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Executive Summary

Purpose of this Report

National Grid Electricity Transmission plc (National Grid) is making an application for development consent to upgrade the electricity transmission system in East Anglia between Norwich and Tilbury. Norwich to Tilbury (the 'Project') comprises reinforcement of the transmission network between the existing Norwich Main Substation in Norfolk and Tilbury Substation in Essex, via Bramford Substation, the new East Anglia Connection Node (EACN) Substation and the new Tilbury North Substation.

This Transport Assessment (TA) has been produced to support the application for development consent under the Planning Act 2008. The TA documents the assessment taken to understand the effects of the Project on the transport network in accordance with the requirements set out in relevant national policy.

Scope of the Assessment

The operational (and maintenance) effects in relation to traffic and transport matters have been scoped out of the TA as the operational (and maintenance) traffic movements are not anticipated to have a material effect on the transport network and receptors, and are therefore classed as negligible. Therefore, the TA focuses on potential effects during construction.

The Project spans across four Local Highway Authorities, namely Norfolk County Council, Suffolk County Council, Essex County Council and Thurrock Council. The key links and junctions expected to be used by the construction traffic generated by the Project have been reviewed and assessed where deemed necessary. The scope of the TA is focused on construction impacts on the following receptors:

- Strategic Road Network (SRN) and Major Road Network (MRN) – change in traffic flows at junctions and impact on drivers and walkers, cyclists and horse riders (WCH), road safety
- Local Road Network (LRN) – change in traffic flows, on-street parking, road safety, and impact on drivers/WCH
- Bus Network – change in traffic flows and passenger delay, severance to bus stops
- WCH Network – severance, fear and intimidation, amenity, road safety.

Results of the Assessment

The TA has set out the following related to the scope of the assessment (as defined above), focused on temporary impacts during the peak period of construction activity for each location assessed:

- Relevant national, regional and local policy and guidance, which provided a framework for the assessment
- Existing baseline and future baseline transport conditions
- The level of construction traffic expected on the road network

- Requirements for temporary amendments to the road network and Public Rights of Way (PRoW)
- The resultant impact of the Project on the road network, bus services, and WCH.

Strategic Road Network and Main Road Network

The assessment includes consideration of potential impacts on the A14, where the section between J49 and J51 is forecast to carry the highest volumes of construction traffic generated by the Project, as it services multiple Primary Access Routes (PARs).

The assessment indicates that the total traffic on the SRN/MRN would increase by less than 15% in the AM and PM peak hours during peak periods of Project construction activity.

Junction modelling has been undertaken for the worst-case peak construction traffic which is only expected to occur for a short duration (e.g. one week). The addition of the Project construction traffic on the junctions assessed generally had minimal impact on the capacity compared to the Future Base and Committed Development scenario. In most cases, given the small impact from the Project construction traffic and the short duration of worst-case peak flows, no mitigation is proposed. Where mitigation measures are proposed, these are generally minor such as temporary signage to warn general traffic of potential delay due to the Project traffic.

It is concluded that there would be no substantial Project traffic impacts on the SRN.

Local Road Network

On the LRN, some percentage increases of traffic owing to the Project are deemed significant, primarily due to the low future baseline traffic levels. However, the total future flows in these road links are not expected to have a material impact on the operation (or maintenance) or performance of the network and generally occur over a short duration (e.g. one week). There are links where duration is expected to be for a longer period of time, though the associated construction traffic flows are notably lower.

It is concluded that there would be no substantial Project traffic impacts on the LRN.

Road Safety

A review of Personal Injury Collision Data has been analysed along the full length of the links along PARs and connecting to LRN junctions to identify patterns in collision locations in order to establish any areas of safety concerns. In general, the collisions happened during daylight hours, with fine weather conditions and with a dry road surface. No specific collision patterns were identified based on conditions. A small number of road links were identified to have a collision rate equal to or exceeding the national average, which can be influenced by various factors and should be interpreted with caution. In general, these collisions do not suggest a significant pattern or a presence of a hotspot on these links, therefore it is reasonable to conclude that the Project would have no substantial adverse impact on road safety along the PARs.

A mitigation measure that will be secured through the Construction Traffic Management Plan (CTMP) would be a driver information pack for all construction drivers that includes the identified hazard locations such as areas of road safety concern (e.g. where pedestrians may be crossing the carriageway away from designated crossing points or within the carriageway or adjacent verge) for their awareness.

Parking and Loading

Parking provision for construction workers and construction vehicles would be provided within temporary construction compounds. Therefore, there would be no substantial direct impacts on existing on-street parking on the LRN. Any lane closures and traffic management required would be temporary and short-term with diversion routes provided where practicable.

Bus Network

There are 22 PARs identified to have one or more buses operating per hour within the transport network considered in the assessment.

There are no expected changes to bus services, bus stops or taxi facilities for over four weeks in any 12-month period during the construction period 2027–2031 as a result of the construction activities. There would be short-term impact (less than four week duration) on some bus networks as a result of the Project, these would be mitigated on a case-by-case basis in liaison with bus operators and the Local Highway Authority.

Short-term road closures associated with overhead line stringing, construction of highway mitigation works, construction of bellmouth junctions and the open-cut cable swathe are expected on some of the roads. Full road closures are expected to be for no more than four weeks and would require a diversion. Other roads are expected to be managed through: Managed/ Road Open/Single Lane Running/Single Lane Running with widening avoiding the need to close the road. The duration of these would be between six to eight weeks and would retain access for vehicles on the affected roads. Minimal delay to bus services is therefore expected. If a bus stop is located on those roads, a temporary stop would be provided in a suitable location, following agreement with the relevant Local Highway Authority and the bus operators.

Walkers, Cyclists and Horse Riders Network

The assessment of Project impacts on the WCH network considers potential impacts on WCH severance, fear and intimidation, amenity and road safety. Mitigation has been proposed to address locations where issues have been identified in relation to severance, amenity and fear and intimidation. An Outline PRow Management Plan (document reference 7.6) has been prepared with the aim of reducing disruption to users (as far as practicable). For each PRow the default expectation is that the diversion would be provided on a like for like basis. Disruption and delay to PRow users has been minimised as much as reasonably practicable, with options to keep PRow open, or to manage the access (as far as practicable). Where this is not practicable, the existing PRow would be temporarily closed and a temporary diversion provided via the shortest, or most feasible alternative route.

