied to reduce material movements for construction, including the following, which are explained in greater detail below:

a. Design for manufacture and assembly, build offsite, and modular construction

b. Consolidation of deliveries

c. Maximising load density (removing unused space on vehicles)

d. Retention and reuse of site-generated materials such as excavated soils, vegetation, and demolition waste where possible.

e. The proximity principle (of sourcing materials as close to the Project as possible)

f. Use of multimodal transport

Design for manufacture and assembly

2.4.2 Design for manufacture and assembly, is the prefabrication of all or part of an item offsite, for delivery then assembly and installation to form a completed asset, such as a piece of equipment or structure, with minimal onsite works.

2.4.3 Modular construction reduces vehicle trips and associated emissions, and can reduce overall construction times by improving the efficiency of delivery and assembly on site. It can also reduce construction activity risks.

2.4.4 The Contractors will be required to review the design to investigate the use of prefabricated structures and components and encourage a process of assembly rather than construction onsite, where economically and technically feasible.

Consolidation

2.4.5 Consolidation is the grouping of materials from multiple deliveries onto fewer vehicles to minimise the overall number of deliveries.

2.4.6 Provision has been made within compounds for mass storage of materials and equipment and to manage delivery flows to individual worksites.

2.4.7 The Contractors will also be required to detail their performance in terms of reducing site traffic through consolidation.

Load density maximisation

2.4.8 The Project will require Contractors to plan and detail how they will maximise load density for all vehicle trips (the amount of weight that can be safely loaded per unit volume). This will reduce road miles travelled, emissions and road risks.

The proximity principle

2.4.9 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 embody the proximity principle of sourcing materials as close to the Project as possible.

2.4.10 The Contractor will use the BRE Framework Standard for Responsible Sourcing (BES 6001) (BRE, 2008), to verify imported materials are sustainably sourced and managed, to reduce impacts throughout the supply chain.

MW002 Multimodal transport

2.4.11 Multimodal transport refers to the use of road, water, and rail in combination to optimise material transport and delivery.

2.4.12 The Project will seek to reduce road vehicle miles travelled using a combination of modes of transport, using a ‘final mile’ strategy to transport the materials efficiently to site from the main delivery terminal or depot. (See Section 6 for the final mile approach).

2.4.13 The location of the main construction compounds of the Project provides for access to ports, rail in limited locations and the strategic road network (SRN) (Section 6).

2.5 Managing construction delivery movements

2.5.1 The following measures will manage unavoidable construction vehicle movements, which are explained in greater detail in the sections below:

a. Traffic management plans (in accordance with the oTMPfC)

b. Queuing and holding points at site entrances within the Order Limits

c. Supply chain data analysis (information to provide an understanding of vehicle movements associated with deliveries, so that improvements and efficiencies can be implemented)

d. Materials distribution management (planning the flow and movement of materials to optimise movements and avoid stockpiling)

e. Delivery booking system

f. Movement of Abnormal Indivisible Loads

g. Mitigating measures for vulnerable road users

h. Construction site good housekeeping and safety

Traffic management plans

2.5.2 The preparation of traffic management plans (TMPs) for construction is a requirement of the draft DCO (Schedule 2 Requirement 10) and will be prepared by the contractors to optimise vehicle movements with the aim of reducing impacts and improving safety.

2.5.3 The oTMPfC provides an overview of the approach that will be followed and will inform the preparation of a TMP for construction by the contractors. This will require approval by the Secretary of State following consultation with the relevant highway authority/authorities.

Vehicle holding points

2.5.4 To manage the arrival of vehicles to the site compounds, the Project will make provision for vehicle holding points with reception and booking-in areas, located inside the Order Limits and close to agreed work site entrances.

2.5.5 These areas will receive and process vehicles making deliveries on a scheduled basis, to minimise the risk of queuing on the highway (in accordance with the oTMPfC).

Supply chain data analysis

2.5.6 Supply chain data analysis will provide an understanding of vehicle movements associated with deliveries, so that improvements and efficiencies can be implemented.

2.5.7 Construction sites will be fitted with technology such as Automatic Number Plate Recognition, to enable the MWC to track and analyse data relating to vehicle movements for the Project. This will help to drive conformity with agreed delivery hours, delivery routes, delivery of pre-booked materials, idling times, near misses and any non-conformity. This would enable Contractors to review, assess and improve performance where necessary.

2.5.8 The use and management of couriers will also form part of the data analysis to understand and aid the maximisation of load capacity.

Materials distribution management

2.5.9 The Project will implement a systematic approach to logistics management to drive efficiencies. A delivery management system will coordinate materials distribution to compounds to optimise movements and avoid stockpiling.

2.5.10 The Contractors will monitor material quantity requirements to avoid over-ordering, reducing risk of oversupply and damage on site, which could lead to waste materials being generated

Delivery booking system

2.5.11 The Contractors will implement a delivery booking system for all construction deliveries associated with their site. A delivery booking system will enable forward planning and coordination of delivery vehicle movements including management of non-conformances to delivery slots and proactive resolution of peaks in demand.

2.5.12 The delivery booking system would also allow the recording of driver details, registration numbers and arrival and departure times.

Movement of Abnormal Indivisible Loads

2.5.13 The tunnel boring machines (TBMs), bridge structures and associated specialist equipment including tower cranes, mobile cranes and plant, would be delivered as Abnormal Indivisible Loads. This would also include wide loads and long loads (loads of exceptional length) for items such as bridge spans, crawler crane assemblies, and self-propelled modular transporters (used for manoeuvring heavy and large loads).

2.5.14 The CoCP confirms that Contractors must follow relevant legal requirements and planning processes for the transportation of Abnormal Indivisible Loads, including the assessment of structures, junctions and routes for the movement of these loads. This may require modification of junctions or temporary removal of street furniture and lighting for example, to enable a load to pass. All such movements would be carefully planned in consultation with the relevant highway authorities and the police (and detailed in the Traffic Management Plan for Construction).

Mitigating measures for vulnerable road users

2.5.15 To mitigate the impact of HGVs and other construction vehicles on vulnerable road users, the Project will apply the Fleet Operator Recognition Scheme (FORS) and Construction Logistics and Community Safety scheme, which demand collaborative action and reporting to prevent fatal, serious and near-miss collisions between vehicles servicing construction projects and vulnerable road users including pedestrians, cyclists and motorcyclists. This is a requirement of the CoCP.

Construction site good housekeeping and safety

2.5.16 All vehicle movements on the Project construction sites will be managed in accordance with the requirements set out in the CoCP. This also includes good housekeeping and site security.

3 Environmental setting and existing infrastructure – considerations and constraints

3.1 Context

3.1.1 The geographical context and extent of the Project means that there are a number of constraints, including environmental and physical infrastructure, to consider in the planning of material movement for the Project. These are detailed below, and the relevant locations are indicated on Plate 3.1 and Plate 3.2.

3.2 Environmentally sensitive sites

Thames Estuary and Marshes Ramsar

3.2.1 The Thames Estuary and Marshes Ramsar is a designated site of international importance located on the southern side of the River Thames, near Gravesend. In order to reduce harm to the Ramsar and its functionally linked habitat, the Project is not seeking to create a new jetty (deep or shallow water) on the south side of the River Thames within the Project's Order Limits. This forms a constraint on river transport of materials into or out of construction compounds on the south side of the River Thames.

Port of Tilbury2

3.2.2 The Port of Tilbury2 has an area of land committed to environmental mitigation as part of its DCO. This area would be the only practicable location to site a direct rail connection to the construction compound at the North Portal (CA05 and CA05A). In light of the alternative existing rail facilities available in the immediate vicinity of the North Portal, it is considered disproportionate to construct a new temporary rail spur which would have the effect of dislodging the Port of Tilbury's environmental mitigation. As a result, a direct rail connection is not considered appropriate for material movement on the north side of the River Thames.

3.3 Existing amenities

3.3.1 The Milton Rifle Range (a police training site) is located within the Thames Estuary and Marshes Ramsar. This creates a physical barrier to access to the River Thames from southern worksites within the project Order Limits. This forms a further constraint on river transport of materials into or out of sites via the river on the southern side of the River Thames.

3.4 Use of the strategic and local road network

3.4.1 There are a limited number of SRN routes within the vicinity of the Order Limits.

3.4.2 The Project would primarily use direct access from the A2 and A226 to compounds south of the River Thames, and the A13, A1089, and the M25 to compounds t north of the River Thames for construction traffic movements, however, this is not possible in all locations so the local road network will need be used where required. The forecast impact to the road network is described in the Transport Assessment (REF TBC).

3.4.3 Where construction traffic uses local roads, it will be via a limited number of routes across the geography of the Project (refer to the CoCP for detail on mitigation and limitations for vehicle routes) Additional measures to ensure safe use of the road network for construction traffic will be developed in consultation with the relevant local authorities and secured in the traffic management plan developed during construction using the principles set out in the oTMPfC.

3.5 River infrastructure and water transport

3.5.1 On the north bank of the River Thames, there are three operational jetties in close proximity to the Order Limits (the North Portal area), however all the jetties are fully utilised by existing landowners and business owners and do not have additional capacity for import of materials for the construction of the Project.

3.5.2 The busy navigational channel of the River Thames precludes the potential for the creation of a new jetty (deep or shallow water) on the north and south sides of the river within the Order Limits.

3.6 Land features and infrastructure

3.6.1 The Tilbury Loop railway line forms a physical barrier to the continuation of offline access (construction traffic access via the haul roads inside the Order Limits) between the north bank of the River Thames and the intersection of the Order Limits with the M25.

3.6.2 Substation Road (located between the North Portal and the Tilbury Loop railway line) is a privately owned road. We propose to use this road to access compounds at the North Portal (CA05 and CA05a), whilst seeking to balance that use with the road owner's operational requirements.

3.6.3 Parts of Medebridge Road in South Ockendon form a private road owned and maintained by Veolia UK. This road has been identified as a key access route to worksites north of the A13, to minimise the use of the local road network in this area. We also propose to use this road to access compounds north of the A13 (CA11 & CA13), whilst seeking to balance that use with the road owner's operational requirements.

3.7 Permitted activities

3.7.1 The construction compound at the North Portal (CA05) would be located within the extent of two commercial landfill sites. In order for the Project to undertake construction activities in this area, including material excavation, storage and treatment, the DCO will address existing and required permitting requirements to provide for authorisation and regulation of any activities in that setting.

3.8 Proposed developments

Thurrock Flexible Generation Plant

3.8.1 The Thurrock Flexible Generation Plant is a project proposed by Statera Energy (SE), situated to the west of the North Portal. The proposed Order Limits of SE’s DCO overlap with those of the Project.

3.8.2 It is currently anticipated that if both projects are granted their DCOs the construction periods would be undertaken at the same time, including use of the same road and access points for the Projects CA05 and CA05a construction compounds.

3.8.3 The two projects would work together to ensure neither impedes the delivery of the other whilst ensuring impacts on the local road network are minimised.

The London Resort

3.8.4 The London Resort is a major proposed development on both the north and south sides of the River Thames, which has submitted a DCO application. The construction programme for the London Resort is understood to coincide with that of the Project.

3.8.5 The Project would seek to work with London Resorts promotor to minimise disruption on the road network.

Plate 3.1 Geographical features and existing infrastructure south of the River Thames

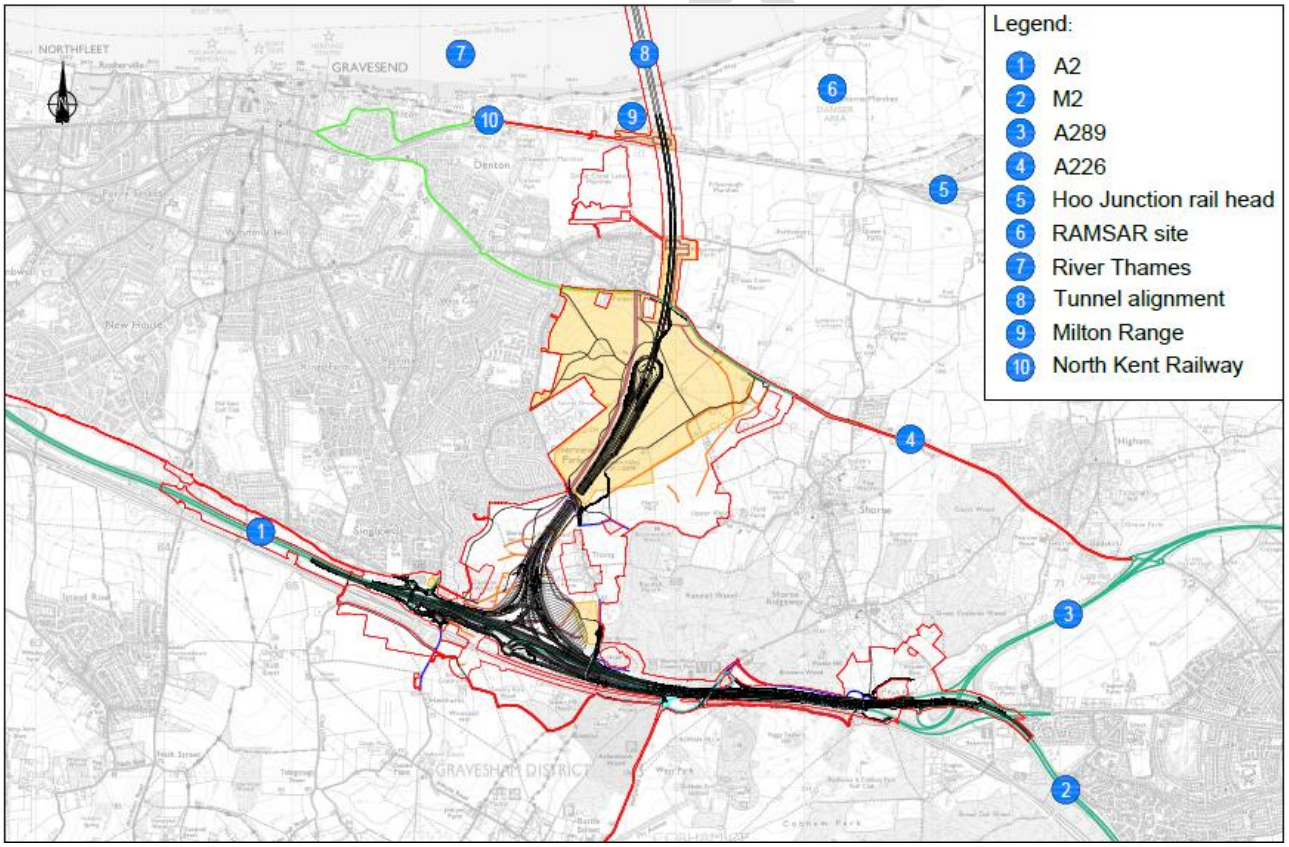
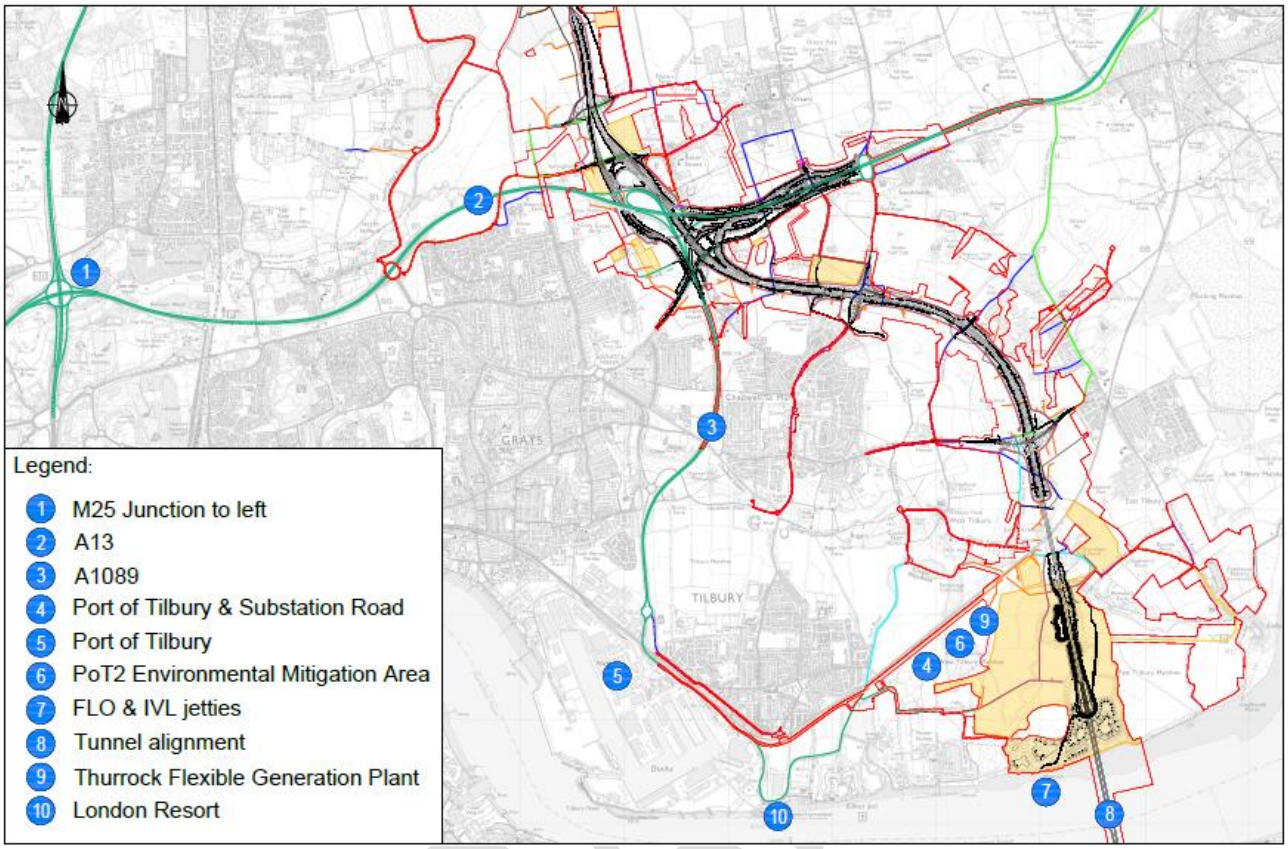


Plate 3.2 Geographical features and existing infrastructure north of the River Thames



4 Construction logistics on large-scale projects

4.1 The need for construction compounds

4.1.1 To optimise the management of construction logistics on large-scale (major) projects, construction compounds are needed to provide appropriately located areas for specific activities, such as storing, managing and maintaining plant, storage and use of materials, operational activities such as concrete batching, and for workers' welfare and office facilities.

4.1.2 This is relevant to this oMHP because the use of compounds will optimise vehicle movement for material movements, storage and use. The Project has defined two types of compound – construction compounds for the main construction works, and utilities logistic hubs (ULHs) for works that are utility-specific.

