

National Grid Cable Tunnel Replacement Project

Environmental Statement Volume IV

Chapter 18 Traffic and Transport - Gravesend

December 2023



Quality information

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18 Traffic and Transport

18.1 Introduction

- 18.1.1 This chapter assesses the likely effects of the Tilbury to Grain and Tilbury to Kingsnorth (TKRE) Tunnel Replacement Project ("the Proposed Development"). It considers the likely effects on traffic and transport receptors during the construction and operational phases of the Proposed Development at the Gravesend site.
- 18.1.2 This chapter also identifies any additional mitigation measures to prevent, minimise or control likely adverse effects on traffic and transport receptors arising from the Proposed Development.
- 18.1.3 This chapter should be read together with the introductory chapters of this Environmental Statement (Volume II, Chapters 1 – 6). This traffic and transport assessment has also been informed by the schemes listed in Chapter 23: Cumulative Effects (ES Volume V).
- 18.1.4 This chapter is supported by the following appendices in ES Volume VI and figures included within this chapter:
- Appendix 10.1: Outline Construction Traffic Management Plan (CTMP);
 - Appendix 10.2: Abnormal Load Assessment Report;
 - Appendix 18.1: Transport Note (Gravesend);
 - Appendix 18.2: Transport Scoping Presentation and Meeting Minutes;
 - Appendix 18.3: Receptor Sensitivity Levels;
 - Appendix 18.4: Baseline Traffic Movements;
 - Appendix 18.5: Construction Worker Trip Distribution;
 - Appendix 18.6: Preliminary Highway Impact Assessment;
 - Appendix 18.7: Magnitude of Change;
 - Appendix 18.8: Assessment of Construction and Decommissioning Phase;
 - Appendix 18.9: Cumulative Assessment;
 - Figure 1.1: Site Location Plan;
 - Figure 18.1: Traffic & Transport Study Area (Gravesend);
 - Figure 18-2: Gravesend Road Link and Road Junction Receptors;
 - Figure 18-3: Traffic Survey Locations;
 - Figure 18-4: Surrounding Highway Network;
 - Figure 18-5: Walking and Cycling Routes; and
 - Figure 18-6: Site Access and Construction Vehicle Routing.

18.2 Relevant Legislation, Policy and Guidance

Introduction

18.2.1 The section of this chapter provides an overview of the relevant legislation, planning policy and technical guidance relevant to the traffic and transport assessment.

Legislation

18.2.2 The following pieces of legislation apply specifically to the traffic and transport assessment:

- Traffic Management Act (2004); and
- Highways Act (1980).

18.2.3 The Traffic Management Act 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.

18.2.4 The Highways Act is an Act of the Parliament of the United Kingdom that outlines various provisions and regulations related to highways, roads, and their management.

18.2.5 Further details on the above are set out within the Outline CTMP (Appendix 10.1).

National Policy

18.2.6 National Planning Policy relevant to this traffic and transport assessment are detailed in Table 18-1.

Table 18-1: National Planning Policy

Policy Reference	Policy Context
National Planning Policy Framework (Ref 18-1)	The Government's National Planning Policy Framework (NPPF) was originally published in March 2012 and later revised in September 2023, and outlines the Government's planning policies and how they are expected to be applied. The most relevant paragraphs in the context of transport are set out below. Paragraph 104 outlines that 'transport issues should be considered from the earliest of stages of plan-making and development proposals'; this is to ensure that: • The potential impacts of development on transport networks can be addressed • 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 • Opportunities to promote walking, cycling and public transport use are identified and pursued • The environmental impacts of traffic and transport infrastructure can be identified, assessed and considered – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains • Patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places.

Policy Reference	Policy Context
	Paragraph 110 outlines the key considerations when assessing sites to be allocated for development in plans or specific development applications. These are: • Appropriate opportunities to promote sustainable transport modes can be (or have been) taken up, given the type of development and its location • Safe and suitable access to the site can be achieved for all users • The design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance • Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree. Paragraph 111 states that development should only be prevented or refused on highways grounds where there would be an unacceptable impact on highway safety, or the residual cumulative impacts of development on the road network would be severe. As outlined in Paragraph 113, all developments that will generate significant amounts of movement should be required to provide a travel plan and be supported by a Transport Statement (TS) or Transport Assessment (TA) so that the likely impacts of the proposal can be assessed.
Overarching National Policy Statement for Energy (NPS EN-1) (Ref 18-2)	NPS EN-1 was published in 2011 and provides the basis for decisions regarding nationally significant energy infrastructure. Section 5.13 outlines the planning policy for traffic and transport, including guidance on undertaking relevant parts of the Environmental Impact Assessment (EIA) (which has been considered in producing this chapter of the Environmental Statement (ES). The most relevant paragraphs for this purpose are 5.13.3 to 5.13.5 which are set out as follows: • Paragraph 5.13.3, which states that if a project is likely to have significant transport implications, a transport assessment should be included with the ES; • Paragraph 5.13.4, which states that where appropriate, a travel plan to include demand management measures to mitigate transport impacts should be prepared; and • Paragraph 5.13.5, which states that where additional transport infrastructure is proposed, this should be discussed with the relevant network providers (in terms of the possibility of co-funding by Government for any third-party benefits). In addition, Section 3.1 relates to the decision making which includes the following: • Paragraph 3.1.1: “the UK needs all the types of energy infrastructure covered by this NPS in order to achieve energy security at the same time as dramatically reducing greenhouse gas emissions”;

Policy Reference	Policy Context
	- Paragraph 3.1.2: “it is for industry to propose new energy infrastructure projects within the strategic framework set by Government. The Government does not consider it appropriate for planning policy to set targets for or limits on different technologies”; - Paragraph 3.1.3: the decision maker should therefore “assess all applications for development consent for the types of infrastructure covered by the energy NPSs on the basis that the Government has demonstrated that there is a need for those types of infrastructure and that the scale and urgency of that need is as described for each of them in this Part”; and - Paragraph 3.1.4, the decision maker should “give substantial weight to the contribution which projects would make towards satisfying this need when considering applications for development consent under the Planning Act 2008”.
Overarching National Policy Statement for energy (EN-1) (from early 2024) (Ref 18-3)	The 2011 versions of the National Policy Statements remain in force until the revised NPS are designated in early 2024. Section 5.14 outlines the planning policy for Traffic and Transport, including guidance on undertaking relevant parts of the Environmental Impact Assessment (EIA) (which has been considered in producing this chapter of the Environmental Statement (ES). The most relevant paragraphs for this purpose are Paragraphs 5.14.5 to 5.14.21 as follows: - Paragraph 5.14.5, which states that if a project is likely to have significant transport implications, a Transport Appraisal should be included with the ES (with reference to the Department for Transport’s Transport Analysis Guidance (TAG)); - Paragraph 5.14.6, which sets out that applicants should consult National Highways and Highways Authorities as appropriate to agree the assessment and mitigations; - Paragraph 5.14.7, which states that a Travel Plan including demand management measures to mitigate transport impacts should be provided. The applicant should also provide details of proposed measures to improve access by active, public and shared transport to: reduce the need for parking associated with the proposal; contribute to decarbonisation of the local network; and reduce the need to travel and secure modal shifts to mitigate transport impacts; - Paragraph 5.14.8, which also highlights that the assessment should consider any possible disruption to services and infrastructure (such as road, rail and airports); - Paragraph 5.14.9, which states if additional transport infrastructure is needed or proposed, it should always include good quality walking, wheeling and cycle routes, and associated facilities (changing/storage etc) needed to enhance active transport provision; - Paragraph 5.14.10, which discusses that applicants should discuss with network providers the possibility of co-funding by government for any third-party benefits. Guidance has been issued which explains the circumstances where this may be

Policy Reference	Policy Context
	possible, although the government cannot guarantee in advance that funding will be available for any given uncommitted scheme at any specified time; • Paragraph 5.14.13, which informs that regard should always be given to the needs of freight at all stages in the construction and operation of the development including the need to provide appropriate facilities for Heavy Goods Vehicle (HGV) drivers as appropriate, and; • Paragraph 5.14.16, directs that applicants should consider the Department for Traffic (DfT) policy guidance “Water Preferred Policy Guidelines for the movement of abnormal indivisible loads” when preparing their application.
National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (Ref 18-4)	NPS EN-5 was published in 2011 and sets out the policies relating to electricity generation and its infrastructure, for consideration in conjunction with NPS EN-1. It is currently in force until early 2024.
National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (from early 2024) (Ref 18-5)	The 2011 versions of the National Policy Statements remain in force until the revised NPS are designated in early 2024.

Local Planning Policy

18.2.7 Local Planning Policies relevant to this traffic and transport assessment are detailed in Table 18-2.

Table 18-2: Local Planning Policy

Policy Reference	Policy Context
Kent Local Transport Plan 4 (Ref 18-6)	The Kent Local Transport Plan 4 (LTP4) was adopted in 2017 and builds on the previous LTP3 (2011-2016). LTP4 sets out Kent County Council’s (KCC) policies to deliver strategic outcomes for transport and is supplemented by implementation plans and a methodology for prioritising funding. KCC set the following ambition which is supported by five overarching policies outlined below: <i>“To deliver safe and effective transport, ensuring that all Kent’s communities and businesses benefit, the environment is enhanced and economic growth is supported”</i>. • Policy 1 – <i>“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”</i>. • Policy 2 – <i>“Promote affordable, accessible and connected transport to enable access for all to jobs, education, health and other services”</i>. • Policy 3 – <i>“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”</i>. • Policy 4 – <i>“Deliver schemes to reduce the environmental footprint of transport and enhance the historic and natural environment”</i>.

Policy Reference	Policy Context
	Policy 5 – <i>“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”.</i>
Freight Action Plan Kent (Ref 18-7)	The Freight Action Plan Kent was developed by KCC with the aim of effectively addressing concerns related to the movement of freight both through and within Kent. The document highlights a number of actions that KCC are looking to achieve in relation to freight movement across the county, including: - Tackling the problem of overnight lorry parking in Kent; - Finding a long-term solution to Operation Stack; - Effectively managing the routing of HGV traffic to ensure that such movements remain on the strategic road network for as much of the journey as possible; - Taking steps to address problems caused by freight traffic to communities; and - Ensuring that KCC continues to make effective use of planning and development control powers to reduce the impact of freight traffic.
Gravesham Local Plan Core Strategy (2014) (Ref 18-8)	This Core Strategy sets out Gravesham Borough Council’s long term spatial vision for the Borough covering the period 1 April 2011 to 31 March 2028. Paragraph 4.1.6 of the Core Strategy introduces Policy CS01: Sustainable Development, and outlines that “When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework and in this Core Strategy. It will work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area”. Paragraph 5.5.38 of the Core Strategy introduces Policy CS11: Transport, and outlines that <i>“New developments should mitigate their impact on the highway and public transport networks as required. As appropriate, transport assessments and travel plans should be provided and implemented to ensure the delivery of travel choice and sustainable opportunities for travel. Transport assessment work is required to be undertaken in accordance with national and local policy guidance, and to identify detailed highway and public transport network requirements and management arising from the development”.</i>

Guidance

18.2.8 This traffic and transport assessment has been carried out in accordance with the following:

Institute of Environmental Management and Assessment Guidelines (IEMA, July 2023)

18.2.9 The Institute of Environmental Management and Assessment (IEMA) Guidelines for the Environmental Assessment of Traffic and Movement (2023) (Ref 18-9) provides guidance on examining the environmental impacts of developments in terms of traffic and transportation.

Construction Logistics and Community Safety (CLOCS, August 2022)

18.2.10 The CLOCS guidance (Ref 18-10) draws upon evolving best practice, standards, policies and codes of practice, providing a standard which planning authorities, developers and contractors can

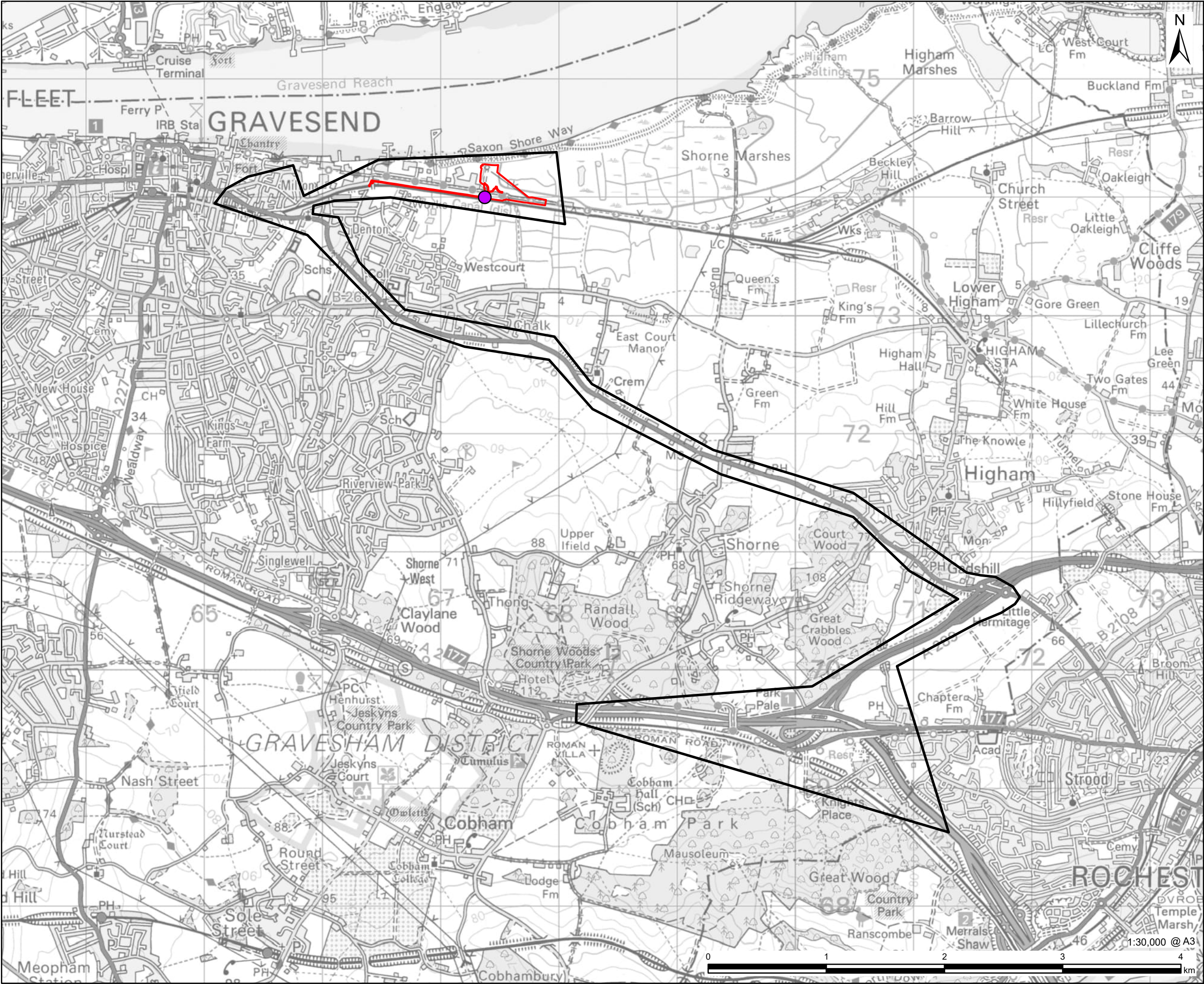
implement and providing a coherent set of guidelines which can be adhered to, with the primary goals of achieving:

- Zero collisions between construction vehicles and the community;
- Improved air quality and reduced emissions;
- Fewer vehicle journeys; and
- Reduced reputational risk.