Where temporary construction works are proposed to be undertaken within an area of open access land (OAL) during the construction phase, Main Works Contractor(s) staff would be on site and would assist users of the OAL to move around the temporary construction areas. The right to roam across affected OAL will be maintained with temporary closures (managed), and will in general be closed for less than four weeks. Therefore, no significant impact on WCHs are expected as a result of the Project.

A long-term road closure of Wymondham Road (Link PAR5) is required, resulting in a 2.4 km diversion route between Flordon Road and B1113 Norwich Road. This diversion route has been agreed with the Local Highway Authority who advised this would have no significant effects on the local highway network or road users given an increase of journey time of just two minutes is anticipated for drivers and no dedicated facilities for WCH are provided.

Short-term temporary road closures associated with overhead line stringing, construction of highway mitigation works, construction of bellmouth junctions and the open-cut cable swathe are also expected on some roads. However, these closures are likely to be for no more than four weeks and would be either managed or a road closure with a diversion provided. Therefore, no significant impact on WCH delay is expected as a result of the Project.

Conclusions

This TA demonstrates that in general there would be no substantial adverse impacts upon the transport network during construction. Traffic generated during the construction of the Project is considered short-term. Any impacts on the transport network during this phase would be temporary and mitigation would be implemented where the assessment has deemed necessary, including those that would be secured through the Outline CTMP (document reference 7.3).

1. Introduction

1.1 Overview

- 1.1.1 Norwich to Tilbury (the ‘Project’) comprises reinforcement of the transmission network between the existing Norwich Main Substation in Norfolk and Tilbury Substation in Essex, via Bramford Substation, the new (EACN) Substation and the new Tilbury North Substation.

1.2 Purpose of the Transport Assessment

- 1.2.1 A Transport Assessment (TA) is a comprehensive and systematic process that sets out transport issues relating to a project. This TA establishes the baseline transport conditions relevant to the Project; identifies the future transport conditions and transport impacts of the Project; and establishes whether mitigation is required for transport issues generated by the Project.
- 1.2.2 This TA has been produced to support the application for development consent under the Planning Act 2008. The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (APFP Regulations) require Development Consent Order (DCO) applications to be accompanied by *‘any other documents considered necessary to support the application’* in accordance with Regulation 5(2)(q) of the APFP Regulations.
- 1.2.3 This assessment has been developed in accordance with relevant national, regional, and local transport and planning policy, including the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ), 2024a) and National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (DESNZ, 2024b).
- 1.2.4 In April 2025, the government launched a consultation on proposed changes to NPS EN-1 (DESNZ, 2024a), NPS EN-3 (DESNZ, 2024c) and NPS EN-5 (DESNZ, 2024b) that ended on 29 May 2025. Details on how these consultation documents have been considered by the Project can be found within the Planning Statement (document reference 5.6).

1.3 Scope of the Transport Assessment

Temporal Scope

- 1.3.1 The temporal scope considers the time period over which changes to the environment and the resultant effects are predicted to occur and are typically defined as either being temporary or permanent.
- Permanent – these are effects that would remain even when the Project is complete, although these effects may be caused by environmental changes that are permanent or temporary

- Temporary – these are effects that are related to environmental changes associated with a particular activity associated with construction of the Project and would cease when that activity finishes.

1.4 Technical Scope

1.4.1 The scope of the TA is focused on construction impacts within the Study Areas and the parameters and methodology for the assessment are set out in Section 6.

1.4.2 The following receptors are considered:

- Strategic Road Network (SRN) – change in traffic flows at junctions and impact on drivers and Walkers, Cyclists, and Horse Riders (WCH), road safety
- Major Road Network (MRN) – change in traffic flows at junctions and impact on drivers and WCH, road safety
- Local Road Network (LRN) – change in traffic flows at junctions, on-street parking, road safety, and impact on drivers/WCH
- Bus Network – change in traffic flows and passenger delay, access to bus stops
- WCH Network – severance, fear and intimidation, amenity, road safety.

1.5 Geographical/Regional Scope

1.5.1 The Project passes through the counties of Norfolk, Suffolk and Essex and the unitary authority area of Thurrock Council (part of the ceremonial county of Essex). In addition to rural villages along the proposed corridor, the proposed alignment is in proximity to a number of towns and cities, including:

• Norwich	• Manningtree
• Diss	• Colchester
• Stowmarket	• Coggeshall
• Needham Market	• Witham
• Ipswich	• Braintree
• Hadleigh	• Chelmsford.

1.5.2 The existing road network for the region comprises a number of major roads between the large population centres, with smaller settlements and rural areas being serviced by a network of rural roads. Existing baseline conditions are described in Chapter 4 of this report. The TA Study Area is set out in Section 2.21 and shown on Figure 1: Traffic and Transport Study Area in Appendix I.

1.6 Relationship with Environmental Statement

1.6.1 This TA is focused on evaluating the traffic and transport impacts on the performance of the transport network as a result of the Project, in particular during the peak hours. Opportunities to reduce the reliance on road transport, such as using rail or ports for heavy equipment delivery, and use of public transport are considered in line with local and national transport planning policies.

- 1.6.2 The Environmental Statement (ES) Chapter 16: Traffic and Transport (document reference 6.16) evaluates the environmental consequences of traffic and transport changes and considers the wider transport effects, typically based on daily traffic flows on a variety of receptors. The findings of this TA help to contribute to the traffic and transport assessment within the ES (Volume 6 of the DCO application), predominately where junction modelling of peak hour traffic would help inform the assessment of effects relating to driver and public transport delay as a result of increased traffic along the Primary Access Routes (PARs) and through key junctions.
- 1.6.3 In addition, the TA has interrelationships with other environmental topics within the ES (Volume 6 of the DCO application), namely:
- ES Chapter 7: Air Quality (document reference 6.7)
 - ES Chapter 8: Ecology and Biodiversity (document reference 6.8)
 - ES Chapter 10: Health and Wellbeing (document reference 6.10)
 - ES Chapter 14: Noise and Vibration (document reference 6.14)
 - ES Chapter 15: Socio-economics, Recreation and Tourism (document reference 6.15).

1.7 Consultation on the Scope of the Assessment

- 1.7.1 Pre-application discussions on the scope of the TA have been held between National Grid, National Highways and Local Highway Authorities to seek feedback on the contents and structure of the document. Discussions have been held with:
- Norfolk County Council
 - Suffolk County Council
 - Essex County Council
 - Thurrock Council
 - National Highways.
- 1.7.2 A summary of discussions held with relevant consultees at monthly traffic and transport thematic meetings and specific regional meetings where the TA was discussed is summarised in Table B1 in Appendix B.

