

National Grid Cable Tunnel Replacement Project

Environmental Statement Volume VI Appendix 10.1 Outline Construction Traffic Management Plan

December 2023





the
transportation
consultancy

EXCEED RESPECT VALUE INNOVATE

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1. Introduction

1.1 Overview

The Transportation Consultancy Ltd ('ttc') have been appointed to prepare an outline Construction Traffic Management Plan (CTMP) in support of the construction and uprating of the transmission distribution system of the National Grid (NG) TKRE, Grain-Tilbury and Kingsnorth-Tilbury 400kV circuits which are forecasted to become overloaded in their current capacity and require uprating.

1.2 Purpose of the CTMP

This CTMP has been prepared to accompany a planning application in relation to the construction and uprating of the NG tunnelled transmission distribution system between TKRE, Grain-Tilbury and Kingsnorth-Tilbury.

The impacts of the proposed tunnel circuit system will primarily occur during the construction phase of the project and therefore this report, identifies a safe and efficient transport route for vehicles to access the site during the construction period, with due consideration of the existing highway conditions.

This document provides a framework for information and strategies that would be adopted within the final CTMP which would be developed for the final stages of the development.

This CTMP will be submitted for approval by the relevant Local Highway Authority (LHA). Any CTMP submitted for approval must be substantially in accordance with this Outline CTMP which provides a framework for:

- The traffic management processes and proposals that should be anticipated during the construction phase of the development;
- The basis of the logistics strategy to be adopted during the construction stages; and,
- The travel planning that would be implemented to assist and guide the construction workforce travel patterns.

This CTMP should be read alongside the Abnormal Indivisible Load (AIL) Access Study (Report Reference: 210707-02) which also supports the planning application.

1.3 Objectives of the CTMP

The objectives of the CTMP would be to:

- provide details of the construction processes for the stage of works;
- minimise impacts of the construction stages on the local highway network;
- enhance safety and awareness;
- provide information on traffic routeing and site access;
- provide an indication of programme and key dates; and,
- identify temporary traffic management, waiting and loading controls

1.4 Stakeholder Consultation

A series of Microsoft 'Teams' meetings were held between the project team and the following relevant stakeholders in late Summer 2023 to introduce the project (or provide a project update), inter alia, identify the key parameters, programme length and peak construction traffic movements including details on access routing and management practises:

- Gravesham District Council;
- Thurrock Council;
- Kent County Council;
- National Highways; and,
- Sustrans

A summary of discussions concerning the management of pedestrian and cyclist movements on the Thames and Medway Canal during the construction phase of the proposed development is presented in **Section 6**.

1.5 Structure of the CTMP

The remainder of this CTMP is structured as follows:

- **Chapter 2** – Development Proposals
- **Chapter 3** – Policy Context
- **Chapter 4** – Access Route Strategy
- **Chapter 5** – Construction Programme & Traffic Movements
- **Chapter 6** – Temporary Traffic Management Measures
- **Chapter 7** – Signage Principles
- **Chapter 8** – Monitoring & Enforcement

2. Development Proposals

2.1 Overview

The proposed development is situated in the south-east of England in the administrative boundaries of the following authorities:

- Thurrock Council (TC) – a Unitary Authority (also act as the LHA); and,
- Kent County Council (KCC)

The existing NG Grain-Tilbury and Kingsnorth-Tilbury 400kV circuits are forecasted to become significantly overloaded in their current capacity and require uprating. The circuits are predominantly overhead line, with cabled sections installed within a deep tunnel crossing the River Thames.

The uprating of the Grain-Tilbury and Kingsnorth-Tilbury 400kV circuits involves:

- Installation of 400kV cables within a new tunnel connection under the River Thames;
- Uprating of 400kV 4TK Grain-Tilbury and 4VG Kingsnorth-Tilbury overhead lines including downleads by reconductoring of the existing OHL sections of the Tilbury-Grain/Tilbury-Kingsnorth circuits; and,
- Uprating of substation bays at Grain, Kingsnorth, and Tilbury substations

2.2 Site Location

The Tilbury site is located within an industrial area and is bound by a concrete production factory to the north, industrial land to the east, the River Thames to the south and a vehicle storage site to its west. The Gravesend site is bound by the River Thames to the north, shooting range to the east, Thames and Medway Canal Road to the south and the Metropolitan Police Training building to the west.

Figure 2.1 below illustrates the site's location within the local context.

Figure 2.1 Site Location



The Tilbury site is served by the private Tilbury 2 RORO access road. The access road provides a two-way single carriageway with an approximate width of 7.3m, reducing to a minimum width c.5m. A pedestrian footway is provided on one side of the road up to the rail level-crossing where the provision terminates. The access road is subject to a 20mph speed limit, which reduces to 14mph to the east of the s-bend, with street lighting provided at regular intervals.

The Gravesend site is served by the Thames and Medway Canal Road which is owned and maintained by Network Rail. The road is single lane and subject to a 20mph speed limit, with an approximate width of 3.0m. A pedestrian footway is provided on the northern side of the access road with four passing bays provided. During the site audit, parked vehicles were observed to park within the parking bays.

2.3 Development Phases

This CTMP considers the construction phase of the proposed development only. The operational phase of the proposed development will generate very few vehicle movements and, therefore, the operational transport effects are negligible and scoped out of this CTMP.

2.4 Project Timescales

The duration of the entire construction programme is approximately 46 months commencing in March 2025. The tunnel construction is expected to last approximately 8 months. It is intended that the new cable tunnel will be operational by January 2029.

2.5 Vehicle Classification

A number of vehicle types will be used for the construction traffic. **Table 2.1** outlines each vehicle type with typical example vehicles.

Table 2.1 Typical Construction Vehicle Classification*

Light Goods Vehicles (LGVs)	Other Goods Vehicles 1 (OGV 1)	Other Goods Vehicles 2 (OGV 2)	Abnormal Loads
Car	Excavator / JCB	24 - 44-tonne Truck	Tunnel Boring Machine Transporter
Van	Tractor Trailer	Low Loader	Cable Drum Transporter
4x4 Pick-up	7-tonne Truck	Flat Bed	Mobile Crane (Liebherr LTM 1500 8.1)
4x4 Transit	16-tonne MGW		
Welfare Van			

*COBA Classifications

2.6 HGV and LGV Movements

The construction phase of the proposed development will principally involve a combination of Light Goods Vehicles (LGV) and Heavy Goods Vehicles (HGV). The traffic movements associated with this phase are outlined in **Chapter 5**.

2.7 Abnormal Indivisible Loads (AIL)

The proposed development is expected to require the movement of Abnormal Indivisible Loads (AIL) to transport plant and material including the Tunnel Boring Machine (TBM) and cable drums to the site. The impact of AILs is considered within the accompanying AIL Access Study report.

If and where feasible, the movement of the TBM by navigable waterway (River Thames) will be investigated. Scenarios for the delivery and removal of the TBM by waterway (via Port of Tilbury Docks) and by the Local Road Network (LRN) and Strategic Road Network (SRN) e.g A134, A1089 and A2, M2 are considered and outlined within the AIL Access Study report.

3. Policy Context

3.1 Overview

This chapter provides an examination of national policy, local policy and relevant legislation.

3.2 National Policy

National Planning Policy Framework (NPPF)

In September 2023, the Department for Levelling Up, Housing and Communities published the revised National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England and how these should be applied.

The NPPF provides a framework within which locally prepared plans for housing *and other development* can be produced. The NPPF must be considered in the preparation of local and neighbourhood plans and is a material consideration in planning decisions.

Notably the core revisions do not involve transport. As a result, due consideration has been given to the recently revised NPPF however, the fundamental transport and highways planning principles remain unchanged.

At the heart of the NPPF is a presumption in favour of sustainable development, an approach which should be followed by local planning authorities in their plan making and decision taking.

The NPPF sets out how sustainable development will be delivered, which includes promoting sustainable transport (Paragraphs 104 - 113). Within this section of the NPPF it is recognised that transport policies have an important role to play in facilitating sustainable development and contribute to wider sustainability and health objectives. The NPPF identifies the need to favour sustainable transport modes to enhance travel choice, and to locate developments that generate significant movement where the need to travel will be minimised and the use of sustainable transport modes can be maximised.

Section 9: Promoting Sustainable Transport, of the NPPF, paragraph 104 is applicable to the preparation of this CTMP and states that:

Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- a) *the potential impacts of development on transport networks can be addressed;*
- b) *opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
- c) *opportunities to promote walking, cycling and public transport use are identified and pursued;*
- d) *the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*

e) patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places.

3.3 Local Policy

Thurrock Transport Strategy (2013 – 2026)

The Thurrock Transport Strategy describes TC's transport strategy for the period 2013 to 2026. Based on a robust evidence base and feedback from residents and key stakeholders, it sets out the aims, objectives and a series of policies for delivering transport improvements in Thurrock.

In delivering Thurrock's vision for transport, a series of strategic aims were developed. These aims outline the broad goals that Thurrock wishes to achieve to move towards the realisation of the vision. The following relevant aims and objectives are outlined.

Aim – Improving Air Quality

- *To improve air quality, particularly in Air Quality Management Areas, in line with National Air Quality Strategy objectives*
- *To reduce nitrogen dioxide emissions from transport*
- *To reduce particulate matter emissions from transport*
- *To reduce carbon dioxide emissions from transport*
- *To reduce vulnerability to the impacts of climate change*

Aim – Safer Roads

- *To reduce the number of people killed or seriously injured in Road Traffic Accidents*
- *To create a safer environment for road users, especially those who are more vulnerable*

Thurrock Traffic Management Plan

The Thurrock Traffic Management Plan aims to facilitate traffic flows and reduce the number and duration of congestion incidents through an effective network management regime. In meeting this aim, the following objectives have been developed:

- *To reduce the number of congestion incidents and disruption related to:*
 - ▶ *Roadworks;*
 - ▶ *Road traffic accidents;*
 - ▶ *Events; and*
 - ▶ *Parking.*
- *To continue to minimise incidents and delays related to severe weather;*
- *To maintain and, where possible, improve journey times and speeds and therefore improve journey reliability; and*
- *To make the best and most effective use of data collection and information analysis*

Freight Movements

Thurrock is traditionally an area of port-related activity, heavy industry, cement manufacture and mineral extraction, and much of its river frontage is highly industrialised.