18.3 Scope and Methodology

Study Area

- 18.3.1 The site is bound by the River Thames to the north, Milton Rifle Range to the east, Thames and Medway Canal Road to the south and the Metropolitan Police Specialist Training centre to the west. A site location plan is held in Figure 1.1 in ES Volume II Chapter 1: Introduction. The study area for the assessment has been defined based on the area where there may be a transport impact resulting from the construction of the Proposed Development. This includes routes along which HGVs and construction worker vehicles will travel during the works programme. The traffic and transport study area is shown on Figure 18-1 below.
- 18.3.2 The following road link receptors have been assessed in relation to the Proposed Development within the study area:
- G-RL1: A2(T) (West);
 - G-RL2: M2 (East);
 - G-RL3: A289;
 - G-RL4: A226 (between A289 and Peartree Lane);
 - G-RL5: A226 (between Peartree Lane and Lion Roundabout);
 - G-RL6: A226 (between Lion Roundabout and Ordnance Road);
 - G-RL7: Ordnance Road and Canal Road;
 - G-RL8: Norfolk Road and Mark Lane; and
 - G-RL9: Thames and Medway Canal Road.
- 18.3.3 The following road junction receptors have been assessed in relation to the Proposed Development within the study area:
- G-RJ1: M2/ A2/ A289 Junction;
 - G-RJ2: A289/ A226 Junction;
 - G-RJ3: A226/ Peartree Lane Signalised Junction;
 - G-RJ4: A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout;
 - G-RJ5: A226/ Ordnance Road Signalised Junction; and
 - G-RJ6: Mark Lane/ Thames and Medway Canal Road Junction.
- 18.3.4 The above receptors are shown on Figure 18-2 below.



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LEGEND

- Red Line Boundary (Above Ground)
- Site Access
- Traffic and Transport Study Area

NOTES

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ISSUE PURPOSE

Traffic and Transport

PROJECT NUMBER

60677311

FIGURE TITLE

Gravesham Traffic and Transport study area

FIGURE NUMBER

Figure 18.1

Scope and Appraisal Methodology

18.3.6 The technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the traffic and transport assessment are described in Section 18.6.

Desk Study

18.3.7 The traffic and transport baseline environment conditions described in Section 18.5 have been informed by the following data sources (see section below in relation to traffic survey data):

- Traffic growth calculated using National Road Traffic Forecast (NRTF) growth factors, with National Transport Model (NTM) adjustments applied within the Trip Ends Model Program (TEMPro) (Ref 18-12) utilising National Trip Ends Model (NTEM) dataset v8.0;
- Personal Injury Accident (PIA) data from KCC for the agreed study area shown on Figure 18-1;
- Local travel and network information gathered from various online sources including local public transport operators, PRow and walking and cycling routes;
- For cumulative schemes, planning application documents on the Planning Inspectorate (PINS) Examination Library for Lower Thames Crossing (Ref 18-13) and the Gravesham Borough Council planning portal for Albion Waterside (Ref 18-14) and the Nuralite Industrial Estate (Ref 18-15), which has informed Section 18.10 based on the schemes listed in Chapter 23: Cumulative Effects;
- As presented to KCC Highways during the scoping stage (see Appendix 18.2), the construction worker distribution (see Appendix 18.5) has been informed by 2021 Census data (TS060 – Industry dataset) (Ref 18-16) based on the number of existing residents living within an approximate 60-minute catchment of the site and working within the construction industry. Whilst it is acknowledged that the dataset was collected during the COVID-19 pandemic, this represents that latest information currently available and is considered to be appropriate for informing the likely distribution of construction workers (as opposed to using information from the now outdated 2011 Census); and
- Route planning software, such as Google Maps (Ref 18-17), to inform the review of the most direct and functional routes to the Proposed Development (in combination with the above).

Survey

18.3.8 Baseline traffic data has been obtained for the surrounding highway network as follows (see Figure 18-3 below for the locations of these counts):

- Department for Transport (DfT) traffic counts (Ref 18-11) where available; and
- Recent traffic surveys on the local highway network to supplement the above.

18.3.9 DfT traffic count data has been obtained for the following:

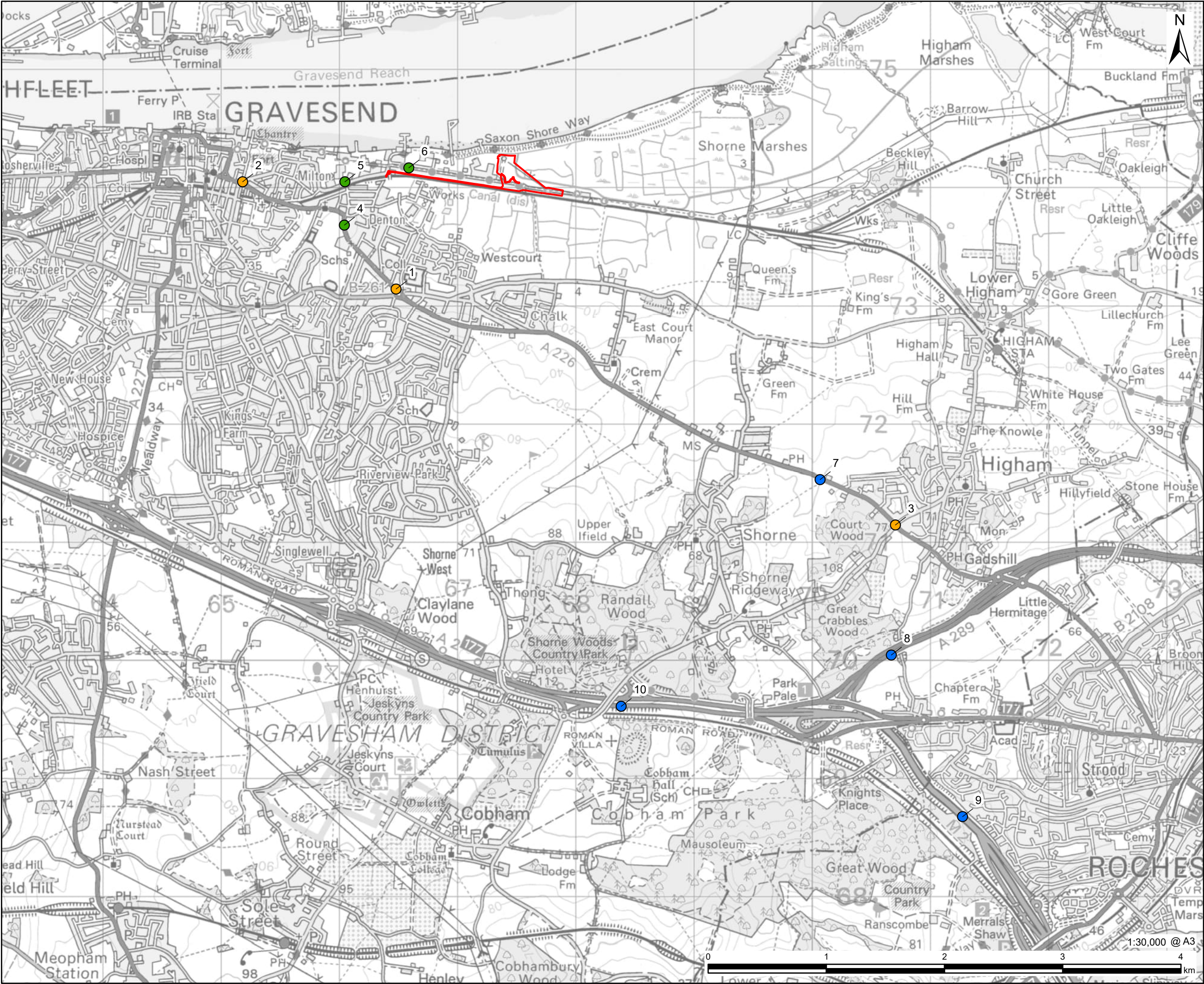
- The M2 to the east of the junction with the A2(T) and A289 (2022 manual count);
- The A2(T) to the west of the junction with the M2 and A289 (2022 manual count); and
- The A289 to the northeast of the junction with the M2 and A2(T) (2022 manual count).

18.3.10 The following Automatic Traffic Counts (ATC) and Manual Classified Counts (MCC) have been carried out to supplement the above:

- A226/ Peartree Lane Signalised Junction (MCC, Thursday 14 September 2023);
- A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout (MCC, Thursday 14 September 2023);

- A226/ Ordnance Road signalised junction (MCC, Thursday 14 September 2023);
- A226 between the Lion Roundabout and the junction with Ordnance Road (ATC, 11-17 September 2023);
- Norfolk Road (ATC, 11-17 September 2023); and,
- Thames and Medway Canal Road (ATC, 9-15 June 2023).

18.3.11 The scope of the above surveys was agreed with KCC Highways on 29 August 2023.



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Traffic Survey Locations

- Automatic Traffic count locations (June and September 2023)
- Department for Traffic counts (2016 and 2022)
- Manual Classified counts (September 2023)

NOTES

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ISSUE PURPOSE

Traffic and Transport

PROJECT NUMBER

60677311

FIGURE TITLE

Gravesham Traffic Survey Locations

FIGURE NUMBER

Figure 18.3

18.4 Consultation Undertaken

18.4.1 A summary of the feedback received within the Screening Opinion received from Gravesham Borough Council (dated 3 August 2023) is set out below.

18.4.2 The following comments were made by Gravesham Borough Council:

“Fortunately, this proposal has most of the work being conducted from the Tilbury side of the river, with the spoil from one shaft and the tunnel being removed via the north portal. Similarly, materials for construction of the shaft and tunnel will arrive from the north as will the Tunnel Boring Machine.

The only traffic generation in Gravesend will be in the construction of the southern shaft and the necessary buildings and pylons to receive the cables and connect to the overhead wire system in Gravesend. Plus, the removal of the Tunnel Boring Machine. This level of traffic would not be considered significant but could involve some abnormal loads which will require careful management.

Given the anticipated time of construction, there could be conflict with the redevelopment at the Canal Basin and Albion Waterside (Application 20210270), as well as the Lower Thames Crossing and the applicant will need to carefully manage the development and its deliveries and waste removal to minimise any adverse impacts that may be caused by delays outside his control.

It would be desirable that no HGV movements should take place during school arrival and leaving times at Chantry Community Academy due to the age of the children, and parental parking.”

18.4.3 The following comments were made by KCC:

“A full Transport Assessment covering the impact on the nearby local highway network should be submitted in support of any application so that it may be assessed by the Local Highway Authority.”

18.4.4 In terms of Public Rights of Way, KCC summarised the following:

- Public Rights of Way (PRoW) Footpaths NG1 and NG2 lay north and south of the site respectively;
- No works can be undertaken on a PRoW without the express consent of the Highways Authority;
- Should any temporary closure(s) be required to ensure public safety then the duration of the closure should be kept to a minimum with alternative route(s) provided for the duration;
- PRoW must otherwise not be stopped up, diverted, obstructed, or the surface disturbed;
- There must be no encroachment on the current width of PRoW;
- No furniture or fixtures may be erected on or across PRoW without consent.

18.4.5 The above feedback has been considered as part of this ES and the Outline CTMP, although the position with respect to the Transport Assessment has since been updated following further consultation with KCC Highways (see below).

18.4.6 Consultation has since been undertaken with key stakeholders including Gravesham Borough Council, KCC as the Local Highways Authority (LHA) and National Highways (NH). A meeting was held with KCC Highways on the 15 September 2023 to review the following:

- The feedback received within the Screening Opinion;
- The latest information relating to the project and Proposed Development;
- The key traffic and transport parameters relating to the construction phase, including the proposed construction programme, construction vehicle numbers, assessment scenario, working hours and travel patterns;
- The proposed construction vehicle routes, study area and traffic surveys to inform the assessment;

- An initial highway impact assessment for the surrounding highway network during the peak construction phase;
- Any nearby walking and cycling routes to be managed during construction;
- The proposed scope and methodology for the transport deliverables including this ES chapter, the Transport Assessment, Outline CTMP and Abnormal Load Assessment Report;
- The project programme leading up to planning submission.

18.4.7 The presentation and meeting minutes are held in Appendix 18.2. A further meeting was held with KCC on 17 October 2023 to review the strategy for managing users of Footpath NG2 and National Cycle Network Route 1. The discussions have been used to inform the strategy for managing PRow users and cyclists during the construction phase, as set out within the Outline CTMP (Appendix 10.1).

18.4.8 Notwithstanding the Screening Opinion feedback (above), on 4 October 2023, KCC Highways confirmed that in terms of the Transport Assessment, it would be acceptable to prepare a short note with any TA-specific content (where not covered elsewhere), signposting the remaining TA components (i.e. within the ES/CTMP) to minimise document crossover. Therefore, a Transport Note has been prepared on this basis, which is held in Appendix 18.1.