4.2 Construction compounds

4.2.1 Construction compound locations have been identified based on the following requirements:

a. To support the type, scale and complexity of works such as the tunnel portal sites

b. To facilitate material deliveries and storage (of both imported and excavated materials) in key locations

c. To be in suitable proximity to worksites and existing transport infrastructure, such as the strategic road network, rail and river access, to optimise vehicle movements and minimise impact on the environment and community

d. To provide the necessary facilities and operations capability to the Project construction workforce (including offices, welfare, catering, storage, and materials processing)

e. To be close to existing transport networks to enable the Project workforce to commute to their place of work (compounds often provide a base location for the start and end of the working day)

f. To respond to feedback from stakeholders

4.2.2 Based on the above criteria, it has been identified that 18 construction compounds are required for the main works.

4.2.3 Plate 4.1 to Plate 4.4 show the main works construction compounds

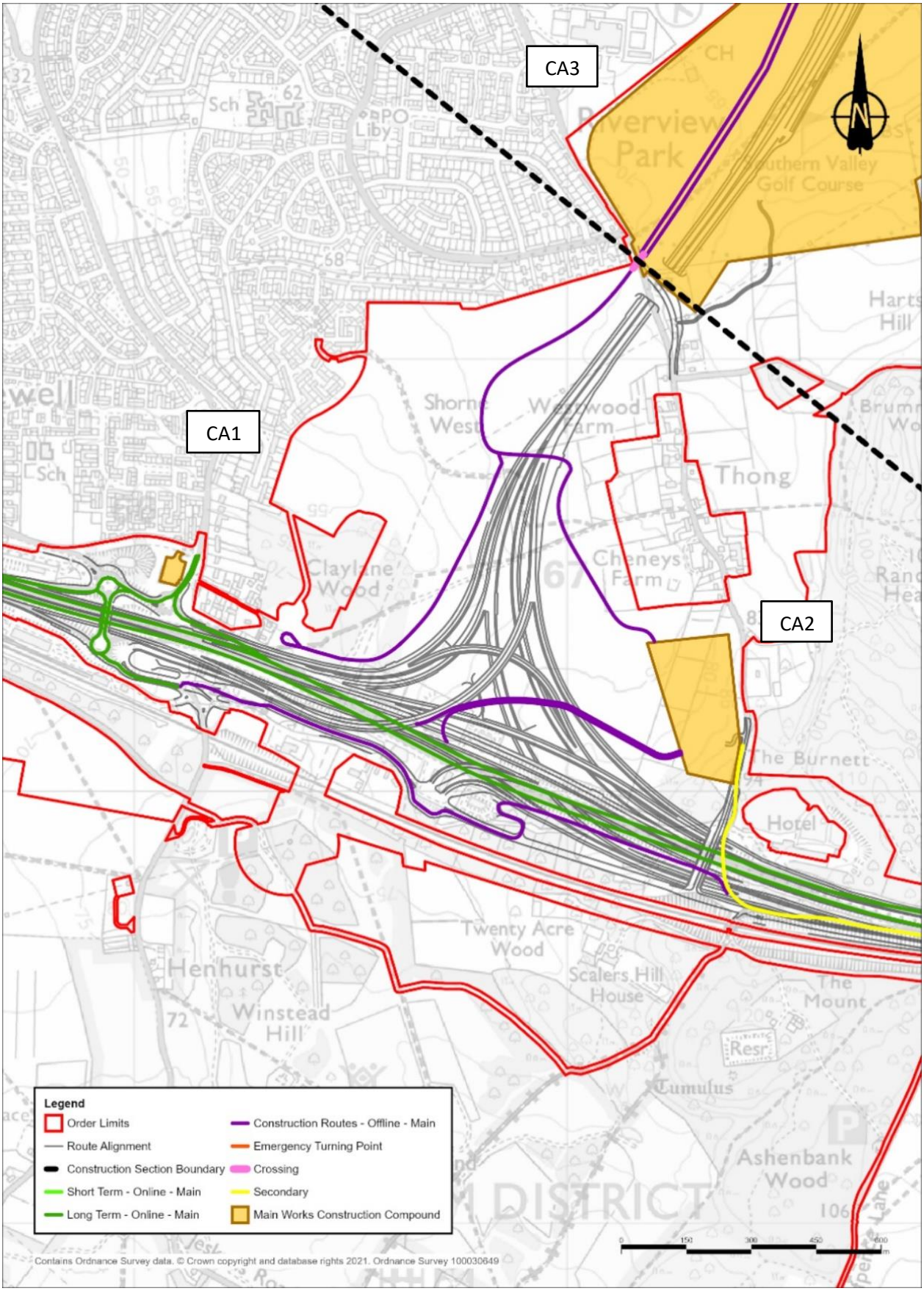
4.2.4 Plate 4.1 below shows main works compounds:

a. CA1 – near Gravesend East junction

b. CA2 – near the A2 and Thong Lane

c. CA3 – north of the dashed line (part of CA3)

Plate 4.1 Compounds and HGV construction traffic routes (A2 to Thong Lane over LTC)



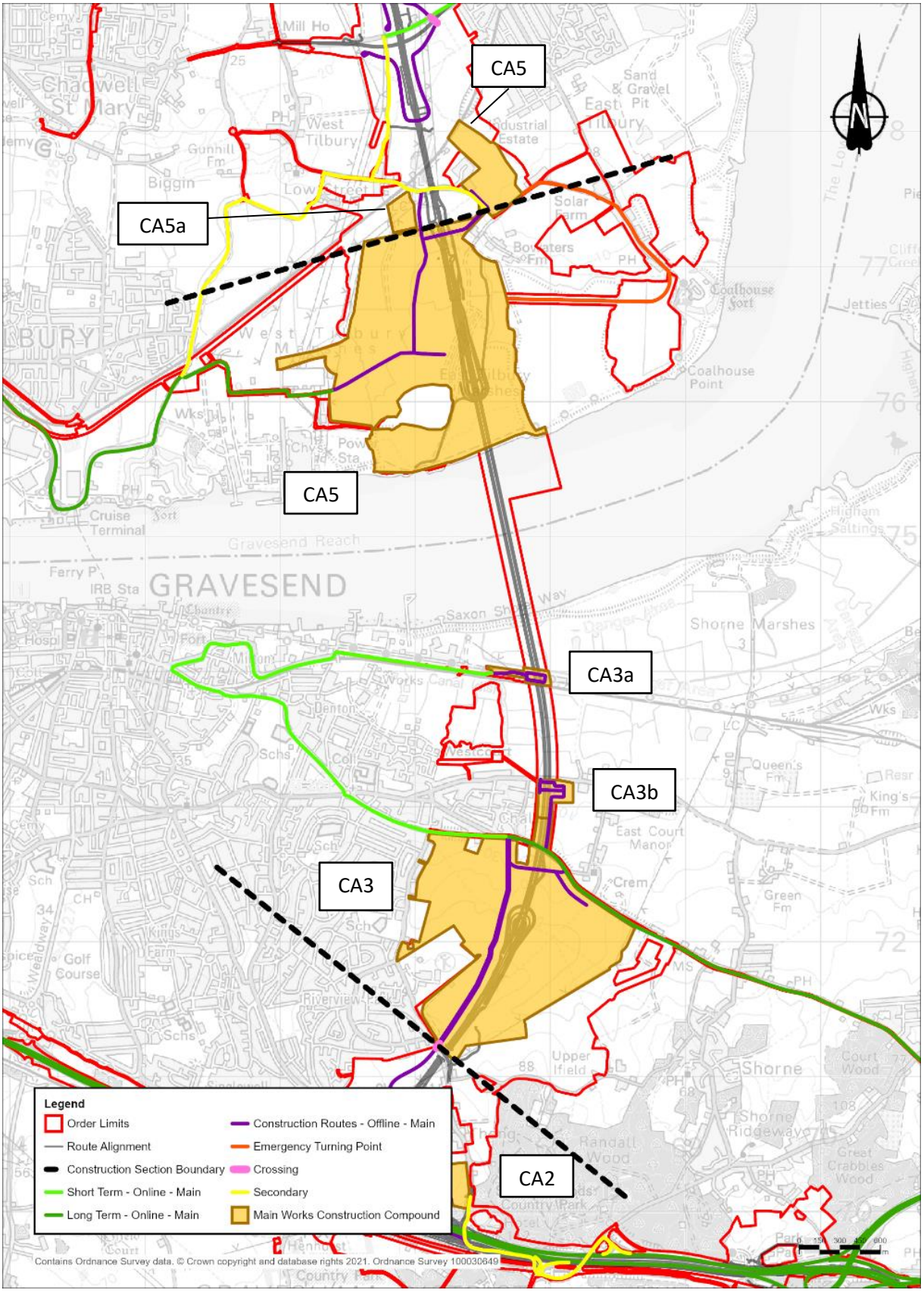
4.2.5 Plate 4.2 below shows main works compounds:

a. CA3 – around proposed southern tunnel portal

b. CA5 – around proposed northern tunnel portal (including the section between the dashes line and tilbury loop line, east of the Project alignment)

c. CA5a – between dashed line and tilbury loop line (west of the Project alignment)

Plate 4.2 Compounds and HGV construction traffic routes (South Portal to North Portal)



4.2.6 Plate 4.3 below shows main works compounds:

a. CA5 – around proposed northern tunnel portal (including the section between the dashes line and tilbury loop line, east of the Project alignment)

b. CA5a – between dashed line and tilbury loop line (west of the Project alignment)

c. CA6 – south of the A13 and east of the A1089 near Brentwood Road

d. CA7 – south of the A13 and east of the A1089 near the A1013

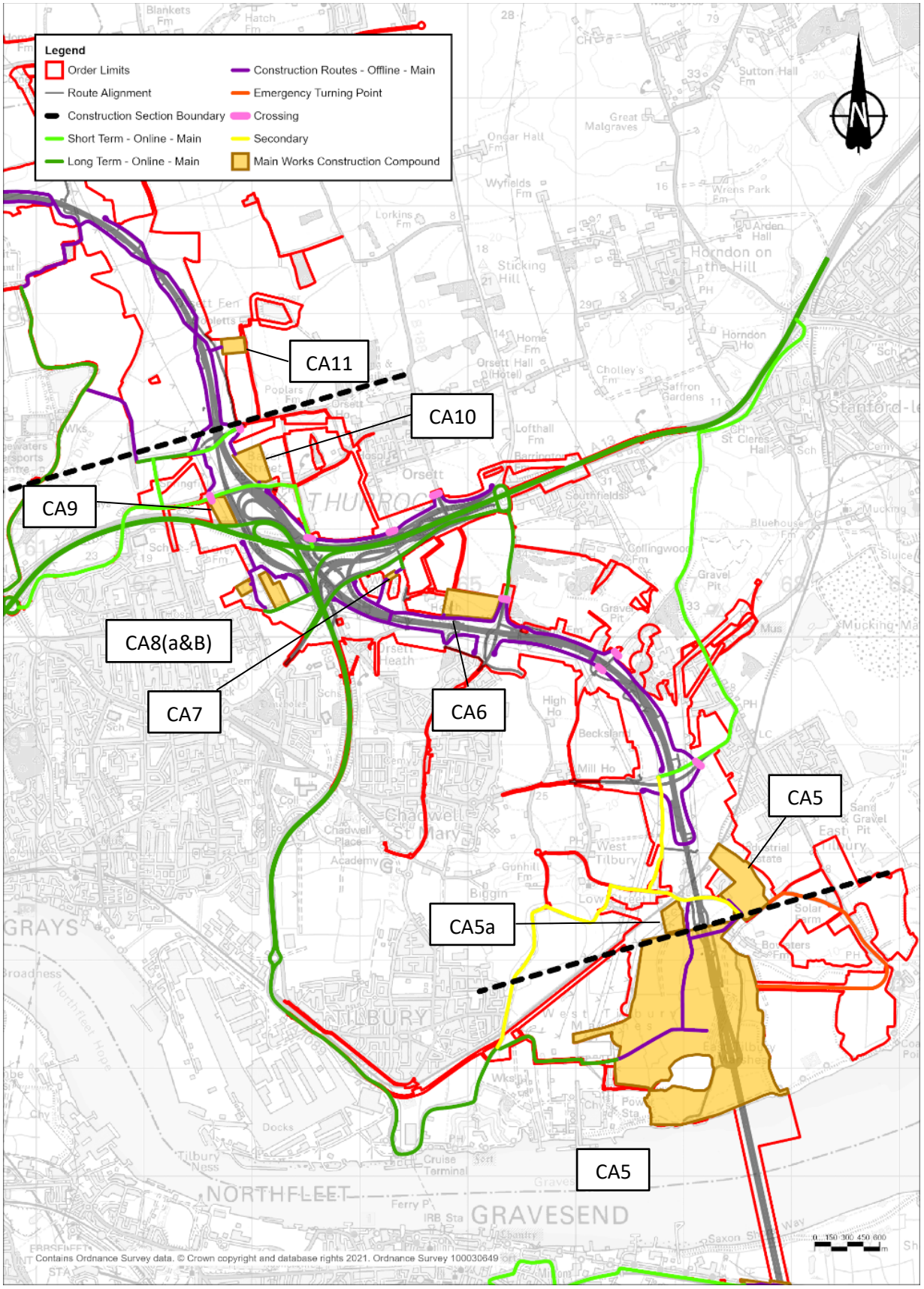
e. CA8(a&b) - south of the A13 and west of the A1089

f. CA9 – north of the A13 and west of the Project alignment

g. CA10 – north of the A13 and east of the Project alignment

h. CA11 – north of the A13, east of the Project alignment near Fen Lane

Plate 4.3 Compounds and HGV construction traffic routes (North Portal to A13)



4.2.7 Plate 4.4 below shows main works compounds:

a. CA9 – north of the A13 and west of the Project alignment

b. CA10 – north of the A13 and east of the Project alignment

c. CA11 – north of the A13, east of the Project alignment near Fen Lane

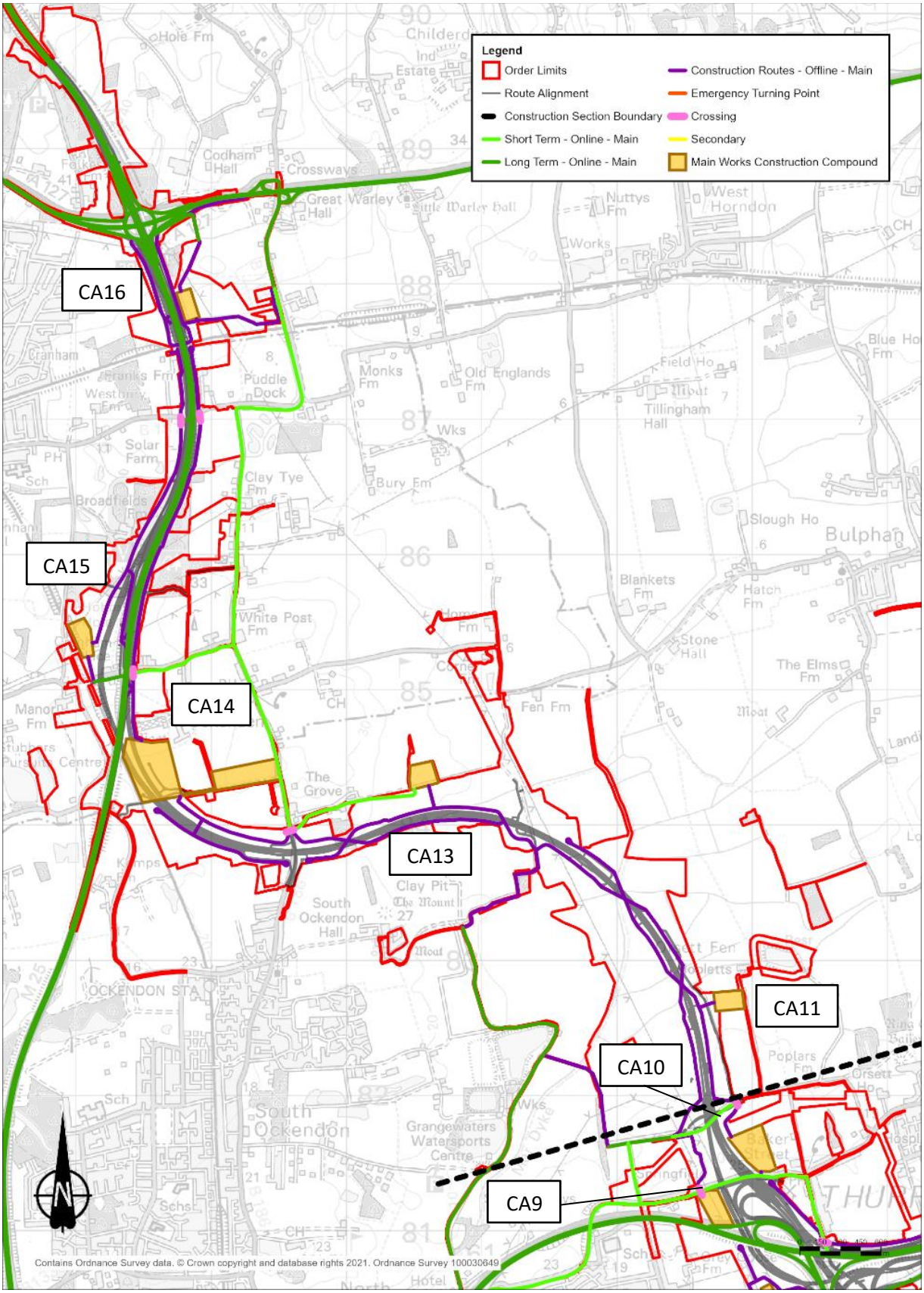
d. CA13 – north of the Project alignment in an open field

e. CA14 – just east of the M25 and near Ockendon Road

f. CA15 – just west of the M25 and near Ockendon Road

g. CA16 – just east of the M25 and near the A127

Plate 4.4 Compounds and HGV construction traffic routes (A13 to M25)



4.3 Utility logistic hubs

4.3.1 In addition to the 18 construction compounds, there would be 16 ULHs to facilitate the delivery of specific utility works. The ULHs would be required for the receiving, storing and distribution of plant and materials required for the completion of specific utility works. Their establishment, use and demobilisation would be aligned with the construction programme. The ULHs would include facilities such as office space, welfare, refuelling, security, vehicle and wheel-wash, and parking.

4.3.2 The ULHs would include a materials laydown area appropriate to the size and quantity of the materials that would need to be stored. The ULHs would be in operation to facilitate specific utilities works, and once completed, the ULHs would be demobilised.

4.4 Access routes to construction compounds and ULHs

4.4.1 Access routes to each of the 18 main works compounds from the public highway have been developed in consultation with stakeholders, including local authorities and regulatory bodies, and through development of the Project design. The oTMPfC provides an overview of the approach taken by the Project.

4.4.2 Ten of the ULHs would primarily use the same access routes as the main works compounds. For the six ULHs where access routes differ, levels of construction traffic movements will be low (further information is provided in the oTMPfC).