1.8 Consents and Licences

- 1.8.1 National Grid is seeking certain traffic and highway powers in the Draft DCO (document reference 3.1) such as powers to regulate traffic. In addition to these powers, National Grid would need to obtain highway consents and licences such as permits for street works and road works.

1.9 Traffic Regulation Orders

- 1.9.1 Traffic Regulation Orders (TROs) and Temporary Traffic Regulation Orders (TTROs) will be required for regulating traffic on roads in proximity to the Project, including if a street needs to be closed or diverted temporarily during construction. These could include:

- Temporary restriction of waiting
- Temporary restriction of speed
- Permanent restriction of speed
- Temporary restriction of access
- Temporary no overtaking order.

1.9.2 Article 49 of the Draft DCO (document reference 3.1) allows National Grid and its Main Works Contractor(s) to introduce TROs for the purposes specified in Schedule 13 or to any other extent that is expedient or necessary, with the consent of the traffic authority, for the purposes of the authorised development or for purposes ancillary to the construction or maintenance of the authorised development.

1.10 Permit Schemes

1.10.1 Part 3 of the Traffic Management Act 2004 introduced Permit Schemes as an alternative framework to the notification system under the New Roads and Street Works Act 1991 for highway maintenance and improvements works. The Permit Scheme would work alongside the street works powers set out in Part 3 Article 11 of the Draft DCO (application document 3.1).

1.10.2 In accordance with Article 12 of the Draft DCO (application document 3.1) National Grid is proposing to use the Permit Scheme in place and operated by Norfolk County Council, Suffolk County Council, Essex County Council and Thurrock Council, in order to best coordinate the street works required for the Project.

1.10.3 Permits for street works issued under a Permit Scheme will therefore cover many of the aspects detailed within the Outline Construction Traffic Management Plan (CTMP) (document reference 7.3). Due to the enforceable nature of Permit Schemes and the role of the relevant Local Highway Authorities in considering and issuing the permits, compliance with permit conditions will, subject to Article 12 of the Draft DCO, take precedence over the CTMP in the case of any conflict between the application for and subsequent terms of a permit and the requirements of the Outline CTMP.

1.11 Vehicle Classification Description

1.11.1 A range of construction vehicles that would be required to construct the Project would use the road network. Heavy Goods Vehicles (HGVs) would be required which includes:

- Ordinary Goods Vehicle 1 (OGV1): two axles, over 3.5 tonnes and up to 7.5 tonnes gross weight
- Ordinary Goods Vehicle 2 (OGV 2): two or more axles, over 7.5 tonnes gross weight
- Other HGVs: low-loader units used to deliver larger items such as excavators, construction mats, and welfare units.

1.11.2 Vehicles would also include Light Goods Vehicles (LGVs), with includes:

- Commercial vehicles used to transport goods with a total gross weight not exceeding 3.5 tonnes

- Smaller deliveries made by cars and vans to deliver smaller items and the workers to the site.

1.12 Special Order Vehicle Movements

- 1.12.1 Construction traffic movements are proposed to include the operation of non-standard vehicles (vehicles that do not comply with the Road Vehicles (Construction and Use) Regulation 1986 (C&U) Regulations or the Road Vehicles (Authorised Weight) Regulations 1998 (AW Regs)). Non-standard vehicles are considered under these regulations to be vehicles (and their loads) that exceed 44 tonnes, have a width of more than 2.9 m, or a rigid length of more than 18.65 m. This includes Abnormal Indivisible Loads (AILs), mobile cranes, and engineering machinery.
- 1.12.2 Special Types General Orders (STGO) are a set of regulations which allow non-standard vehicles to be driven on UK highways, set by the Driver and Vehicle Standards Agency. Where an STGO applies to the Project, this will be undertaken in accordance with Government Guidance Special types enforcement guide (Driver and Vehicle Standards Agency, 2018). This is anticipated to require the use of escort vehicles.
- AILs – these include the vehicles used to deliver items that cannot be divided into two or more loads to be transported by road and would therefore exceed the standard maximum permitted dimensions of HGVs. These include the delivery of the super grid transformers to the substations and the cable drum deliveries. AILs require STGO and relevant documentation and authorisation would be completed through the Electronic Service Delivery for Abnormal Loads system
 - Mobile cranes – the Project is anticipated to use 160 tonne and 250 tonne cranes for the installation and removal of the pylons. A piling rig is also anticipated to be used for construction of the foundations of the pylons, Cable Sealing End (CSE) compound, substations and temporary bridges. Both the cranes and the piling low-loader are anticipated to fall within the criteria of the STGO regulations. These vehicle numbers have been included within the construction traffic numbers
 - Engineering machinery that is moveable and comprises a motor vehicle or trailer specifically built for engineering operations.
- 1.12.3 The Outline CTMP (document reference 7.3) and Outline Code of Construction Practice (CoCP) (document reference 7.2) provide further details on the most onerous vehicles considered to use the site access points (SAPs) connecting to the PARs, and the assumed access infrastructure.

1.13 Transport Assessment Structure

- 1.13.1 This TA is structured as follows:
- Chapter 2: Project Description – this provides a brief overview of the main components of the Project
 - Chapter 3: Key Planning Policy Context – this describes the policy context in relation to the traffic and transport impacts of the Project
 - Chapter 4: Existing Baseline Transport Conditions – this provides details of the existing local area and site context

- Chapter 5: Future Baseline – this sets out any likely changes to the transport networks in the future
- Chapter 6: Methodology – this sets out the approach and methodology used to assess the transport networks
- Chapter 7: Transport Assessment – this provides details of the assessment of Project impacts on the transport network
- Chapter 8: Conclusion – this summarises the findings of the report.

1.13.2 The TA also refers to information contained within other application documents. Key documents include the following:

- Works Plans (document reference 2.3)
- Traffic Regulation Order Plans (document reference 2.4)
- Access, Rights of Way and Public Rights of Navigation Plans (document reference 2.5)
- Design and Layout Plans – Traffic and Transport (document reference 2.6.3)
- Draft DCO (document reference 3.1)
- Design Development Report (document reference 5.15)
- ES Chapter 16: Traffic and Transport (document reference 6.16)
- Outline CoCP (document reference 7.2)
- Outline CTMP (document reference 7.3)
- Outline Public Rights of Way (PRoW) Management Plan (document reference 7.6).