18.5 Baseline Environment

Existing Baseline

Highway Network

- 18.5.1 The M2 is part of the Strategic Road Network (SRN) managed by National Highways (NH) and is a dual carriageway road which runs in a southeast direction from the junction with the A2(T) and the A289 (which form M2 Junction 1). The M2 is subject to a derestricted speed limit (70mph) and links two sections of the A2(T) to the east and west, ultimately providing access between London and Dover.
- 18.5.2 The A2(T) is a major trunk road which runs in a southeast direction connecting London with Dover. The A2(T) is subject to various speed limits (ranging between 50-70mph) and bypasses Gravesend before merging into the M2 at the Three Crutches Interchange near Strood (M2 Junction 1).
- 18.5.3 The A289 is a dual carriageway road which runs in a northeast direction from the M2 Junction 1 and provides access to Gillingham. The A289 is subject to a derestricted speed limit (70mph) between M2 Junction 1 and the Four Elms Roundabout (junction with the A228), and then reduces to 50mph and then 40mph as it runs through Gillingham.
- 18.5.4 The A226 is a single carriageway road which runs between Dartford in the northwest (via Gravesend) and Strood in the southeast. The A226 is subject to various speed limits (ranging between 30-50mph) within the study area, including 30mph between the Lion Roundabout and the junction with Ordnance Road to the west, and 40-50mph between the Lion Roundabout and the junction with the A289 to the east.
- 18.5.5 Ordnance Road is a single carriageway road that runs between the junctions with the A226 Milton Road to the southwest and the junction with Albion Terrace to the northeast. Ordnance Road then becomes Canal Road which runs towards the junction with Prospect Grove in the east before becoming Norfolk Road. Norfolk Road is a single carriageway road that runs to the east before becoming Mark Lane. Mark Lane runs in a north-south direction between DJ Coaches and Denton Wharf and provides access to Thames and Medway Canal Road via a three-arm priority junction.
- 18.5.6 Thames and Medway Canal Road is a single lane road which is subject to a 20mph speed limit and runs adjacent to the railway line which is owned by Network Rail. It becomes a private road after the entrance to the Metropolitan Police Specialist Training Centre, where access onto this road is for authorised vehicles only.
- 18.5.7 The surrounding highway network is shown in Figure 18-4 below.



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 Red Line Boundary (Above Ground)
 A Road
 Local Road
 Strategic Road Network

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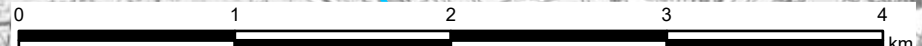
Traffic and Transport

60677311

Gravesham Surrounding Highway Network

Figure 18.4

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Baseline Traffic Flows

- 18.5.8 As identified above, baseline traffic data has been obtained for the surrounding highway network within the study area based on available DfT traffic counts (Ref 18-11) and recent traffic surveys carried out in September 2023 (see Figure 18-3 for the survey locations).
- 18.5.9 The DfT traffic counts were carried out in 2022. Traffic growth to derive 2023 baseline flows has been calculated using National Road Traffic Forecast (NRTF) growth factors, reflecting projected increases in annual vehicle mileage on roads within England and Wales. National Transport Model (NTM) adjustments have then been applied within TEMPro (Ref 18-12) using NTEM dataset v8.0 and the NRTP 2022 Core dataset. These reflect local factors (i.e. Gravesham) for the appropriate road types, to determine the forecast increases in baseline car driver/ passenger trips during each period.
- 18.5.10 A summary of the growth factors is set out in Table 18-3 below. It is noted that the average weekday and average day growth factors are identical. For robustness, the higher factors for a 'trunk road' have been adopted for the A2(T), rather than the lower factors for an 'A road'.

Table 18-3: Traffic Growth Factors to 2023

Growth Period	Road Type	Adopted Road	Traffic Growth Factor			
			AM Peak	PM Peak	Average Weekday	Average Day
2022 to 2023	Motorway	M2	1.0075	1.0073	1.0075	1.0075
	Trunk	A2(T)	1.0087	1.0085	1.0087	1.0087
	A Road	A289	1.0046	1.0045	1.0047	1.0047

- 18.5.11 In addition to the parts of the highway network covered by the traffic counts, the above information has been used to estimate baseline (2023) traffic flows for the following road junctions within the study area:
- M2/A2/A289 Junction – based on the traffic flows entering the junction from all three arms comprising the M2 (west), A2(T) (east) and A289 (northeast);
 - A289/A226 Junction – in the absence of data for the A289 to the northeast of the junction, this has been based on the traffic flows entering and exiting the junction via the A289 to the southwest, as well as 50% traffic flows entering and exiting the junction via the A226; and
 - Mark Lane/Thames and Medway Canal Road Junction – given that limited trips would be expected to travel to/ from Mark Lane for the local employment uses to the north, this has been based on the traffic flows entering the junction from Norfolk Road (south) and the Thames and Medway Canal Road (east).
- 18.5.12 The Automated Traffic Count (ATC) on the A226 between the Lion Roundabout and the junction with Ordnance Road (7 days, 24 hours) has been used to estimate 12 hour weekday (7am-7pm) and 24 hour daily traffic flows for the junctions along the A226 by applying conversion factors to the MCCs (single weekday, 7am-10am and 4pm-7pm). The ATC on Norfolk Road (7 days, 24 hours) has been used to estimate 12 hour weekday (7am-7pm) and 24 hour daily traffic flows for Ordnance Road based on the MCC at the A226/ Ordnance Road junction (single weekday, 7am-10am and 4pm-7pm).
- 18.5.13 A summary of the 2023 baseline traffic flows on the above parts of the highway network, during the weekday network peaks (8am-9am and 5pm-6pm) and shoulder peak hours (7am-8am and 6pm-7pm), as well as 12 hour weekday (7am-7pm) and 24 hour (daily) are held in Appendix 18.4. The average weekday and daily traffic flows are also provided in Table 18-4.

Table 18-4: 2023 Baseline Average Weekday (12 hours) and Daily (24 hours) Two-Way Flows

Receptor Ref	Location	Average Weekday (7am-7pm)		Average Day (24 Hours)	
		HGVs	Total	HGVs	Total
G-RL1	A2(T) (West)	9,855	108,004	9,633	126,568
G-RL2	M2 (East)	8,015	78,314	9,379	96,670
G-RL3	A289	3,340	43,966	3,464	49,196
G-RL4	A226 (between A289 and Peartree Lane)	450	10,866	456	13,090
G-RL5	A226 (between Peartree Lane and Lion Roundabout)	468	11,125	475	13,402
G-RL6	A226 (between Lion Roundabout and Ordnance Road)	498	11,511	506	13,867
G-RL7	Ordnance Road and Canal Road	593	6,982	539	6,625
G-RL8	Norfolk Road and Mark Lane	490	2,800	445	2,656
G-RL9	Thames and Medway Canal Road	12	622	10	636
G-RJ1	M2/A2/A289 Junction	10,368	114,626	10,955	135,421
G-RJ2	A289/A226 Junction	3,564	49,398	3,692	55,741
G-RJ3	A226/ Peartree Lane Signalised Junction	489	12,581	497	15,157
G-RJ4	A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout	935	25,728	949	30,995
G-RJ5	A226/Ordnance Road Signalised Junction	914	15,726	927	18,945
G-RJ6	Mark Lane/Thames and Medway Canal Road Junction	274	1,669	227	1,644

Collision Data

- 18.5.14 This section provides a summary of full PIA data obtained from KCC Highways for the highway network within the agreed study area as shown on Figure 18-1. The most recently available PIA data covers the five-year period between the start of April 2018 and the end of March 2023. Whilst it is acknowledged that the data includes the period of Covid-19 restrictions between the first Covid lockdown in March 2020 and the start of the 2021 autumn school term (considered by National Highways as representing 'a-typical' traffic conditions), this nonetheless includes more than three years' of 'typical' data and provides a single complete dataset. The scope of the collision review was agreed with KCC Highways in September 2023.
- 18.5.15 A summary of the PIA data from KCC (categorised by severity: slight, serious and fatal) is set out below in Table 18-5. This includes a separate summary of collisions involving goods vehicles (>3.5 tonnes) to inform the assessment of Hazardous/Large Loads in Section 0.

Table 18-5: Collision Review (KCC Data)

Receptor Ref	Location	Total Collisions				Collisions involving a Goods Vehicle (>3.5 tonnes)			
		Sl	Se	Fa	Total	Sl	Se	Fa	Total
G-RL1	A2(T) (West)	15	2	0	17	8	0	0	8
G-RL2	M2 (East)	3	0	0	3	1	0	0	1
G-RL3	A289	3	0	0	3	0	0	0	0
G-RL4	A226 (between A289 and Peartree Lane)	3	1	0	4	0	0	0	0
G-RL5	A226 (between Peartree Lane and Lion Roundabout)	22	6	0	28	2	1	0	3
G-RL6	A226 (between Lion Roundabout and Ordnance Road)	30	3	0	33	1	0	0	1
G-RL7	Ordnance Road and Canal Road	3	0	0	3	0	0	0	0
G-RL8	Norfolk Road and Mark Lane	1	0	0	1	0	0	0	0
G-RL9	Thames and Medway Canal Road	No data available (private road)							
G-RJ1	M2/A2/A289 Junction	32	6	1	39	5	1	0	6
G-RJ2	A289/A226 Junction	4	0	0	4	0	0	0	0
G-RJ3	A226/ Peartree Lane Signalised Junction	2	1	0	3	0	0	0	0
G-RJ4	A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout	9	0	0	9	0	0	0	0
G-RJ5	A226/Ordnance Road Signalised Junction	3	0	0	3	0	0	0	0
G-RJ6	Mark Lane/Thames and Medway Canal Road Junction	0	0	0	0	0	0	0	0

Sl = Slight, Se = Serious, Fa = Fatal

18.5.16 The above shows that there are several locations where more than five PIAs were recorded within the five year period, which may suggest that these locations are more sensitive to an increase in traffic from a highway safety perspective. There are also several locations which appear to have a good safety record with three or fewer PIAs within the five year period, which suggest that these locations may be less sensitive to an increase in traffic from a highway safety perspective. In terms of PIAs involving goods vehicles, there are only two locations where more than five PIAs were recorded within the five year period.

18.5.17 Following on from the above, collision rates have been calculated in billion vehicle miles for road links (except Thames and Medway Canal Road due to absence of data) to provide a comparison with national road safety statistics provided within Road Casualties Great Britain (Ref 18-18). The following formula has been used to calculate the collision rate, where 1,826 reflects the number of days over which the collision data has been sourced (between 01 April 2018 to 31 March 2023).

$$\text{Collision Rate} = \frac{\text{Number of recorded PIAs (per road link)} \times 1 \text{ billion}}{1,826 \times \text{AADT (2023)} \times \text{length of road (miles)}}$$

18.5.18 The above has been informed by the 2023 baseline traffic flows presented in Table 18-4 for an average day (24 hours). The national average collision rate has been calculated between 2018 and 2022 using dataset RAS0302: Urban and rural roads, for the appropriate road type. A summary of the comparison is presented in Table 18-6 below.

Table 18-6: Collision Rates (Road Links)

Receptor Ref	Location	Road Type	PIAs	AADT (2023)	Link Length (miles)	Collision Rate	National Average
G-RL1	A2(T) (West)	Rural A-Road	17	126,568	0.68	108	181
G-RL2	M2 (East)	Motorway	3	96,670	0.40	42	56
G-RL3	A289	Rural A-Road	3	49,196	0.67	50	181
G-RL4	A226 (between A289 and Peartree Lane)	Rural A-Road	4	13,090	0.50	337	181
G-RL5	A226 (between Peartree Lane and Lion Roundabout)	All A-Road	28	13,402	2.84	403	346
G-RL6	A226 (between Lion Roundabout and Ordnance Road)	Urban A-Road	33	13,867	0.99	1,311	642
G-RL7	Ordnance Road and Canal Road	Urban Other Road	3	6,625	0.52	475	625
G-RL8	Norfolk Road and Mark Lane	Urban Other Road	1	2,656	0.37	553	625

18.5.19 The above shows that the A226 (G-RL4, G-RL-5 AND G-RL-6) has a higher collision rate than the national average for the comparable road type and location (moving from rural to urban, east to west) and may therefore be more sensitive to a change in traffic flow/ type. Otherwise, the remainder of the surrounding highway network has a lower collision rate than the national average for the comparable road type and location and may therefore be considered as less sensitive to a change in traffic flow/type. This information has been used to inform the assessment of Road Safety and Hazardous/Large Loads within Section 0.

Public Transport Network

18.5.20 Public transport in the vicinity of the site includes Gravesend and Ebbsfleet International railway stations approximately 3km and 6km to the west of the site respectively and Higham railway station approximately 4.5km to the southeast of the site. Gravesend railway station is served by Thameslink and Southeastern services, with a high frequency of services during the weekday peak hours including four Thameslink services in each direction (covering two different routes) and approximately six Southeastern services in each direction (covering five different routes). Destinations served by these services include those towards Dartford, London, St Albans and Luton to the west, as well as Gillingham, Sittingbourne and Maidstone to the east.