4.4.3 To minimise the use of the existing road network, haul routes have been proposed within the Order Limits. While these will be established early in the construction programme, some Project-related construction traffic would still need to access compounds via the local road network. The Transport Assessment (REF TBC) sets out the forecast impacts on traffic as a result of the Project. The use of the haul roads as part of the final mile approach is described in Section 6.

4.4.4 Plate 4.5 to Plate 4.8 show the additional access routes associated with utility works (in addition to the main works access routes) and the proposed utility logistic hubs (ULH) locations.

Plate 4.5 Compounds and HGV construction traffic routes (A13 to M25)

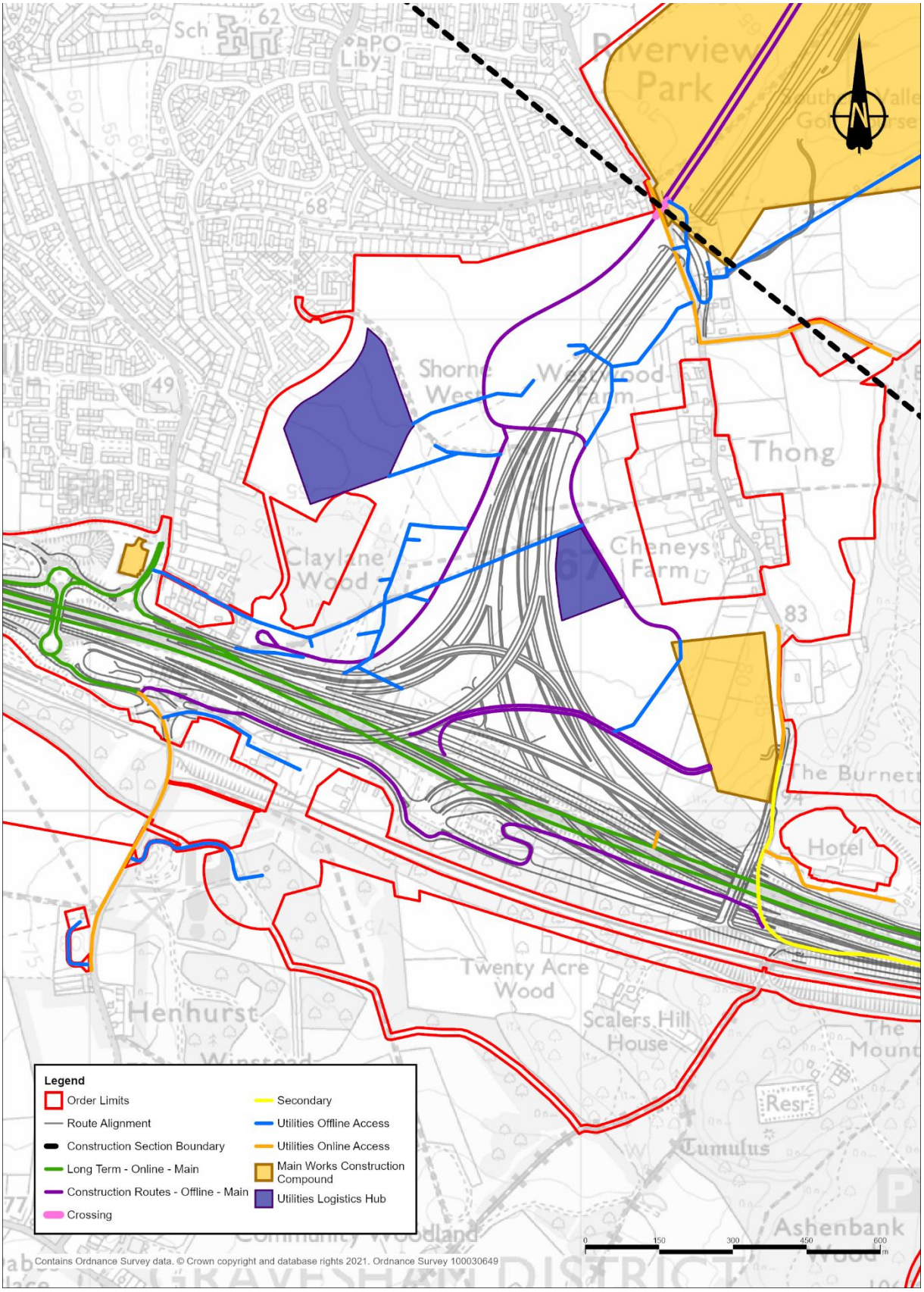


Plate 4.6 Compounds, ULH and HGV construction traffic routes including Utilities (South Portal to North Portal)

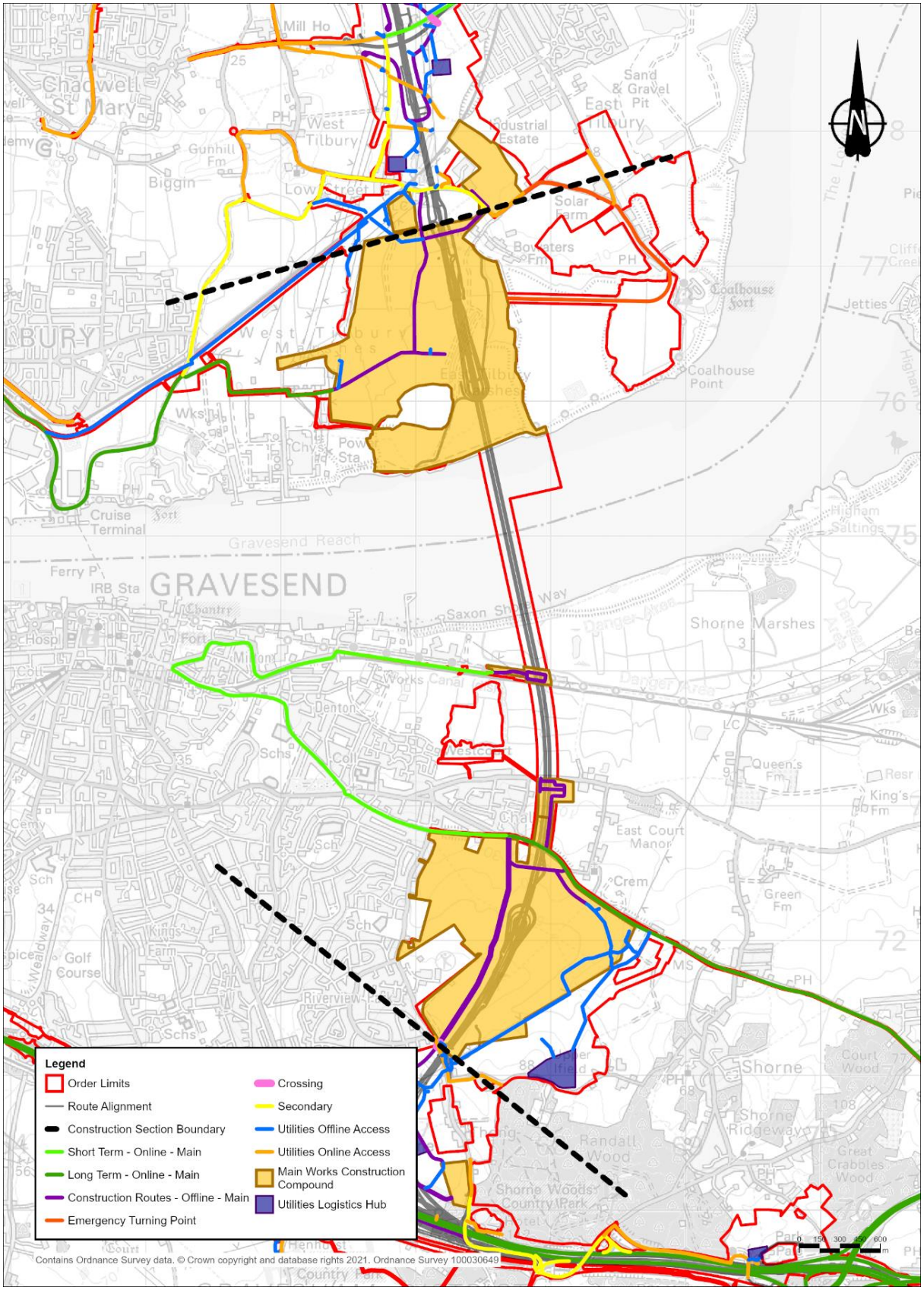


Plate 4.7 Compounds, ULH and HGV construction traffic routes including Utilities (North Portal to A13)

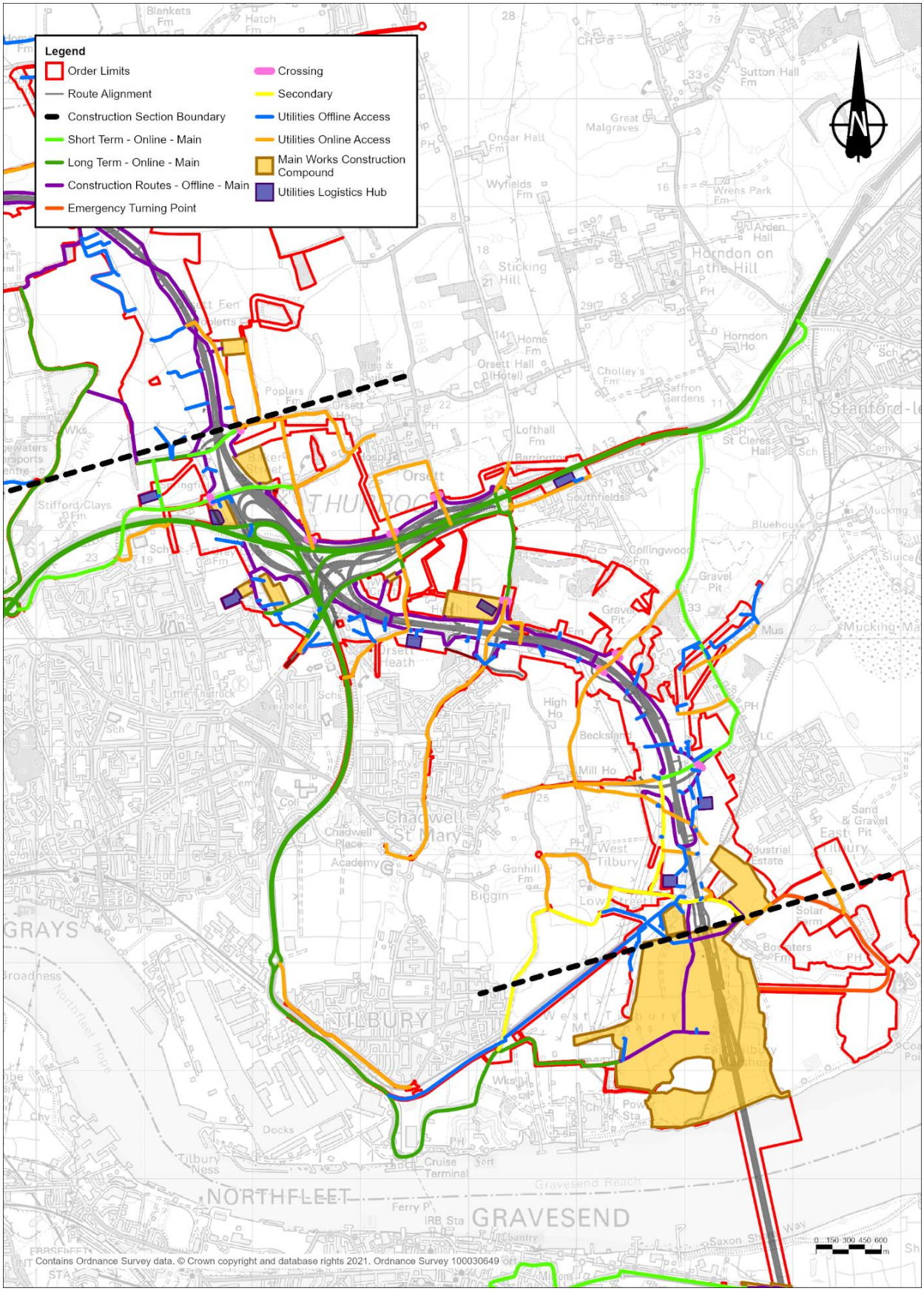
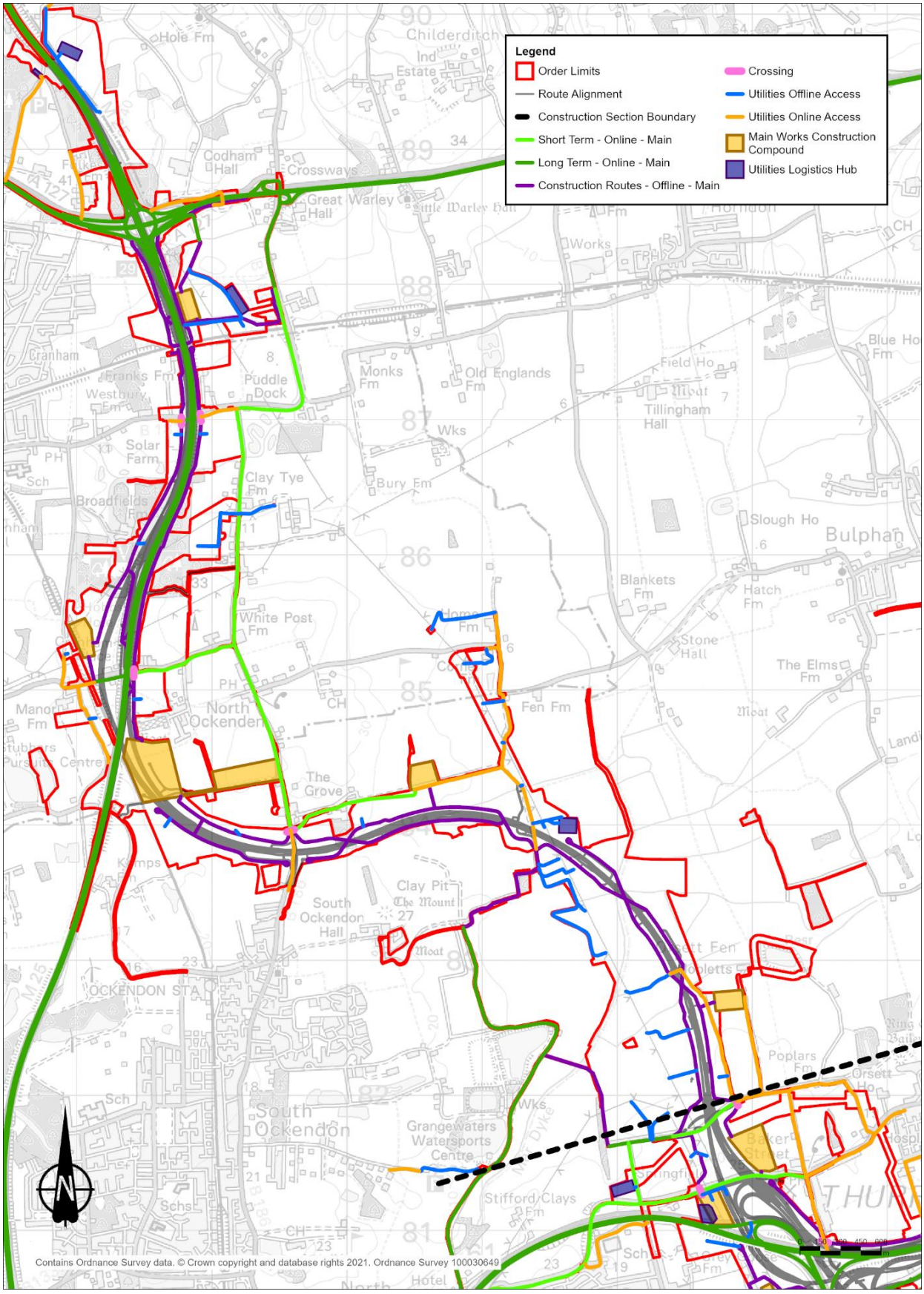


Plate 4.8 Compounds, ULH and HGV construction traffic routes including Utilities (A13 to M25)



5 Materials movements

5.1 Material supply

5.1.1 To assess the capability and capacity of suppliers to support the construction of the Project, potential local suppliers were identified and engaged. The purpose of the engagement was to understand the infrastructure in place to deliver the required materials and equipment via river, rail or local road, production capabilities and experience of supplying a major project.

5.1.2 The assessment has focused on material supplies that form the majority of Project demand in terms of quantity and frequency of construction deliveries. This included ready-mixed concrete, aggregates (sand, gravel, rock and recycled), cement and asphalt.

5.1.3 Kent County Council and Essex County Council have produced aggregate assessments for local supply opportunities.

5.1.4 Targeted engagement was also undertaken with suppliers that have numerous sites local to the Order Limits and experience of supplying major projects to better understand availability of supply within the 20km catchment area.

5.1.5 The assessment focused on a 20km catchment area, considered to equate to a road journey of up to one hour, which is considered to embody the proximity principle and focus on supply sites and depots most likely to be used in the Project's construction.

5.1.6 The sites identified in principle could form part of the appointed Contractors supply source during construction. It would be for the appointed Contractor to agree the procurement of their material supply during construction. The sites identified are listed in Appendix A and categorised by their multimodal delivery capabilities and proximity to the Project.

5.2 Material transportation to the Project sites

Aggregate transportation via rail

5.2.1 The majority of rail-borne aggregates used by the construction sector in London and the surrounding area are sourced from one of three areas: the Mendip Hills in Somerset, Leicestershire, or the Peak District.

5.2.2 Traffic from the Mendip Hills dominates, travelling along the Great Western route into Greater London at Acton. From this central facility (Acton), trains are forwarded or divided to carry large or smaller loads to their respective destinations

5.2.3 By contrast, traffic from Leicestershire and the Peak District tends to run directly to terminals via the Midland Main Line.

5.2.4 The review of potential local suppliers to support the delivery of the Project has identified several sites that utilise the existing rail paths to deliver material near to the Project. It would be possible to use rail as part of a multimodal approach to import materials to the Project via an existing rail connection, with onward transport via the road network.

5.2.5 Section 7 has provided detail on the limitations to provide a direct rail connection to the Project.

Aggregate transportation via river

5.2.6 As discussed in Section 3, there are three operational jetties on the north bank of the River Thames in close proximity to the Order Limits, however all the jetties are fully utilised by existing landowners and business owners and do not have additional capacity for import of materials for the construction of the Project.

5.2.7 Both Port of Tilbury London Limited (PoTLL) and Port of Tilbury2 are close to the Project Order Limits. Port of Tilbury2 has a Construction Materials Aggregate Terminal (CMAT) within it, which will receive aggregates by river and distribute onwards via road or rail into London and Essex. This provides an advantageous supply connection for the Project given its close geographical proximity.

5.2.8 The Project recognises the opportunity that Port of Tilbury2 presents for reducing vehicle movements by road. As such, the Project and MWCs will engage with aggregate suppliers and the Port of Tilbury2 collaboratively, to proactively seek opportunities to use the Port, and develop a strategy that supports reduction of material movement by road vehicles. This strategy should consider traffic impacts on the Asda roundabout and should also incorporate the principles of the 'final mile' strategy (Section 7.4).