As a result of high freight activity, there are high levels of Heavy Goods Vehicles (HGVs) on the road network. HGVs take up more road space than cars and light duty vehicles, further limiting road network capacity and impeding traffic flows. HGV flows are highest in the following locations:

- *Approaching the port and Tilbury;*
- *The industrial waterfront areas in Purfleet;*
- *The M25; and*
- *Along the A13, particularly at the junction with the A1089 Dock Approach Road to Tilbury.*

Policy TTS19: Freight

To reduce the adverse impacts of road freight TC will work to:

- *Safeguard existing well-located freight wharves and facilities for rail and water freight interchange;*
- *Protect previously used rail accessible sites, including those owned by non-railway bodies, from development of non-rail based uses where there is a reasonable prospect of developing them for rail freight use; and*
- *Encourage new freight and logistics development to locate near and use rail freight facilities and develop sustainable distribution strategies.*

Policy TTS24: Reducing Freight Emissions

The Council will work with freight associations and operators to mitigate the adverse impacts of freight operations by reducing emissions from Heavy Goods Vehicles in Thurrock and encouraging the use of rail and water freight where feasible.

Kent Local Transport Plan 4

LTP4 sets out KCC's policies to deliver strategic outcomes for transport and is accompanied by implementation plans and a methodology for prioritising funding.

KCC set the following ambition which is supported by five overarching policies outlined below:

To deliver safe and effective transport, ensuring that all Kent's communities and businesses benefit, the environment is enhanced and economic growth is supported.

Policy 1 - *Deliver resilient transport infrastructure and schemes that reduce congestion and improve journey time reliability to enable economic growth and appropriate development, meeting demand from a growing population.*

Policy 2 - *Promote affordable, accessible and connected transport to enable access for all to jobs, education, health and other services.*

Policy 3 - *Provide a safer road, footway and cycleway network to reduce the likelihood of casualties, and encourage other transport providers to improve safety on their networks.*

***Policy 4** - Deliver schemes to reduce the environmental footprint of transport, and enhance the historic and natural environment.*

***Policy 5** - Provide and promote active travel choices for all members of the community to encourage good health and wellbeing, and implement measures to improve local air quality.*

3.4 Legislation

Traffic Management Act (2004)

The Traffic Management Act (TMA) aims to improve traffic management, enhance road safety, reduce congestion, and facilitate efficient transportation systems. It provides a legislative framework for authorities to take necessary actions in managing traffic flow, implementing traffic regulations, and ensuring the effective operation of the road network. Some of the key purposes of the TMA are presented below:

- **Traffic Regulation:** The TMA provides powers and mechanisms for local authorities to regulate and control traffic through measures such as traffic calming, parking management, speed limits, and road closures. It enables authorities to implement traffic orders and enforce various restrictions to ensure safe and efficient movement of vehicles, pedestrians, and cyclists.
- **Network Management:** The TMA facilitates the coordination and management of the road network by empowering local authorities to plan, implement, and maintain traffic management schemes. This includes measures like traffic signals, road signs, road markings, and bus lanes. The Act encourages authorities to adopt an integrated approach to manage traffic and coordinate with other agencies for effective network management.
- **Street Works and Utilities:** The TMA includes provisions related to street works and utilities, ensuring that activities such as road repairs, maintenance, and utility installations are properly coordinated to minimize disruption to traffic flow. It establishes requirements for street works permits, noticing procedures, and reinstatement standards to maintain the quality and safety of the road network.
- **Civil Enforcement:** The TMA introduces provisions for civil enforcement of parking and traffic contraventions. This allows local authorities to issue penalty charge notices (PCNs) and enforce parking regulations, bus lane violations, and other traffic-related offenses through civil means. It streamlines the enforcement process and provides consistent standards across different local authorities.
- **Traffic Management Powers:** The TMA grants additional powers to local authorities and traffic authorities, empowering them to manage and regulate traffic effectively. It enables authorities to introduce innovative measures, implement traffic schemes, and adapt to changing transportation needs and challenges.

Highways Act (1980)

The Highways Act 1980 is a legislation in the United Kingdom that outlines various provisions and regulations related to highways, roads, and their management. The Act serves several purposes, including:

- **Highway Authority Responsibilities:** The Act defines the roles and responsibilities of highway authorities, typically local authorities or highway agencies, in maintaining and managing the highway network. It sets out the duties of these authorities in terms of inspecting, repairing, and maintaining highways to ensure they are safe and accessible for public use.

- **Highway Construction and Improvement:** The Act establishes procedures and requirements for the construction, improvement, and alteration of highways. It covers matters such as the acquisition of land for road development, the establishment of new highways, and the standards for their construction, design, and layout.
- **Traffic Regulation and Control:** The Highways Act provides powers for regulating and controlling traffic on highways. It enables authorities to implement traffic management measures, including the installation of traffic signs, road markings, and traffic lights. The Act also includes provisions for speed limits, parking restrictions, and other traffic-related regulations.
- **Rights of Way and Access:** The Act addresses issues related to public rights of way and access to the highway network. It establishes rules for the creation, classification, and maintenance of public footpaths, bridleways, and other rights of way. It also covers matters such as the extinguishment or diversion of public rights of way.
- **Street Works and Utilities:** The Highways Act includes provisions concerning street works and utilities. It regulates the coordination, licensing, and control of activities such as road excavations, utility installations, and maintenance work. The Act establishes requirements for permits, noticing procedures, and reinstatement standards to minimize disruption to the highway network.
- **Liability and Compensation:** The Act sets out principles and procedures related to liability and compensation for highway-related matters. It clarifies the responsibilities of highway authorities for maintaining safe highways and defines the liability for accidents or damage caused by the condition of the roads.

3.5 Summary

The proposed development has been designed in accordance with the NPPF guidelines and the Traffic Management Act, and this CTMP demonstrates that the above objectives would be satisfied by the construction of the development.

4. Access Route Strategy

4.1 Overview

This chapter outlines the access route strategy which has been undertaken to review the construction haulage routes to the proposed development.

The following key considerations have been taken into account for delivering the access route strategy to the proposed development:

- Use the shortest route available from the location of the access points to the SRN;
- Use a sliding scale approach with regards to route assignment and road classification, utilising the 'A' classified highway network as far as practicable, before resorting to lower classifications of highway;
- Avoid single carriageway highways where alternatives are available; and,
- Avoid settlements and sensitive receptors (schools, retail areas), wherever possible.

A routing exercise has been conducted to determine which of the available routes that link the tunnel shaft sites with the higher order 'A' classified highway network/SRN, would be most suitable to support the construction of the development.

4.2 Access Routes to the Proposed Development

Route Analysis and Review

The potential routes to access the site from different 'A' classed roads have been identified and analysed. Each route has been 'RAG' (Red, Amber, Green) rated in terms of distance, road restrictions, sensitive land uses and road quality, to identify which route would be the most suitable for the construction vehicles to access the site. The RAG classification is as follows:

- **Green** – high quality, no constraints, low risk.
- **Amber** – reasonable quality, some constraint, medium risk.
- **Red** – poor quality, high risk constraints with no mitigation.

As the site will be accessed from both sides of the River Thames a variety of access routes have been identified and assessed for the most efficient and safe route. A route has been selected from the north to access the site in Tilbury and one route from the south to access Gravesend.

Types of Constraint/Issues

A desktop review of the access routes was supported by a site audit in April 2023 with the purpose of identifying:

- Height restrictions;
- Weight restrictions;
- Road classification;

- Road layout;
- Crossing facilities;
- Traffic calming features;
- Sensitive receptors e.g. schools / community facilities etc accessed by vulnerable road users;
- Visibility constraints e.g. horizontal/vertical carriageway alignment, encroaching vegetation etc;
- Restricted access;
- Speed limits and traffic speeds;
- Congestion;
- Steep gradients; and,
- Vulnerable road users (pedestrians, cyclists and equestrians)

Route to Tilbury Shaft

Due to the location of the site on the Tilbury side of the development and the nature of the LRN, there is only one suitable route to access the site from the SRN. The route identified does not pass through sensitive land uses and remains on the SRN for the duration of its course. The A1089 also provides the primary freight route to/from the Port of Tilbury Docks and carries high volumes of HGV traffic.

This route is graded as 'Green' as there are no issues or constraints identified. The route is illustrated in **Figure 4.1**.