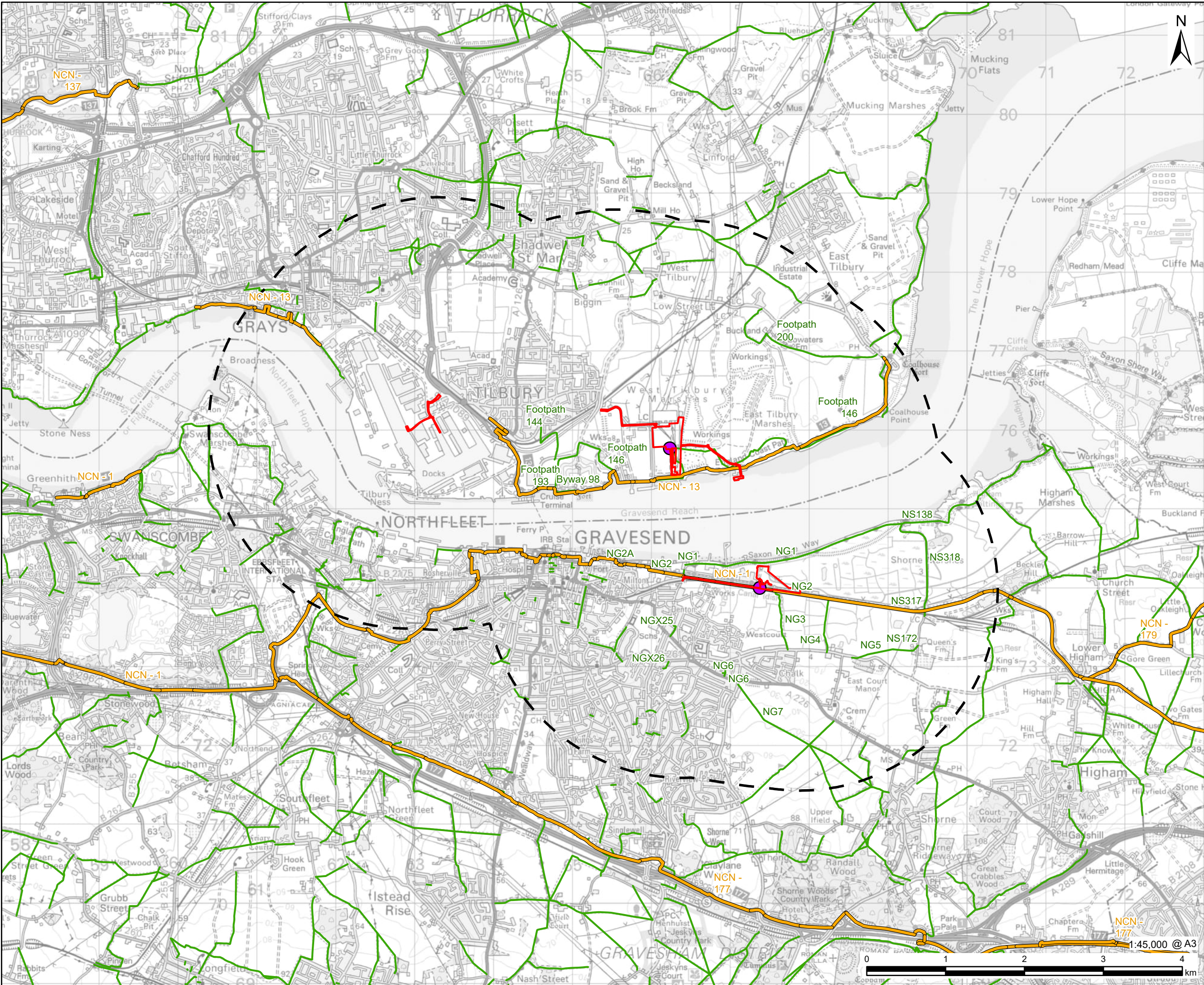
18.5.21 The nearest key bus stops to the site are located on the A226 approximately 1.7km to the southwest which are served by bus routes G1, 111, 190, 311, 416, 417, 480, 481, 489, 735 and 736. The Clock Tower bus stop located on the A226 Milton Road is the closest stop to the Proposed Development, approximately 2.5km to the southwest. The following bus routes, their destinations and their typical frequency serve the Clock Tower bus stop;

- 190: Gravesend – Chatham; two to three services per hour (first service 05:53, last service 19:20);
- 416: Gravesend – Meopham; four services per day (first service 10:20, last service 15:15);
- 417: Gravesend – Cliffe; three services per day (first service 08:40, last service 15:45);
- 480A/490A: Dartford – Riverview Park; five services per hour (first service 04:00, last service 00:35);
- 481: Riverview Park – Ebbsfleet International Railway Station; one service per hour (first service 07:30, last service 22:30); and
- 489: New Ash Green – Gravesend; 6-8 services per day (first service 07:25, last service 18:05).

Active Travel Network

18.5.22 The walking and cycling routes in the vicinity of the Proposed Development are presented in Figure 18-5 below. These include the following:

- PRoW NG1 (Footpath)/ England Coast Path/ Saxon Shore Way – these share the same route along the southern side of the River Thames, passing east-west through the redline boundary;
- National Cycle Network (NCN) Route 1 – this route passes east-west along the Thames and Medway Canal, immediately to the south of the site;
- PRoW NG2 (Footpath) – this route utilises the footway which runs along the northern side of the Thames and Medway Canal, immediately to the south of the site.



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- LEGEND**
- Red Line Boundary (Above Ground)
 - 2.5km Buffer of Red Line boundary
 - Site Access
 - National Cycle Network
 - Public Rights of Way

NOTES
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ISSUE PURPOSE
Traffic and Transport

PROJECT NUMBER
60677311

FIGURE TITLE
Walking and Cycling routes (including PRow)

FIGURE NUMBER
Figure 18.5

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Future Baseline

- 18.5.23 The future baseline scenarios are set out in ES Volume II Chapter 4: Environmental Impact Assessment Methodology.
- 18.5.24 In the absence of the Proposed Development, traffic flows on the surrounding highway network would be expected to increase as a result of housing and employment growth. Therefore, projected background traffic growth has been applied to the 2023 baseline traffic flows to represent conditions during the future baseline (and construction peak assessment year) of 2026.
- 18.5.25 Traffic growth has been calculated using NRTF growth factors, reflecting projected increases in annual vehicle mileage on roads within England and Wales. NTM adjustments have then been applied within TEMPro utilising NTEM dataset v8.0 and the NRTP 2022 Core dataset to reflect local factors (i.e. Gravesham) for the appropriate road types, to determine the forecast increases in future baseline car driver/ passenger trips during each period. These represent the latest datasets available, covering the period up to 2061. For robustness, the higher factors for a 'trunk road' have been adopted for the A2(T), rather than the lower factors for an 'A road'.
- 18.5.26 A summary of the growth factors is set out in Table 18-7 below.

Table 18-7: Traffic Growth Factors to 2026

Growth Period	Road Type	Adopted Roads	Traffic Growth Factor			
			AM Peak	PM Peak	Average Weekday	Average Day
2023 to 2026	Motorway	M2	1.0319	1.0313	1.0321	1.0319
	Trunk	A2(T)	1.0303	1.0298	1.0305	1.0304
	A-Road	A289 and A226	1.0196	1.0190	1.0198	1.0196
	Minor	Local roads	1.0199	1.0193	1.0201	1.0199

18.5.27 The anticipated future baseline flows on the surrounding highway network are summarised in Appendix 18.4 in ES Volume VI, including for the weekday peak hours. The average weekday and daily traffic flows are provided in Table 18-8.

Table 18-8: 2026 Future Baseline Average Weekday (12 hours) and Daily (24 hours) Two-Way Flows

Receptor Ref	Location	Average Weekday (7am-7pm)		Average Day (24 Hours)	
		HGVs	Total	HGVs	Total
G-RL1	A2(T) (West)	10,156	111,303	9,926	130,414
G-RL2	M2 (East)	8,272	80,828	9,679	99,758
G-RL3	A289	3,406	44,834	3,532	50,160
G-RL4	A226 (between A289 and Peartree Lane)	458	11,080	465	13,347
G-RL5	A226 (between Peartree Lane and Lion Roundabout)	477	11,344	484	13,665
G-RL6	A226 (between Lion Roundabout and Ordnance Road)	508	11,738	515	14,139
G-RL7	Ordnance Road and Canal Road	605	7,122	549	6,757
G-RL8	Norfolk Road and Mark Lane	499	2,856	454	2,709
G-RL9	Thames and Medway Canal Road	12	634	10	649
G-RJ1	M2/A2/A289 Junction	10,674	117,936	11,278	139,330
G-RJ2	A289/A226 Junction	3,635	50,374	3,765	56,834
G-RJ3	A226/ Peartree Lane Signalised Junction	499	12,830	506	15,454

Receptor Ref	Location	Average Weekday (7am-7pm)		Average Day (24 Hours)	
		HGVs	Total	HGVs	Total
G-RJ4	A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout	954	26,236	968	31,603
G-RJ5	A226/Ordnance Road Signalised Junction	932	16,037	945	19,317
G-RJ6	Mark Lane/Thames and Medway Canal Road Junction	279	1,703	232	1,677

18.5.28 The consideration of cumulative effects as a result of committed developments is set out within Section 18.10, based on the schemes identified within Chapter 23, Cumulative Effects.

18.6 Key Parameters for Assessment

Assessment Criteria

- 18.6.1 A detailed description of the Proposed Development is provided in ES Volume II, Chapter 3 – The Project Description. In accordance with the 2023 IEMA Guidelines for the Environmental Assessment of Traffic and Movement (Ref 18-9), the following criteria has been considered in this assessment of the construction phase:
- Severance of communities;
 - Pedestrian delay (incorporating delay to all non-motorised users);
 - Non-motorised user amenity;
 - Fear and Intimidation on and by road users;
 - Road vehicle driver and passenger delay;
 - Road user and pedestrian safety; and
 - Hazardous/large loads.
- 18.6.2 The 2023 IEMA guidelines set out two rules in identifying potential links for analysis:
- Rule 1: include highway links where traffic flows will increase by more than 30% (or the number of HGVs will increase by more than 30%); and
 - Rule 2: include any other specifically sensitive areas (e.g. accident black spots, conservation areas, hospitals, links with high pedestrian flows etc.) where traffic flows have increased by 10% or more.
- 18.6.3 Based on this, links and junctions have been assessed where traffic flows are expected to increase by 30% or more as a result of the Proposed Development. Links and junctions have not been assessed where there is expected to be a less than 30% increase in traffic flows as a result of the Proposed Development, unless any specifically sensitive areas are identified. In addition, a negligible magnitude of change has been assigned where there is expected to be fewer than 30 additional vehicle trips per hour during each of the development peak hours as a result of the Proposed Development (except for the assessment of hazardous/large loads), irrespective of the proportional increase in traffic flows.
- 18.6.4 The type of traffic which is anticipated to be generated by the Proposed Development has been categorised as follows: General Traffic, Light Goods Vehicles (LGVs), HGVs and Abnormal Indivisible Loads (AILs). The vehicle routing and movements associated with the Proposed Development's construction have been considered and discussed through consultation with KCC.
- 18.6.5 The receptors which may be impacted have been identified based on the locations and volumes of the proposed construction traffic i.e. the forecast increase in vehicle movements. This has been completed by identifying the percentage increases in vehicular activity along the identified construction routes when compared to the baseline traffic count data (factored up to the future baseline year of 2026) for road links within the traffic and transport study area.
- 18.6.6 Typically, when assessing the impacts of traffic effects, there are a range of particular groups and locations which may be sensitive to changes in traffic conditions compliant with the criteria previously outlined.
- 18.6.7 These are outlined in the 2023 IEMA Guidance as 'Affected Parties', as follows:
- People at home;
 - People at work;
 - Sensitive and/or vulnerable groups (including young age, older age, income, health status, social disadvantage and access and geographic factors);

- Locations with concentrations of vulnerable users (e.g. hospitals, places of worship and schools);
- Retail areas;
- Recreational areas;
- Tourist attractions;
- Collisions clusters and routes with road safety concerns; and
- Junctions and highway links at (or over) capacity.

18.6.8 As a general rule, the forecast changes to baseline (magnitude of change), the relative value/sensitivity/importance of the affected receptor and the scale, nature and significance of the effect (consequence) should be considered. In addition, the anticipated effect should be classified as short-term, medium-term or long-term, as well as permanent or temporary.

18.6.9 To calculate the trip distribution of workers travelling to and from the proposed construction compounds each day, a simple gravity model has been developed based on 2021 Census data (representing the latest information currently available) for construction workers living within an approximate 60-minute catchment area of the site. Construction traffic associated with the Proposed Development has been distributed onto the surrounding highway network within the traffic and transport study area (see Figure 18-1) to calculate the resultant percentage increases on each link. This represents the area where transport impacts may arise as a result of the construction of the Proposed Development, with no impacts expected beyond this area.

18.6.10 Assessments have been undertaken at the peak period of construction (as agreed with KCC), which is identified to be in 2026, based on forecast construction traffic movements.

18.6.11 Baseline traffic flows have been factored up to the identified peak year of construction (2026) by adopting growth factors derived from TEMPro v8.0 (Ref 18-12) for the relevant areas impacted by the Proposed Development.

Sensitivity

18.6.12 The general criteria for defining the importance or sensitivity of receptors are set out in Table 18-9, which applies to the assessment of Severance, Pedestrian Delay, Non-Motorised User Amenity, and Fear and Intimidation. Key factors influencing this include:

- The value of the receptor or resource based upon empirical and/or intrinsic factors, for example considering any legal or policy protection afforded which is indicative of the receptor or resources' value internationally, nationally or locally; and
- The sensitivity of the receptor or resource to change, for example is the receptor likely to acclimatise to the change. This will consider legal and policy thresholds which are indicative of the ability of the resources to absorb change.

Table 18-9: Categorising the Overall Sensitivity of Receptors (Severance, Pedestrian Delay, Non-Motorised User Amenity, and Fear and Intimidation)

Receptor Sensitivity	Receptor Examples
High	More than two sensitive users present (e.g. schools, play areas, care/retirement homes, disabled parking bays, hospitals, places of worship, historic buildings).
Medium	Two sensitive users present (e.g. schools, play areas, care/retirement homes, disabled parking bays, hospitals, places of worship, historic buildings).
Low	At least one of the following:

Receptor Sensitivity	Receptor Examples
	- One sensitive user present (e.g. schools, play areas, care/retirement homes, disabled parking bays, hospitals, places of worship, historic buildings) - Many residential properties with direct frontage to highway link being used as construction route - Pedestrians using footways, PRoW and/or crossings on highway link - Cyclists using on-road designated cycle routes along highway link.
Negligible	No receptors along link, or at least one of the following: - Few residential properties with direct frontage to the highway link being used as a construction traffic route - Workplaces with direct frontage to highway link being used as construction route - Cyclists using off-road designated cycle routes along highway link.

18.6.13 The general criteria for defining the importance or sensitivity of receptors for the assessment of Driver Delay are set out in Table 18-10.

Table 18-10: Categorising the Overall Sensitivity of Receptors (Driver Delay)

Receptor Sensitivity	Receptor Examples
High	Road Links: Not applicable Road Junctions: Roundabout or signalised junction (at least four arms) within a built-up area. Significant queuing (10+ vehicles) on 2+ arms.
Medium	Road Links: Key local route within a built-up area Road Junctions: Roundabout or signalised junction (at least four arms) outside of a built-up area. Significant queuing (10+ vehicles) on 1-2 arms and/ or moderate queuing (5-9 vehicles) on 3-4 arms.
Low	Road Links: Strategic route within a built-up area OR a local route outside of a built-up area. Road Junctions: Roundabout or signalised junction (fewer than four arms) outside of a built-up area OR a priority junction within a built-up area. Moderate queuing (5-9 vehicles) on 1-2 arms and/ or low queuing (3-4 vehicles) on 3-4 arms.
Negligible	Road Links: Strategic route outside of a built-up area OR a minor/ local no-through route Road Junctions: Priority junction outside of a built-up area. Low queuing (3-4 vehicles) on 1-2 arms and/ or no queuing at the junction.