5.3 Waste movement

5.3.1 Each construction compound would have a defined waste management area. Contractors would be required to define an area to enable the segregation of wastes to increase recovery. The oSWMP provides high-level principles for the management of waste during construction of the Project. Using the principles set in the oSWMP, a construction phase site waste management plan will be developed by the appointed Contractor during construction (refer to Control Plan extract in Plate 2.1).

5.3.2 The oSWMP also includes detail on the types and quantities of waste forecasted to be generated that will require management.

5.3.3 The Code of Construction Practice (CoCP) includes mitigation measures to support the reuse and recovery of materials and minimise offsite waste management to reduce the associated number of vehicle movements. Specific waste commitments are made in the REAC and detailed in the Outline Site Waste Management Plan

5.4 Excavated material receiver sites

5.4.1 It is important to understand the anticipated volumes of excavated material which will need to be taken offsite, to validate available offsite capacity at third-party receiver sites (Section 6.3 provides further detail on anticipated volumes).

5.4.2 A detailed description of the approach and identified receiver sites will be provided in the Excavated Materials Assessment (EMA) (REF TBC) which will be provided in the DCO Application. The EMA will provide a framework to allow the MWC to identify and assess new or alternative receiver sites which were not previously assessed, or which were previously excluded as potential receiver sites. This would be subject to the sites meeting the criteria established in the EMA.

5.4.3 By identifying potential receiver sites and demonstrating capacity, the EMA has helped develop assumptions for the management of excavated material, to inform the construction traffic impact assessments.

5.4.4 Appendix B provides an overview of the third-party waste facility sites identified to date.

6 Movements of excavated material

6.1 Introduction

6.1.1 An assessment of earthwork quantities has been carried out to establish an illustrative approach to handling excavated material. This will include associated mass haul movements i.e. how is the transportation of excavated material handled between point of excavation to destination for placement, stockpiling and/or management offsite. This assessment has been used as a baseline position to support the traffic and environment assessments.

6.1.2 The earthwork assessment includes the following:

a. Quantification of excavated material defined as surplus to the needs of the Project

b. Indicative illustration of mass haul movements using the temporary haul roads defined as 'offline', and movements using the road network defined as 'online'

c. A project wide view to the management and handling of excavated material.

6.1.3 The ground investigation works have provided information on the physical (geotechnical) and chemical properties of excavated material. It is important to understand the anticipated quantities and geology of the excavated materials to establish appropriate handling and use onsite, or management offsite if surplus to requirements and if hazardous materials are encountered.

6.1.4 The mass haul movements shown in the assessment are indicative and likely to change as the Project is developed through detailed design, and as the nature of the ground is fully understood during excavation activities.

6.1.5 Detail has been provided within section 6.4 regarding the duration of excavated material mass movements where vehicles need to move via an online route and the process may be obstructive, e.g. a planned road closure is required to facilitate the movement safely and mitigate the impact on the road network. Mass haul movements that are offline along the internal haul road are generally unconstrained and will be carried out in line with the appointed Contractor phasing and programme of works.

6.2 Overview of excavated material volumes

6.2.1 The Project would require onsite retention (within the Order Limits) of approximately 11.7 million m^3 of excavated materials. The volume of material considered to be unsuitable for reuse, or surplus and requiring management offsite, is estimated to be approximately 1.33 million m^3.

6.2.2 Table 6.1 provides a further breakdown of the excavated material volumes.

Table 6.1 Volume and type of excavated materials (as dug)

Location	Section A - Kent Roads		
South of the River Thames	Material type	Material is anticipated to be Chalk (as dug), with lesser contributions of made ground and Head deposits.	
	Excavated volume (m^3)	~1,480,000	
	Volume for retention within Order Limits (m^3)	~1,458,000	
	Volume for offsite management (m^3)	Inert	0
		Hazardous	~22,000
	Section B (South of River Thames) – Tunnels & Approaches		
South of the River Thames	Material type	Material is anticipated to be Chalk (as dug) with lesser contributions of made ground, Alluvium, River Terrace Deposits and Head deposits.	
	Excavated volume (m^3)	~2,515,000	
	Volume for retention within Order Limits (m^3)	~2,513,000	
	Volume for offsite management (m^3)	Inert	0
		Hazardous	~2,000
	Section B (North of River Thames) – Tunnels & Approaches		
North of the River Thames	Material type	Material is anticipated to be Chalk slurry (from tunnel boring machine (TBM) with made ground (landfill), pulverised fuel ash, Peat and Alluvium from the launch ramp and North Portal area.	
	Excavated volume (m^3)	~2,135,000	
	Volume for retention within Order Limits (m^3)	~2,110,000	
	Volume for offsite management (m^3)	Inert	~520,000 * *offline transportation to IVL receiver site located within the order limits*
		Hazardous	~25,000* offsite management (outside of Order Limits)
	Section C – Roads North		
North of the River Thames	Material type	Material is anticipated to be made ground, Alluvium, River Terrace Deposits and Clay	
	Excavated volume (m^3)	~3,195,000	
	Volume for retention within Order Limits (m^3)	~2,710,000	
	Volume for offsite management (m^3)	Inert	~470,000
		Hazardous	~15,000

	Section D – Roads North		
North of the River Thames	Material type	Material is anticipated to be made ground, Alluvium, River Terrace Deposits and Clay	
	Excavated volume (m^3)	~2,405,000	
	Volume for retention within Order Limits (m^3)	~1,606,000	
	Volume for offsite management (m^3)	Inert	~793,000
		Hazardous	~6,000
	Summary		
Project Total	Excavated volume (m^3)	~11,730,000	
	Volume for retention within Order Limits (m^3)	~10,397,000	
	Volume for offsite management (m^3)	Inert (management outside of Order Limit	~1,333,000,
		Inert (management within the Order Limits)	~520,000
		Hazardous	~70,000

6.3 Provision for stockpiling

General approach

6.3.1 It will be necessary to include provision for stockpiling of excavated materials during construction works, to aid the phasing of construction and the reuse of material across the Project. Where practicable, the phasing of the earthwork activities would promote minimising double handling (handling and placement of excavated material more times than necessary) and movement of material to its permanent destination.

6.3.2 Provision has been made within the Order Limits for stockpiles. Within compounds, stockpiles will be managed relative to the site-specific activities. The stockpiling areas will consider sensitive receptors in the layout, along with managing the impact of the following:

a. Lighting

b. Access and egress

c. Loading/unloading areas (including hours of operation)

d. Dust

e. Noise

f. Visual impact

g. Rainwater runoff

6.3.3 Where reasonably practical, the stockpile locations within the compounds will be positioned to provide mitigation, such as sound or visual barriers, in line with the environmental impact assessment (REF TBC). This mitigation is detailed in the Register of Environmental Actions and Commitments

6.4 Offline transportation of excavated material

6.4.1 Mass haul movements of excavated material within the worksites would predominately be offline via a constructed internal haul road network.

6.4.2 A key principle in the handling of excavated material is to maximise the transportation via offline haul roads to minimise the impact on the online road network, both strategic and local.

6.4.3 There would be over 11.7 million m^3 of material excavated to be transported across the site for reuse, with a further 1.34 million m^3 estimated for management offsite.

6.4.4 The following primary worksite locations have been identified where significant offline movements would occur. The locations are presented by each of the key construction areas in terms of the site geography: Roads North; Tunnels; and Kent Roads. For each worksite described, the associated compound has been referenced to provide context to location and access arrangements.

Roads North

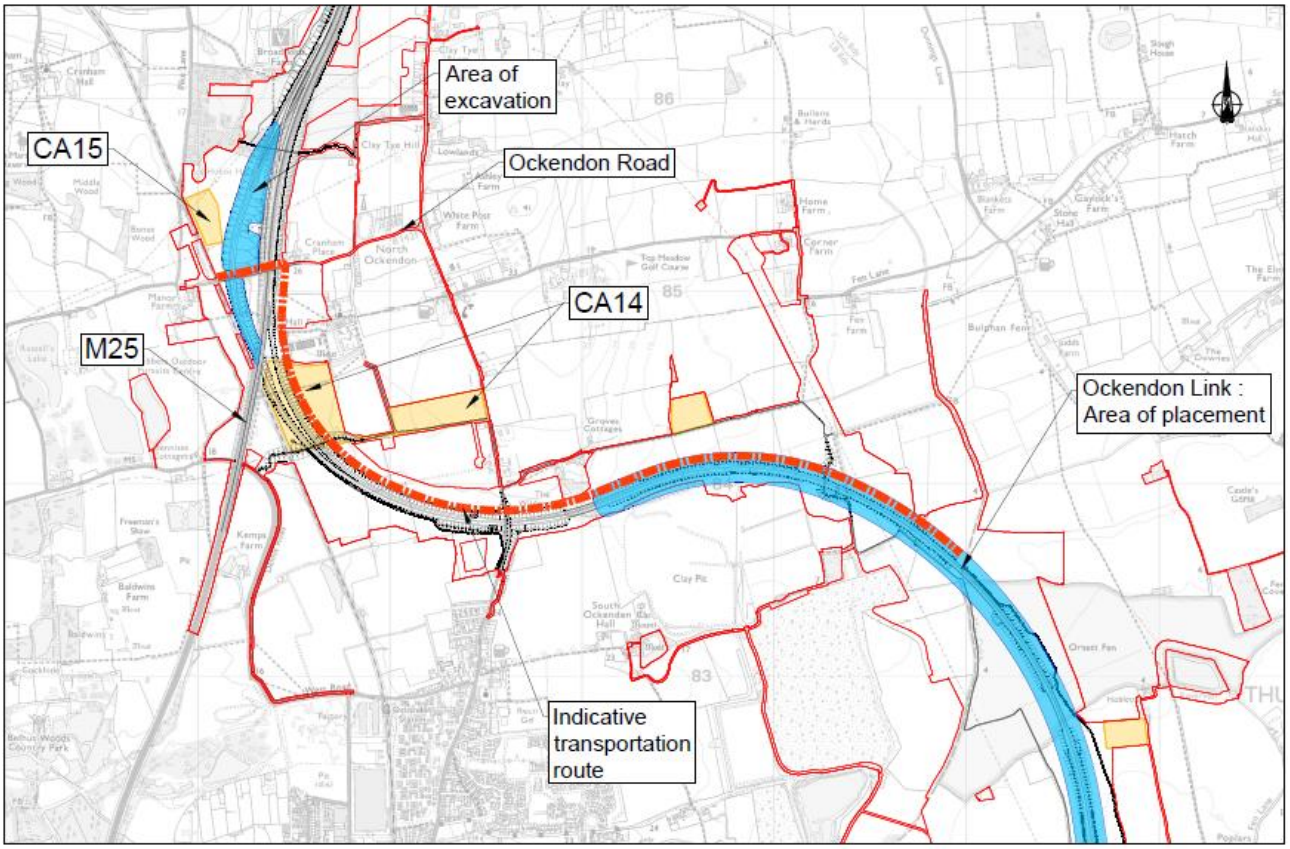
To construct the Ockendon Link

6.4.5 Several earthwork operations would be required to form the embankments for the proposed Ockendon Link of the Project route (CA14, CA13 & CA11). The location west of the M25 (CA15) where a deep cutting would be formed to connect the Project road to the M25, has been identified as a source for suitable material to form these embankments in addition to material sourced from the Ockendon Link.

6.4.6 The earthwork operation assessment has identified a deficit of approximately 100,00 m^3 for suitable material within the Ockendon Link location.

6.4.7 The worksites between the location of the material source west of the M25 (point of excavation) and placement will be constrained by the existing M25 alignment to maintain a direct offline route. It is anticipated that there will be over 12,000 construction vehicle movements to transport the excavated material using the road network. To mitigate this online movement, the transportation period will align with the closure of Ockendon Road over a period of up to 20 months. The material will then be transported using earthmoving construction vehicles along Ockendon Road during the closure period. This will provide direct offline access to the haul road for transportation to the work sites associated with the construction of the Ockendon Link, while mitigating any associated construction traffic impacts associated with this mass haul movement on the online road network. The proposed route is shown in Plate 6.1.

Plate 6.1 Ockendon Road offline haul route



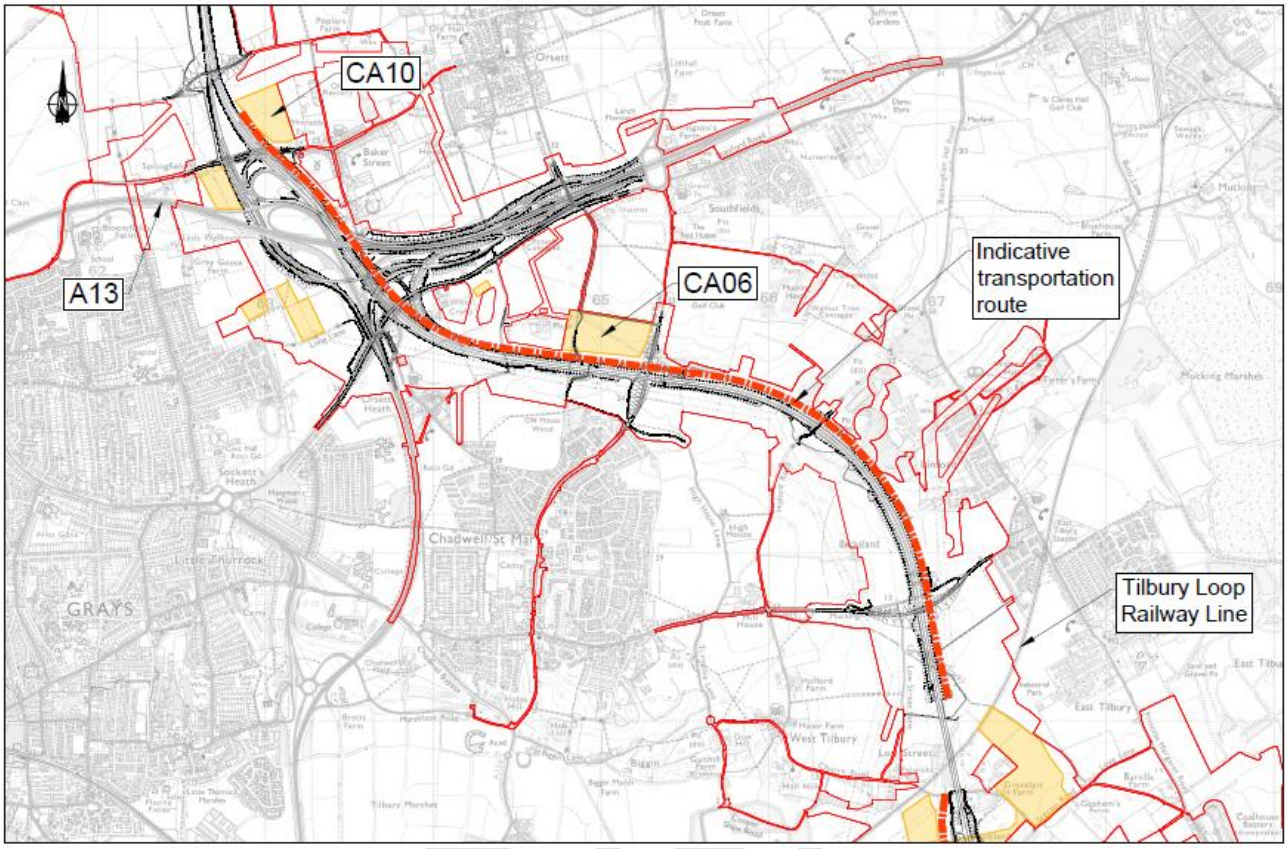
South of A13 up to the Tilbury Loop railway

6.4.8 The construction of the 4km section of the Project route south of the A13 up to the Tilbury Loop railway line (CA06) will require a significant earthwork operation. This will involve the construction of a series of embankments and false cuttings, to form the Project route and associated crossings over the local road network.

6.4.9 The earthwork operation assessment has identified a requirement for approximately 900,000m^3 of excavated material to form the embankments and false cuttings, across the 4km section. It is anticipated that the primary source of material used would initially be from the cutting operations along the Project route within this section. Once a route is established under the A13 as part of the Project route, the remaining excavated material required will be sourced from the cutting operations north of the A13 (CA10).

6.4.10 The transportation of the 900,000 m^3 of excavated material will be via the constructed haul roads using heavy duty construction vehicles. The haul road in this section follows the Project route including under the A13, mitigating the need to use the road network to access north of the A13. The haul road in this section would require a series of road crossings at the point of interface with the local road network. The road crossings will be managed under temporary traffic signals or a similar system. The oTMPfC provides further detail of temporary traffic management measures. This is illustrated in Plate 6.2.

Plate 6.2 Illustration of mass haul movements south of the A13 towards Tilbury Loop Rail line



Tunnels

North Portal Site (CA05)

6.4.11 The earthwork operation at the North Portal site would involve the handling of approximately 2.1 million m^3 of excavated material. This includes the material generated from the two TBMs.

6.4.12 The site is situated on and adjacent to Goshems Farm, a historical landfill site located between the North Portal and the River Thames and includes a parcel of land called Shed Marsh. The site is currently managed by Ingrebourne Valley Limited (IVL) as part of a restoration project to raise the land using inert material and restore it back to high quality, arable farmland. IVL has been receiving excavated material from several major infrastructure projects in London, for approximately five years. IVL operates the existing permits associated with these sites.

6.4.13 Shed Marsh would be used to temporarily store and manage excavated material generated from the North Portal and tunnelling operations.