2. Project Description

2.1 Introduction

- 2.1.1 National Grid Electricity Transmission plc ('National Grid') owns and maintains the national high voltage electricity transmission network throughout England and Wales.
- 2.1.2 The transmission network connects the power from where it is generated to the regional Distribution Network Operators who then supply businesses and homes.
- 2.1.3 National Grid holds the Transmission Licence for England and Wales, and its statutory duty is to develop and maintain an efficient, coordinated and economical system of electricity transmission and to facilitate competition in the generation and supply of electricity, as set out in the Electricity Act 1989.
- 2.1.4 National Grid has developed plans for Norwich to Tilbury (referred to as the 'Project' in this report). The Project would support the UK's net zero target through the connection of new low carbon energy generation in East Anglia and by reinforcing the transmission network.
- 2.1.5 The Project comprises reinforcement of the transmission network between the existing Norwich Main Substation in Norfolk and Tilbury Substation in Essex, via Bramford Substation, the new EACN Substation and the new Tilbury North Substation.
- 2.1.6 The reinforcement is needed because the existing transmission network, even with current upgrading, will not have sufficient capacity for the new renewable energy (a substantial proportion of which would be generated by offshore wind) that is expected to connect to the network over the next 10 years and beyond. Completion of the Project, together with other new reinforcements across the country, will meet this future energy transmission demand both in East Anglia and across the UK.
- 2.1.7 The Project is a Nationally Significant Infrastructure Project (NSIP), and National Grid is seeking development consent under statutory procedures set by government. NSIPs are projects of certain types, over a certain size, which are considered by the government to be of national importance, hence permission to build them needs to be given at a national level, by the relevant Secretary of State (in this case the Secretary of State for Energy Security and Net Zero). Instead of applying to the local authority for planning permission, the developer must apply to the Planning Inspectorate for a DCO that would grant development consent.
- 2.1.8 National Grid has submitted an application for development consent to the Planning Inspectorate. The Examining Authority (consisting of one or more examining inspectors), after a period of public examination, would make their recommendation to the Secretary of State for Energy Security and Net Zero, who in turn would decide on whether development consent should be granted for the Project.
- 2.1.9 The Project is identified as critical to delivering a network which supports the clean power pathways for 2030 delivery.

2.2 Project Overview

- 2.2.1 Details of the Project are included within ES Chapter 4: Project Description (document reference 6.4) and the Design Development Report (document reference 5.15).

2.3 Permanent Features

- 2.3.1 The permanent (operational) features of the Project comprise:

- A new 400 kilovolt (kV) electricity transmission connection of approximately 180 km overall length from Norwich Main Substation to Tilbury Substation via Bramford Substation, a new EACN Substation and a new Tilbury North Substation, including:
 - Approximately 159 km of new overhead line supported on approximately 509 pylons, either standard steel lattice pylons (approximately 50 m in height) or low height steel lattice pylons (approximately 40 m in height) and some of which would be gantries (typically up to 15 m in height) within proposed CSE compounds or existing or proposed substations
 - Approximately 21 km of 400 kV underground cabling, some of which would be located through the Dedham Vale National Landscape (an Area of Outstanding Natural Beauty (AONB))
- Up to seven new CSE compounds (with permanent access) to connect the overhead lines to the underground cables
- Modification works to connect into the existing Norwich Main Substation and a substation extension at the existing Bramford Substation
- A new 400 kV substation on the Tendring Peninsula, referred to as the EACN Substation (with a new permanent access). This is proposed to be an Air Insulated Switchgear (AIS) substation
- A new 400 kV substation to the south of Orsett Golf Course in Essex, referred to as the Tilbury North Substation (with a new permanent access). This is proposed to be a Gas Insulated Switchgear (GIS) substation
- Modifications to the existing National Grid Electricity Transmission overhead lines to facilitate the connection of the existing network into the new Tilbury North Substation to provide connection to the Tilbury Substation
- Ancillary and/or temporary works associated with the construction of the Project.

- 2.3.2 In addition, third party utilities diversions and/or modifications would be required to facilitate the construction of the Project. There would also be land required for environmental mitigation and Biodiversity Net Gain (BNG).

- 2.3.3 As well as the permanent infrastructure, land would also be required temporarily for construction activities including, for example, working areas for construction equipment and machinery, site offices, welfare, storage and temporary construction access.

2.4 Modifications to Existing Highways

2.4.1 Permanent modifications to existing highways are required as part of the Project. The details of the likely works required are provided below to facilitate construction traffic movements:

- A120 Hardwick Road / Bentley Road: Permanent widening of junction bellmouth and lengthening of merge taper onto A120 northbound (NB) mainline in association with North Falls and Five Estuaries. The existing footpath at this location would also be realigned and offset from the back of the kerb with a 2 m proposed verge separation.
- A12 Ipswich Road / B1070: Lengthening and widening of the merge lane taper onto A12 NB mainline, and the existing footpath at this location would also be realigned and offset from the back of the kerb with a 2 m proposed verge separation.
- The carriageway on Bullen Lane, Bentley Road and Ardleigh Road would also be permanently widened to facilitate future access requirements.
- A14 J55 Copdock Interchange: Changes to lane markings
- Public Rights of Way Little Bromley Footpath 13 and Little Bromley Footpath 14 would be permanently stopped up with diversions due to adjacent highway works.

2.5 Site Access Points

2.5.1 Permanent SAPs are required where permanent access roads would be provided to CSE compounds and new substations. These are shown on ES Figure 4.2: Proposed Project Design – Permanent Features (document reference 6.4.F2) and comprise:

- JC-B013 permanent SAP on Raydon Road and a new access track to the CSE compound
- TB-B021 permanent SAP on Boxted Road with permanent access to the CSE compound
- TB-B035 permanent SAP on Crabtree Lane to the CSE compound
- TB-B079 permanent SAP on Fairstead Road to the CSE compound
- TN-B011 permanent SAP off High Horse Lane to the CSE compound
- Tilbury North Substation has two options:
 - TN-B007 permanent SAP off Brentwood Road to Tilbury North Substation
 - TN-B014 permanent SAP off Buckingham Hill Road to Tilbury North Substation.