18.6.14 The preliminary criteria for defining the importance or sensitivity of receptors for the assessment of Road Safety and Hazardous/Large Loads are set out in Table 18-11. The collision rate for road links has also been calculated and compared with national road safety statistics provided within Road Casualties for Great Britain (Ref 18-18) to determine an appropriate receptor sensitivity level.

Table 18-11: Categorising the Overall Sensitivity of Receptors (Road Safety and Hazardous/Large Loads)

Receptor Sensitivity*	Road Safety	Hazardous/Large Loads
High	10+ collisions in five years, or more than three serious collisions and/ or one fatal collision in five years	5+ serious/fatal collisions (or more than one fatal collision) involving a goods vehicle (>3.5 tonnes) in five years
Medium	5-9 collisions (with up to three serious collisions and/ or one fatal collision) in five years	3-4 serious/fatal collisions (with up to one fatal collision) involving a goods vehicle (>3.5 tonnes) in five years
Low	3-4 collisions in five years (with up to one serious collision and no fatal collisions) in five years	1-2 serious collisions (with no fatal collisions) involving a good vehicle (>3.5 tonnes) in five years
Negligible	Fewer than three collisions (with no serious or fatal collisions) in five years	No serious or fatal collisions involving a goods vehicle (>3.5 tonnes) in five years

*subject to a collision rate comparison with national road safety statistics (for road links)

18.6.15 Table 18-12 provides a summary of receptor sensitivity to severance, pedestrian delay, non-motorised user amenity effects and fear and intimidation, which have been taken forward for assessment. Further detail is provided in Appendix 18.3 and Appendix 18.8 in ES Volume VI.

Table 18-12: Sensitivity of Receptors for Severance, Pedestrian Delay, Non-motorised User Amenity, Fear and Intimidation

Ref	Receptor Type	Description	Sensitivity
G-RL1	Road Link	A2(T) (West)	Negligible
G-RL2	Road Link	M2 (East)	Negligible
G-RL3	Road Link	A289	Negligible
G-RL4	Road Link	A226 (between A289 and Peartree Lane)	Medium
G-RL5	Road Link	A226 (between Peartree Lane and Lion Roundabout)	Medium
G-RL6	Road Link	A226 (between Lion Roundabout and Ordnance Road)	High
G-RL7	Road Link	Ordnance Road and Canal Road	Medium
G-RL8	Road Link	Norfolk Road and Mark Lane	Low
G-RL9	Road Link	Thames and Medway Canal Road	Low
G-RJ1	Road Junction	M2/A2/A289 Junction	Negligible
G-RJ2	Road Junction	A289/A226 Junction	Negligible
G-RJ3	Road Junction	A226/ Peartree Lane Signalised Junction	Low
G-RJ4	Road Junction	A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout	Medium
G-RJ5	Road Junction	A226/Ordnance Road Signalised Junction	Medium
G-RJ6	Road Junction	Mark Lane/Thames and Medway Canal Road Junction	Low

18.6.16 Table 18-13 provides a summary of receptor sensitivity to driver delay effects, which have been taken forward for assessment. Further detail is provided in Appendix 18.3 and Appendix 18.8 in ES Volume VI.

Table 18-13: Sensitivity of Receptors for Driver Delay

Ref	Receptor Type	Description	Sensitivity
G-RL1	Road Link	A2(T) (West)	Negligible
G-RL2	Road Link	M2 (East)	Negligible
G-RL3	Road Link	A289	Negligible
G-RL4	Road Link	A226 (between A289 and Peartree Lane)	Low
G-RL5	Road Link	A226 (between Peartree Lane and Lion Roundabout)	Low
G-RL6	Road Link	A226 (between Lion Roundabout and Ordnance Road)	Medium
G-RL7	Road Link	Ordnance Road and Canal Road	Low
G-RL8	Road Link	Norfolk Road and Mark Lane	Low
G-RL9	Road Link	Thames and Medway Canal Road	Negligible
G-RJ1	Road Junction	M2/A2/A289 Junction	Negligible
G-RJ2	Road Junction	A289/A226 Junction	Negligible
G-RJ3	Road Junction	A226/ Peartree Lane Signalised Junction	Medium
G-RJ4	Road Junction	A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout	High
G-RJ5	Road Junction	A226/Ordnance Road Signalised Junction	High
G-RJ6	Road Junction	Mark Lane/Thames and Medway Canal Road Junction	Negligible

18.6.17 Table 18-14 provides a summary of receptor sensitivity to road safety and to hazardous/large loads effects, which have been taken forward for assessment. Further detail is provided in Appendix 18.3 and Appendix 18.8 in ES Volume VI.

Table 18-14: Sensitivity of Receptors for Road Safety and Hazardous/Large Loads

Ref	Receptor Type	Description	Road Safety	Hazardous/Large Loads
G-RL1	Road Link	A2(T) (West)	High	Negligible
G-RL2	Road Link	M2 (East)	Low	Negligible
G-RL3	Road Link	A289	Low	Negligible
G-RL4	Road Link	A226 (between A289 and Peartree Lane)	Medium*	Negligible
G-RL5	Road Link	A226 (between Peartree Lane and Lion Roundabout)	High	Low
G-RL6	Road Link	A226 (between Lion Roundabout and Ordnance Road)	High	Negligible

Ref	Receptor Type	Description	Road Safety	Hazardous/Large Loads
G-RL7	Road Link	Ordnance Road and Canal Road	Low	Negligible
G-RL8	Road Link	Norfolk Road and Mark Lane	Negligible	Negligible
G-RL9	Road Link	Thames and Medway Canal Road	Negligible	Negligible
G-RJ1	Road Junction	M2/A2/A289 Junction	High	Low
G-RJ2	Road Junction	A289/A226 Junction	Low	Negligible
G-RJ3	Road Junction	A226/ Peartree Lane Signalised Junction	Low	Negligible
G-RJ4	Road Junction	A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout	Medium	Negligible
G-RJ5	Road Junction	A226/Ordnance Road Signalised Junction	Low	Negligible
G-RJ6	Road Junction	Mark Lane/Thames and Medway Canal Road Junction	Negligible	Negligible

*sensitivity level has been increased to reflect a higher collision rate than the national average

Magnitude

- 18.6.18 As identified within the 2023 IEMA guidelines, the magnitude of each impact represents the level of change from the baseline conditions.
- 18.6.19 This assessment considers a range of potential effects that could be experienced during the construction stage of the Proposed Development and this section identifies how magnitude will be considered for each.
- 18.6.20 **Severance** is defined in the IEMA guidelines as the “*perceived division that can occur within a community when it becomes separated by major traffic infrastructure. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by infrastructure*”. The guidelines state that changes in traffic flow of 30%, 60% and 90% are regarded as producing ‘slight’, ‘moderate’ and ‘substantial’ changes in severance respectively. However, caution should be observed when applying these thresholds to very low baseline flows which are unlikely to experience severance impacts even with high percentage changes in traffic.
- 18.6.21 **Pedestrian Delay** (incorporating delay to all non-motorised users) is considered to be affected by the changes in volume, composition or speed of traffic, in terms of their respective impacts on the ability of pedestrians to cross roads. The assessment of pedestrian delay serves as a proxy for the delay that other modes of non-motorised users may experience when crossing roads. In general, increases in traffic levels and/or traffic speeds are likely to lead to greater increases in pedestrian delay.
- 18.6.22 **Non-Motorised User Amenity** is broadly defined as “*the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic*”. The guidance suggests that a tentative threshold for judging the significance of changes in non-motorised user amenity would be where the traffic flow (or HGV component) is halved or doubled.
- 18.6.23 **Fear and Intimidation** occurs through a combination of traffic flow, speed, proportion of HGVs and the proximity of traffic to people. These indicators are often heightened by a perceived lack of protection or buffers from the highway or through narrow or non-existent footways. The assessment

considers each road on a case-by-case basis, however there are thresholds provided in the 2023 IEMA guidelines which are presented in Table 18-16.

- 18.6.24 **Driver Delay** is an effect cited in the 2023 IEMA guidance and relates to incremental increases in traffic (as outlined in Table 18-15). However, traffic delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system. As a further consideration, where any temporary road closures or traffic management is likely to be in place to enable the construction of the Proposed Development, any additional potential delay caused by these resultant diversion routes has been reported.
- 18.6.25 **Road Safety** considers Personal Injury Accident (PIA) data obtained for the most recent five-year period available at junctions and links along the proposed construction traffic routes. The sensitivity of discrete areas of the highway network can then be determined following a detailed review of the baseline characteristics including the collision rate and any collision clusters. This has been used to assess whether the additional traffic during construction of the Proposed Development would be likely to have a detrimental effect on road safety.
- 18.6.26 With regard to **Hazardous/Large Loads**, the guidance states that the transportation of dangerous or hazardous loads by road should be recognised including specialist loads that might be involved in the construction phase of the development. Where the number of movements is considered to be significant, risk or catastrophe analysis should be carried out to illustrate the potential for an accident and the likely effect of such an effect. Appropriate routes for abnormal load movements should be considered, with mitigation strategies to secure safe passage. As part of the Proposed Development, there will be the requirement for abnormal loads which are categorised as Large Loads.
- 18.6.27 In view of the above, the impacts of Hazardous/Large Loads have been considered, in the form of a qualitative risk assessment to establish the likelihood and extent of such effects. The projected impacts of the Proposed Development has been measured separately, dependent upon the receptor, for the construction period. The Outline CTMP, provided in ES Volume VI Appendix 10.1 and Abnormal Load Assessment Report, provided in ES Volume VI Appendix 10.2 include details of measures that will be employed to ensure the safe vehicular transport of components to and from the Proposed Development.
- 18.6.28 Table 18-15 and Table 18-16 summarise the criteria that have been used to assess the magnitude of effect (based on increases i.e. 'adverse' effects), along with the thresholds that have been used to determine whether effects are considered high, medium, low or negligible. Depending on the baseline information available, the various thresholds identified for the proportional increases in traffic flow relate to peak hour flows and daily flows (whichever is highest). Within these tables, neither the sensitivity of receptors, nor the duration of effects, is taken into consideration. These tables are formed using 2023 IEMA Guidelines and professional experience in order to build on the information presented by the guidelines to allow a more thorough assessment to be carried out.
- 18.6.29 In terms of magnitude of change for receptors, a negligible magnitude of change has been assigned where there is expected to be fewer than 30 additional vehicle trips per hour during each of the development peak hours as a result of the Proposed Development, irrespective of the proportional increase in traffic flows. This is designed to avoid over-reporting impacts in areas where baseline traffic flows are very low and is in line with the IEMA Guidelines which states that caution should be observed when applying thresholds to very low baseline flows given that these are unlikely to experience impacts even with high percentage changes in traffic.

Table 18-15: Categorising the Overall Magnitude of Effect of a Receptor

Impact	Negligible	Low	Medium	High
Severance	Increase in total traffic flows of below 30% (or increase in	Increase in total traffic flows of 30-59% (or increase in HGV flows of 10-39%).	Increase in total traffic flows of 60-89% (or increase in	Increase in total traffic flows or HGV flows of 90% and above.

Impact	Negligible	Low	Medium	High
	HGV flows of below 10%).		HGV flows of 40-89%).	
Pedestrian Delay	The severity of the impact will be determined based on the thresholds identified above for severance.			
Non-Motorised User Amenity	Increase in total traffic flows of below 50%.	Increase in total traffic flows of 50-69%.	Increase in total traffic flows of 70-99%.	Increase in total traffic flows of 100% or above.
Fear and Intimidation	No change in degree of hazard level for daily traffic flows, HGV flows and vehicle speeds (see Table 18-16 below).	One step change in degree of hazard level (see Table 18-16 below), but with <400 daily vehicle increase or <500 daily HGV increase.	One step change in degree of hazard level (see Table 18-16 below), but with >400 daily vehicle increase or >500 daily HGV increase.	Two step changes in degree of hazard level based on the degree of hazard scores for daily traffic flows, HGV flows and vehicle speeds (see Table 18-16 below).
Driver Delay	Increase in total traffic flows of below 30%.	Increase in total traffic flows of 30-59%.	Increase in total traffic flows of 60-89%.	Increase in total traffic flows of 90% and above.
Road Safety	Increase in total traffic flows of below 30% (or increase in HGV flows of below10%).	All links estimated to experience increases in total traffic flows of at least 30% or increases in HGV flows of at least 10% are analysed further on a case by case basis.		
Hazardous/Large Loads	Based on the probability of a personal injury accident, categorised as fatal or serious, involving a hazardous/large load, occurring.			

18.6.30 Further details relating to Fear and Intimidation, in terms of calculating magnitude of impact based on the 2023 IEMA guidelines, are provided in Table 18-16 below.

Table 18-16: Categorising the Overall Magnitude for Fear and Intimidation

Criteria	Degree of Hazard (Level)			
	Small	Moderate	Great	Extreme
A) Average Hourly Traffic Flow	<600 (0)	600-1,200 (10)	1,200-1,800 (20)	>1,800 (30)
B) Daily HGV Flow	<1,000 (0)	1,000-2,000 (10)	2,000-3,000 (20)	>3,000 (30)
C) Average Speed	<20mph (0)	20-30mph (10)	30-40mph (20)	>40mph (30)
Total Score (A+B+C)	0-20	21-40	41-70	71+

18.6.31 Table 18-15 and Table 18-16 above set out the proposed magnitude thresholds for the respective environmental effects that are considered in this assessment. All effects have a proposed magnitude that does not, initially, consider the duration over which an effect is likely to be experienced.

18.6.32 Duration is considered when assessing the overall significance of residual effects, noting that the DMRB Volume 11 Section 2 Part 5 states in Paragraph 1.47:

“Recognition should be made that permanent impacts will be more significant than those of a temporary nature. For example, the impact may only occur during a single phase of the project construction and may be temporary. Alternatively, the impact may be long-term or irreversible and hence permanent. It is, therefore, important that the assessment distinguishes between permanent and temporary impacts”.