Figure 4.1 Tilbury Access Route

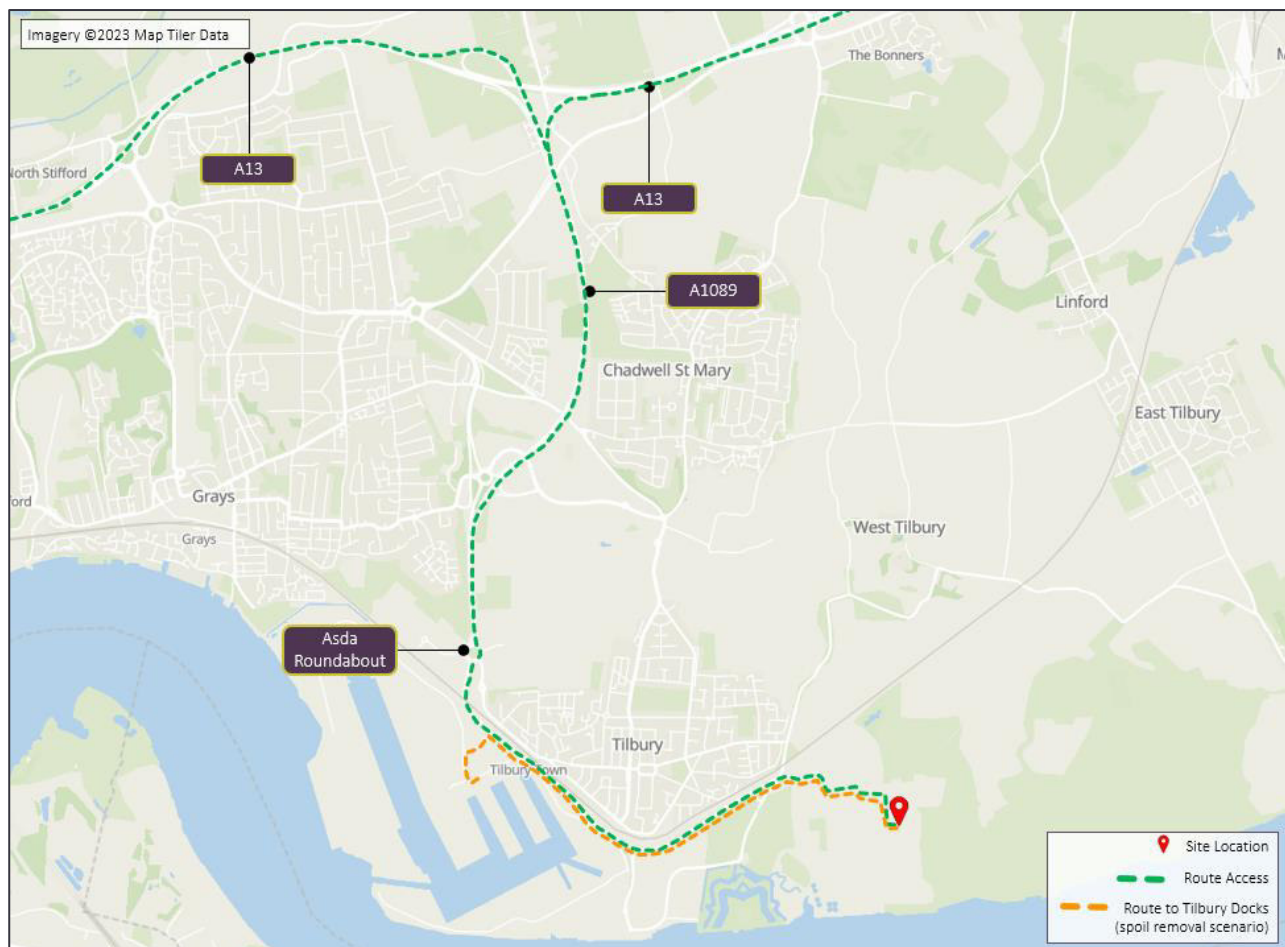


Figure 4.1 illustrates the proposed route to construction access the site and comprises of the following:

- **Inbound:** Exit the A13 onto the A1089 – southbound on A1089 and take the 3rd exit at the Asda Roundabout continuing on the A1089 through Tilbury – continue onto the internal access toward Tilbury 2 RORO Terminal before passing through the unmanned security entrance – follow the internal access road toward site turning left before Tilbury 2 RORO access.
- **Outbound:** A reverse of the above route

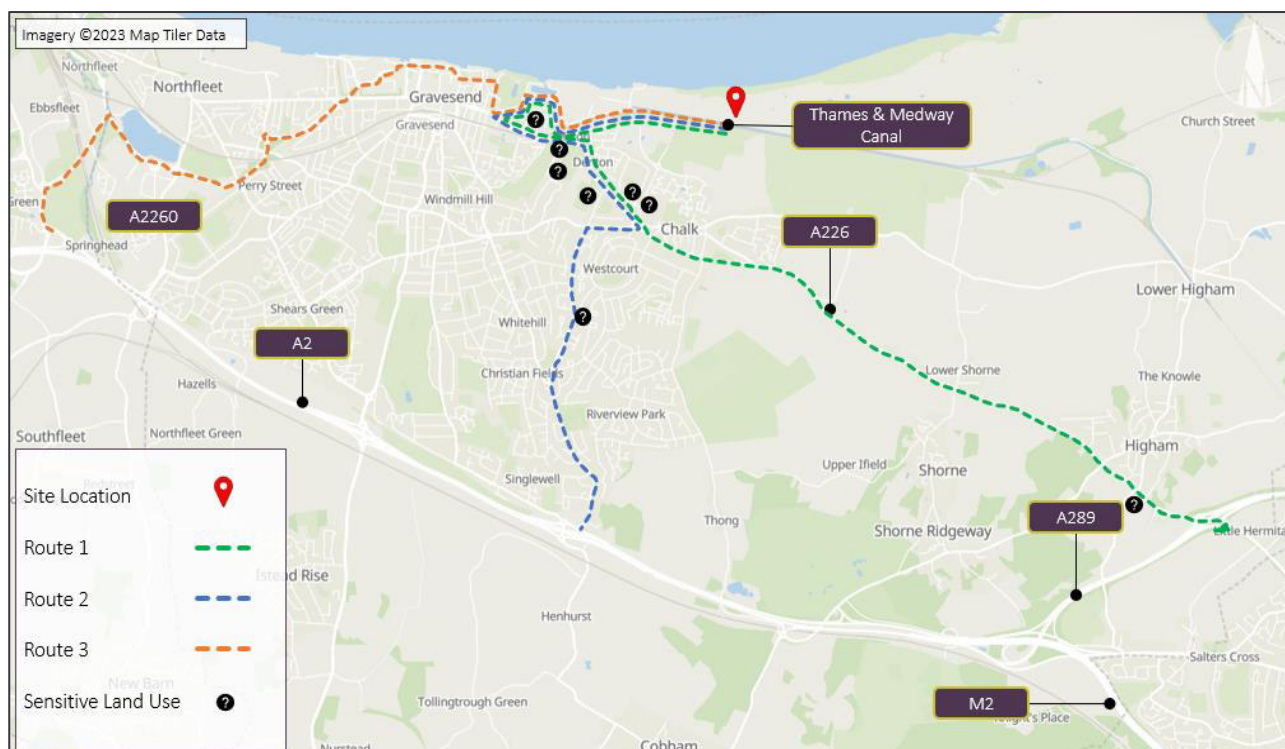
The route measures approximately 8.3km and would take construction vehicles approximately 10-minutes to access the site from the A1089. The A1089 is of high quality, there are no restrictions, and no sensitive land uses that are a cause for concern. The A1089 is the principal access route for freight to access Tilbury 2 RORO and the Port of Tilbury Docks and therefore experiences high volumes of HGV movements.

Figure 4.1 also illustrates the route between the Tilbury Site and the Port of Tilbury Docks which would be used by HGVs if the scenario where all tunnel/shaft spoil is removed via barge (River Thames) is taken forward.

Route to Gravesend Shaft

Three route options were assessed to identify the most appropriate route to access the site as illustrated in **Figure 4.2**.

Figure 4.2 Gravesend Access Routes



A 'RAG' assessment is set out below in **Table 4.1** below, to identify which of the routes displayed in **Figure 4.2** would be most suitable for the construction traffic to access the Gravesend site.

Table 4.1 RAG Rating – Gravesend Access

Route	Description	Length	Restrictions	Sensitive Land Use	Road Quality	RAG
1	Exit site egress – Thames and Medway Canal – Mark Lane – Norfolk Road – Canal Road – Ordnance Road – (A226) Milton Road – (A226) East Milton Road – (A226) Rochester Road – (A226) Gravesend Road – (A289) Hasted Road – Exit to the M2 either westbound or southeast bound.	c.11.8km (typically 14–20-minute drive)	None.	Gad's Hill School located off Gravesend Road. Shared use cycle lane along Gravesend Road. Kids Inc Day Nursery – Gravesend- Rochester Road. St John's Catholic Primary School on Rochester Road. St. Mary's Roman Catholic Church. St Peter's & St Paul's Church on East Milton Road. Gravesend Grammar School off Milton Road. Chantry Community Academy on Ordnance Road.	The road quality throughout the entirety of this access route is of high quality, with the exception of Thames and Medway Canal which is a narrow (3.3m) road, with a worst-case width of 2.9m.	

2	Exit the A2 onto Valley Drive – Old Road East (B261) – Rochester Road (A226) – East Milton Road (A226) – Milton Road (A226) – Ordnance Road – Canal Road – Norfolk Road – Mark Lane – Thames and Medway Canal	c.7.4km (typically 12–18-minute drive)	None.	Valley Drive routes through a residential area. Kids Inc Day Nursery – Gravesend- Rochester Road. St John’s Catholic Primary School on Rochester Road. St. Mary’s Roman Catholic Church. St Peter’s & St Paul’s Church on East Milton Road. Gravesend Grammar School off Milton Road. Chantry Community Academy on Ordnance Road.	Valley Drive is of high quality however, routes through a residential area with dwellings directly fronting the carriageway on both sides which would be unsuitable for construction traffic A226 is of high quality with dwellings set back a considerable distance from the carriageway and sided by wide grassed verges and footways	
3 (Inbound)	Exit the A2 onto the A2260 – Ebbsfleet Gateway (A2260) – Thames Way (A226) – Turn right before London Road and carry on Thames Way under the tunnel – West Street (A226) – Crooked Lane (A226) – The Terrace (A226) – Harmer Street (A226) – Milton Road (A226) – Ordnance Road – Canal Road – Norfolk Road – Mark Lane – Thames and Medway Canal.	c.8.4km (typically 14-20-minute drive)	None.	Shared use cycle lane on Thames Way (A226). Chantry Community Academy on Ordnance Road.	A2260 and A226 are high quality roads Pinch points on and town centre / residential one-way streets impacting outbound only. Inbound route not impacted by the above constraints	
3 (Outbound)	Thames and Medway Canal – Mark Lane – Norfolk Road – Canal Road – Ordnance Road – Milton Road (A226) – Windmill Street – Woodville Place – Wrotham Road – Rathmore Road – Darnley Road – New Road – Overcliffe (A226) – Thames Way (A226) – Ebbsfleet Gateway (A2260) – A2					

Table 4.1 identifies the potential access routes which have been assessed in terms of distance, road restrictions, nearby sensitive land uses and road quality. All routes identify a degree of constraint due the site only being accessible through Gravesend town centre and its location in context to the A2 / M2.

Route 1 has been identified as a ‘Green’ route, despite routing past some sensitive land uses and resulting in the longest journey time; it provides the safest and most suitable and convenient route to/ from the site for HGVs.