2.5.2 Site access points have been designed in accordance with relevant highways standards and a Stage 1 Road Safety Audit undertaken. A summary of all Road Safety Audits undertaken for the Project are provided within Appendix A.

2.6 Modification to Speed Limits

2.6.1 Permanent changes to speed limits are also proposed on a number of roads primarily on the approach to SAP. The extent of the permanent speed restrictions can be

found within Schedule 13 of the Draft DCO (document reference 3.1) for the following roads:

- Bullen Lane, Suffolk – speed limit to be restricted to 30 mph
- Bottle Bridge Road / Wenham Road, Suffolk – speed limit to be restricted to 50 mph
- Little Bromley Road, Essex - speed limit to be restricted to 30 mph
- Ardleigh Road, Essex - speed limit to be restricted to 30 mph
- Bentley Road, Little Bromley, Essex - speed limit to be restricted to 30 mph and 40 mph
- Boxted Road, Essex – speed limit to be restricted to 40 mph
- Crabtree Lane, Essex - speed limit to be restricted to 40 mph
- Fairstead Road, White Notley, Essex – speed limit to be restricted to 40 mph
- Brentwood Road, Thurrock - speed limit to be restricted to 40 mph.

2.7 Permanent Features (Operation and Maintenance)

Overhead Line (Including CSE Compounds)

- 2.7.1 The typical lifespan of an overhead line would be at least 40 years, depending on use and location. Over this time, the overhead line and CSE compounds would be subject to regular inspection from the ground (on foot or using a small van/4x4 vehicle) or by helicopter to check for visible faults or signs of wear in line with existing maintenance requirements at any point in time. The inspections would confirm when refurbishment is required and indicate if plant/tree growth or development were at risk of affecting safety clearances.
- 2.7.2 Maintenance activity carried out on lattice pylons would involve climbing the pylon to access the work area (e.g. conductors). Access to the pylons may require temporary access works to gain entry to site.
- 2.7.3 There are two main types of overhead line refurbishment:
- ‘Fittings only’ refurbishment would be undertaken if the conductors were still in good condition. The refurbishment involves removing and replacing the insulators, their associated fittings and the spacers that keep the conductors separate in the spans between pylons. The insulators and fittings have a life expectancy of approximately 20 to 40 years
 - Full refurbishment would typically be needed at the end of the lifespan of the overhead line (40 years, although pylons have a typical life expectancy of 80 years) and works would be subject to separate permissions, to consider the latest site conditions and legislation in force at that time.
- 2.7.4 Refurbishment would usually be carried out in two stages because the overhead line has two circuits, one on each side of the pylon. This means that work can be undertaken on one side only, so that the other side can be kept ‘live’. Once all the work has been completed on the first side, the circuit would be re-energised. The opposite side would then be switched off so that the work could be carried out on the other side.

- 2.7.5 The refurbishment works would require temporary access tracks, small compounds and, potentially, scaffolding to protect roads and other features during the work. Vans would be used to carry workers in and out of site and trucks would be used to bring new materials and equipment to site and remove old equipment. Once the Project has been constructed and commissioned, including the temporary installation of access roads and installation of scaffolding to protect roads, railways and footpaths would be required as necessary (like the initial construction requirements).
- 2.7.6 The typical design life of a CSE compound would be at least 40 years, depending on use and location. The CSE compounds would contain equipment that would be monitored remotely. Site inspections would include visual checks, for signs of damage or wear, of the condition of non-mechanical equipment, structures, and buildings. Mechanical (manually operated) earth switches would require inspection and servicing as part of these visits. Intermittent upgrades and repairs would be complete as and when required to ensure their ongoing operation.

Underground Cables

- 2.7.7 Underground cables have a typical design life of at least 40 years. Over this time, the cables would be subject to regular checks. Inspections would be undertaken approximately every three years using the fibre-optic cables that were installed alongside the underground cables during construction. This would identify whether cable repairs were required. This would involve light vehicle access to any joint bays along the cable alignment and typically teams of two staff members.
- 2.7.8 When a repair is needed, the area where the fault is located would be accessed using a temporary access track. A working area would be established, like that used for construction, and the ground would be excavated. If a cable needs to be replaced, then that section of the cable (between two joints) would need to be removed and new joints constructed. A benefit of ducting these cables is that the whole length to be removed does not necessarily need to be excavated depending on the condition of the duct and cable. Staffing and vehicle requirements for maintenance activities would vary depending on the scale of the works.
- 2.7.9 There would be restrictions regarding works directly above the underground cables. For example, trees cannot be planted over the top or within 10 m of underground cables.
- 2.7.10 For the purposes of the assessment, a permanent easement of 60 m is assumed for open cut installation and 180 m for trenchless installation. This has been reduced in some locations to consider sensitive features or may increase subject to site conditions.

Proposed New EACN Substation, Tilbury North Substation and Modifications to existing Substation

- 2.7.11 The new EACN Substation, new Tilbury North Substation and other existing substations to be modified as part of the Project would typically be unmanned during periods of general operation. However, routine site visits would be required to visually inspect the condition of the equipment, structure, and buildings for signs of wear and tear. Routine maintenance would also need to be undertaken on a three-year cycle for each circuit. This involves electrical isolation of the equipment and checks to the equipment which may lead to maintenance of certain moving parts, electrical contacts, etc., to ensure the system continues to operate without fault. In addition,

there would be maintenance of the auxiliary systems which would be tested monthly and maintained as required. The proposed works are not likely to change the current activity patterns within the substations. The routine inspections would only require small teams with limited light vehicle movements. During periods of maintenance, staffing and vehicle numbers would increase, varying with the scale of the works required.

- 2.7.12 Under the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS), National Grid has a duty, following the occurrence of a secured event on the onshore transmission system, to take measures to resecure the system to the above operational criteria as soon as reasonably practicable. To meet this duty, the permanent site access roads to the new EACN Substation and new Tilbury North Substation would be retained to maintain AIL access to the sites.
- 2.7.13 During operation (and maintenance) of the Project, traffic generated would be associated with infrequent repair for routine maintenance, inspection activities, and a small number of operational staff (approximately 0 to 3 vehicles annually based on evidence from other overhead line projects). The impact of operational traffic from overhead line projects would be expected to be substantially lower than 30% of existing traffic, and movements are not anticipated to have a material effect on the transport network and receptors and are therefore classed as negligible. Therefore, the operational (and maintenance) transport effects have been scoped out of the TA and this report focuses on construction activities and temporary effects.
- 2.7.14 The permanent transport features of the Project that would be in place during operation (and maintenance), are outlined in Section 1.3 of this report.