18.6.33 All of the traffic and transport effects associated with the construction of the Proposed Development would be temporary effects.

Significance of Effects

18.6.34 As set out in Volume II, Chapter 4: Environmental Impact Assessment Methodology, the significance of effect is determined through the consideration of two elements; the magnitude of the impact and the sensitivity of the receptor as outlined above. Table 18-17 below shows the matrix that has been used to determine the effect category. Effects which are classified as **major** or **moderate** are considered to be significant (shown in **bold**).

Table 18-17: Significance Matrix

Sensitivity of Receptor	Magnitude of Change			
	Negligible	Low	Medium	High
High	Negligible / Minor	Moderate	Major	Major
Medium	Negligible	Minor	Moderate	Major
Low	Negligible	Negligible	Minor	Moderate
Negligible	Negligible	Negligible	Negligible	Negligible / Minor

18.7 Embedded Mitigation

- 18.7.1 Embedded measures form an integral, committed and deliverable part of the Proposed Development design or comprise standard construction practices. They are assumed to be implemented and are therefore factored into the determination of significant residual effects.
- 18.7.2 The Proposed Development will minimise construction impacts through the implementation of an CTMP and Construction Environmental Management Plan (CEMP) during the construction phase. These documents will detail and formalise the measures that will mitigate construction-related effects and outline versions are set out in ES Volume VI Appendix 10.1 and Appendix 3.1.
- 18.7.3 The Outline CTMP (ES Volume VI Appendix 10.1) sets out the mitigation measures to be implemented during the construction phase of the Proposed Development to ensure that all traffic associated with the construction works operates in a safe and compliant manner at all times. This section summarises the types of mitigation measures that have been considered to mitigate against the effects on traffic and transport receptors where required. These measures will be adopted during the construction phase and will be agreed with Gravesham Borough Council and/ or Kent County Council (through regular liaison) and adhered to by the appointed Contractor. The Outline CTMP includes the following (note, this is not an exhaustive list):
- Measures designed to manage construction traffic (e.g. HGVs and construction staff movements at the start and end of the working day) in order to minimise the impact on local residents, businesses, road users and other potentially sensitive land uses and ensure all third-party traffic interfacing with the Proposed Development is kept safe from the on-going work;
 - A traffic routing strategy to ensure vehicles accessing the site do so via the most appropriate route(s) and to avoid (or minimise) conflict with sensitive areas such as residential areas;
 - Access security personnel and traffic marshals to ensure the access point is managed safely and securely. Swept path analysis will be undertaken to ensure vehicles can safely enter and exit the Proposed Development from/ to the local highway network without impacting road users;
 - Temporary traffic management/ construction signage at the site access point and on the approach to the site access (as required) to ensure safe movements of all road users;
 - A Delivery Management System will be used to ensure deliveries to the site are spread across the whole day where possible, to minimise the impact of HGV traffic during the network peak periods;
 - Providing safe pedestrian access routes between car parking locations, access points, work areas, site office and welfare facilities. Appropriate crossing points and segregation will be provided where pedestrian and vehicle routes interact;
 - Appropriate loading/ unloading and parking areas for construction vehicles to avoid the need for parking or waiting on the highway. Suitable space will be provided within the site to allow all vehicles to enter and exit the site in a forward direction;
 - A parking review to ensure a clear route is available to construction vehicles travelling to/ from the Proposed Development, particularly on local/ access roads e.g. Thames and Medway Canal Road;
 - A requirement for vehicles to be correctly maintained and operated in accordance with the manufacturer's recommendations and in a responsible manner. All HGV and LGV construction vehicles associated with the Proposed Development will be clearly identifiable using a vehicle marking scheme to assist with the monitoring process of construction vehicles;
 - An Information Pack to be provided to all contractors, covering a variety of topics and providing information on the requirements of working on the Proposed Development;
 - A specialised haulage service to allow AILs to be transported, with the necessary escort, permits and traffic management in place;

- An access route inspection and swept path analysis for the largest equipment/ construction material delivery vehicles and transporters (including AILs) would also be undertaken to determine the need for any additional control measures; and
- Construction vehicles will be checked and cleaned where necessary prior to exiting the site to reduce debris on the road network and a road sweeper will be utilised to remove debris from the local road network if necessary.

18.7.4 Further to the above, two meetings were held with KCC (the latter also involving Sustrans) to review management and mitigation of walking and cycling routes impacted by the scheme, including PRow. The following temporary closures/ diversions are proposed following input from stakeholders:)

- PRow NG2 (Footpath) along the northern side of the Thames and Medway Canal (immediately to the south of the site) will be temporarily closed to ensure pedestrian safety. Pedestrians will be diverted to PRow NG1 (Footpath)/ England Coast Path/ Saxon Shore Way, which runs along the southern side of the River Thames. The diversion route will be signed for the duration of the closure and will result in an additional 1.2km walking distance; and
- NCN Route 1 along the Thames and Medway Canal (immediately to the south of the site) will be temporarily closed to ensure cyclist safety. Going from west to east, cyclists will be diverted onto Chequers Street (in Lower Higham), Chalk Road, Lower Road, Lower Higham Road, A226 Rochester Road, Raphael Road, Prospect Grove (via a subway) and Norfolk Road. The diversion route will be signed for the duration of the closure and will result in an additional 1.5km cycling distance.

18.7.5 Further details of the above diversion routes (as well as other options which were considered for NCN Route 1, but ultimately discounted) are identified in the Outline CTMP (Appendix 10.1).

18.7.6 The following measures will also be adopted in line with KCC's comments within the Screening Opinion:

- Works will only be undertaken on PRow once the express consent of the Highways Authority has been received;
- The duration of the closures identified above will be kept to a minimum with alternative routes provided throughout (as identified);
- PRow will otherwise not be stopped up, diverted, obstructed, or the surface disturbed;
- There will be no encroachment on the current width of PRow;
- No furniture or fixtures will be erected on or across PRow without consent; and
- 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.

18.8 Potential Impacts

Introduction

- 18.8.1 To identify potential impacts, this section provides details of the proposed construction access and vehicle routing arrangements, construction programme, working hours, assessment parameters, forecast trip attraction and distribution and a preliminary highway impact assessment. These details have informed the assessment of the effects of the Proposed Development set out within Section 18.9 based on the parameters set out in Section 18.6.

General Overview

- 18.8.2 The potential impacts of the Proposed Development, as assessed within Section 18.9, relate to the forecast increase in traffic levels (including HGVs) on the surrounding highway network (within the study area) during the peak construction phase (2026) and whether this increase is expected to have a significant impact on other road users, cyclists and pedestrians across any of the receptors based on the assessment criteria identified in Section 18.6.

Forecast Construction Vehicle Trip Attraction

- 18.8.3 For the purposes of this assessment and based on the information provided in support of the application, the peak daily number of HGVs and construction staff required for the Proposed Development are identified below, during the peak construction phase (2026) which comprises of the tunnelling works. The shortest expected construction programme for the tunnelling phase will be 8 months, which provides a worst-case in terms of monthly (and therefore daily) construction vehicle trips. The duration of the entire construction programme is approximately 46 months.
- 18.8.4 There is expected to be a daily peak of 32 HGVs (64 two-way movements) during the peak construction phase of the Proposed Development. This type of traffic would mainly be associated with the delivery of materials and equipment as follows:
- Tunnel shaft construction;
 - Tunnel shaft lining segments delivery;
 - AILs for the removal of the Tunnel Boring Machine (five HGVs are expected in total);
 - Shaft fit out and head house construction;
 - Sealing end compound construction; and
 - 400kv overhead line diversions.
- 18.8.5 In terms of staff, there is expected to be a daily peak of 40 construction workers associated with the Proposed Development (which is a maximum daily figure). All construction workers will travel to/from the Proposed Development at the start and end of the working day. It has been assumed that all construction workers would travel by vehicle to provide a worst-case assessment in terms of road trips. An average vehicle occupancy factor of 1.5 construction workers per vehicle has been adopted which is considered to be reasonable, yet robust, given that staff will be encouraged to car share wherever possible in order to reduce the number of trips generated. This therefore equates to a daily peak of 27 staff vehicles (54 two-way movements) during the peak construction phase of the Proposed Development.
- 18.8.6 The following assumptions have been adopted in terms of working hours and daily travel patterns:
- The core construction working hours will be Monday to Sunday (8am-6pm);
 - Construction worker travel patterns have been based on the 'shoulder' peaks to the traditional network peak hours, with staff arrivals taking place between 7am-8am and staff departures taking place between 6pm-7pm; and

- HGV movements have been distributed across a 10-hour window, arriving and departing between 8am-6pm. Rather than just adopting a flat profile, the profile of HGV movements across the day has been based on the existing daily profile of HGV movements on the A226 (informed by the ATC). It should be noted that HGV movements will, in practice, be limited as far as possible so as not to travel during the traditional peak hours of 8am-9am and 5pm-6pm through the measures set out within the Outline CTMP (Appendix 10.1).

18.8.7 A daily profile of overall construction vehicle movements (arrivals and departures) for the Proposed Development during the peak construction phase is presented in Table 18-18 below.

Table 18-18: Forecast Peak Daily and Hourly Construction Vehicle Movements (2026)

Time	Staff		HGVs		Total Vehicles		
	Arr	Dep	Arr	Dep	Arr	Dep	Total
07:00-08:00	27	0	0	0	27	0	27
08:00-09:00	0	0	3	3	3	3	6
09:00-10:00	0	0	4	4	4	4	8
10:00-11:00	0	0	4	4	4	4	8
11:00-12:00	0	0	3	3	3	3	6
12:00-13:00	0	0	4	4	4	4	8
13:00-14:00	0	0	3	3	3	3	6
14:00-15:00	0	0	4	4	4	4	8
15:00-16:00	0	0	3	3	3	3	6
16:00-17:00	0	0	2	2	2	2	4
17:00-18:00	0	0	2	2	2	2	4
18:00-19:00	0	27	0	0	0	27	27
Total	27	27	32	32	59	59	118

Forecast Construction Vehicle Trip Distribution

18.8.8 The Proposed Development will be accessed via the Thames and Medway Canal Road. The proposed construction route is the shortest available between the site and the SRN which is as follows:

- Arrivals: M2/A2(T) – A289 – A226 – Ordnance Road – Canal Road – Norfolk Road – Mark Lane – Thames and Medway Canal Road; and
- Departures: Thames and Medway Canal Road – Mark Lane – Norfolk Road – Canal Road – Ordnance Road – A226 – A289 – M2/A2(T).

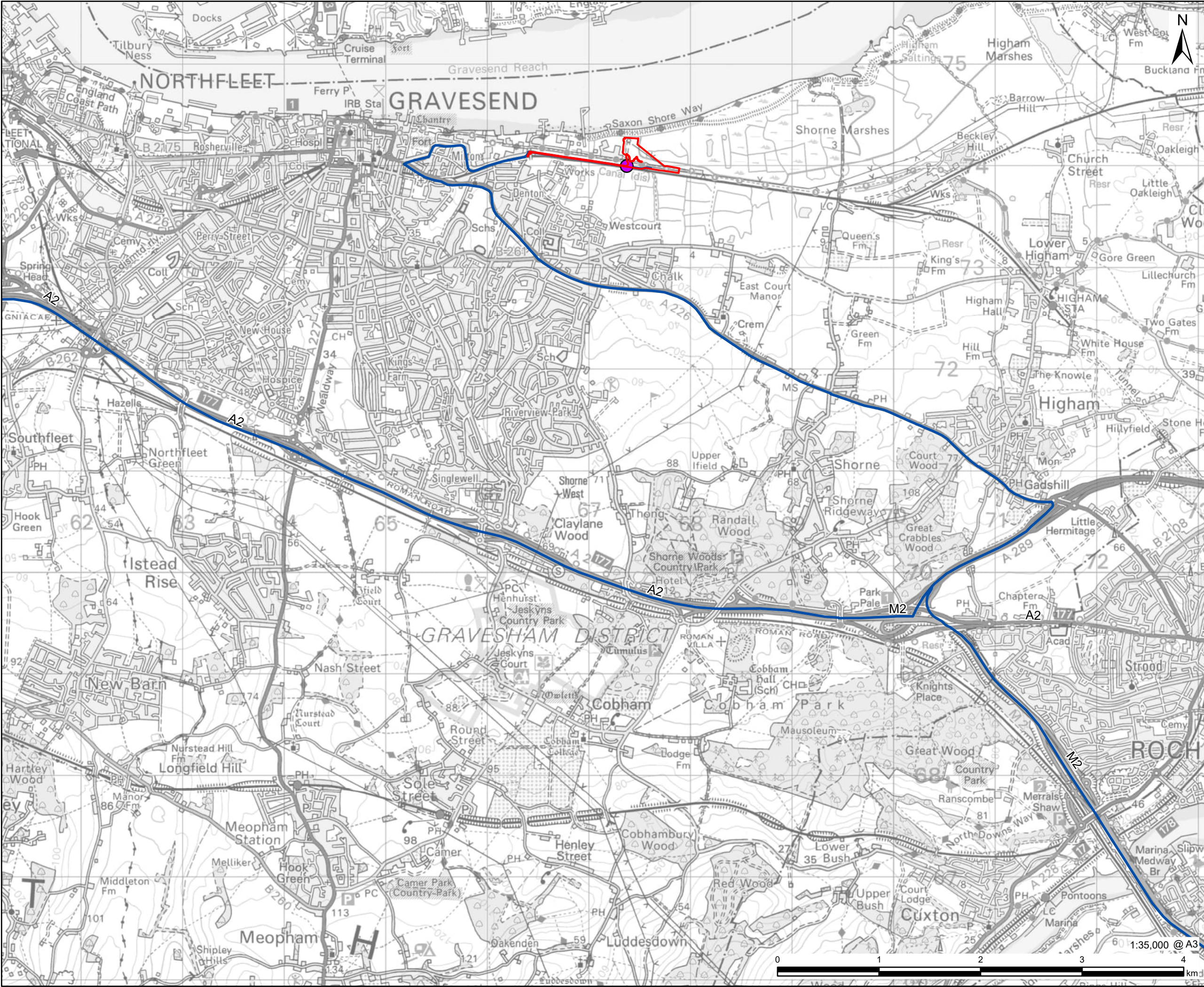
18.8.9 Further details of the proposed access arrangements are set out within the Outline CTMP (ES Volume VI Appendix 10.1). The location of the site access is shown on Figure 18.2.