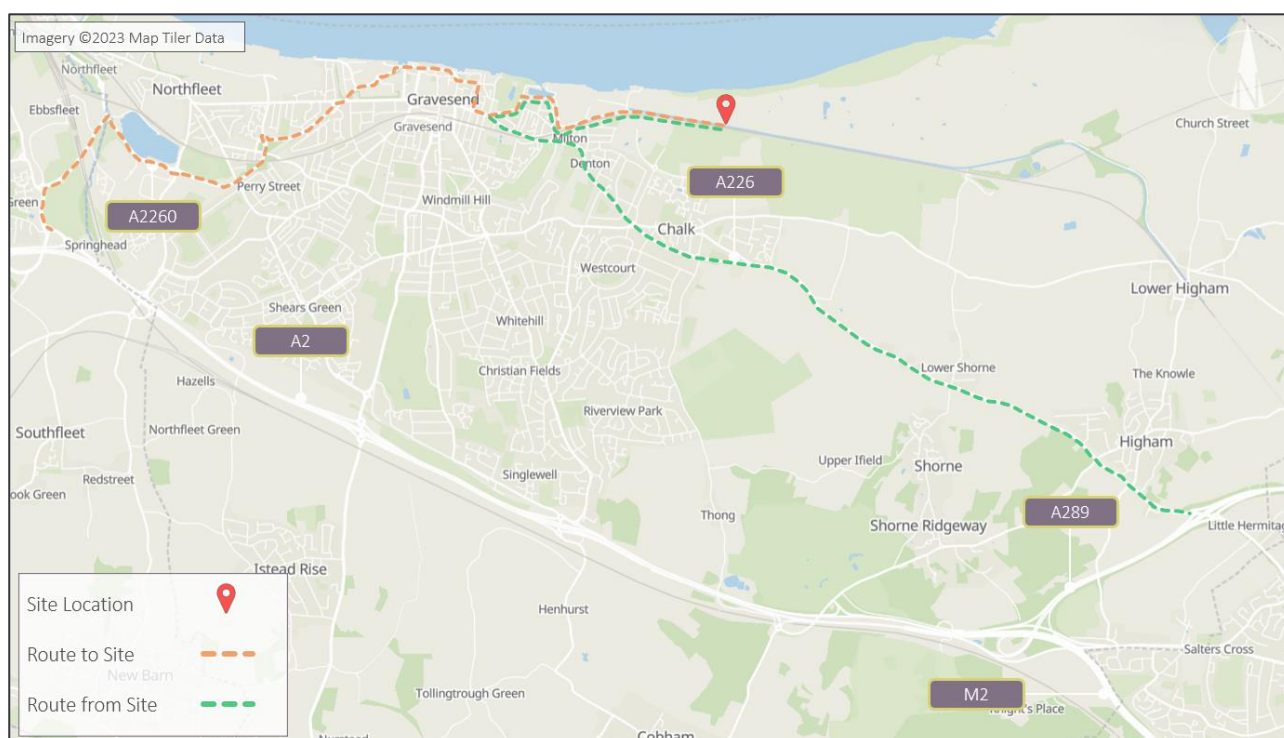
Route 2 has been identified as an ‘Amber/Red’ route, despite being the shortest most direct route, it passes through a populated residential area which would be unsuitable for construction traffic due to noise/air pollution and conflict with vulnerable road users.

Route 3 has been identified as an ‘Amber’ route as although it is of a reasonable distance to the site, it passes through narrow roads within the town centre and routes along frontages of residential areas, which could create disturbances and significantly increase the road usage due to the construction HGVs generated as a result of the proposed development.

Alternatively, a combination of Routes 1 and 3 could also be considered, wherein construction traffic would arrive via Route 3 and depart along Route 1. This would ensure an even spread of traffic across the LRN, and convenient access from the A2, a major route for HGVs.

Figure 4.3 illustrates the preferred access routes to/from the Gravesend shaft.

Figure 4.3 Gravesend Preferred Access Routes



Summary

After careful evaluation of the LRN, it has been determined that Route 1 would be the most suitable option for general construction traffic to the Gravesend shaft. The roads along this route are sufficiently wide, ensuring safe access to the site and avoiding congestion, and the associated environmental noise/air quality impacts on the town centre.

4.3 Existing Traffic Conditions

In order to establish the current traffic levels and vehicle speeds, traffic surveys were commissioned on the local highway network in vicinity of the Tilbury and Gravesend sites.

An Automatic Turning Count (ATC) was installed on the A1089 (Station Approach) which captured existing traffic flows toward the Tilbury 2 port and proposed Tilbury site for a 7-day period commencing on the Friday 9th June 2023 to record volumetric flows and speed data.

A second ATC was installed on the Thames and Medway Canal Road which captured existing traffic flows toward the Metropolitan Police Training building and the proposed Gravesend site. This was installed over the same time period, as above, to record volumetric flows and speed data.

Figure 4.4 illustrates and identifies the ATC locations.

Figure 4.4 ATC Survey Locations



A summary of the volumetric and speed data captured on the A1089 Station Approach and Thames and Medway Canal Road is outlined within **Table 4.2** to **Table 4.5** respectively.

A copy of the raw data can be made available upon request.

Table 4.2 A1089 Station Approach – ATC Traffic Survey Summary

Time Period	Northeastbound	Southwestbound	Two-Way
Volumetric Data			
Weekday AM Peak Hour 06:00-07:00	85	85	170
Weekday PM Peak Hour 13:00-14:00	102	99	201
Weekday Average 12-hour (07:00:19:00)	805	991	1,796

Time Period	Northeastbound	Southwestbound	Two-Way
Volumetric Data			
Weekday Average Daily Flow (24hr)	1,178	1,448	2,626
7-day Average Daily Flow (24hr)	922	1,132	2,054
Speed Data			
7-day Average Speed	37.5mph	35.2mph	-
7-day 85 th Percentile Speed	44.4mph	41.2mph	-

Table 4.2 identifies that the weekday peak hours on Station Approach occur between 06:00-07:00 and 13:00-14:00. The weekday 12-hour average (07:00-19:00), when construction activities are proposed, is identified as 1,796 two-way movements on the Station Road. Traffic flows are generally observed to be evenly split in each direction. This is presented in **Table 4.3** below.

Table 4.3 A1089 Station Approach – 5-day Average

Time Period	Northeastbound	Southwestbound	Two-Way	Time Period	Northeastbound	Southwestbound	Two-Way
00:00	15	27	42	13:00	102	99	201
01:00	18	27	45	14:00	74	97	171
02:00	14	19	33	15:00	66	100	166
03:00	22	31	53	16:00	45	70	115
04:00	29	49	78	17:00	39	54	93
05:00	87	63	150	18:00	31	34	65
06:00	85	85	170	19:00	24	36	60
07:00	67	93	160	20:00	28	34	62
08:00	81	88	169	21:00	20	32	52
09:00	76	87	163	22:00	12	32	44
10:00	76	90	166	23:00	17	21	38
11:00	84	96	180	-	-	-	-
12:00	66	83	149	-	-	-	-

Table 4.4 Thames and Medway Canal Road – ATC Traffic Survey Summary

Time Period	Eastbound	Westbound	Two-Way
Volumetric Data			
Weekday AM Peak Hour 07:00-08:00	79	12	91
Weekday PM Peak Hour 14:00-15:00	19	44	63
Weekday Average 12-hour (07:00-19:00)	294	328	622
Weekday Average Daily Flow (24hr)	389	388	777
7-day Average Daily Flow (24hr)	321	315	636
Speed Data			
7-day Average Speed	25.9mph	24.8mph	-
7-day 85 th Percentile Speed	34.3mph	32.0mph	-

Table 4.4 identifies that the weekday peak hours on Thames and Medway Canal Road occur between 07:00-08:00 and 14:00-15:00. The weekday 12-hour average (07:00-19:00), when construction activities are proposed, is identified as 622 two-way movements on the Thames and Medway Canal Road. Traffic flows are generally observed to follow a tidal flow pattern, where before midday, the highest proportion of traffic flows route eastbound (assumed to be arrivals associated with the Metropolitan Police Training building). After midday, the reverse occurs, which again, can be assumed to be related to departures from the Metropolitan Police Training building). This is presented in **Table 4.5** below.

Table 4.5 Thames and Medway Canal Road – 5-day Average

Time Period	Eastbound	Westbound	Two-Way	Time Period	Eastbound	Westbound	Two-Way
00:00	1	4	5	13:00	17	43	60
01:00	0	0	0	14:00	19	44	63
02:00	0	0	0	15:00	13	38	51
03:00	1	0	1	16:00	9	49	58
04:00	11	4	15	17:00	10	35	45
05:00	12	5	17	18:00	13	18	31
06:00	49	6	55	19:00	7	11	18
07:00	79	12	91	20:00	7	12	19
08:00	39	12	51	21:00	4	13	17
09:00	20	14	34	22:00	1	2	3
10:00	21	18	39	23:00	1	1	2

Time Period	Eastbound	Westbound	Two-Way	Time Period	Eastbound	Westbound	Two-Way
11:00	27	19	46	-	-	-	-
12:00	28	26	54	-	-	-	-

5. Construction Programme & Traffic Movements

5.1 Overview

This chapter outlines the construction programme and phases of the proposed development including a high-level estimation of the typical construction HGV movements associated with each phase/activity.

The duration of the entire construction programme is approximately 46 months commencing in March 2025. The tunnel construction is expected to last approximately 8 months. It is intended that the new cable tunnel will be operational by January 2029.

During the construction period, traffic movements will principally be associated with the following sources:

- The delivery and/or collection of plant;
- The delivery of construction materials and/or removal of waste materials; and,
- The construction workforce

Construction activity varies considerably on a day-to-day basis and it is not possible to predict with certainty the daily variation. However, the following estimates are representative of typical activity based on the expected construction programme.

5.2 Construction Hours and Delivery Times

The number of HGVs associated with construction traffic during the construction period is likely to have an adverse, but temporary effect on the LRN. Consideration will be given to the programming of HGV movements and the timing of deliveries, thus minimising disruption to traffic on the LRN. Typical working hours will be during daylight periods, although some deliveries may be programmed when the public roads are at their quietest (such as the movement of the TBM).

All construction works will be carried out during the working hours of:

- 08:00 – 18:00 Monday to Sunday

No works are to be undertaken out of hours (subject to TBM delivery), on Sundays or Bank Holidays without prior consultation and agreement with the relevant LHAs.

The TBM and tunnelling works will operate 24/7 from July 2026, however, spoil removal and concrete tunnel lining activities will be carried out within the times specified above.