2.8 Temporary Features

- 2.8.1 The temporary features of the Project are as follows:
- Land would be required temporarily for construction activities including temporary construction compounds (provided for the overhead line, underground cables, CSE compounds, substations and highway mitigation works); working areas for construction equipment and machinery; site offices; welfare; storage for cable drums, soil, machinery and other materials; waste management; and temporary construction access
 - Temporary construction routes, referred to as PARs, are shown on Figure 1: Traffic and Transport Study Area in Appendix I. These temporary routes are located on the LRN and connect the Project to the SRN and MRN. These routes would be used by both construction vehicles and staff vehicles
 - Temporary haul roads off the public highway and within the Order Limits would be used by construction vehicles to get between SAPs and a specific working area. Temporary traffic management would be provided at these SAPs where required such as signage warning other road users of the likely presence of construction vehicles and any temporary speed limit restrictions
 - In addition to site access points, haul roads cross the public highway network at various locations. On the LRN, temporary crossover points are provided to allow construction vehicles to cross over the road and progress along the proposed haul roads. Temporary signage would be erected along the haul roads within the working area where necessary

- Temporary AIL routes have also been proposed. These would cater for AIL movements, for example the transportation of transformers to the substation and cable drums to each end of the underground cable sections
- Temporary PRow diversions are required and the approach to applying these is based on minimising the disruption to PRow users as much as reasonably practicable. Where practicable, the PRow would remain open, or with managed access, and diversions would be proposed via the shortest, or most appropriate, feasible alternative route. The right to roam across the affected OAL would be maintained. However, access to areas where construction activities are being undertaken would be subject to restrictions on safety grounds that would be managed by the Main Works Contractor(s)
- Temporary provision for pedestrians and cyclists in the form of a shared footway adjacent to Bentley Road and Ardleigh Road with a suitable crossing provided as part of the design
- Short-term road closures associated with overhead line stringing, construction of highway mitigation works, construction of bellmouth junctions and the open-cut cable swathe are expected on some of the roads. Full road closures are expected to be for no more than four weeks and would require a diversion. Other roads are expected to be managed through: Managed/ Road Open/Single Lane Running/Single Lane Running with widening avoiding the need to close the road. The duration of these would be between six to eight weeks and would mainly access for vehicles on the affected roads. If a bus stop is located on those roads, a temporary stop would be provided in a suitable location, following agreement with the relevant Local Highway Authority and the bus operators. Temporary signage for any planned diversion would be installed in accordance with relevant signage design guidance
- A long-term temporary road closure of Wymondham Road (Link PAR5), which would require a 2.4 km diversion route to be introduced between via Flordon Road and B1113 Norwich Road. This diversion route has been agreed with the Local Highway Authority who advised this would have no significant effects on the local highway network given an increase of journey time of just two minutes is anticipated for drivers
- The Indicative Highway Mitigation Plans can be found within Appendix C of the Outline CTMP (document reference 7.3). These plans, based on the current proposed alignment, provide details of routes and access options for construction vehicles and identifies where there are likely modifications to existing highway features, vegetation removal/cutting back, temporary traffic regulation orders, temporary removal of street furniture, speed restrictions, suspension of parking and loading, carriageway widening and works within the highway boundary
- Temporary traffic management to be provided in agreement with Local Highway Authority where the carriageway width on PARs is noted as being too narrow to accommodate design vehicle movement
- Additional mitigation measures such as temporary road signs, speed restrictions and traffic calming measures would be provided at site specific locations as environmental additional mitigation
- Junction signal optimisation, temporary signage to warn motorists of peak hour congestion and availability of alternative routes

- Temporary provision for pedestrians and cyclists along Hoford Road between Buckingham Hill Road and Tilbury North Substation site access to separate users from construction traffic. However, this may become a permanent feature following further discussions with Thurrock Council.

2.8.2 Details of temporary features can be found within the following:

- Design and Layout Plans - Traffic & Transport (document reference 2.6.3)
- Access, Rights of Way and Public Rights of Navigation Plans (document reference 2.5)
- Traffic regulation order plans (document reference 2.4)
- Draft DCO – Schedule 5 Streets Subject to Street Works (document reference 3.1)
- Draft DCO – Schedule 6 Streets Subject to Alternation of Layout (document reference 3.1)
- Draft DCO - Schedule 7 Streets or PRowWs to be Permanently Stopped Up (document reference 3.1)
- Draft DCO - Schedule 8 Streets or PRowWs to be Temporarily Closed (document reference 3.1)
- Draft DCO – Schedule 9 Access to Works (document reference 3.1)
- Draft DCO – Schedule 13 Traffic Regulation Orders (document reference 3.1)
- ES Chapter 16: Traffic and Transport (document reference 6.16).

2.9 Mitigation Measures

- 2.9.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.
- 2.9.2 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project. Embedded measures are those that are intrinsic to and built into the design of the Project, for example the inclusion of a largely continuous temporary haul road to reduce effects on the local highway network during construction.
- 2.9.3 Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance. The Outline CoCP (document reference 7.2) contains relevant standard mitigation measures relating to Traffic and Transport, and construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project.
- 2.9.4 An Outline Construction Workers Travel Plan (CWTP) has been prepared and is an appendix within the Outline CTMP (document reference 7.3). This sets out the framework and principles proposed for the management of construction worker travel to mitigate potential impacts and encourage more sustainable modes of transport.