18.8.10 The forecast trip distribution in terms of trips entering/ exiting the study area based on their expected points of origin when arriving to the Proposed Development (and conversely points of destination when departing) is set out in Table 18-19 below.

Table 18-19: Forecast Trip Distribution

Point of Entry	Staff	HGVs
A2(T) (West)	76%	50%
M2 (East)	24%	50%
Total	100%	100%

- 18.8.11 The staff distribution has been based on 2021 Census data (TS060 – Industry dataset) which identifies the number of existing residents living within a 60-minute catchment of the site who also work in the construction industry. A 'distance decay' approach has then been used to inform the trip distribution based on their proximity to the Proposed Development. Further details of the methodology and calculations are held in ES Volume VI Appendix 18.5.
- 18.8.12 In terms of the HGV trip distribution, an equal split has been adopted given that the M2 (east) serves areas within Kent to the southeast and the A2(T) (west) serves other areas closer to London with a connection with the M25. An HGV routing plan is held in Figure 18-6 below.
- 18.8.13 All construction vehicles are expected to use the remainder of the network within the study area including the A289, A226, Ordnance Road, Canal Road, Norfolk Road, Mark Lane and the Thames and Medway Canal Road.



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LEGEND

- Red Line Boundary (Above Ground)
- Site Access
- Construction HGV route

NOTES
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ISSUE PURPOSE
Traffic and Transport

PROJECT NUMBER
60677311

FIGURE TITLE
Site Access and Vehicle Routing

FIGURE NUMBER
Figure 18.6

Potential Construction Effects

- 18.8.14 A preliminary highway impact assessment has been undertaken to identify the forecast increases in traffic levels on the surrounding highway network (receptors) as a result of construction traffic during the peak construction phase. This has been informed by the forecast trip generation and distribution presented above.
- 18.8.15 The preliminary highway impact assessment is set out in ES Volume VI Appendix 18.6, which includes all receptors during the development 'shoulder' peak hours (7am-8am and 6pm-7pm), network peak hours (8am-9am and 5pm-6pm), the weekday 12-hour period (7am-7pm) and 24 hour daily period. The average 12-hour weekday traffic flow assessment is also provided in Table 18-20, which typically identifies higher proportional increases than the average 24-hour daily traffic flow assessment due to lower baseline traffic flows. The results have been used to inform the assessments within Section 0.

Table 18-20: Preliminary Highway Impact Assessment – Construction Phase (2026) – Average Weekday (12 hours) Two-Way Flows

Receptor Ref	Location	Average Weekday (7am-7pm)			
		Base	Dev	Total	% Increase
G-RL1	A2(T) (West)	111,303	73	111,376	0.1%
G-RL2	M2 (East)	80,828	45	80,872	0.1%
G-RL3	A289	44,834	118	44,952	0.3%
G-RL4	A226 (between A289 and Peartree Lane)	11,080	118	11,198	1.1%
G-RL5	A226 (between Peartree Lane and Lion Roundabout)	11,344	118	11,462	1.0%
G-RL6	A226 (between Lion Roundabout and Ordnance Road)	11,738	118	11,856	1.0%
G-RL7	Ordnance Road and Canal Road	7,122	118	7,240	1.7%
G-RL8	Norfolk Road and Mark Lane	2,856	118	2,974	4.1%
G-RL9	Thames and Medway Canal Road	634	118	752	18.6%
G-RJ1	M2/A2/A289 Junction	117,936	118	118,054	0.1%
G-RJ2	A289/A226 Junction	50,374	118	50,492	0.2%
G-RJ3	A226/ Peartree Lane Signalised Junction	12,830	118	12,948	0.9%
G-RJ4	A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout	26,236	118	26,354	0.4%
G-RJ5	A226/Ordnance Road Signalised Junction	16,037	118	16,155	0.7%
G-RJ6	Mark Lane/Thames and Medway Canal Road Junction	1,703	118	1,821	6.9%

- 18.8.16 The above shows that based on all traffic flows during the average weekday (12 hours), proportional impacts as a result of construction traffic during the peak construction phase (2026) remain below 30% for all receptors. It should also be noted that a maximum of 27 two-way construction vehicle

trips are expected during any given hour as a result of the Proposed Development on any given receptor (see ES Volume VI Appendix 18.6). Therefore, as this level of activity falls below 30 additional vehicle trips per hour (including during the development peak hours), a negligible magnitude of change has been assigned for all receptors, except for the assessment of hazardous/large loads.

Potential Operational Effects

18.8.17 During normal operation of the Proposed Development, the only traffic generated would be associated with infrequent repair and routine maintenance works. Therefore, additional traffic movements during the operational phase are not anticipated to have a significant effect on the transport network or receptors. As such, an assessment of the operational phase has been scoped out of this ES chapter.

18.9 Assessment of Effects

- 18.9.1 This assessment of traffic and transport effects has been undertaken after the implementation of embedded mitigation. Please see Table 18-21: below.
- 18.9.2 The assessment has been based on the receptors and their sensitivities levels as identified in Section 18.3 (see also ES Volume VI Appendix 18.3). Details of magnitude of impact with respect to each of the assessment criteria are set out in ES Volume VI Appendix 18.7, based on the information presented in Section 18.6. Further details of the assessments are held in ES Volume VI Appendix 18.8.

Table 18-21: Assessment of Traffic and Transport Effects during the Construction Phase

Receptor	Value/ Sensitivity	Potential Impact	Embedded Mitigation	Additional Mitigation	Magnitude	Effect
Construction Phase (Severance / Pedestrian Delay)						
G-RL1	Negligible	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL2	Negligible	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL3	Negligible	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL4	Medium	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL5	Medium	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL6	High	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Minor
G-RL7	Medium	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL8	Low	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL9	Low	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ1	Negligible	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ2	Negligible	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ3	Low	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ4	Medium	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ5	Medium	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ6	Low	Severance / Pedestrian Delay	See Section 18.7	Not required	Negligible	Negligible
Construction Phase (Non-Motorised User Amenity)						
G-RL1	Negligible	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible

Receptor	Value/ Sensitivity	Potential Impact	Embedded Mitigation	Additional Mitigation	Magnitude	Effect
G-RL2	Negligible	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RL3	Negligible	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RL4	Medium	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RL5	Medium	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RL6	High	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Minor
G-RL7	Medium	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RL8	Low	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RL9	Low	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RJ1	Negligible	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RJ2	Negligible	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RJ3	Low	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RJ4	Medium	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RJ5	Medium	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
G-RJ6	Low	Non-Motorised User Amenity	See Section 18.7	Not required	Negligible	Negligible
Construction Phase (Fear and Intimidation)						
G-RL1	Negligible	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RL2	Negligible	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RL3	Negligible	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RL4	Medium	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RL5	Medium	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RL6	High	Fear and Intimidation	See Section 18.7	Not required	Negligible	Minor
G-RL7	Medium	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RL8	Low	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible

Receptor	Value/ Sensitivity	Potential Impact	Embedded Mitigation	Additional Mitigation	Magnitude	Effect
G-RL9	Low	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RJ1	Negligible	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RJ2	Negligible	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RJ3	Low	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RJ4	Medium	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RJ5	Medium	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
G-RJ6	Low	Fear and Intimidation	See Section 18.7	Not required	Negligible	Negligible
Construction Phase (Driver Delay)						
G-RL1	Negligible	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL2	Negligible	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL3	Negligible	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL4	Low	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL5	Low	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL6	Medium	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL7	Low	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL8	Low	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RL9	Negligible	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ1	Negligible	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ2	Negligible	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ3	Medium	Driver Delay	See Section 18.7	Not required	Negligible	Negligible
G-RJ4	High	Driver Delay	See Section 18.7	Not required	Negligible	Minor
G-RJ5	High	Driver Delay	See Section 18.7	Not required	Negligible	Minor
G-RJ6	Negligible	Driver Delay	See Section 18.7	Not required	Negligible	Negligible

Receptor	Value/ Sensitivity	Potential Impact	Embedded Mitigation	Additional Mitigation	Magnitude	Effect
Construction Phase (Road Safety)						
G-RL1	High	Road Safety	See Section 18.7	Not required	Negligible	Minor
G-RL2	Low	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RL3	Low	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RL4	Medium	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RL5	High	Road Safety	See Section 18.7	Not required	Negligible	Minor
G-RL6	High	Road Safety	See Section 18.7	Not required	Negligible	Minor
G-RL7	Low	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RL8	Negligible	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RL9	Negligible	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RJ1	High	Road Safety	See Section 18.7	Not required	Negligible	Minor
G-RJ2	Low	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RJ3	Low	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RJ4	Medium	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RJ5	Low	Road Safety	See Section 18.7	Not required	Negligible	Negligible
G-RJ6	Negligible	Road Safety	See Section 18.7	Not required	Negligible	Negligible
Construction Phase (Hazardous/Large Loads)						
G-RL1	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RL2	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RL3	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RL4	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RL5	Low	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RL6	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible

Receptor	Value/ Sensitivity	Potential Impact	Embedded Mitigation	Additional Mitigation	Magnitude	Effect
G-RL7	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RL8	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RL9	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RJ1	Low	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RJ2	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RJ3	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RJ4	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RJ5	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible
G-RJ6	Negligible	Hazardous/Large Loads	See Section 18.7	Not required	Low	Negligible

18.9.3 As shown above, the Proposed Development is expected to result in no significant impacts during the peak construction phase, with all effects for all receptors across all assessment criteria categorised as either negligible or minor.

18.10 Additional Mitigation

18.10.1 Additional mitigation measures are additional topic and site-specific measures that have been applied to mitigate or offset any likely significant effects. As no significant effects are expected, no additional mitigation has been identified further to the embedded mitigation set out previously.

18.11 Cumulative Effects

Combined Effects

18.11.1 There are unlikely to be any significant combined environmental effects associated with traffic and transport assessed above and other the environmental topics. Given the nature of the Proposed Development (replacing existing infrastructure within an industrial area), and following the mitigation measures to be implemented as identified through the environmental assessments, it is determined that the combined impacts are of a scale that no significant combined impacts would arise.

Cumulative Effects

18.11.2 This section considers the potential cumulative effects on single receptors during the construction of the Proposed Development with regards to the construction and operational phases of other developments. The 'other developments' identified in Chapter 23: Cumulative Effects have all been considered. Those developments which have been identified as potentially interacting with the Proposed Development, in terms of generating additional traffic movements within the study area during the peak construction phase (2026), are as follows:

- Lower Thames Crossing (Planning Inspectorate Reference: TR010032) – construction traffic;
- Albion Waterside (Planning Application Reference: 20210270) – construction traffic; and

- Systematic redevelopment of the existing Nuralite site (Planning Application Reference: 20190290) – operational traffic.

18.11.3 The following 'other developments' have been scoped out of this cumulative assessment:

- Thurrock Flexible Generation Plant (Planning Inspectorate Reference: EN010092) – this site is situated in Thurrock (north of the River Thames) and there is therefore no geographical overlap in the study area;
- Tilbury2 (Planning Inspectorate Reference: TR30003) – this site is situated in Thurrock (north of the River Thames) and there is therefore no geographical overlap in the study area;
- Erection of a new training building at the Metropolitan Police Specialist Training Centre (Planning Application Reference: 20211541) – neither the outline application or the reserved matters applications included any transport-related documentation or construction programme details, therefore no transport or traffic effects are expected on this basis; and
- Erection of 3 industrial units at land north of Dalefield Way (Planning Application Reference: 20160314) – it is understood that this development has been completed and any operational trips associated with this site should therefore be captured by the baseline surveys carried out in 2023. Furthermore, KCC did not consider it necessary for a Transport Assessment to be prepared in support of the planning application as a low level of operational trips were expected.

18.11.4 The following section reviews each cumulative scheme in turn, followed by an overall cumulative assessment, including all cumulative schemes and the Proposed Development.

Lower Thames Crossing

18.11.5 The Lower Thames Crossing (LTC) is a Nationally Significant Infrastructure Project (NSIP) (Planning Inspectorate Reference: TR010032). This scheme has not yet been consented and any potential cumulative effects would therefore be subject to the approval of the application and the timescales for construction. Nonetheless, a review has been carried out below to inform this cumulative assessment.

18.11.6 The forecast construction traffic flows for the LTC are presented in the Transport Assessment (TR010032/APP/7.9) which was most recently updated in September 2023 at Deadline 4 (Ref 18-13). This identifies that, based on Tables 8.23-8.33 of that document, Phase 6 (scheduled to take place in 2027) is expected to be the peak construction phase in terms of construction traffic demand. The forecast changes in traffic flows to the south of the River Thames during Phase 6 are presented in plates 8.60 to 8.62 of the LTC Transport Assessment. These identify that there is expected to be additional traffic on the A289 and the A226 during the peak construction phase of the LTC. However, there is expected to be a temporary reduction in traffic on the M2 and A2(T) as a result of Temporary Traffic Management measures associated with LTC. The following assumptions have been adopted to estimate peak daily and peak hour construction vehicle movements on these parts of the network:

- Plates 8.60 (AM peak), 8.61 (Interpeak) and 8.62 (PM peak) present changes in PCU flows, in each direction, based on various thresholds. The average value of each threshold (by direction) has therefore been adopted to estimate the change e.g. where a threshold is between +51 and +100 PCUs, a value of +75 PCUs has been adopted. This is considered to provide to most realistic estimate of traffic associated with LTC, to avoid potentially underestimating or overestimating traffic flows by adopting the lower or upper thresholds. The identified value for each direction has then been combined to identify an overall two-way change in PCU flows.
- The AM peak is 7am-8am, the PM peak is 5pm-6pm and Interpeak is an average hour within the period 9am-3pm. For the purposes of this high-level appraisal and in the absence of any further information, 12-hour weekday flows have been estimated by multiplying the Interpeak traffic flows by nine and then combining this with the AM and PM peaks, to represent an overall eleven-hour period of 7am-6pm (given that there is no information for 6pm-7pm).
- Table 8.28 presents construction traffic demand in Phase 6 and has been used to convert PCUs to total vehicles by adopting LTC's PCU conversion values of 1 for staff (to represent cars/ vans)

and 2.5 for earthworks and supplies (to represent HGVs). This identifies that a 77% conversion factor should be applied to PCUs to identify total vehicles, and that 19% of total vehicles are expected to be HGVs. For example, 100 PCUs would equate to 77 vehicles including 62 cars/vans (62 PCUs) and 15 HGVs (38 PCUs).