5.3 Construction Workers

The peak number of construction workers have been identified as follows:

- Tilbury – 160 no. staff; and,
- Gravesend – 40 no. staff

5.4 Site Set-up & Demolition

The establishment of the construction compounds is expected to be broadly similar between the two sites. It will be necessary to transport offices, stores, and equipment to the sites as well as secure fencing as required. This is likely only to require access by LGVs and MGVs. This process is expected to take up to three weeks to complete.

Works would be carried out on the access to the site in both Tilbury and Gravesend which would commence in October 2024 and end in June 2025 at Tilbury and would commence in January 2025 and complete in September 2025 at the Gravesend.

The procurement of the TBM will take up to a total of 16 months (November 2024 – February 2026) and the construction would take 2 months.

5.5 Shaft Excavation

Once the site has been established, the shaft sinking process can begin. Shaft excavation is expected to take up to 8 months on the driving side and up to 6 months on the receiving side, this process involves the excavation of approximately 12,992m³ and 12,807m³ of spoil in the corresponding Tilbury and Gravesend shafts, of which is anticipated to have a diameter of 15m and a depth of 44m and 43m.

The spoil will be required for removal from both sites, by which a number of methods could be utilised:

- Removal by barge (via River Thames) – Tilbury only; and,
- Removal by road – Tilbury and Gravesend.

The method of removal depends on the contractor and the location of disposal relative to the sites. For robustness it is assumed that all spoil will be removed off site via the LRN and could result in the total production of 2,548 and 2462 two-way HGV trips in the respective Tilbury and Gravesend sites over the 8-month boring process. This could result in 15 daily two-way trips at each respective site based upon a capacity of 15m³ per HGV.

5.6 Tunnelling Process

The delivery of TBM will require 5 no. AIL movements and up to 55 supporting vehicle trips. Details of these deliveries can be found within the AIL Access Study (Report Reference: 210707-02) which outlines the processes related to the TBM arrival and departure.

The tunnelling process is anticipated to take up to 8 months, commencing in July 2026 and completing in February 2027. The excavation of the tunnel will result in 72,690m³ of spoil, which will be transported from the Tilbury site only. This is expected to generate approximately 10,218 two-way movements during the 8-month period and results in a daily average of 75 two-way movements for this activity, based on road transport only.

Removal of Spoil by River Thames

It should be noted that tunnelled spoil removal could be undertaken by barge via the River Thames, which would reduce the number of HGV movements on wider road network around Tilbury during the construction phase. For this scenario, use of the Port of Tilbury Docks is being investigated and could be utilised however, HGVs will still be required to route a short distance between the Tilbury site and the Port of Tilbury Docks on

the A1089 (for c.4km only). It will not be necessary for HGVs to route further north on this road or onward to the A13 which will remain largely unaffected if this scenario is progressed.

Removal of spoil from the Gravesend site has not been investigated and unlikely to be feasible due to the difficulty of accessing a jetty in this location.

At this stage, it is assumed that a capacity of 1,000m³ could be accommodated on each barge. Based on a total removal of 12,992m³ and 72,690m³ for the shaft excavation and tunnel drive respectively, this would result in approximately 13 and 73 barges for the respective activities. The total potential number of vehicle movements removed from the wider highway network north of the Port of Tilbury Docks on the A1089 and A13 is c.5,713. Given the estimated rate of advance of the tunnelling/shaft construction, c.0.7 barges worth of spoil is excavated per day allowing for a pair of barges to alternate at the Port of Tilbury Docks and moving to the desired spoil deposition location.

5.7 Shaft and Tunnel Construction

Both the Tilbury and Gravesend shaft/tunnel construction will comprise of the same processes:

- Construction materials including aggregate – 814 two-way HGVs; and,
- Shaft lining segments – 208 two-way HGVs.

This generates a total of 1,022 two-way trips across an 8-month period resulting in a daily average of 16 two-way trips at either side of the site.

Tunnel construction consists of:

- TBM consumables – 512 two-way HGVs; and,
- Tunnel lining segment – 4,410 two-way HGVs.

This is forecast to generate 4,922 two-way movements over a period of 8-months, which results in a daily average of 115 two-way trips.

5.8 Dismantling & Removal of TBM

The removal of equipment at Tilbury is unlikely to require the use of any vehicles larger than those required for the installation process.

Given the direction of travel of the TBM from north to south; the TBM will be removed via the Gravesend shaft. The removal and transport of the TBM at Gravesend will require the removal of AILs providing that the TBM is to be reused. However, if the TBM is not to be reused it could be reduced to component form before removal. This process is expected to take up to 1 month and will commence in March 2027.

Full details can be found within the AIL Access Study.

5.9 Summary of HGV Movements

The number of movements would be re-examined when the appointed Contractor's construction methods and detailed programming of the works are sufficiently progressed. This would enable a more accurate assessment of vehicle movements each week during construction.

Table 5.1 outlines the indicative HGV movements associated with the scenario where all spoil from the shaft and tunnel phases is removed via the highway network at Tilbury and onto the A1089 and A13. This presents a robust and worst-case scenario in terms of resulting HGV movements and traffic impact.

Table 5.2 outlines the indicative HGV movements associated with the scenario where spoil from the shaft and tunnel phases only, is removed via barge. This scenario reduces the resulting HGV movements on the wider road network however, residual HGVs will remain for spoil removal between the Tilbury site and the Port of Tilbury Docks. This scenario removes a significant volume of HGV traffic on the wider network further north of the A1089 and A13.

Table 5.3 outlines the indicative HGV movements associated with the scenario where all spoil from the shaft is removed via the highway network at Gravesend. Note, removal of spoil by barge is not possible at Gravesend.

Table 5.1 Tilbury - Construction HGV Movements (all spoil removed via Highway Network)

Construction Phase	Total Two-Way HGV Movements	Average Two-Way HGV Movements	Peak Two-Way HGV Movements	Programme Length
Shaft Construction	2,548	15	30	8-months
Tunnel Construction	10,218	75	150	8-months
Tunnel lining segments delivery	4,410	40	80	23-weeks
Shaft lining segments delivery	208	1	3	44-weeks
Abnormal Indivisible Loads (AILs) TBM	10	2	6	1-week
Abnormal Indivisible Loads (AILs) Cable Drums	72 (36 x 2)	2	3	4-weeks
Shaft fit out and head house construction	128	6	n/a	12 months
Sealing End compound construction	780 (390 x 2)	3	10	26-weeks
400kv overhead line diversion	1,300 (650 x 2)	8	20	32-weeks

Table 5.2 Tilbury - Construction HGV Movements (all Shaft/Tunnel spoil removed via Barge)

Construction Phase	Total Two-Way HGV Movements	Average Two-Way HGV Movements	Peak Two-Way HGV Movements	Programme Length
Shaft Construction	814	5	10	8-months
Tunnel Construction	512	4	8	8-months
Tunnel lining segments delivery	4,410	40	80	23-weeks

Construction Phase	Total Two-Way HGV Movements	Average Two-Way HGV Movements	Peak Two-Way HGV Movements	Programme Length
Shaft lining segments delivery	208	1	3	44-weeks
Abnormal Indivisible Loads (AILs) TBM	10	2	6	1-week
Abnormal Indivisible Loads (AILs) Cable Drums	72 (36 x 2)	2	3	4-weeks
Shaft fit out and head house construction	128	6	n/a	12 months
Sealing End compound construction	780 (390 x 2)	3	10	26-weeks
400kv overhead line diversion	1,300 (650 x 2)	8	20	32-weeks

Table 5.3 Gravesend - Construction HGV Movements

Construction Phase	Total Two-Way HGV Movements	Average Two-Way HGV Movements	Peak Two-Way HGV Movements	Programme Length
Shaft Construction	2,462	15	30	8 months
Shaft lining segments delivery	208	1	3	8 months
Abnormal Indivisible Loads (AILs)	10	2	6	1 week
Shaft fit out and head house construction	128	6	n/a	12 months
Sealing End compound construction	780 (390 x 2)	3	10	26 weeks
400kv overhead line diversions	1,100 (550 x 2)	7	15	32-weeks

In addition to the construction HGV and LGV movements there would be some private vehicle movements associated with staff and visitors. Staff will be encouraged to car share wherever possible in order to reduce the number of trips generated. Staff movements by shuttle bus or Park & Ride will be investigated.

6. Temporary Traffic Management Measures

6.1 Overview

This chapter outlines a number of mitigation measures that could be implemented during the construction phase of the development.

6.2 Traffic Management Measures

The guiding principles for traffic management activities focus on the health and safety of all construction personnel and the minimisation of inconvenience to the general public.

Basic communication requirements of the CTMP will be to provide:

- Advanced warning of changes to the public highway to enable drivers to adjust their driving; accordingly.
- Clear information and guidance as to how to safely negotiate the work site; this includes the delineation of travel paths and their separation from the work site with barricading as required.
- Site Induction for new drivers to ensure they are familiar with the site layout and all relevant procedures outlined within this CTMP.

Site Access Control

A traffic marshal will be appointed to control access to and from each site where required and ensure drivers have been through the site induction process. It will be the responsibility of the traffic marshal to guide incoming traffic and be aware of any egressing vehicles. Construction vehicles delivering to the site will be under continuous control of the traffic marshal.

Site Security Measures

Appropriate security fencing will be established around the sites including compounds, works areas and areas used for the storage of plant and machinery, hazardous substances. The condition and effectiveness of these boundaries will be subject to regular inspection.

Where determined necessary by the contractor, Closed Circuit Television (CCTV) will be installed within construction areas. Remote cameras will be installed at compounds for security purposes when items of value are left, with permanent CCTV being installed at the primary compounds. Access to working areas will be restricted to approved personnel only, with the Site Supervisor to monitor and manage traffic and site visitors.

Personnel Access

Security gates will be used to ensure that only authorised personnel and deliveries can enter and will remain closed at all other times.

Personnel requiring access to the site for reasons other than carrying out physical construction work will be treated as a site visitor. All visitors will be granted access by appointment only and must in all cases be authorised by a senior manager at each site and be required to attend a site induction session to maintain health and safety.

All visitors, except for authorised collection or delivery drivers, shall always be the responsibility of the permanent pass holder whilst on site and must sign in at security.