- 2.9.5 An Outline CTMP (document reference 7.3) has been prepared which sets out the strategy and measures which will be adopted by National Grid and the Main Works Contractor(s), subject to agreement with the Local Highway Authorities and National Highways. It outlines proposed traffic management measures and monitoring and management principles to ensure the adherence to construction routes to minimise the disruption to the road network. The appointed Main Works Contractor(s) would assign Transport Coordinators who will be responsible for the monitoring and management of measures recorded within Outline CTMP (document reference 7.3) and complying with the subsequently agreed final CTMP. The Transport Coordinators would liaise with the Travel Plan Coordinator (TPC) to help identify initiatives to limit vehicle movements. They would also liaise with the Local Highway Authorities to provide monitoring reports for the CTMP.
- 2.9.6 Highway mitigation measures associated with the construction access routes have been designed to allow for the safe movement of construction vehicles on the highway network including abnormal indivisible loads. These measures include carriageway widening and passing places, vegetation removal/cutting back, TROs, temporary removal of street furniture, speed restrictions, suspension of parking and loading, and works within the highway boundary. Proposed highway mitigation can be found on the Indicative Highway Mitigation Plans found within the Outline CTMP (document reference 7.3).
- 2.9.7 Temporary traffic management will primarily be used during construction and removal of SAPs, when erecting or dismantling scaffolding, netting and stringing where the overhead lines cross the highway network, where the underground cables cross the highway networks, for the safe operation of SAPs and crossover points, and potentially at locations on the PARs where mitigation measures are required. Other instances, than those detailed above, may arise where traffic management on the public highway and haul roads is required.
- 2.9.8 Temporary traffic management will be provided in accordance with Safety at Street Works and Road Works – A Code of Practice and Traffic Signs Manual (TSM) Chapter 8, proportionate to the size of road, duration of works and volume of traffic. To reduce the temporary impact on local road users, the length of the traffic management measures would be kept to a minimum and left in situ for the shortest duration as far as is reasonably practicable.
- 2.9.9 An Outline PRoW Management Plan (document reference 7.6) has also been prepared with the aim of reducing disruption to users (as far as practicable). Priority has been given to either keeping PRoW open or providing a managed access. Where this is not practicable, temporary closure of the existing PRoW would be required and a diversion put in its place via the shortest, or most feasible alternative route. The Outline PRoW Management Plan summarises the proposed management strategy, describes the proposed temporary mitigation, and outlines the expected duration for each affected PRoW as a result of proposed construction activities by the Project. Planned temporary closures and diversions are illustrated within the Access, Rights of Way and Public Rights of Navigation Plans (document reference 2.5) and outlined in the Draft DCO (document reference 3.1).
- 2.9.10 Additional environmental mitigation has been proposed which comprises measures over and above any embedded and standard mitigation measures. These measures are shown on Figure 2: Additional Measures in Appendix I. These measures have been identified within ES Chapter 16: Traffic and Transport (document reference 6.16) to further reduce significant environmental effects based on amenity, fear and

intimidation, and severance where existing issues were identified through engagement with Local Highway Authorities.

2.9.11 These measures may be either temporary or permanent on a case-by-case basis and subject to agreement with the relevant Local Highway Authority, and Persons with Interest in Land (PILs). These measures will be secured through the Outline CTMP (document reference 7.3) with the Local Highway Authorities and include the following:

- Construction driver information pack to include identified hazard locations, such as areas with road safety concerns i.e. where pedestrians may be crossing the carriageway away from designated crossing point or within the carriageway or adjacent verge
- Restricting construction vehicles to outside of school pick-up/drop-off where a school is located directly on the PAR (Stowupland High School on PAR 16 – A1120 Church Road, and Margaretting Church of England Primary School on PAR 54 – B1002 Main Road)
- Maintenance of adjacent vegetation along footways and verges
- Warning signs of hazard ahead.

2.10 Working Hours

2.10.1 It is assumed that the core working hours for construction (as set out within Requirement 6 of the draft DCO (document reference 3.1)) would be:

- Monday to Friday: 07:00 – 19:00
- Saturdays, Sundays, Bank Holidays and other public holidays: 07:00 – 17:00.

2.10.2 No percussive piling works would take place outside of the hours of 07:00 – 19:00 Monday to Friday and 07:00 to 17:00 on Saturdays.

2.10.3 Unless otherwise agreed with the local highway authority, no HGV deliveries would be made to site outside of the hours of 07:00 to 19:00 Monday to Friday and 07:00 to 17:00 on Saturdays.

2.10.4 The following operations may take place outside the core working hours:

- Trenchless crossing operations including at landfalls and beneath highways, railway lines, woodlands, nature reserves, Sites of Special Scientific Interest or watercourses
- The installation and removal of conductors, pilot wires and associated protective netting (included but not limited to) across highways, railway lines or watercourses
- The jointing of underground cables
- The continuation of any work activity commenced during the core working hours to a point where they can securely and or safely be paused
- Any highway works requested by the highway authority to be undertaken on a Saturday or Sunday or outside the core working hours

- The testing or commissioning of any electrical plant installed as part of the authorised development including undertaking of any identified corrective activities
- The completion of works delayed or held up by severe weather conditions which disrupted or interrupted normal construction activities
- Activity necessary in the instance of an emergency where there is a risk to persons or property
- Security monitoring
- Non-intrusive surveys
- Intrusive surveys
- Oil processing of transformers or reactors in substation sites
- Delivery to the transmission works of abnormal indivisible loads and any highway works requested by the highway authority to be undertaken outside the core working hours
- Mechanical and electrical installation works within buildings once erected and enclosed.

2.10.5 The core working hours exclude:

- Start up and close down activities up to 1 hour either side of the core working hours.

2.10.6 The severe weather conditions referred to means any weather which prevents work from taking place during the core working hours by reason of physical incapacity (whether for reasons of visibility, ground conditions, power availability, site access or otherwise) or being contrary to safe working practices.

2.10.7 Furthermore, as identified in the Outline CTMP (document reference 7.3), where a PAR is located directly past a school, construction vehicles would travel outside the weekday drop-off/pick-up times. This applies to:

- Freeman Community Primary School (Stowupland) on PAR 16 – A1120 Church Road
- Margaretting Church of England Primary School (Margaretting) on PAR 54 – B1002 Main Road only

2.11 Night working

2.11.1 There is no intention for night working on the Project as standard. However, there would be occasions where night working is required, as set out in the operations that may take place outside of the core working hours above. There is also the potential for the trenchless crossing works to be undertaken at night. Parts of the trenchless crossing operations require continuous working to achieve completion of the crossing. Some road works may also need to be undertaken at night to reduce effects on local traffic. Construction Routeing Strategy