18.11.7 The forecast cumulative increases in daily construction traffic flows as a result of LTC are presented further below, based on peak construction traffic flows and on the worst-case assumption that the peak construction phases would both overlap. The full cumulative assessment for all schemes combined including for the peak hours is held in ES Volume VI Appendix 18.9.

Albion Waterside

18.11.8 The construction phase of Albion Waterside (Planning Application Reference: 20210270) is expected to take place between 2022 and 2030, which therefore overlaps with the peak construction year of the Proposed Development. Information has therefore been taken from Section 13 of the TA (Ref 18-14) which informed the planning application to identify construction vehicle trips on the surrounding highway network. The following assumptions have been adopted within the TA to estimate peak daily and peak hour construction vehicle movements:

- There would be up to 39 HGVs and 21 LGVs per day during peak construction, of which 15% would travel during the peak hours (8am-9am and 5pm-6pm);
- There would be up to 385 construction workers during peak construction, equating to 193 vehicles on the assumption that 50% staff would travel as a car driver;
- 15% of staff would arrive between 8am-9am and 15% of staff would depart between 5pm-6pm.

18.11.9 In terms of trip distribution, three potential routes could be used including a route from the east, a route from the south and a route from the west. All three routes would result in construction vehicles using the A226 Milton Road, Ordnance Road and Canal Road within the study area. However, only the route from the east would result in construction vehicle trips using routes within the remainder of the study area including the A226, A289 and the A2(T) to the east. It has been assumed that 50% of construction vehicle trips associated with Albion Waterside would use the eastern route for robustness. The forecast cumulative increases in daily construction traffic flows as a result of Albion Waterside are presented further below, based on peak construction traffic flows and on the worst-case assumption that the peak construction phases would both overlap. The full cumulative assessment for all schemes combined including for the peak hours is held in ES Volume VI Appendix 18.9.

Nuralite Industrial Estate

18.11.10 The operational vehicle trip generation associated with the Nuralite Industrial Estate (Planning Application Reference: 20190290) is presented in Table 6.8 of the TA (Ref 18-15) which informed the planning application. The main trip distribution is presented within Appendix 17e of the TA. A separate figure showing HGV routing is shown by ES Volume VII Figure 5.2. This information has been used to estimate operational traffic flows across the highway network within the study area, including for the peak hours of 7:30am-8:30am and 5pm-6pm, as well as daily. The following assumptions have been adopted:

- It has been assumed that all vehicle trips extending beyond the network assessed within the Nuralite TA and travelling towards the study area for the Proposed Development would enter the study area. These trips have then been split 50/50 in each direction at key junctions including along the A226 to the east and west of the junction with Forge Lane, and along the M2 and A2(T) to the east and west of the junction with the A289; and
- HGVs follow a different route to general traffic and it has been assumed that 100% of these would use the A289 within the study area, with 50% using the M2 and A2(T) to the east and west.

18.11.11 The forecast cumulative increase in daily operational traffic flows as a result of the Nuralite site are presented further below. The full cumulative assessment for all schemes combined including for the peak hours is held in ES Volume VI Appendix 18.9.

Total Cumulative Traffic Flows

18.11.12 The total daily cumulative traffic flows associated with the schemes identified above are presented below in Table 18-22.

Table 18-22: Forecast Total Cumulative Two-Way Traffic Flows (Daily)

Receptor Ref	Location	LTC		Albion Waterside		Nuralite Site	
		HGVs	Total	HGVs	Total	HGVs	Total
G-RL1	A2(T) (West)	0	0	39	156	102	298
G-RL2	M2 (East)	0	0	0	0	102	298
G-RL3	A289	75	387	39	156	204	596
G-RL4	A226 (between A289 and Peartree Lane)	611	3,134	39	156	0	424
G-RL5	A226 (between Peartree Lane and Lion Roundabout)	611	3,134	39	156	0	424
G-RL6	A226 (between Lion Roundabout and Ordnance Road)	611	3,134	39	156	0	424
G-RL7	Ordnance Road and Canal Road	0	0	156	625	0	0
G-RL8	Norfolk Road and Mark Lane	0	0	0	0	0	0
G-RL9	Thames and Medway Canal Road	0	0	0	0	0	0
G-RJ1	M2/A2/A289 Junction	75	387	39	156	204	596
G-RJ2	A289/A226 Junction	611	3,134	39	156	204	424
G-RJ3	A226/ Peartree Lane Signalised Junction	611	3,134	39	156	0	424
G-RJ4	A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout	611	3,134	39	156	0	424
G-RJ5	A226/Ordnance Road Signalised Junction	611	3,134	78	313	0	424
G-RJ6	Mark Lane/Thames and Medway Canal Road Junction	0	0	0	0	0	0

18.11.13 As identified in Table 18-22, the cumulative schemes are not expected to result in any increases in traffic on the local highway network within close proximity to the Proposed Development including Norfolk Road and Mark Lane (G-RL8), the Mark Lane/ Thames and Medway Canal Road junction (G-RJ6) and Thames and Medway Canal Road (G-RL9). Therefore, no cumulative impacts are expected on these parts of the network. An assessment of these receptors as a result of the Proposed Development in isolation is set out in Section 18.9.

18.11.14 The forecast increases in cumulative traffic levels on the surrounding highway network (receptors) as a result of the Proposed Development (construction traffic during the peak construction phase) and the above schemes is set out in ES Volume VI Appendix 18.9. This includes the development 'shoulder' peak hours (7am-8am and 6pm-7pm), network peak hours (8am-9am and 5pm-6pm), the weekday 12-hour period (7am-7pm) and 24-hour daily period. In order to provide a worst-case assessment, the peak hour traffic flows for each scheme (which vary – see above) have been adopted for both the network and shoulder peak hours. The daily traffic flows presented for each cumulative scheme have been adopted for both the 12-hour weekday and 24-hour daily periods, given that it is not possible to calculate separate traffic flows for each period based on the information presented.

18.11.15 The average 12-hour weekday traffic flow assessment is also provided in Table 18-23, which identifies higher proportional increases than the average 24-hour daily traffic flow assessment due to lower baseline traffic flows. All percentage cumulative increases remain below 30% based on 24-hour daily traffic flows.

Table 18-23: Cumulative Assessment – Construction Phase (2026) – Average Weekday (12 hours) Two-Way Flows

Receptor Ref	Location	Average Weekday (7am-7pm)			
		Base	Committed + Dev	Total	% Increase
G-RL1	A2(T) (West)	111,303	527	111,830	0.5%
G-RL2	M2 (East)	80,828	342	81,170	0.4%
G-RL3	A289	44,834	1,257	46,091	2.8%
G-RL4	A226 (between A289 and Peartree Lane)	11,080	3,832	14,912	34.6%
G-RL5	A226 (between Peartree Lane and Lion Roundabout)	11,344	3,832	15,176	33.8%
G-RL6	A226 (between Lion Roundabout and Ordnance Road)	11,738	3,832	15,570	32.6%
G-RL7	Ordnance Road and Canal Road	7,122	743	7,865	10.4%
G-RL8	Norfolk Road and Mark Lane	2,856	118	2,974	4.1%
G-RL9	Thames and Medway Canal Road	634	118	752	18.6%
G-RJ1	M2/A2/A289 Junction	117,936	1,257	119,193	1.1%
G-RJ2	A289/A226 Junction	50,374	3,832	54,206	7.6%
G-RJ3	A226/ Peartree Lane Signalised Junction	12,830	3,832	16,661	29.9%
G-RJ4	A226/ Dering Way/ Lower Higham Road/ Old Road East (Lion) Roundabout	26,236	3,832	30,068	14.6%

Receptor Ref	Location	Average Weekday (7am-7pm)			
		Base	Committed + Dev	Total	% Increase
G-RJ5	A226/Ordnance Road Signalised Junction	16,037	3,988	20,024	24.9%
G-RJ6	Mark Lane/Thames and Medway Canal Road Junction	1,703	118	1,821	6.9%

18.11.16 As can be seen from Table 18-23, the predicted cumulative increases in 12-hour weekday traffic against the baseline total traffic flows are expected to remain below the 30% threshold for the majority of the highway network, except for the A226 (receptors G-RL4, G-RL5 and G-RL6) where a low magnitude of change (between 30-60%) is expected. However, the magnitude of change remains the same for all receptors based on these daily traffic flows, with or without the Proposed Development. This supports Section 18.9, where no impacts are expected on these parts of the network as a result of the Proposed Development in isolation. Therefore, the cumulative increases identified above are assumed to result in no discernible environmental impact for these parts of the highway network as a result of the Proposed Development.

18.11.17 In terms of the weekday network and shoulder peak hours (as presented in ES Volume VI Appendix 18.9), the following cumulative increases are expected in addition to those identified based on daily traffic flows:

- The A226 (G-RL4 and G-RL5) is expected to experience a greater than 30% increase in cumulative traffic between 7am-8am, 8am-9am and 5pm-6pm, which is equivalent to a low magnitude of change (between 30-60%), and a greater than 60% increase in cumulative traffic between 6pm-7pm, which is equivalent to a moderate magnitude of change (between 60-90%);
- The A226 (G-RL6) is expected to experience a greater than 30% increase in cumulative traffic between 7am-8am, 8am-9am, 5pm-6pm and 6pm-7pm, which is equivalent to a low magnitude of change (between 30-60%);
- The A226/ Peartree Lane signalised junction (G-RJ3) is expected to experience a greater than 30% increase in cumulative traffic between 7am-8am, 5pm-6pm and 6pm-7pm, which is equivalent to a low magnitude of change (between 30-60%); and
- The A226/ Ordnance Road signalised junction (G-RJ5) is expected to experience a greater than 30% increase in cumulative traffic between 7am-8am, 5pm-6pm and 6pm-7pm, which is equivalent to a low magnitude of change (between 30-60%).

18.11.18 The Proposed Development is only expected to result in a maximum traffic flow increase of 3% on the above receptors during the weekday network and shoulder peak hours when compared to future baseline flows. Therefore, traffic flows associated with the Proposed Development will represent an insignificant proportion of cumulative traffic flows. Any potential discernible environmental impacts for the surrounding highway network as a result of additional traffic arising from committed schemes and the Proposed Development would not be expected to be attributed to the Proposed Development.

Cumulative Effects Summary

18.11.19 It is considered that each of the potential impacts and environmental risks relating to Traffic and Transport associated with the works can be managed through the application of accepted good practice and compliance with the measures outlined above. Whilst cumulative increases in traffic have been identified for the A226 following the inclusion of the cumulative schemes (with an associated increase in magnitude of change), this remains the case without the Proposed Development, which is in itself expected to have a negligible impact with no environmental effects on the A226 as a result of construction-related traffic.

18.11.20 As a result, the Proposed Development is not in itself expected to result in any significant environmental effects in terms of Traffic and Transport. It is concluded that any potential discernible environmental impacts as a result of additional traffic arising from committed schemes and the Proposed Development would not be expected to be attributed to the Proposed Development.

18.12 Overall Summary

18.12.1 Following the above assessment, no significant effects on traffic and transport have been identified as a result of the Proposed Development during any phase with the embedded mitigation in place, as all effects have either been categorised as minor adverse or negligible. No additional mitigation is therefore required to avoid any potentially significant effects.

18.13 References

Ref 18-1 Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework. London: Ministry of Housing, Communities & Local Government, pp. 30-32.

Ref 18-2 Department of Energy and Climate Change (2011). Overarching National Policy Statement for Energy (EN-1). London: Department of Energy and Climate Change, pp. 108-109.

Ref 18-3 Department for Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1) (from early 2024). London: Department for Energy Security and Net Zero, pp. 146-149.

Ref 18-4 Department of Energy and Climate Change (2011). National Policy Statement for Electricity Networks Infrastructure (EN-5). London: Department of Energy and Climate Change.

Ref 18-5 Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5) (from early 2024). London: Department for Energy Security and Net Zero.

Ref 18-6 Kent County Council (2016). Local Transport Plan 4: Delivering Growth without Gridlock 2016-2031 [online]. Available at https://www.kent.gov.uk/__data/assets/pdf_file/0011/72668/Local-transport-plan-4.pdf, pp 9-19 [Accessed 29 August 2023].

Ref 18-7 Kent County Council (2017). Freight Action Plan Kent [online]. Available at https://www.kent.gov.uk/__data/assets/pdf_file/0012/6105/Freight-action-plan.pdf [Accessed 29 August 2023].

Ref 18-8 Gravesham Borough Council (2014). Gravesham Local Plan Core Strategy [online]. Available at <https://www.gravesham.gov.uk/local-plan-policy/local-plan> [Accessed 30 August 2023].

Ref 18-9 Institute of Environmental Management and Assessment (IEMA) Guidelines (2023). Environmental Assessment of Traffic and Movement. IEMA, pp 1-41.

Ref 18-10 Construction Logistics and Community Safety (2022). CLOCS Standard [online]. Available at https://www.clocs.org.uk/resources/clocs_standard_v4.pdf [Accessed 30 August 2023].

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18.14 Abbreviations

Abbreviation	Meaning
AIL	Abnormal Indivisible Loads
ATC	Automatic Traffic Count
CLOCS	Construction Logistics and Community Safety
CTMP	Construction Traffic Management Plan
DfT	Department for Transport
ECC	Essex County Council
EIA	Environmental Impact Assessment
ES	Environmental Statement
HGV	Heavy Goods Vehicle
IEMA	Environmental Management and Assessment
LGV	Light Goods Vehicles
LHA	Local Highways Authority
LTC	Lower Thames Crossing
LTP	Local Transport Plan
NCN	National Cycle Network
NRTF	National Road Traffic Forecast
NSIPs	Nationally Significant Infrastructure Projects
NTM	National Transport Model
NTEM	National Trip Ends Model
NPS	National Policy Statement
PIA	Personal Injury Accident
PINS	Planning Inspectorate
PRoW	Public Right of Way
SRN	Strategic Road Network
TA	Transport Assessment
TAG	Transport Analysis Guidance
TEMPro	Trip Ends Model Program
TKRE	Tilbury to Grain and Tilbury to Kingsnorth
TS	Transport Statement