Visitors must always use the pedestrian walkways and access gates provided for safe and easy access to site office.

Compounds will be segregated into non-PPE and PPE areas. Personnel will not be allowed access into PPE areas without the appropriate equipment as per construction standards.

HGV Booking

A booking system (Delivery Management System - DMS) will be used to ensure deliveries to the sites will be spread across the whole day where possible. This will minimise the impact of HGV traffic during the network peak periods. This booking schedule will also form part of and inform the monitoring process of the CTMP.

Dedicated members of staff will travel on the construction routes and monitor LGV and HGV traffic using the routes associated with the proposed development. Staff will be trained to conduct this monitoring process, collect and collate data.

Delivery vehicle dwell times will be kept to a minimum; vehicle engines will also be turned off to reduce noise pollution. Appropriate traffic management including clear and visible construction works signage will be implemented and used when/where required; this will be submitted by the Contractor prior to commencement, as requested. Banksmen will also be in position as and when required.

Traffic Marshal

Qualified personnel (Traffic Marshal) will be in place at key locations when necessary, during the construction of the proposed development. These are likely to be required in place at site accesses for key deliveries or at the Thames and Medway Canal Road during busy periods. Qualified personnel can be provided at other locations as required.

HGV Emissions

All vehicles used in the construction of the proposed development will be to Euro standard V class or better.

Parking & Loading

Appropriate loading / unloading and parking areas for construction vehicles will be designated to avoid the need for parking or waiting on the highway. Any clashed deliveries will be sent away to avoid waiting on the highway.

Upon arrival to each site compound, all deliveries will report to the coordinated delivery contact. This will be communicated to all suppliers and subcontractors at their site induction for all new drivers.

Whilst on-site, the delivery operation will be controlled by a trained Traffic Marshal, from the point of guiding a vehicle to its designated off-loading area to guiding the vehicle back onto the LRN. Both the Traffic Marshal and drivers will follow relevant safety procedures and operate the same signalling systems.

Adequate parking will be provided to ensure that the safety and efficient operation of the public highway is not reduced. At no time will construction personnel, including contractors and suppliers, be authorised to park outside of the site boundaries, including on the public highway, unless prior permission has been granted by either the relevant landowner or the LHA.

On-site parking will be managed to ensure safety of all personnel. Parking terms and regulations will be clearly displayed using signage displayed in the immediate vicinity of the parking provision.

Road Safety

Suitable space within the works site will be provided for all vehicles to park, unload and manoeuvre, therefore enabling all egressing vehicles to exit onto the access road in a forward-facing direction. Reversing onto any public highway will not be permitted.

A 'Near Miss' reporting system for all highways incidents. The contractor will ensure that all accidents and near misses are recorded within this system and that drivers are instructed to report all issues recorded through the system. Any accidents or near misses involving vehicles travelling to / from the site will be recorded, investigated, and reported internally and to the client referring specific incidents to the LHA as deemed necessary.

The contractor will retain records of all incidents (e.g. speeding and driver hours) and submit to the relevant authorities upon request. If emerging issues are identified, the contractor and the LHA will initiate discussions with relevant stakeholders.

Road Condition Surveys

Each access point to the LRN by any access road or track used by the proposed development will be inspected. These inspections shall take place before first use, regularly during use and following final use, to ensure that the surface of the highway altered for the proposed development remains in good repair and safe for the public traffic using the highway. Any repairs that are required to maintain the altered highway throughout the construction period will be carried out in a timely manner.

Daily inspections will be carried out on Thames and Medway Canal Road. These will be recorded, and remedial action will be taken to remove any dirt and debris resulting from construction operations.

Wheel Washing

All vehicles exiting from Tilbury and Gravesend will be checked and cleaned manually (or if it is deemed necessary will pass over a wheel cleaning facility) prior to using the LRN. The cleansing of vehicles will ensure the removal of debris from all vehicles ahead of joining the road network. If required, a road sweeper will be utilised to further ensure that the LRN remains safe and clear of debris.

Tipper Covers

It is expected that all tippers importing or removing loose material will be covered and it is the responsibility of the Traffic Marshall to ensure vehicles do not leave site without the appropriate covers. Any vehicles arriving to site without appropriate covers will be reported immediately to ensure the supplier is informed and appropriate action taken.

Vehicle Identification

All HGV and LGV construction vehicles associated with the proposed development will be clearly identifiable using a vehicle marking scheme. The purpose of this is to assist with the monitoring process of the construction vehicles within the LRN.

It is envisaged that this will be achieved by placing suitable signs in or onto all HGVs and LGVs entering and exiting the working areas onto the LRN. This signage would be passed to appointed contractors prior to the

start of construction. The exact form of identification is still to be determined; however, wording stating “TKRE, Grain-Tilbury and Kingsnorth-Tilbury” or similar will be used. Vehicles dedicated to the proposed development long term, i.e. staff cars, Site Supervisor commercial LGVs, will also be inducted and their registrations stored on record.

Pedestrian Access Routes

Safe pedestrian access routes between car parking locations, access points, work areas, site offices and welfare facilities will be provided within site areas at Tilbury and Gravesend where possible. Where pedestrian and vehicle routes interact, appropriate crossing points and segregation will be provided.

Pedestrians accessing the construction compounds and other work areas are always required to wear the mandatory PPE.

Vehicle Holding Area

There is no intention in providing a remote HGV holding area, therefore a vehicle call up procedure is not required.

Parking Suspensions

Parking restrictions will be imposed on the Thames and Medway Canal Road during the construction phase of the proposed development to enable safe passage for HGV movements, if required (subject to DMS). Given the private ownership of this road, no licences or permits will be necessary however, advance warning signage will be installed prior to suspensions and consultation with neighbouring users will be required to determine whether any mitigation is required.

Information Packs

Information packs will be provided to all contractors, which will form part of the contractual agreement between the contractors and National Grid. The information pack may contain the details of the following CTMP requirements:

- Site induction;
- HGV restrictions;
- Construction routes;
- Non-compliance guidance;
- Complaints procedure;
- CTMP protocols and indications required for all contractors including a code of good practice;
- Guidance on standard communication procedures between contractors and site; and,
- CTMP contacts (emergency and non-emergency).

Information packs and communications details will be shared with relevant LPAs and LHAs ahead of any construction works.

Pedestrian / Cyclist Management – Thames & Medway Canal Road

Thames & Medway Canal Road hosts the National Cycle Network (NCN) Route 1, managed by Sustrans (custodian of the NCN in the UK). This route is also identified as the Public Right of Way (PRoW) NS317.

Regionally, NCN1 is a long-distance route from Dover to Scotland. Locally, NCN1 routes via Chatham, Gravesend, Dartford before routing adjacent to the River Thames toward central London.

Beyond the vehicle ingress/egress to the Gravesend site at Eastcourt Marshes, the NCN route is traffic-free up to Canal Road which serves the Nuralite Industrial Estate north of Lower Higham. The route is formed of an all-weather surfaced material and is unlit.

At the time of writing, the PRoWs NG2 and NS317 are closed between Norfolk Road and Shornemead Crossing due to construction works are planned on or near them. The alternative diversion route is via PRoW NG1 and Bridleway NS318 which will be signed for the duration of the closure. This diversion routes across Shorne Marshes to the 'Saxon Shore Way/England Coast Path (NG1)', which runs adjacent to the River Thames. This diversion route will be drawn upon and utilised again during the construction phase of the development for all pedestrian movements.

With regard to the management of pedestrians and cyclists, several scoping meetings were held with relevant stakeholders: KCC and Sustrans to seek input on the suggested mitigation and most appropriate solution to for all interested parties.

A summary of mitigation measures and observations/comments following input from the stakeholder meetings is presented in **Table 6.1**.

Table 6.1 Mitigation Options and Comments

Mitigation Measure	Scoping Comments/Observations	RAG
Cyclists to dismount for narrow sections	Not recommend by Sustrans. Not all cyclists can dismount. Cyclists likely to ignore dismount signage	
Segregated sections for pedestrians and cyclists	The width of Thames & Medway Canal Road is too narrow to offer this as a measure.	
Banksman and management (e.g. gates, stop/go boards, temporary traffic lights)	Reliance on banksman being present during throughout working day and construction duration. Some route users may still ignore – banksman have no authority or enforcement.	
Temporary floating pedestrian and cycling structures on the canal side verge	A sensitive water vole habitat and enhancement is present within this verge created by the Canal and Medway River Trust	
Restricting use of passing bays for daytime car parking	May push parking onto other neighbouring roads or result in highway safety issues due to erroneous parking behaviour. However, the measure to be considered for the safety of parked vehicles.	
Closures and diversion in place during most intensive periods of works (shaft sinking and site levelling)	Whilst may not be most practical, it will help mitigate safety issue by removing vulnerable road users from affected route. Advance signage to be clearly identified – measure to be monitored throughout.	