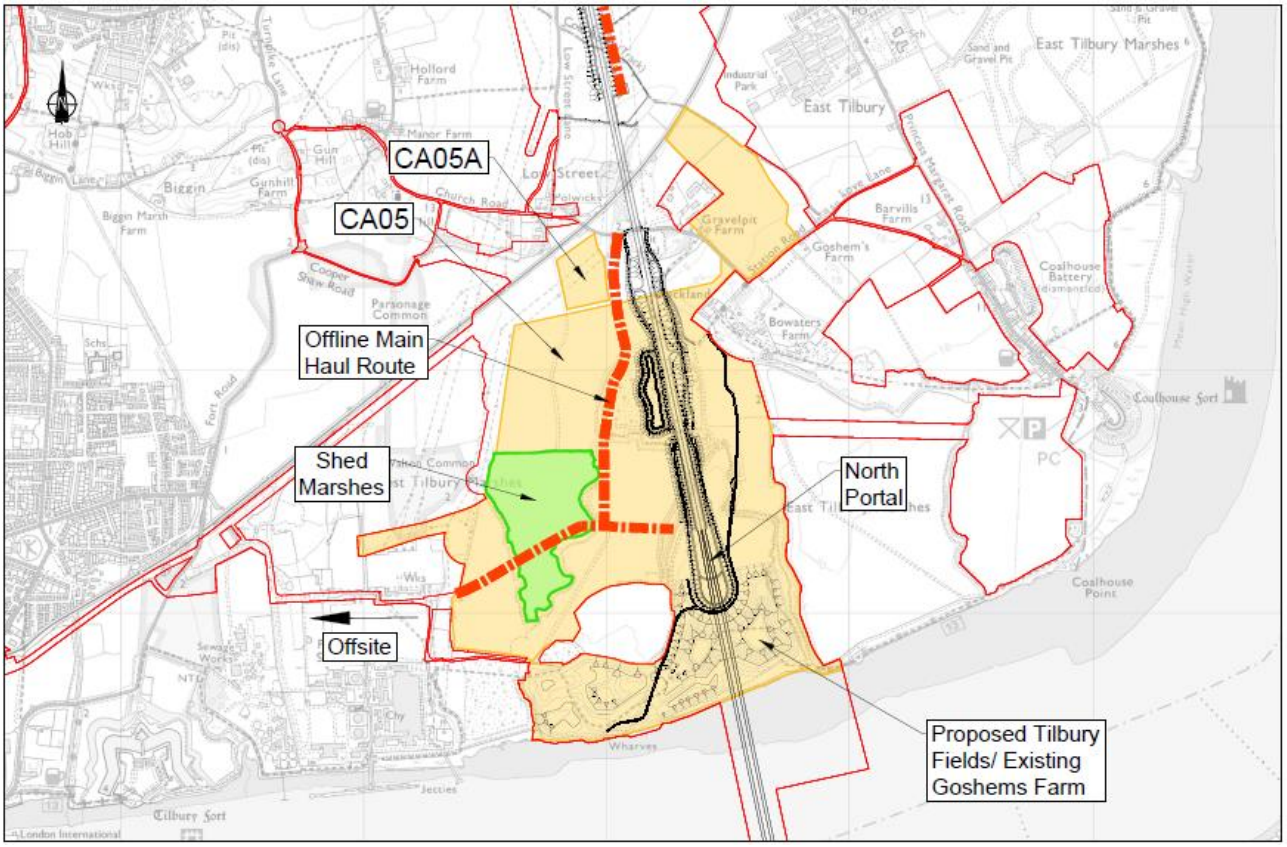
6.4.14 As part of the proposed Project design the Tilbury Fields landscape feature will be situated on the existing Goshems Farm. The design of Tilbury Fields looks to utilise the excavated material generated from the construction of the tunnel and portal to create a multi-functional space located on the River Thames, and adjacent the Northern Portal. The various materials excavated from the tunnel can be used to create the substrate for the creation of an open mosaic habitat at Tilbury Fields, for the benefit of invertebrates and other fauna. The

designation of Tilbury Fields as a Park will help the regular disturbance of land that would benefit the open mosaic habitat.

6.4.15 Approximately 1 million m^3 of material arisings from the north portal construction and tunnel boring will be used to develop the landscape feature. A further 550,000m^3 will be used to form the embankments and landscaping surrounding the North Portal. It is anticipated the works will occur concurrently with the tunnelling and North Portal construction works as the excavated material becomes available for placement. The remaining surplus approximately 520,000m^3 will be retained within the Order Limit and managed by IVL as part of their long-term restoration project.

6.4.16 The transportation of all the excavated material (excluding any contaminated material) from the North Portal construction and tunnelling operations will be offline, using heavy duty construction vehicles. Haul roads will be constructed to facilitate the movement of excavated material at the North Portal site.

Plate 6.3 Overview of the North Portal site and Goshems Farm



Kent Roads

Between Thong Lane and the A2

6.4.17 The construction of the Project route north of the A2 and south of Thong Lane (in the vicinity of CA02) involves a series of deep cuttings and construction of embankments.

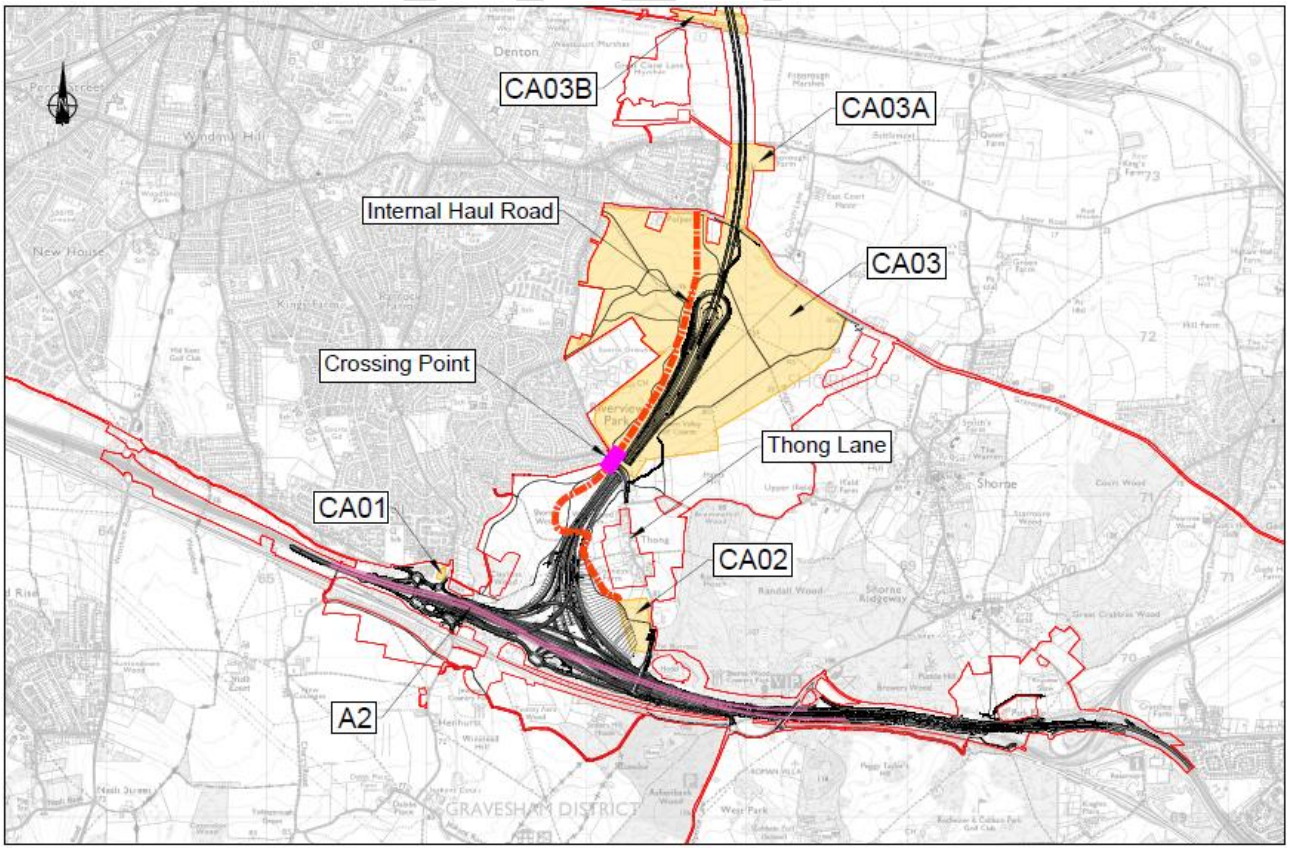
6.4.18 The earthwork operation would require approximately 1.4 million m^3 of excavated material to be handled and placed to form the deep cuttings, embankments and proposed Project landscape contours. The earthwork assessment has identified there is a deficit of 270,000 m^3 of excavated material, which will be sourced from the South Portal site (CA03), just north of Thong Lane.

6.4.19 The remaining 1.13 million m^3 will be sourced from the cutting operations between Thong Lane and the A2.

6.4.20 The transportation of the 1.4million m^3 of excavated material will be via the constructed haul roads using heavy duty construction vehicles. The haul road in this section follows the Project route and will be modified to suit the phasing of the works in this area.

6.4.21 It is anticipated there will be over 15,000 movements associated with transporting the excavated material from the South Portal worksite to south of Thong Lane. This material will be transported along the internal haul road but would need to cross Thong Lane. The road crossing will be managed under temporary traffic signals or a similar system to manage the traffic flows along Thong Lane. In addition, provision has been made within the Order Limits either side of the proposed Project route and associated compounds (CA02 and CA03) for stockpiling of material. Stockpiling will reduce the frequency of vehicle movements and mitigate against construction impacts associated with the construction vehicle movements at the crossing point.

Plate 6.4 Transportation route of excavated material between the South Portal site and south of Thong Lane



6.5 Online transportation of excavated material

6.5.1 There is a Project focus on maximising offline mass haul movements. In most cases, as described in Section 6.4, this has been achieved. In the circumstances described below, where online movements have been specified, this is due to physical constraints such as a railway line or crossing of the SRN. In the case for offsite management of excavated material, this is limited to a road-based approach due to the limitations with the use of rail and river described in Section 7.2.

6.5.2 The following locations have been identified where online movements would occur. The locations are presented by each of the key construction areas, i.e. Roads North, Tunnels and Kent Roads. For each worksite described the associated compound has been referenced to provide context to location and access arrangements.

Kent Roads

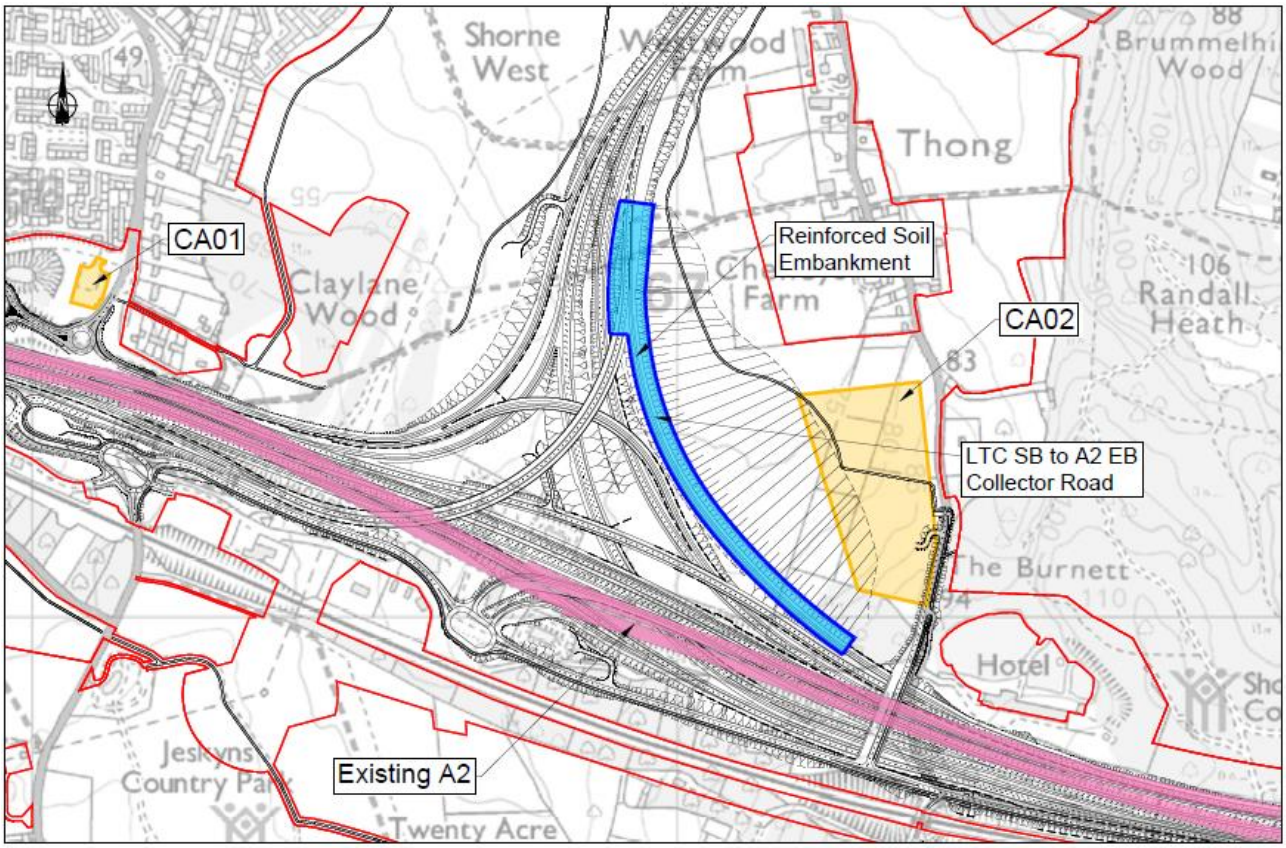
External importation of reinforced soil – CA02

6.5.3 The construction of the reinforced soil embankment to form the Project route southbound to A2 eastbound collector road would require the importation of reinforced soil. The initial ground investigation has indicated the material in this area is unlikely to be suitable to construct the reinforced soil embankments resulting in a requirement to import 360,000m^3 of material.

6.5.4 The earthwork assessment has identified that the classification of the material required to form the reinforced soil embankments, will need to be imported from an external source i.e. excavated material not generated by the Project. The appointed Contractor would be required to source suitable material and transport it in accordance with the MHP and the temporary traffic management plan.

6.5.5 Due to the lack of suitable rail and river connectivity, the material would be transported using the earthmoving construction vehicles via the road network. The location of the worksite is in the vicinity of CA02 and the material would be transported via the A2 and onto the connecting haul road for placement and/or storing. The transportation of this material would require over 40,000 construction vehicle movements over a short period of time (anticipated less than one year). Provision for stockpiling has been made within CA02. This will provide flexibility in the transportation of material over a longer duration (within the anticipated 1-year) at a steady frequency to mitigate against the impacts of high frequency of movements over a short period.

Plate 6.5 Location of reinforced soil embankment



Roads North & Tunnels

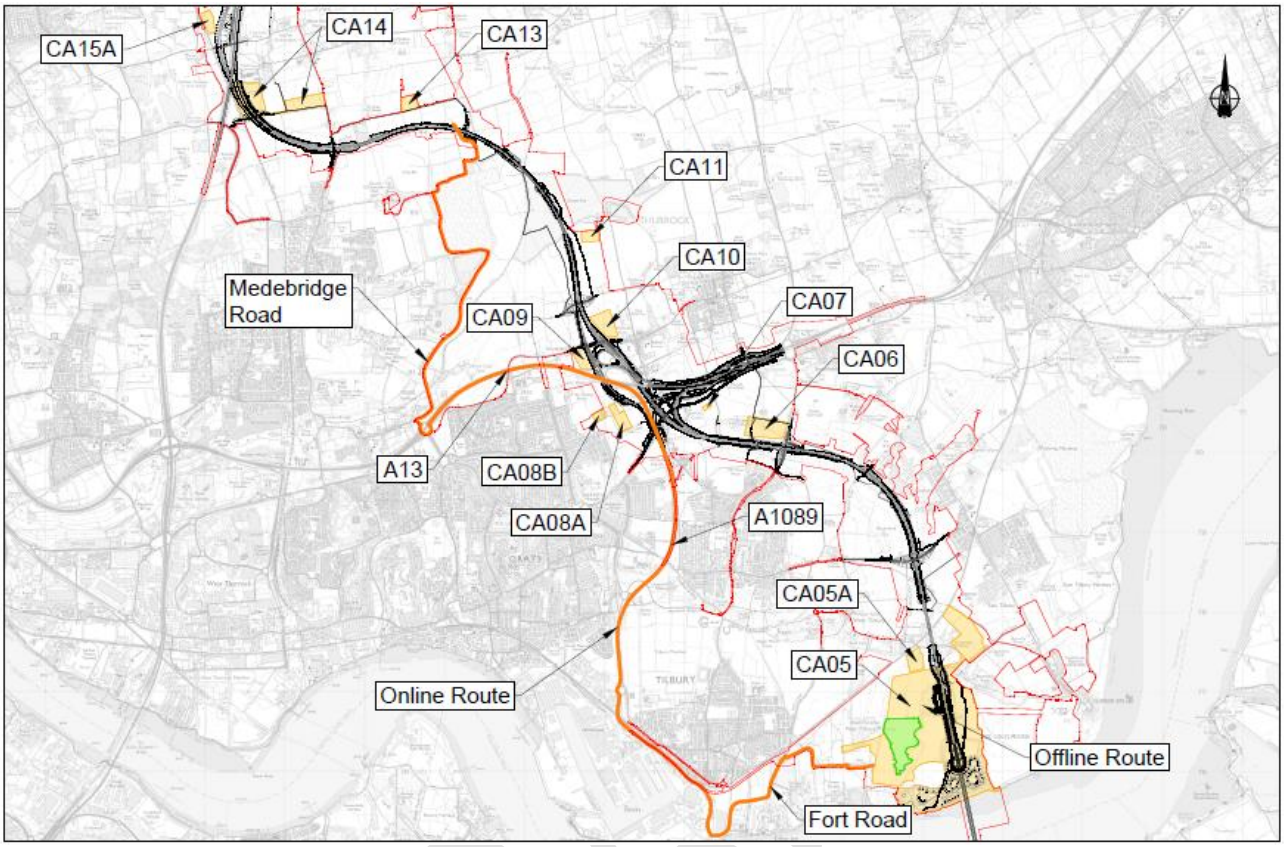
The transfer of excavated material between work sites in the vicinity of CA06, CA10 & CA14 to CA05 and CA05a

6.5.6 The construction of the Project route and connecting access road at the southern end of the Tilbury viaduct (CA05a) and North Portal approach (CA05) requires the construction of structural embankments. The initial ground investigation has indicated the material in this area is unlikely to be suitable to construct the structural embankments resulting in a requirement to import 310,000m^3 of material.

6.5.7 The earthwork assessment has anticipated the importation of this material would come from the worksites located north of the Tilbury Loop railway line (CA06) including A13 (CA10) and the M25, where there is a surplus requirement of excavated material.

6.5.8 The offline transportation of material between worksites situated further north at the A13 and M25 worksites (CA06, CA10 and CA14) is constrained by the location of the Tilbury Loop railway line. The level crossing at Station Road has limited periods for traffic to cross over the Tilbury Loop railway line. With over 35,000 construction vehicle movements to transport the imported material the capacity for crossing at Station Road is not feasible. As a result, the online route identified would be via the A13, A1089 and Fort Road providing access to the worksite, while avoiding the use of the Station Road level crossing. It is anticipated that the material would be required towards the latter end of the programme. Provision has been made within the associated compounds for stockpiling to enable transportation of material over a longer period at lower frequency of HGV movements.

Plate 6.6 Online route of transportation of excavated material between worksites north and south of the Tilbury Loop railway



6.6 Management of material offsite to receiver sites

6.6.1 The earthwork assessment has identified the following quantities of excavated material as surplus to requirements, for management offsite:

a. North of the River Thames: 1,309 million m^3 (an additional 520,000m^3 is managed by IVL but retained within the Order Limits)

b. South of the River Thames: 24,000m^3 (of which all is contaminated material)

6.6.2 The above quantities include excavated contaminated material as well as inert excavated material.

6.6.3 As detailed in Section 5.4, the Excavated Material Assessment (REF TBC) will have a set a criterion to establish suitable receiver sites and waste facility sites. The appointed Contractor will identify suitable sites for transporting excavated material surplus to requirements.