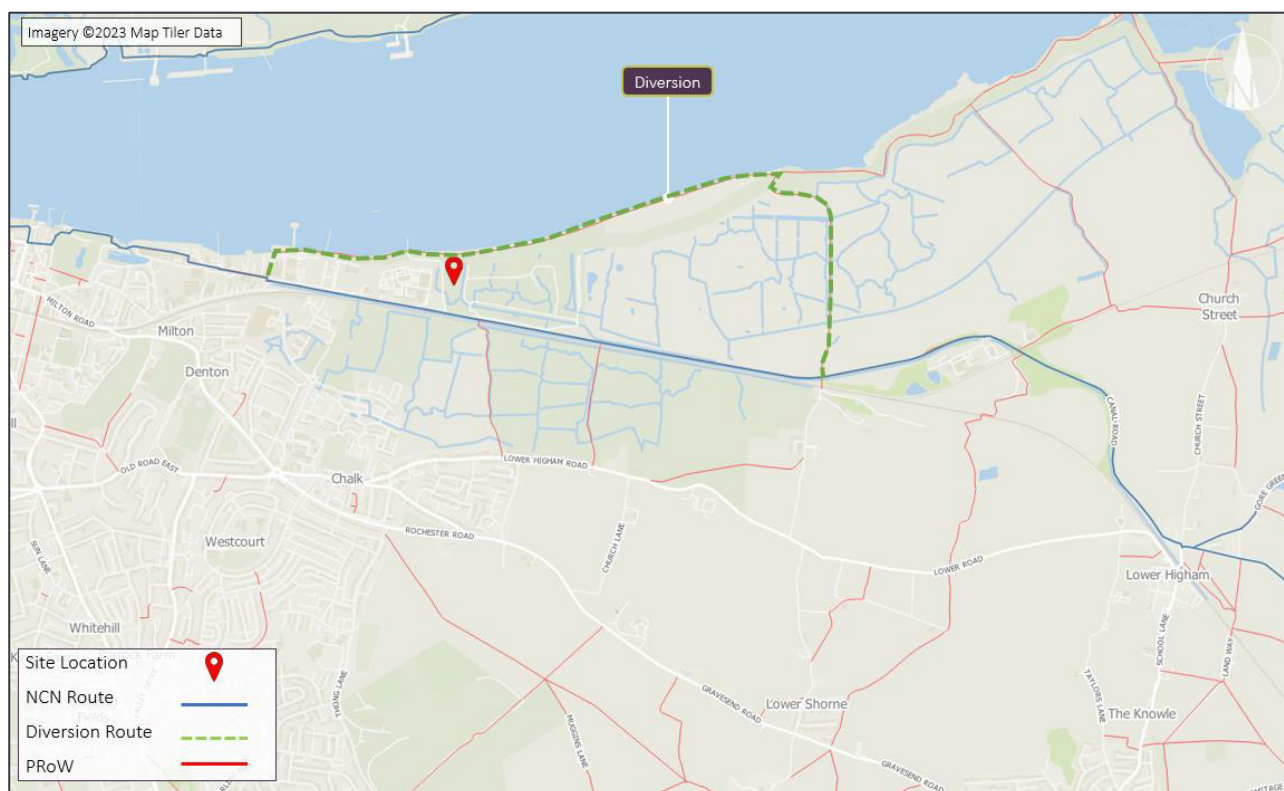
Shortening diversion using Queen's Farm Road	Measure would require pedestrian/cyclists to route over live rail line creating safety concerns. Understood Level Crossing is closed.	
Diverting cyclists onto pedestrian coastal path by upgrading existing route to a shared path	Upgrade to all user access (capable of accommodating two-way cycle movements) unlikely to be feasible due to available with.	

In summary, the following preferred mitigation measures have been verbally agreed upon (may be subject to change within this live document and on-going review).

Pedestrian Management

The preferred method of mitigation will be to divert all pedestrian users of NG2 onto the NS318 and NG1 (Saxon Shore Way / England Coast Path) as illustrated in **Figure 6.1**. This equates to an additional 1.2km travelled.

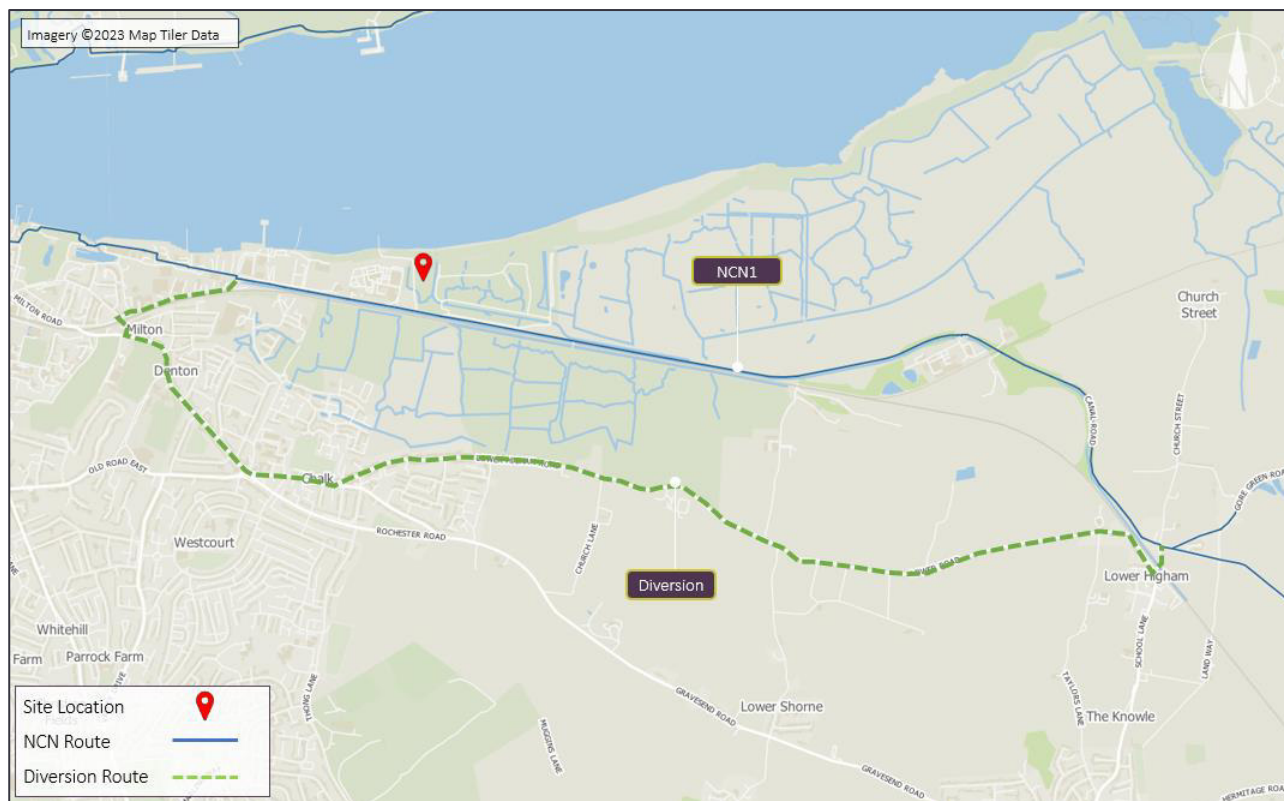
Figure 6.1 Pedestrian Diversion



Cyclist Management

The preferred method of mitigation will be to divert all east-to-west cyclists using NCN1 onto Chequers Street (at Lower Higham) – Chalk Road – Lower Road – Lower Higham Road – A226 (Rochester Road) – Raphael Road – subway – Prospect Grove – Norfolk Road. The diversion would be reversed for all west-to-east cyclists. The diversion equates to an additional 1.5km travelled.

Figure 6.2 Cyclist Diversion



Users of the diversion routes will be managed when needed, to ensure that these routes remain accessible and can be safely used throughout the construction phase.

7. Signage Principles

7.1 Overview

This chapter outlines the principles of the signage strategy to be implemented during the construction phase of the proposed development.

7.2 Principles of Signage

Temporary signage will be erected around the site access at Tilbury and Gravesend and at other locations on the LRN to provide warning to other road users of the likely presence of construction vehicles undertaking manoeuvres. Signage will be in accordance with Chapter 8 of the Traffic Signs Regulations and General Directives (TSRGD).

The Contractor shall ensure the following principles are applied regarding signage:

- Signs and devices will be erected and displayed before work commences;
- On approaches to the site accesses, signs are erected in the following sequence and then removed in the reverse order.
 - ▶ Advance warning signs;
 - ▶ Other warning signs; and
 - ▶ Instruction signs.
- Signs are placed within the driver's line of sight and at the same time not obscuring other traffic devices from the driver's line of sight;
- All signs and devices are placed in the most advantageous positions, considering the location and nature of hazard and the warning being conveyed, to provide the maximum visual impact for approaching traffic. Such signs and devices shall have an adequate clear view in advance of them (e.g. a minimum of 50m for 60km/h and a minimum of 100m for 100km/h);
- Signs and devices are placed in a manner and position, so they are not obscured from view by vegetation, parked vehicles or any other visual obstruction;
- Signs and devices are placed in a manner and position so as not to become a possible hazard to construction personnel, pedestrians or vehicles (e.g. diverting traffic into an undesirable path);
- Signs and devices shall be regularly checked for effectiveness and maintained in a satisfactory condition.
- Permanent signs which conflict with the signs required for the temporary work situation are covered or removed;
- Signs and devices are removed from the site when practical and once the hazard ceases to exist, restoring the road / footway to previous condition; and,
- Original signage is uncovered or reinstalled returning the signs to their original state as a minimum

Figure 7.1 illustrates examples of construction signage that would be introduced.

Figure 7.1 Construction Signage Examples



7.3 Erection and Location of Signs

The contractor will ensure all road signs are used with approved stands or erected on posts set into the ground (where permitted by the relevant authorities).

Where signs are erected on posts set into the ground the following will apply:

- On un-kerbed roads in both rural and urban areas the sign should be at least 600mm clear of the outer edge of the road shoulder, line of guideposts or face of the guard measured towards the property boundary. The clearance should not be less than 1m nor more than 5m from the edge of the running lane and the height of the sign should be 1.5m above the nearest edge of the running lane;
- On kerbed roads, signs should be located back from the face of the kerb, no less than 300mm and no more than 1.0m. The height of the sign should be approximately 2.2m above the kerb or footway to reduce the interference from parked cars; and,
- Where the signs are erected on temporary stands for short term work, they should be erected on the road shoulder in un-kerbed areas no closer than 600mm to the running lane. In kerbed areas the provisions outlined above for post-mounted signs shall be followed.

7.4 Advance and Intermediate Advance Warning Signs

Advance and intermediate advance warning signs will alert approaching vehicles of changes to road conditions, enabling road users to negotiate any travel path at an acceptable level of risk.

Advance Warning Signs

Advance warning signs for vehicular traffic are not required in the following situations:

- Whereby works are sufficiently remote from the roadway, meaning that no action or extra vigilance is required of a driver other than would be normally required on that section of road; and

- Where approach speeds are so low that no devices are needed to provide advance warning; i.e. signs and devices can be seen in plenty of time for drivers to take necessary action.

Intermediate Warning Signs

The intermediate advance warning signs are:

- Diversion Ahead (if required); and
- Prepare to Stop

7.5 Access Route Signage

Temporary signage will be erected along construction access routes on the LRN to provide access (directional) routing information. These will be placed to ensure that construction vehicles and staff are able to travel directly to site. Locations of the temporary signage will be drafted in plan format and approved by the LHA ahead of installation.