6.6.4 The transportation of this material will be via the road network using earthmoving construction vehicles to suitable sites identified by the appointed Contractor. South of the River Thames, there are 3,000 construction vehicle movement and in the north over 155,000 construction vehicle movements associated with the surplus of excavated material.

6.6.5 It is anticipated the offsite transportation of the excavated material will be spaced out over the duration of the earthworks programme (approximately four years). In addition, provision has been made within the Order Limits including compounds for stockpiling of material. Doing so would mitigate against the construction impacts associated with the construction vehicle movements.

7 Transport options for materials movement

7.1 Introduction

7.1.1 This section summarises the Project's material transport options and details the final mile approach.

7.1.2 There are limited existing direct connections to the Project Order Limits which can be used for the transport of material. A review of the use of road, river, and rail networks has been carried out with a focus on the final mile strategy (the road-based link between the multimodal point and the applicable construction worksite).

7.1.3 This has helped identify an approach to reduce and manage the impacts of construction vehicle movements (as set out in the oTMPfC) on the wider transport network and onsite materials management, by getting materials as close to the construction worksites as possible before using the road network.

7.1.4 Construction vehicle movements broadly cover the following:

a. Hard materials/assets deliveries such as drainage pipes and ducting

b. Aggregate materials such as sand, cement and ballast

c. Abnormal loads for bridge beams and plant

d. Utility plant and materials

e. Waste removal

f. Earthworks movements on site

7.2 Considerations of transport options for material movement

Rail

7.2.1 There are no existing railheads within the Order Limits. As such, the feasibility of implementing direct rail connections has been evaluated in terms of environmental impacts, available capacity, construction demand and operations, as detailed below.

Rail: south of the River Thames

7.2.2 The construction works required to be undertaken south of the River Thames TBM reception site and A2/M2 connection sites) will produce significant volumes of excess ground materials. The majority of this material will be used to execute project design. The only exception would be contaminated material, which would need to be disposed of offsite in an appropriate facility.

7.2.3 Hoo Junction is an operational rail yard 7km away by road. However, it is primarily used by track maintenance fleets and is sited on the busy North Kent railway line, with frequent commuter services which would impact the availability of this rail route (in terms of the timing and ability to dispatch a train). Because

works south of the River Thames (specifically the South Portal site and compound) are not physically adjacent to Hoo Junction, materials or arisings would need to be transported to the rail yard either by road or conveyor.

7.2.4 Movements by road from the South Portal compound to Hoo Junction would create a significant impact on the village of Higham by generating additional traffic through use of HGVs. A conveyor to transport materials to Hoo Junction would have to pass through the Thames Estuary and Marshes Ramsar site. The Ramsar site is of significant ecological importance and as such it is a Special Protection Area (SPA), the tunnel length was extended and southern portal relocated to avoid any construction works there. Therefore, construction of a conveyor through it is not considered an acceptable environmental impact (Para 7.2.32).

7.2.5 The impacts identified above have resulted in a direct rail connection south of the River Thames being considered unviable.

Rail: north of the River Thames

7.2.6 Three of the construction compounds north of the River Thames are located within 1km of existing rail connections: CA05, CA14, and CA15. All other construction compounds north of the River Thames are not considered viable for a rail connection, due to the extensive road transportation on the SRN or local roads (online) that would be required to move materials and supplies to a rail connection.

The North Portal construction area (CA05)

7.2.7 The North Portal construction area (CA05), from where the two TBMs would be launched and driven, is bordered by the existing Tilbury Loop railway line, and construction areas CA14 and CA15 in Thurrock, border the Ockendon branch railway line.

7.2.8 Construction area CA05 does not have direct rail access, even though it is bordered by a railway line. The majority of CA05 comprises landfill (current commercial operational and historic) and floodplain. The only potential site where a railhead or branch line could be created for this compound would be within the Port of Tilbury2 ecological mitigation area.

7.2.9 This is unsuitable given that it would cause Port of Tilbury2 to be in breach of a requirement of its DCOTilbury2. In light of the alternative existing rail facilities available in the immediate vicinity of the North Portal, it is considered disproportionate to construct a new temporary rail spur which would have the effect of dislodging the Port of Tilbury's environmental mitigation. As a result, a direct rail connection is not considered appropriate for material movement on the north side of the River Thames

7.2.10 It is therefore not possible to construct a railhead at the North Portal site (CA05).

Availability of existing rail paths and routes

7.2.11 The existing high volume of rail freight on lines north of the River Thames has limited the availability of train movements and routes for the movement of the Project's materials, arisings or equipment.

Construction areas CA14 and CA15

7.2.12 Construction areas CA14 and CA15, while bordered by the Ockendon branch railway line, cannot include a direct rail connection due to physical spatial constraints requirements. These requirements include the construction of 1500m of temporary sidings and maintenance track including an underpass to provide a route under the M25.

7.2.13 Further analysis has shown limited train path availability on the rail network in this region. There is currently an average of 12 free minutes per hour in which to start and complete a freight movement, which is insufficient for the Project demand.

7.2.14 Taking into consideration the combination of the physical spatial requirements and train path availability, it is not considered appropriate for material movement on the north side of the River Thames.

Rail summary

7.2.15 There are no existing direct rail connections to compounds within the Order Limits. Given the geographical and environmental constraints, combined with the associated planning and consenting challenges, it is not considered possible for the Project to construct a new railhead or any new rail lines to provide a direct rail connection.

7.2.16 Given the geographical constraints and lack of direct rail connections, rail is not considered a favourable transport option for the movement of materials away from the Project.

7.2.17 It would be possible to import bulk aggregates to the Project using a multimodal approach, via an existing rail connection, with onward transport via the road network. Refer to Appendix A, which identifies potential suppliers, including multi-modal transport options.

River

7.2.18 The Project Order Limits are directly adjacent to the River Thames. As such, existing river infrastructure in close proximity to the Order Limits has been considered, please refer to section 3.5.1.

Wharves

7.2.19 A number of wharves are in close proximity to the Order Limits, however following engagement with relevant stakeholders, including the owners and operators, the Project has been advised that they are all fully utilised by existing landowners and commercial operations. Consequently, they cannot provide a river connection for the Project.

Jetties

7.2.20 Two jetties are located in close proximity to the Project's Order Limits on the north bank of the River Thames: The East Tilbury Jetty, and the Ingrebourne Valley Jetty, which are considered below.

7.2.21 As outlined in Section 3, following stakeholder engagement, including the jetties owners and users, and full consideration of environmental and navigation

constraints, it has been determined that it will not be feasible for the Project to construct a new jetty (deep or shallow water) in the River Thames.

East Tilbury Jetty

7.2.22 The East Tilbury Jetty (also known as the Ferrovial Laing O'Rourke 'FLO' jetty) comprises a pontoon approximately 98m long by 24m wide, connected to land by a double bridge approximately 95m in length with 4.2m wide carriageways. The jetty is tidally constrained, providing mooring facilities for bulk cargo loading and unloading, currently operating a maximum of three 1,500t barges at high tide (therefore six barges in total per day).

7.2.23 It would theoretically be possible to use the jetty to deliver bulk aggregates or pre-cast sections to the Project construction compound at the North Portal (CA05) within the tidal window outline above, however the jetty is currently owned by FLO and used by Ingrebourne Valley Ltd (IVL). Its current and proposed future use is to receive waste from other local major projects (Tideway and Silvertown Tunnel in due course) and as such will be operating at full capacity. It is not possible for the Project to use the East Tilbury Jetty as it would cause unacceptable significant negative impact on existing project operations in the London area.

Ingrebourne Valley Jetty

7.2.24 This jetty comprises a pontoon approximately 70m long by 15m wide, connected to land by a single bridge approximately 35m in length with a 4.2m wide carriageway. The jetty provides mooring facilities for bulk cargo loading and unloading which is currently operating a maximum of two 1,500t barges at high tide (therefore four barges in total per day). It would be theoretically possible to use the jetty to deliver bulk aggregates or pre-cast sections to the Project construction compound at the North Portal (CA05).

7.2.25 The IVL jetty is used and owned by IVL. There are also upcoming projects for which the jetty is earmarked to supply. As such, it is not proposed to use this jetty as it would cause unacceptable negative impact on existing project operations in the London area and any additional demand from the Project would negatively impact on those operations.

Ports

7.2.26 In line with the Project approach of considering facilities located within a 20km catchment area (Section 5), approximating to a road journey of up to one hour, there are three ports within close proximity of the Project's Order Limits on the northern side of the River Thames: PoTLL and Port of Tilbury2, both approximately 3.5km to the west, and DP World London Gateway approximately 6.5 km to the east.

7.2.27 Both PoTLL and Port of Tilbury2 provide for aggregate supply and have already been used for the delivery of TBMs for other major projects in the London region, such as Thames Tideway. Currently, DP World London Gateway provides a logistics hub, but does not provide bulk aggregate facilities.

PoTLL and Tilbury2

7.2.28 The Port of Tilbury and Tilbury2 offer services including high-density container terminals, RoRo (roll-on/roll-off), CMAT, bulk cargo and liquid bulk terminal facilities, deep water mooring quay walls and jetties, and warehouse storage.

7.2.29 These facilities are suitable for loading and unloading of heavy cargo. An existing heavy lifting capacity of 140t exists with their available lifting equipment (undertaken by a third-party lifting contractor) for the loading and unloading of the largest TBM components and is therefore suitable in principle for use by the Project.

River summary

7.2.30 Of existing river infrastructure facilities, PoTLL and Port of Tilbury2 are well located for material movements for the Project via river. They are located in close proximity to the Order Limits at the North Portal (CA05), where bulk material supplies including aggregates and oversize equipment such as the TBMs can be delivered to support construction operations on the north side of the River Thames. These facilities will also be suitable for transporting tunnel spoil material if needed.

7.2.31 It would be feasible for the Project to import materials via existing ports on the north side of the River Thames (e.g. PoTLL and Tilbury2), with onward transport via the road network. Refer to Appendix A for references to using the multimodal transport options.

Conveyors

7.2.32 Conveyors have the ability to transport materials between different locations without the use of equivalent vehicle trips. They can operate at higher speed, capacity and over a greater distance than vehicles, per hour.

Conveyor usage south of the River Thames

7.2.33 A review was undertaken to assess the feasibility of the use of a conveyor system to transport arisings offsite from construction areas located south of the River Thames, i.e. from CA03 and CA02.

7.2.34 One potential conveyor route was identified for the Project construction sites south of the River Thames for the movement of material to and from site: Hoo Junction. This is a railyard approximately 7km away by road, with rail connectivity to the North Kent railway line (noting that this rail yard is primarily used by maintenance fleets – Section 6).

7.2.35 The conveyor routes would need to cross the Thames Estuary and Marshes Ramsar (Section 3) and as such, engagement was undertaken with statutory environmental bodies, including the Environment Agency, Natural England and the Royal Society for the Protection of Birds (RSPB).

7.2.36 Following engagement, it was considered that the use of conveyors to transport materials across the southern construction areas to a railyard, would cause a negative environmental impact on the Ramsar as a result of intrusive works required to install and operate the conveyor, and associated noise, and is therefore not feasible.

7.2.37 It remains possible to use conveyors to move material within the Order Limits between construction work sites south of the River Thames and will be explored as part of the preparation and submission of the Materials Handling Plan to the Secretary of State for approval.

Conveyor usage north of the River Thames

7.2.38 North of the River Thames, there is provision for conveyors to be used within the Order Limits to transport materials such as bulk aggregates and also to transfer tunnel arisings to Shed Marsh for IVL to process, once they have reached the tunnel portal.

Conveyor summary

7.2.39 It is considered feasible for a MWC to use conveyors to transport materials within the Order Limits on the north and south sides of the River Thames.

7.2.40 It is not considered feasible for a MWC to use conveyors to transport material outside of the Order Limits.

7.3 Multimodal transportation summary

7.3.1 In order to reduce HGV movements on the SRN and local road network, the MWC will consider the use of multimodal transport of materials.

7.3.2 Transport of materials by rail, river and conveyor have been considered, with the following conclusions:

a. It would be possible to use rail as part of a multimodal approach to import materials to the Project via an existing rail connection, with onward transport via the road network.

b. It would be possible to use existing ports on the north side of the River Thames (e.g. PoTLL and Tilbury2) as part of a multimodal approach to material transport, subject to capacity, with onward transport via the road network.

c. It is considered feasible for a MWC to use conveyors to transport materials within the Order Limits on the northern and southern sides of the River Thames as part of a multimodal approach to material transport.

7.3.3 The Project requires the MWC to consider and implement a multimodal approach to material transport in order to minimise negative impacts and reduce safety risks. The Materials Handling Plan to be submitted to the Secretary of State for approval would include an explanation of how multi-modal solutions have been included and implemented or discounted.

7.4 Final mile strategy

Final mile strategy overview

7.4.1 The ‘final mile’ logistics refer to the last part of the material logistics journey. It is a description of the logistics phase at its most local geographical point to the Project and is applied to materials movements as a best practice approach.

7.4.2 Alignment with a final mile approach supports the use of multimodal transport systems to facilitate optimum transportation to reduce impacts as far as reasonably practicable and to control costs. This oMHP has identified suitable transport options, including river, rail and road, and the MWCs would complete further assessments, in accordance with the Control Plan (Section 2) to fully determine the optimum method of transporting materials from source to the Project construction sites.

7.4.3 The final mile solution would be implemented by the MWCs in conjunction with the oTMPfC, making full consideration of required mileage and mileage reduction, peak traffic hours conflicts and associated impacts.

7.4.4 Construction material suppliers identified within a 20km catchment area of the Project (Section 5) have been recognised as having used a final mile strategy that aligns with the Project. MWCs would be required to identify and appoint a supplier operating under these principles in order to optimise material handling.

7.4.5 Delivery to the construction site directly by rail does not appear feasible as the footprint needed for a railhead within the Order Limits that is clear of main lines, is not available when taking into account the site construction requirements.

7.4.6 The final mile strategy would see delivery and construction vehicles join the Project alignment via the identified access routes, to then join the internal haul route. A focus has been made to establish connection directly from the SRN where reasonably practicable to lessen the Project's dependency on the local road network.

7.4.7 The closest parts of the SRN to the Project are:

a. M25

b. A13

c. A2/M2

d. A1089

7.4.8 The Project will require the Contractors to consult with the highway authority/authorities and adhere to freight and construction traffic routes (outlined in the oTMPfC). This will include a clear understanding of those routes which are not permitted, including any considerations around traffic-sensitive routes/roads and receptors. Refer to the oTMPfC for the principles and mechanism which would be applied and reflected in the TMPfC

8 Summary

8.1 Overview

8.1.1 This oMHP is secured via Schedule 2 Requirements of the DCO. It sets out the approach and high-level principles for handling construction materials and waste on the Project. This applies to handling operations both inside and outside the Order Limits. It is relevant to all construction works required for the Project.

8.1.2 An MHP will be produced during the construction phase of the Project, which would be expected to be substantially in accordance with this oMHP. The MHP would set out a detailed approach for material movement and handling, taking into account a higher level of detail that will be available at this stage, including design, construction programme, traffic management, environmental management and site waste management requirements and commitments.

8.1.3 This oMHP sets out requirements to optimise vehicle logistics, as well as the use of multimodal transportation to reduce impacts. Construction compounds and Utilities Logistic Hubs will be used to optimise vehicle movement for material movements, storage and use.

8.1.4 A number of considerations and constraints have been identified with regards to environmental sensitivity and existing infrastructure, which influences the approach the Project can take in terms of optimising transportation for materials handling.

8.1.5 The Project has engaged with potential local aggregate suppliers to facilitate the assessment of both capability and capacity to support its construction. This has enabled the OHMP to identify practicable material transport routes for delivery at compounds within the Order Limits.

8.1.6 Excavated materials volumes are provided and movements of these materials will be subject to the requirements of the OHMP, both inside the Order Limits (offline) and outside (online). The majority of excavated materials is proposed to be reused within the Project, however for any materials that cannot be reused, receiver sites and associated vehicle movements have been identified.

8.2 Transport Options

8.2.1 There are limited existing direct transport connections to the Project Order Limits which can be used for the transport of material. A review of the use of road, river, and rail networks has been carried out with a focus on the final mile strategy (the road-based link between the multimodal point and the applicable construction worksite).

8.2.2 This has helped identify an approach to reduce and manage the impacts of construction vehicle movements on the wider transport network and onsite materials management, by getting materials as close to the construction worksites as possible before using the road network.

Rail

8.2.3 There are no existing direct rail connections to compounds within the Order Limits. Given the geographical and environmental constraints, combined with the associated planning and consenting challenges, it is not considered possible for the Project to construct a new railhead or any new rail lines to provide a direct rail connection.

8.2.4 For the movement of materials away from the Project, rail is not considered a favourable transport option owing to geographical constraints and the lack of existing connections.

8.2.5 It would be possible to import bulk aggregates to the Project using a multimodal approach, via an existing rail connection, with onward transport via the road network.

River

8.2.6 PoTLL and Port of Tilbury2 are well located for material movements for the Project via river. They are located in close proximity to the Order Limits at the North Portal (CA05), where bulk material supplies including aggregates and oversize equipment such as the TBMs can be delivered to support construction operations on the north side of the River Thames. These facilities will also be suitable for transporting tunnel spoil material if needed.

8.2.7 It would be possible to import materials to the Project via existing ports on the north side of the River Thames (e.g. PoTLL and Tilbury2), with onward transport via the road network.

Conveyors

8.2.8 The use of conveyors can optimise material movements through speed and volume and reduces vehicle movements.

8.2.9 It is considered feasible for a MWC to use conveyors to transport materials within the Order Limits on the north and south sides of the River Thames.

8.2.10 It is not considered feasible for a MWC to use conveyors to transport material outside of the Order Limits.

Multimodal

8.2.11 In order to reduce HGV movements on the SRN and local road network, the MWC will consider the use of multimodal transport of materials. This will require combining the material transport options identified above to identify the most efficient method, to optimise movements and reduce impacts. The following conclusions have been drawn:

a. It would be possible to use rail as part of a multimodal approach to import materials to the Project via an existing rail connection, with onward transport via the road network.

b. It would be possible to use existing ports on the north side of the River Thames (eg PoTLL and Tilbury2) as part of a multimodal approach to material transport, with onward transport via the road network.

c. It is considered feasible for a MWC to use conveyors to transport materials within the Order Limits on the northern and southern sides of the River Thames as part of a multimodal approach to material transport.

Final Mile strategy

8.2.12 The final mile solution would be implemented by the MWCs in conjunction with the oTMPfC, making full consideration of required mileage and mileage reduction, peak traffic hours conflicts and associated impacts.

8.2.13 The focus of the final mile strategy is that delivery and construction vehicles join the Project's internal haul route as quickly as possible from the SRN (where practicable) to reduce the Project's dependency and impact on the local road network.

8.2.14 The Project would require the Contractors to consult with the highway authority/authorities and adhere to freight and construction traffic routes (outlined in the oTMPfC). This would include a clear understanding of those routes which are not permitted, including any considerations around traffic-sensitive routes/roads and receptors.

8.2.15 The final mile strategy should be applied in combination with the full consideration of transport options and a multimodal approach to material movements.

Appendices

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Appendix A Identified suppliers and transportation options assessment

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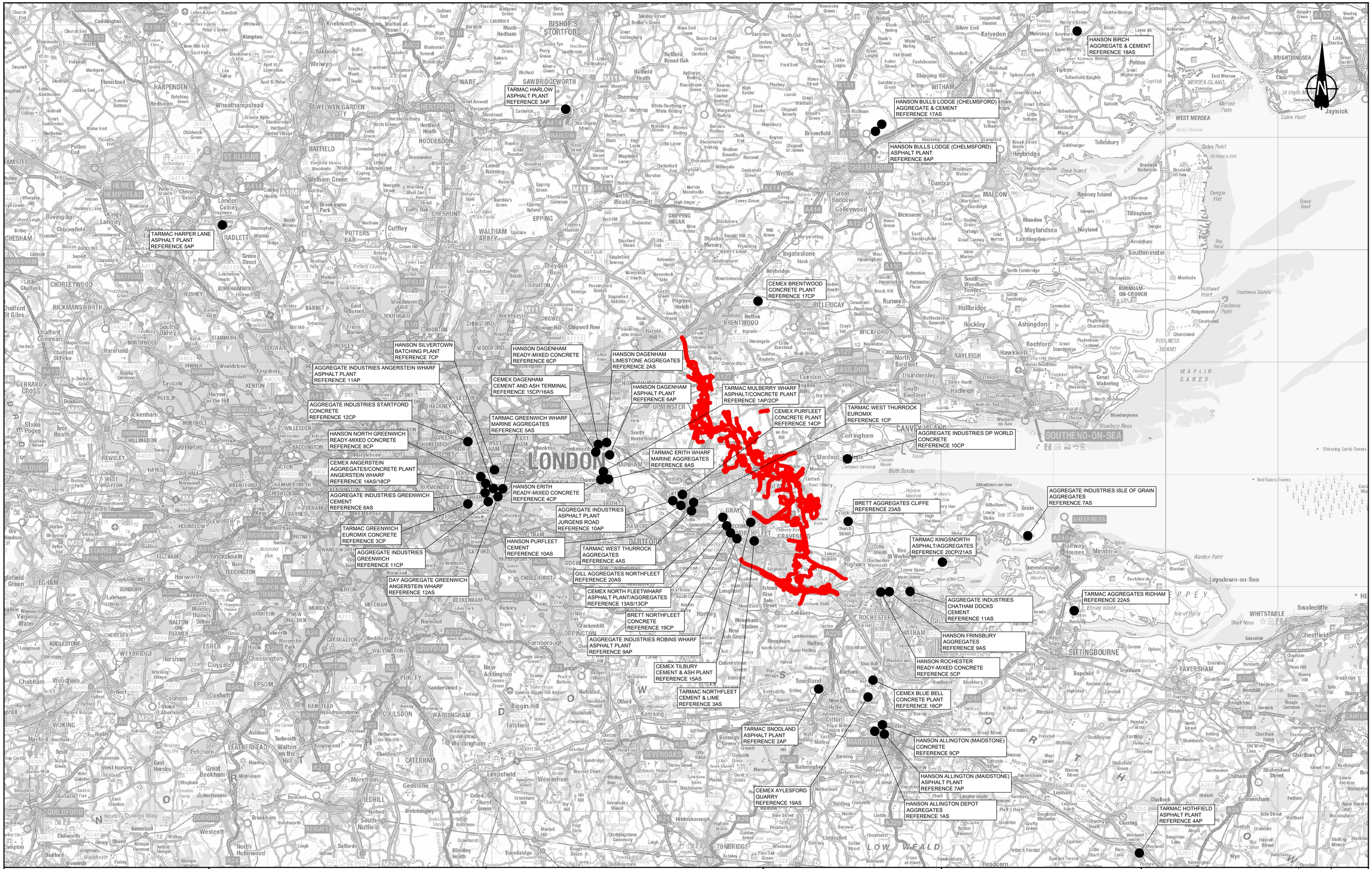
A.1 Local Overview of Potential Supply Sites for Aggregates, cement ready-mixed concrete and asphalt

A.2 Potential supplier sites (aggregates and cement) identified and categorised by their multimodal delivery capabilities and proximity to the Project via the use of the road network

A.3 Potential supplier sites (ready mixed concrete & asphalt) identified and categorised by their multimodal delivery capabilities and proximity to the Project via the use of the road network



NOTES :

1. DRAWING TO BE READ IN CONJUNCTION WITH OUTLINE MATERIAL HANDLING PLAN AND ASSOCIATED TABLE SHOWING MULTIMODAL OPTIONS OF POTENTIAL SUPPLY SITES.
2. STUDY BASED ON AN APPROXIMATE 20Km CATCHMENT AREA.
3. SUPPLY SITES IDENTIFIED IS NOT EXCLUSIVE.

LEGEND :

ORDER LIMITS

IDENTIFIED SUPPLY SITE

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
P01	S2	24/06/2021	For Information	PEg	MH	JSH

Client: highways england

LOWER THAMES CROSSING
5th Floor Beaufort House
15 St Botolph Street
London EC3A 7DT

Project: LOWER THAMES CROSSING DEVELOPMENT PHASE

Drawing title: LOCAL OVERVIEW OF POTENTIAL SUPPLY SITES FOR AGGREGATES, CEMENT, READY-MIXED CONCRETE & ASPHALT

Status		Original Size	Revision
S2	Fit for Information	A1	P01
		Scale	NTS
Drawn	PEg	Date -	24/06/2021
Checked	MH	Date -	24/06/2021
Approved	JSH	Date -	24/06/2021

Drawing number: HE540039-CJV-GCL-S3P_ZZZZZZZZZZ-DR-CW-00009

HE540039-CJV-GCL-S3P_ZZZZZZZZZZ-DR-CW-00009.dwg

Appendix A.2: Potential supplier sites (aggregates and cement) identified and categorised by their multimodal delivery capabilities and proximity to the Project via the use of the road network

					Distance and average duration between supplier delivery site and LTC (Area A ,B South, B North, C & D)					
Ref	**Material**	**Supplier**	**Suppliers Delivery Site**	**Potential Delivery Site for LTC**	**A**	**B South**	**B North**	**C**	**D**	**Comments**
	Rail/Road									
1AS	Limestone Aggregate	Hanson	Allington Depot	Hoo Junction	Yes (Delivered to Hoo Junction) 30min (14miles)	Yes (Delivered to Hoo Junction) 30min (14miles)	Crossing of river required 60min (34.5miles)	Crossing of river required 55min (30miles)	Crossing of river required 55min (28miles)	Local roads not suitable for HGV between Hoo Junction and Compound 2 & 3, hence off road solution required i.e. overground conveyor or direct delivery from supplier site "Allingron
2AS	Limestone Aggregate	Hanson	Dagenham	Tilbury (Freight Services)	Crossing of river required 45min (25miles)	Crossing of river required 35min (20miles)	Yes (Delivered to Tilbury) 25min (17miles)	Yes (Direct from Dagenham) 15min (12miles)	Yes (Direct from Dagenham) 15min (10miles)	Situated north of the river
3AS	Cement	Tarmac	Northfleet	Hoo Junction	Yes (Delivered to Hoo Junction) 15min (6miles)	Yes (Delivered to Hoo Junction) 20min (11miles)	Crossing of river required 35min (19.5miles)	Crossing of river required 30min (16miles)	Crossing of river required 35min (20miles)	Local roads not suitable for HGV between Hoo Junction and Compound 2 & 3, hence off road solution required i.e. overground conveyor or direct delivery from supplier site "Northfleet".
4AS	Cement	Tarmac	West Thurrock	Tilbury (Freight Services)	Crossing of river required 25min (14miles)	Crossing of river required 35min(17miles)	Yes (Delivered to Tilbury) 25min (11miles)	Yes (Direct from Thurrock) 12min (5miles)	Yes (Direct from Thurrock) 10min (5miles)	Situated north of the river
5AS	Cement	Tarmac	Greenwich Wharf	Hoo Junction	Yes (Delivered to Hoo Junction) 40min (25miles)	Yes (Delivered to Hoo Junction) 30min (19miles)	Crossing of river required 50min (27miles)	Crossing of river required 22min (40miles)	Crossing of river required 50min (26miles)	Local roads not suitable for HGV between Hoo Junction and Compound 2 & 3, hence off road solution required i.e. overground conveyor or direct delivery from supplier site "Greenwich
6AS	Cement	AI	Greenwich (Angerstein) Wharf	Hoo Junction	Yes (Delivered to Hoo Junction) 25min (19miles)	Yes (Delivered to Hoo Junction) 35min (24miles)	Crossing of river required 45min (26miles)	Crossing of river required 35min (22miles)	Crossing of river required 30min (19.5miles)	Local roads not suitable for HGV between Hoo Junction and Compound 2 & 3, hence off road solution required i.e. overground conveyor or direct delivery from supplier site "Greenwich
7AS	Aggregates (Sand Gravel)	AI	Isle of Grain	Hoo Junction	Yes (Delivered to Hoo Junction) 30min (17miles)	Yes (Delivered to Hoo Junction) 25min (14miles)	Crossing of river required 65min (36miles)	Crossing of river required 60miles (32miles)	Crossing of river required 65min (36miles)	Local roads not suitable for HGV between Hoo Junction and Compound 2 & 3, hence off road solution required i.e. overground conveyor or direct delivery from supplier site "Isle of Grain".
10CP	Aggregates	AI	DP -London Gateway	Tilbury (Freight Services)	Crossing of river required 35min (22miles)	Crossing of river required 40min (26miles)	Yes (Delivered to Tilbury) 20min (10miles)	Yes (Delivered to Tilbury) 15min (6.5miles)	Yes (Delivered to Tilbury) 20min (12.5miles)	Situated north of the river
18AS	Aggregates	Brett Aggregates	Cliffe	Direct to compound/Hoo Junction	Yes 25min (10.5miles)	Yes 20min (8miles)	Crossing of river required 60min (30miles)	Crossing of river required 50min (26miles)	Crossing of river required 55min (30miles)	Site situated south of the river. Brett Aggregates planning consent contains restriction on HGV movement using local roads. Rail connectivity via Hoo Junction would require off road solution
	River/Road									
4AS	Aggregate	Tarmac	West Thurrock	Delivered to Port of Tilbury	Crossing of river required 25min (14miles)	Crossing of river required 35min(17miles)	Yes (Delivered to Tilbury) 25min (11miles)	Yes (via Road) 12min (5miles)	Yes (Direct via road) 10min (5miles)	Site situated north of the river Thames. Potential river link to Port of Tilbury to reduce road distance for compounds in area B North, C & D. Compounds in area A & B would require delivery
5AS	Cement	Tarmac	Greenwich Wharf	Delivered to Port of Tilbury	Crossing of river required 40min (25miles)	Crossing of river required 30min (19miles)	Yes (Delivered to Tilbury) 50min (27miles)	Yes (via Road) 22min (40miles)	Yes (via Road) 50min (26miles)	Site situated north of the river Thames. Potential river link to Port of Tilbury to reduce road distance for compounds in area B North, C & D. Compounds in area A & B would require delivery
8AS	Aggregates	Tarmac	Erith	Delivered to Port of Tilbury	Yes (via road) 35min (15miles)	Yes (via road) 40min (20miles)	Yes (Delivered to Tilbury) 50min (18miles)	Yes (Delivered to Tilbury) 40min (14miles)	Yes (Delivered to Tilbury) 50min (18miles)	Site situated south of the river Thames. Potential river link to Port of Tilbury to reduce road distance for compounds in area B North, C & D. Compounds in area A & B would require the use
3AS	Cement	Tarmac	Northfleet	Deliver to Port Tilbury & Hoo Junction via rail	Yes (Delivered to Hoo Junction) 15min (6miles)	Yes (Delivered to Hoo Junction) 20min (11miles)	Yes (Delivered to Tilbury) 35min (19.5miles)	Yes (via Road) 30min (16miles)	Yes (via Road) 35min (20miles)	Site situated south of the river Thames. Potential river link to Port of Tilbury to reduce road distance for compounds in area B North, C & D. Compounds in area A & B would require the use
3AS	Limestone Aggregate	Tarmac	Northfleet	Deliver to Port Tilbury & Hoo Junction via rail	Yes (Delivered to Hoo Junction) 15min (6miles)	Yes (Delivered to Hoo Junction) 20min (11miles)	Yes (Delivered to Tilbury) 35min (19.5miles)	Yes (via Road) 30min (16miles)	Yes (via Road) 35min (20miles)	Site situated south of the river Thames. Potential river link to Port of Tilbury to reduce road distance for compounds in area B North, C & D. Compounds in area A & B would require the use
22AS	Aggregates	Tarmac	Ridham	Deliver to Port of Tilbury	Yes (via road) 45min (23miles)	Yes (via road) 45min (24miles)	Yes (Delivered to Tilbury) 70min (44miles)	Yes (via Road) 45min (60miles)	Crossing of river required 70min (38miles)	Site situated south of the river Thames. Potential river link to Port of Tilbury to reduce road distance for compounds in area B North, C & D. Compounds in area A & B would require the use
2AS	Aggregate	Hanson	Dagenham Wharf	Delivered to Port of Tilbury	Crossing of river required 45min (25miles)	Crossing of river required 35min (20miles)	Yes (Delivered to Tilbury) 25min (17miles)	Yes (via Road) 15min (12miles)	Yes (via Road) 15min (10miles)	Situated north of the river. Potential river link to Port of Tilbury(longer river route) to reduce compounds in area B North. Compounds in area A & B would require crossing of river via HGV
9AS	Aggregate (Sand/Gravel)	Hanson	Frinsbury	Deliver to Port of Tilbury	Yes via Road 20min (9miles)	Yes via Road 15min (6miles)	Yes (Delivered to Tilbury) 55min (28miles)	Yes (via Road) 50min (25miles)	Yes (via Road) 50min (27miles)	Situated south of the river. Potential river link to Port of Tilbury(longer river route) to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A
10AS	Cement	Hanson	Purfleet	Delivered to Port of Tilbury	Crossing of river required 25min (12.5miles)	Crossing of river required 25min (18miles)	Yes (Delivered to Tilbury) 20min (10.5miles)	Yes (via Road) 15min (7miles)	Yes (via Road) 20min (9miles)	Site situated north of the river. Potential river link to Port of Tilbury to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A & B would require
6AS	Aggregates	AI	Greenwich (Angerstein) Wharf	Delivered to Port of Tilbury	Crossing of river required 25min (19miles)	Crossing of river required 35min (24miles)	Yes (Delivered to Tilbury) 45min (26miles)	Yes (Delivered to Tilbury) 35min (22miles)	Yes (via Road) 30min (19.5miles)	Site situated south of the river. Potential river link to Port of Tilbury to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A & B would require
6AS	Cement	AI	Greenwich Wharf	Delivered to Port of Tilbury	Crossing of river required 25min (19miles)	Crossing of river required 35min (24miles)	Yes (Delivered to Tilbury) 45min (26miles)	Yes (via Road) 35min (22miles)	Yes (via Road) 30min (19.5miles)	Site situated south of the river. Potential river link to Port of Tilbury to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A & B would require
11AS	Cement	AI	Chatham Docks	Delivered to Port of Tilbury	Yes via Road 25min (10miles)	Yes via Road 20min (7.5miles)	Yes (Delivered to Tilbury) 60min (30miles)	Crossing of river required 50min (26miles)	Crossing of river required 60min (33miles)	Situated south of the river. Potential river link to Port of Tilbury(longer river route) to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A
12AS	Aggregates	Day Aggregates	Greenwich (Angerstein) Wharf	Delivered to Port of Tilbury	Yes via Road 25min (19miles)	Yes via Road 35min (24miles)	Yes (Delivered to Tilbury) 45min (26miles)	Crossing of river required 35min (22miles)	Crossing of river required 30min (19.5miles)	Site situated south of the river. Potential river link to Port of Tilbury to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A & B would require
7AS	Aggregates (Sand Gravel)	AI	Isle of Grain	Delivered to Port of Tilbury	Yes via Road 30min (17miles)	Yes via Road 25min (14miles)	Yes (Delivered to Tilbury) 65min (36miles)	Crossing of river required 60miles (32miles)	Crossing of river required 65min (36miles)	Site situated south of the river. Potential river link to Port of Tilbury to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A & B would require
13AS	Aggregates	CEMEX	Northfleet Wharf	Delivered to Port of Tilbury	Yes via Road 25min (8.5miles)	Yes via Road 30min (12miles)	Yes (Delivered to Tilbury) 35min (17miles)	Yes (Delivered to Tilbury) 30min (12miles)	Yes (Delivered to Tilbury) 25min (11miles)	Site situated south of the river. Potential river link to Port of Tilbury to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A & B would require
14AS	Aggregates	CEMEX	Angerstein Aggregates Wharf	Delivered to Port of Tilbury	Yes via Road 25min (19miles)	Yes via Road 35min (24miles)	Yes (Delivered to Tilbury) 45min (26miles)	Crossing of river required 35min (22miles)	Crossing of river required 35min (19.5miles)	Site situated south of the river. Potential river link to Port of Tilbury to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A & B would require
15AS	Cement	CEMEX	Port of Tilbury	Port of Tilbury	Crossing of river required 35min (20miles)	Crossing of river required 40min (25miles)	Yes via Road 10min (2.5miles)	Yes via Road 10min (3.6miles)	Yes via Road 25min (15miles)	Situated north of the river. Port of Tilbury ideal location to minimise road distance for compound in area B North, C & D. Compounds in area A & B South would require crossing of
16AS	Cement	CEMEX	Dagenham Cement and Ash Plant	Delivered to Port of Tilbury	Crossing of river required 45min (20miles)	Crossing of river required 50min (24miles)	Yes (Delivered to Tilbury) 35min (16miles)	Yes via Road 30min (12miles)	Yes via Road 30min (10miles)	Site situated north of the river. Potential river link to Port of Tilbury to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A & B would require
23AS	Aggregates	Brett Aggregates	Cliffe	Direct to compound/Hoo Junction	Yes 25min (10miles)	Yes 20min (7.7 miles)	Yes (Delivered to Tilbury) 55min (30miles)	Crossing of river required 50min (26miles)	Crossing of river required 50min (28miles)	Potential to use supplier jetty to provide river delivery to Port of Tilbury for compounds B North, C & D.
20AS	Aggregates	Gill Aggregates	Northfleet	Delivered to Port of Tilbury	Yes via Road 25min (8.5miles)	Yes via Road 30min (12miles)	Yes (Delivered to Tilbury) 35min (17miles)	Crossing of river required 30min (12miles)	Crossing of river required 25min (11miles)	Site situated south of the river. Potential river link to Port of Tilbury to reduce road distance and crossing of river for compounds in area B North, C & D. Compounds in area A & B would require
Road										
17AS	Aggregate (Sand/Gravel)	Hanson	Bulls Lodge	Direct to compound	65min (45miles)	55min (40miles)	45min (30miles)	35min (25miles)	30min (23miles)	Road transportation via HGV's using the local and strategic road network
18AS	Aggregate (Sand/Gravel)	Hanson	Birch	Direct to compound	80min (60miles)	75min (55miles)	65min (45miles)	55min (40miles)	55min (39miles)	Road transportation via HGV's using the local and strategic road network
19AS	Aggregates	CEMEX	Aylesford Quarry	Direct to compound	25min (12miles)	30min (12.5miles)	70min (32miles)	60min (28miles)	60min (29miles)	Road transportation via HGV's using the local and strategic road network
21AS	Aggregate (Sand/Gravel)	Tarmac	Kingsnorth	Direct to compound	25min (11.5miles)	20min (9miles)	65min (31miles)	60min (27miles)	60min (28miles)	Road transportation via HGV's using the local and strategic road network

Key	
Tier 1	Less than 30min
Tier 2	30min - <45min
Tier 3	45min - 60min
Tier 4	Greater than 60min

Notes

1) Duration and distance taken from Google Maps
2) Temporary traffic management not taken into consideration
3) Durations stated based on weekday 8am departure, based on data from Google maps
4) Haul route not considered, distance and duration based on movement between supplier site to compound entrance
5) Sites greater than 60 min for all compounds not considered. For sites in the limit of 60min journey time this has been categorised as "Tier 4"
6) Tier based on distance/duration to site not production capacity
7) Refer to drawing: HE540039-CJV-GCL-S3P_ZZZZZZZZZZ-DR-CW-00009 for location of identified sites.