Temporary signage will also be provided in the vicinity of access and will provide warning to other road users of the likely presence of construction vehicles. Temporary signage will be produced and agreed with the LHA.

8. Monitoring & Enforcement

8.1 Overview

This chapter reviews the management structure that will oversee the CTMP. It is important that a strong management structure is in place to ensure the CTMP objectives are met and that continued monitoring and review of the CTMP is maintained.

A Transport Co-ordination Officer (TCO) will be appointed by the Contractor to achieve this.

The TCO will be employed prior to the commencement of works and will have the following transport related responsibilities:

- Liaise with and report to the LHAs about mitigation and any remedial measures, if required;
- Update the CTMP as required;
- Conduct site inductions; and,
- Resolve issues and problems through the liaison with relevant stakeholders including (but not limited to) adjacent landowners, traffic management contractors, LHA/LPA etc.

8.2 Key Contacts

The contact details of the TCO (or Project Manager) and out of hours contact, responsible for the on-site works are provided below:

- | | | |
|----------------------------|---|--------------------------------------|
| ● TCO (or Project Manager) | - | To Be Confirmed (TBC) Once Appointed |
| ● Phone Number | - | TBC |
| ● Email | - | TBC |
| ● Out of Hours Contact | - | To Be Confirmed (TBC) Once Appointed |
| ● Phone Number | - | TBC |
| ● Email | - | TBC |

The LHAs will also be informed if the contact details change at any point during the construction phase.

8.3 Monitoring

The TCO will be appointed prior to construction as part of the CTMP to oversee the implementation and monitoring of the CTMP.

The contractor will undertake monitoring as necessary to ensure compliance with the requirements of the CTMP and this will include the maintenance of records and traffic management measures.

The contractor will ensure that a suitable, qualified member of staff is employed to conduct surveys and monitor construction vehicle activity at specific locations on the construction route network to ensure

adherence to the CTMP. This will include the monitoring of construction vehicles on the LRN and speed enforcement monitoring.

8.4 Compliance

As part of the CTMP a series of mechanisms will be established to provide all parties with a clear understanding of the enforcement procedures that will be applied by the TCO if the requirements contained within this CTMP are not achieved. It is anticipated that these mechanisms can be determined and agreed at a later stage and will include a three-stage process:

- Risk Assessment Method Statement (RAMS) procedures – the contractor will implement the CTMP, adhere to the requirements and meet the goals through management practices. This will include site inductions for contractors, briefing on the obligations of National Grid standards, induction and adherence to RAMS procedures, DMS briefing, driver inductions and compliance guidance;
- Contractual Conditions – to be employed as part of this CTMP compliance methodology and will be built into the contractor's contract, this will be subject to performance review by National Grid; and,
- Actions – to be employed if commitments of this CTMP are breached.

8.5 Enforcement & Corrective Measures

To ensure that the aims of the CTMP can be effectively enforced, it is important to define what will constitute a breach. The following actions will constitute a breach of the CTMP, whereby corrective measures will be required (this list is not exhaustive):

- Vehicles using prohibited routes;
- Construction workers not parking in designated areas or overspill parking on the LRN;
- Construction HGVs not adhering to the agreed routes/times; or
- Construction traffic being driven inappropriately, e.g. speeding.

On receipt of a report of a potential breach, the contractor will investigate the circumstances accordingly using the monitoring tools available and compile a report outlining the breach and ramifications. These reports will be available upon request to the client and the LHAs.

Individual employee breaches would be addressed through UK employment law whereby the three-stage process outlined above may form the basis for disciplinary proceedings.

National Grid will also have the power to remove person(s) from the project should it be required and deemed appropriate.

A copy of the incident reporting protocols and procedures are provided within **Appendix A** for reference.

Appendix A

Incident Reporting Procedures



INCIDENT INVESTIGATION TERMS OF REFERENCE

National Grid Electricity Transmission Contracts Representative:	
Investigation Team Leader (Contractor):	
IMS Number:	
Project Title:	
Incident Title:	
Incident Date:	
Deadline Submission Date:	
First Draft Review Date:	

1. Purpose and Expectations

Why do we carry out incident investigations? There are lots of reasons why we investigate such as: legal, moral and financial reasons, however, we believe that the primary reason is to learn from our incidents and prevent recurrence.

Our Safety Ambition is to have a culture where we always do the right thing regarding safety. We recognise and share what goes well and we welcome learning from what doesn't go well.

An effective investigation requires a methodical, structured approach to information gathering, collation and analysis. The findings of the investigation will form the basis of an action plan to prevent the accident or incident from happening again and for improving your overall management of risk.

As the named 'nominated investigation leader' for the above project, you are required to carry out the investigation into this incident.

This document contains your terms of reference for the investigation. They set out National Grid Electricity Transmission's (NGETs) expectations for 'medium' and 'high' level investigations, including the deliverables at completion.

There is a deadline for submission of the approved investigation report. Therefore, in order to meet this timeline, I will send you a diary invite for to review the first draft of the investigation report (see table above).

The Investigation report does not need to contain superfluous information, just the facts that are relevant to the incident.

The NGET Incident Review Panels (IRP) measure the quality and content of all investigation reports based on the following:

- Has sufficient data been captured?
- Has the investigation analysis identified the root cause?
- Has the investigation analysis considered human / behavioural / management system factors?
- Will the corrective actions prevent recurrence?

- How far have those corrective actions and lessons learnt been shared and implemented?
- An above standard investigation is achieved by organisations with the right approach, attitude and openness to the process. The benefits are far and wide. For more guidance on what to include in your incident investigation report please refer to HSG 245, HSG 48 and Appendix A below.

2. The Terms of Reference For This Investigation Are:

- Conduct interviews with all parties who are involved in the incident, including any relevant NG Project / Operational Team members and Site representatives.
- Visit the scene of the incident to gather the facts / evidence, photos and documentation relevant to the incident.
- Use the Taproot technique (or a similar Root Cause Analysis tool e.g.HSG 245), to establish the causal factors; and ultimately the immediate and root causes of the incident.
- Identify and implement corrective actions that address the root causes of the incident.
- Consider Human Factors as well as systematic and technical issues.
- Produce a clear, good quality and concise investigation report that is thorough and complete and captures each element contained within Appendix A, and in the same order.
- Produce a report that is no more than 10 pages long (excluding appendices).
- Incorporate details of any regulatory communication, instructions, requirements or enforcement action taken.
- To ensure the principles of fair and just consequences is applied to the incident investigation.
- Produce a Shared Learning Bulletin (SLB) on completion of the investigation to share lessons learned more widely within NGET.
- **Additional incident specific requirements to be added here by the NGET Contract Representative prior to issue to contractor.**

Appendix A

1. Executive Summary

Should:

Be a clear and concise overview of what happened, why did it happen (behaviourally or technically) and what you are doing to prevent it happen again.

Be no more than 1 page long.

Be written in plain English.

Give the reader a good summarised overview of the facts, findings and corrective actions that have been put in place without the need to read the full report.

Should not:

Contain abbreviations without introduction.

Have lengthy introductions to the project scope.

2. Description of the Incident

Should:

Provide a clear and succinct overview of the incident to enable the reader to gain enough detail to easily understand what happened.

Gathers all the facts and leave no ambiguity around the incident.

Be written in a non-technical way in plain English

Avoid the use of unreferenced abbreviations.

Include (or reference in appendices) enough photos to enable the reader to fully understand the incident in detail.

Provide details of any plant or equipment that was involved.

Reference relevant supporting information in the appendices.

Be clear about the: who, what, why, when, where and how.

Should not:

Neglect key facts that have contributed towards the incident.

Cover irrelevant information that is not related to the incident.

Duplicate the executive summary.

Leave the reader with any ambiguity surrounding the incident.

Be unnecessarily lengthy and word heavy – less is more!

3. Timeline of Events

Should:

Describe or graphically present a timeline of events which clearly shows – what happened, when and in what sequence.

Include details of any regulatory communication, instructions, requirements or enforcement action taken.

Extend as far as necessary for ongoing incidents or where mitigation, intervention or regulatory interest remain relevant.

Should not:

Provide lengthy detail of 'events' that are not relevant to the incident.

4. Incident Analysis – Immediate Causes, Underlying Causes and Root Causes

Should:

Clearly identify the immediate, underlying (causal factor) and root causes of the incident.

Examine and identify any human factors (refer to HSG 48) that may have contributed towards the incident.

Examine and identify any human failings related to the incident i.e. errors or violation.

Examine and identify any management system failings that may have contributed towards the incident.

Be thorough and free from bias, the analysis must be carried out in a systematic way, so all the possible causes and consequences of the adverse event are fully considered.

Include root causation analysis diagrams.

Should not:

Limit analysis to immediate or underlying causes only.

Focus solely upon a human failing as the cause.

Fail to identify all factors that potentially set the individual / team up to fail.

5. Corrective Actions

Should:

Be clearly aligned to the root causes.

Put in place measures to address the immediate, underlying and root causes of the incident.

Be clear about what the action is intended to achieve and what should be accomplished.

Add or strengthen the company's layers of protection.

Eliminate or decrease the risk of the incident happening again, making it more difficult for human error to occur (if applicable).

Avoid an extensive number of actions.

Be Specific, Measurable, Achievable, Realistic & Timely (SMART)

Be assigned to an action owner with agreed timescales for completion.

Consider actions that are wider than the affect site or location.

Cover arrangements to ensure the action plan is implemented and progress monitored.

Should not:

Be limited to a tool-box talk to the workforce.

Jump to disciplinary action on the individuals involved.

Introduce additional root cause / causal factors not considered in the report.

Be limited to the specific project where systemic or management system failings have been identified.

6. Lessons Learnt

Should:

Identify opportunities for lessons learnt.

Share lessons learnt both locally and more widely i.e. on other company sites and with National Grid.

Should not:

Restrict lessons learnt to the team involved.

Blame individuals or name them in any bulletins.

7. Appendices

Should:

Include relevant supporting information i.e. photos, witness statements, forensic reports, risk assessments, method statements, competence records, statutory reports, certification and supporting information.

Should not:

Include wider information that is not related to the incident.