Appendix A.3: Potential supplier sites (ready mixed concrete & asphalt) identified and categorised by their multimodal delivery capabilities and proximity to the Project via the use of the road network

			Distance and average duration between supplier delivery site and LTC (Area A ,B South, B North, C & D)										
Ref	**Supplier**	**Suppliers Site**	**A**		**B South**		**B North**		**C**		**D**		**Comments**
Concrete			**Distance**	**Duration**	**Distance**	**Duration**	**Distance**	**Duration**	**Distance**	**Duration**	**Distance**	**Duration**	
1CP	Tarmac	West Thurrock (Euromix)	14miles	25min	17miles	35min	11 miles	25min	5miles	12min	5miles	10min	Batching plant located north of the river
2CP	Tarmac	Belvedre (Mulberry)	18.5miles	35min	21 miles	40min	19 miles	45min	14 miles	35min	12miles	35min	Batching plant located south of the river
3CP	Tarmac	Greenwich (Euromix)	25miles	40min	19miles	30min	27miles	50min	22miles	40min	26miles	50min	Batching plant located south of the river
4CP	Hanson	Erith	15miles	35min	19miles	30min	18.5miles	45min	13.5miles	35min	12miles	30min	Batching plant located south of the river
5CP	Hanson	Rochester	7miles	20min	6miles	15min	29miles	60min	24.4miles	50min	22miles	50min	Batching plant located south of the river
6CP	Hanson	Dagenham	25miles	45min	20miles	35min	17miles	25min	12 miles	15min	10miles	15min	Batching plant located north of the river
7CP	Hanson	Silvertown	22miles	45min	25.6miles	50min	23miles	35min	18miles	30min	16.5miles	25min	Batching plant located north of the river
8CP	Hanson	Greenwich	26miles	40min	21miles	35min	23miles	40min	19miles	35min	17miles	35min	Batching plant located south of the river
9CP	Hanson	Allington (Maidstone)	14miles	30min	15miles	30min	34.5miles	60min	30miles	55min	28miles	50min	Batching plant located south of the river
10CP	AI	DP World	22miles	35min	26miles	40min	10miles	20min	6.5miles	15min	12.5miles	20min	Batching plant located north of the river
11CP	AI	Greenwich	19miles	25min	24miles	35min	26niles	45min	22miles	35min	19.5miles	30min	Batching plant located south of the river
12CP	AI	Startford	26miles	45min	23miles	40min	24miles	40min	24miles	30min	17.5 miles	30min	Batching plant located north of the river
13CP	CEMEX	Northfleet Wharf	8.5miles	25min	12miles	30min	17miles	35min	12miles	30min	11 miles	25min	Batching plant located south of the river
14CP	CEMEX	Purfleet	18.5miles	35min	13miles	30min	10miles	20min	5.5miles	12min	5 miles	10min	Batching plant located north of the river
15CP	CEMEX	Dagenham	20miles	45min	24miles	50min	16miles	35min	12miles	30min	10miles	30min	Batching plant located north of the river
16CP	CEMEX	Blue Bell	10miles	20min	11miles	20min	30miles	45min	26miles	35min	25miles	35min	Batching plant located south of the river
17CP	CEMEX	Brentwood	26.5 miles	50min	32miles	55min	16miles	35min	15miles	30min	11.5miles	20min	Batching plant located north of the river
18CP	CEMEX	Angerstein	19miles	25min	24miles	35min	26miles	45min	22miles	35min	19.5miles	35min	Batching plant located south of the river
19CP	Brett	Northfleet	8miles	25min	11.5miles	30min	16.5miles	40min	12miles	35min	10miles	30min	Batching plant located south of the river
20CP	Tarmac	Kingsnorth	10miles	25min	9miles	25min	31miles	55min	26miles	45min	26miles	45min	Batching plant located south of the river
Asphalt													
1AP	Tarmac	Mulberry Wharf	18.5miles	35min	15.5min	30min	19miles	45min	14miles	40min	14miles	40min	Batching plant located south of the river
2AP	Tarmac	Snodland	10miles	20min	11miles	20min	32miles	55min	29miles	45min	28miles	45min	Batching plant located south of the river
3AP	Tarmac	Harlow	36.5miles	45min	40miles	55min	33miles	50min	28miles	40min	21.5miles	30min	Batching plant located north of the river
4AP	Tarmac	Hothfield	34mlles	50min	33miles	50min	54miles	90min	49miles	80min	54miles	90min	Batching plant located south of the river
5AP	Tarmac	Harper Lane	50miles	65min	55.5miles	70min	46.5mies	60min	42miles	55min	35 miles	50min	Batching plant located north of the river
6AP	Hanson	Dagenham	20miles	35min	25miles	45min	17miles	25min	12.3 miles	15min	10miles	15min	Batching plant located north of the river
7AP	Hanson	Allington (Maidstone)	15miles	30min	14miles	35min	34.5miles	60min	30miles	55min	28miles	50min	Batching plant located south of the river
8AP	Hanson	Bulls Lodge (Chelmsford)	40miles	55min	45miles	60min	30miles	45min	25miles	40min	24miles	35min	Batching plant located north of the river
9AP	AI	Robins Wharf	6miles	12min	11miles	20min	17miles	45min	13.5miles	35min	10.5miles	30min	Batching plant located north of the river
10AP	AI	Jurgens Road	14miles	20min	19miles	30min	11miles	30min	6.5miles	20min	2.5miles	15min	Batching plant located north of the river
11AP	AI	Angerstein Wharf	19miles	25min	24miles	35min	26niles	45min	22miles	35min	19.5miles	35min	Batching plant located south of the river

Key		
Tier 1	**Less than 30min**	
Tier 2	**30- 45min**	
Tier 3	**45min +**	

Notes:
1) Duration and distance taken from Google Maps
2) Temporary traffic management not taken into consideration
3) Durations stated based on weekday 8am departure, based on data from Google maps
4) Haul route not considered, distance and duration based on movement between supplier site to compound entrance
5) Sites greater than 45 min for all compounds not considered. For sites in the limit of 60min journey time this has been categorised as "Tier 3"
6) Tier based on distance/duration to site not production capacity
7) Refer to drawing: HE540039-CJV-GCL-S3P_ZZZZZZZZZZ-DR-CW-00009 for location of identified sites.

Appendix B Third-party waste facility sites identified to date

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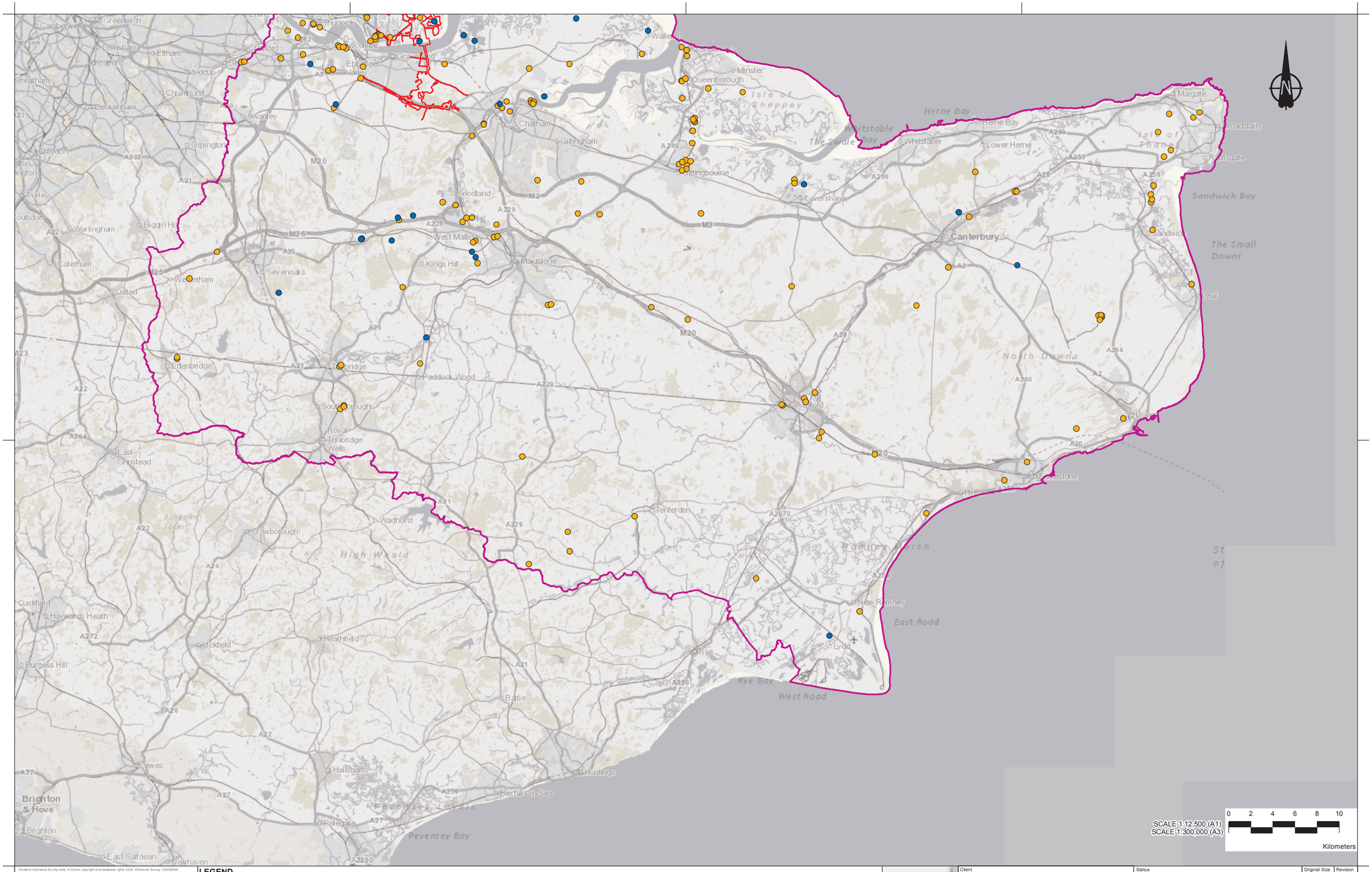
Please find the Third-Party waste facility sites identified to date (3 Figures) below.



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SCALE 1:300,000 (A3)

0 2 4 6 8 10

Kilometers

LEGEND

- Order Limits
- Study Area
- Active Landfills
- Waste Treatment and Transfer Facilities

Indicative locations of sites permitted to manage construction wastes, based on Environment Agency (2020c) dataset Environmental Permitting Regulations - Waste Sites

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
1.1	S8	8/10/2020	For Information	RM	SG	BF

Client: highways england

Project: LOWER THAMES CROSSING
5th Floor Beaufort House
15 St Botolph Street
London EC3A 7DT

Status: Environmental Statement

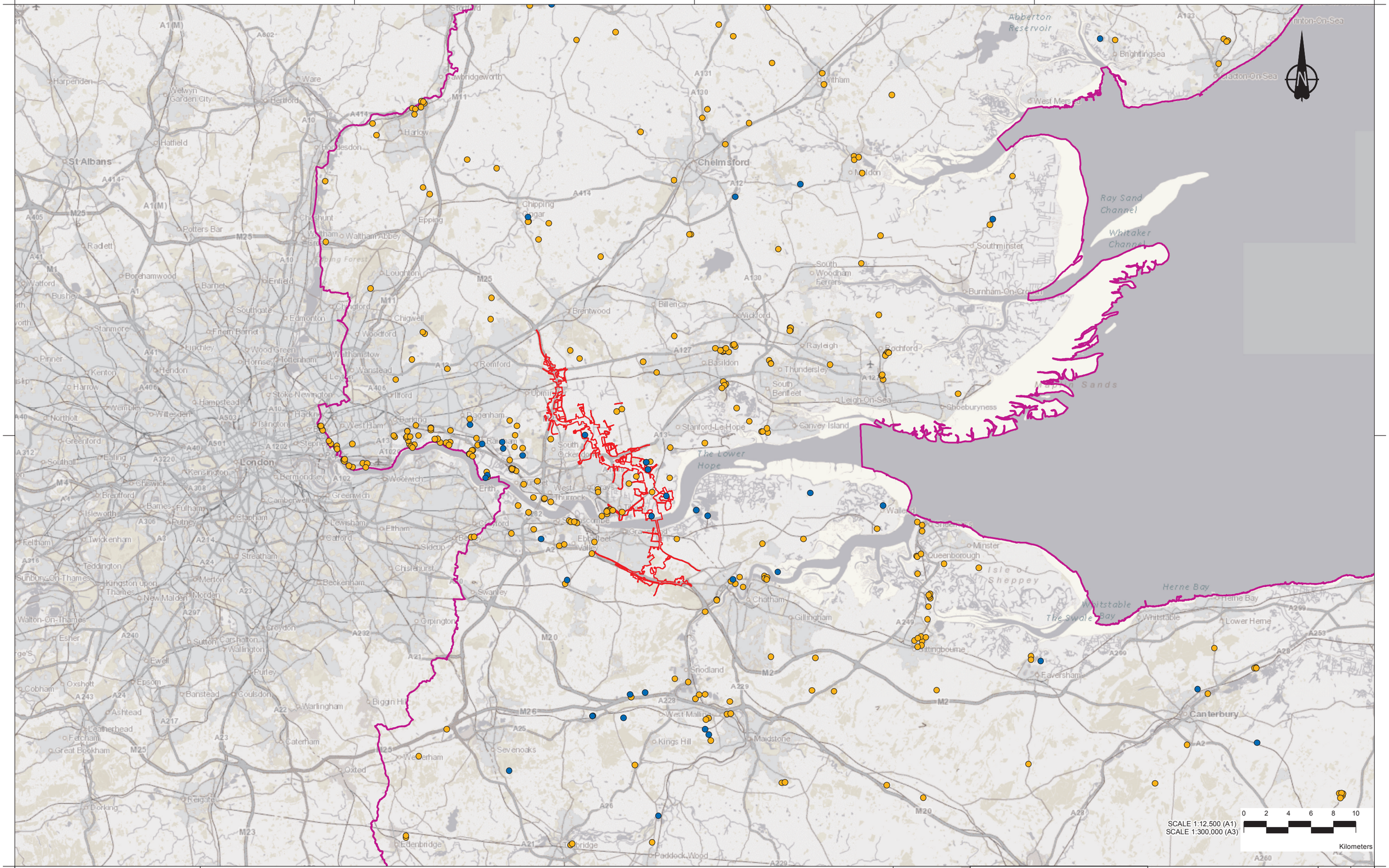
Original Size: A3 | Revision: 1.1

Scale: 1:300,000

Drawing title: Figure 11.1 - Active Landfill and Waste Transfer and Treatment

Drawing number: HE540039-CJV-EGN-SZP_EGNE00000000-DR-LE-50096

MXD Location: Z:\Environment\Environmental Statement\11. Materials\HE540039-CJV-EGN-SZP_EGNE00000000-DR-LE-50096 - Active Landfill and Waste Transfer and Treatment.mxd



LEGEND

- Order Limits
- Study Area
- Active Landfills
- Waste Treatment and Transfer Facilities

Indicative locations of sites permitted to manage construction wastes, based on Environment Agency (2020c) dataset Environmental Permitting Regulations - Waste Sites

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
1.1	S8	8/10/2020	For Information	RM	SG	BF

Client: highways england

Project: LOWER THAMES CROSSING
5th Floor Beaufort House
15 St Botolph Street
London EC3A 7DT

Status: Environmental Statement
Original Size: A3
Revision: 1.1
Scale: 1:300,000

Drawing title: Figure 11.1 - Active Landfill and Waste Transfer and Treatment
Page 2 of 3

Drawing number: HE540039-CJV-EGN-SZP_EGNE00000000-DR-LE-50096

MXD Location: Z:\Environment\Environmental Statement\11. Materials\HE540039-CJV-EGN-SZP_EGNE00000000-DR-LE-50096 - Active Landfill and Waste Transfer and Treatment.mxd

LEGEND

- Order Limits
- Study Area
- Active Landfills
- Waste Treatment and Transfer Facilities

Indicative locations of sites permitted to manage construction wastes, based on Environment Agency (2020c) dataset Environmental Permitting Regulations - Waste Sites

SCALE 1:12,500 (A1)
SCALE 1:300,000 (A3)

0 2 4 6 8 10
Kilometers

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
1.1	S8	8/10/2020	For Information	RM	SG	BF

Client: highways england

Project: LOWER THAMES CROSSING
5th Floor Beaufort House
15 St Botolph Street
London EC3A 7DT

Status: Environmental Statement
Original Size: A3
Revision: 1.1
Scale: 1:300,000

Drawing title: Figure 11.1 - Active Landfill and Waste Transfer and Treatment
Page 3 of 3

Drawing number: HE540039-CJV-EGN-SZP_EGNE00000000-DR-LE-50096

MXD Location: Z:\Environment\Environmental Statement\11. Materials\HE540039-CJV-EGN-SZP_EGNE00000000-DR-LE-50096 - Active Landfill and Waste Transfer and Treatment.mxd