2.12 Terminology

2.12.1 The following terminology is used to describe construction routes, site accesses and compounds:

- **Strategic Road Network:** Comprises the motorway and trunk road network, managed by National Highways, as defined by the Department for Transport
- **Major Road Network:** Routes that form a middle tier of the country's busiest and most economically important Local Highway Authority 'A' roads, sitting between the national SRN and the rest of the local road network, as defined by the Department for Transport, and managed by the Local Highway Authorities. For the Project, the Local Highway Authorities are Thurrock Council, Essex, Suffolk and Norfolk County Councils
- **Local Road Network:** Comprising the local roads managed by relevant Local Highway Authorities
- **Site Access Point:** The location on a PAR where construction vehicles would transition between the LRN and haul roads/working areas
- **PARs:** Access routes designated for use by construction vehicles (typically for HGVs) to travel from the SRN/MRN to the SAP.
- **Secondary Access Routes (SARs):** Access routes which will be considered for specific movements of light vehicles (cars and vans) only moving between adjacent haul road sections, where the haul road is not continuous due to a river, main road, railway or other obstruction
- **Haul roads:** Temporary roads provided outside of the existing public highway. These routes will be managed by National Grid and link the SAPs to the working areas
- **Access tracks:** Temporary access to a smaller scale, isolated works area, typically provided for erection of scaffold and netting at locations the overhead line crosses features such as roads and railways
- **Crossover points:** Locations where haul roads cross the public highway, but are not proposed for construction HGVs to transition to or from the public highway (except in emergency situations)
- **Site compounds:** The proposed locations provided for the overhead line, underground cabling, CSE compounds and substations, and temporary construction compounds

2.13 Primary Access Routes and Haul Roads

2.13.1 Construction traffic would use the SRN and MRN to access the region. From the MRN (and SRN) construction traffic would be routed along a PAR to the SAPs. From the SAPs, traffic would be routed off the public highway along temporary haul roads to access the construction sites. Figure 1: Traffic and Transport Study Area in Appendix I shows the PARs against the Project alignment.

2.13.2 A PAR has been identified for each SAP connecting to each section of haul road. Additional PARs are proposed for longer sections of continuous haul road where appropriate roads for designation as a PAR have been identified.

- 2.13.3 Generally, PARs are proposed to access each end of a haul road section, allowing construction traffic to enter the haul road at one end, travel along the haul road and exit the other end (if required). Dead-end haul roads have been avoided as far as practicable. However, due to site specific constraints, there are some instances of dead end haul roads with only one PAR.
- 2.13.4 In discussions with Local Highway Authorities, a list of highway schemes that are planned on PARs and the associated MRN/SRN have been provided in the Indicative highway mitigation plans in Appendix C of the Outline CTMP (document reference 7.3) and are subject to change.
- 2.13.5 A number of haul roads are proposed to be provided serving the proposed transmission alignment and associated works.
- 2.13.6 The haul roads are proposed to be used for construction movements and would generally be removed once the construction phase has been completed.
- 2.13.7 Haul roads may consist of existing access tracks where suitable, use temporary trackway matting to protect the soil, or involve construction of a temporary road. Temporary bridges would also be required as part of the haul roads.
- 2.13.8 For overhead line construction, the haul roads would be typically 6 m wide, with passing places (widening to 8 m) provided at typical intervals of 200 m. The frequency of passing places would be determined by site-specific conditions at the detailed design stage and the forward visibility along the haul roads.
- 2.13.9 For the construction of underground cables, CSE compounds and substations, the haul roads would be typically 8 m wide to allow for the delivery and movement of larger equipment using AIL vehicles. Therefore, passing places are not required as the road width should be sufficient for two-way HGV movement.
- 2.13.10 In some locations, overhead line construction corridors would require access from the underground cabling alignment corridors. In these locations, a haul road may be constructed adjacent and parallel to the underground cabling construction corridor to access the overhead lines. This would be provided to separate the overhead line construction vehicle movements from the works associated with the underground cable corridor construction. At Fairstead, the overhead line construction corridor would be used to access the underground cable alignment.
- 2.13.11 The haul road arrangement is considered to present a favourable solution for access as it offers the following benefits:
- Haul roads enable materials and the workforce to be moved along the overhead lines and underground cabling construction corridor minimising the use of public highways, avoiding (where practicable) sensitive areas such as villages, schools and minor roads
 - The strategy reduces the number of construction related vehicles impacting the public highway network in the vicinity of the construction corridor
 - The strategy reduces the total number of construction routes (PARs) from the MRN to the construction corridor, and hence the number of local, rural roads impacted by the Project
 - The strategy reduces the number of SAP on the public highway network, and therefore temporary junctions with the public highway

- Longer haul roads enable a high percentage of construction traffic to be routed to the site predominantly via 'A' and 'B' roads, with reduced distances travelled via local, rural roads
- The haul roads reduce journey distances for site staff travelling between construction areas, accommodation, and temporary construction compounds.

2.13.12 An access appraisal to the EACN Substation has been undertaken. The following preference for access has been determined:

- The North Falls and Five Estuaries wind farms are proposed to be located adjacent to the proposed EACN Substation. There is an opportunity through a collaboration agreement to utilise the proposed haul road associated with the wind farm cable corridors between Bentley Road and Ardleigh Road to provide temporary construction access to the substation site
- The permanent operational (and maintenance) and AIL access route has been identified as via the A120 / Bentley Road junction and Ardleigh Road. This route will be the allocated construction route if the opportunity to collaborate with North Falls and Five Estuaries is not an option.

2.14 Site Access Points

- 2.14.1 Temporary SAPs would be provided. A SAP is where construction vehicles would leave the LRN and access the working area within the Order Limits. National Grid has identified temporary access points which make use of existing access points on the LRN where practicable. Some of these may need to be widened to create a bellmouth to safely accommodate construction vehicles. Others involve creating new temporary entrances where a current access point does not exist. The potential for SAPs to be made permanent as a legacy benefit has been considered within the siting of these facilities. Where deemed to be of potential benefit as a permanent facility, these would be promoted on a case-by-case basis and subject to agreement with the relevant Local Highway Authority and PILs. This would typically include, alongside other criteria, a requirement for the facility to meet the relevant permanent design standards once temporary traffic management associated with the Project has been removed.
- 2.14.2 SAPs have been assessed based on site specific constraints and highway safety considerations. The locations of the SAPs on the public highway are generally close to the underground cabling and overhead line construction corridors. The most suitable location for the proposed SAP, and access to the haul roads, has been determined with consideration of road geometry, maximising junction visibility and other site-specific constraints. Locations have, where appropriate, been chosen to minimise the impact on trees and hedgerows. Existing land/field accesses have been used where they are considered to be suitable locations as determined by the above assessment criteria. When forming SAPs, connectivity for active travel users (footways and cycleways) would be preserved, where safe and practicable.
- 2.14.3 The SAP layouts are designed to allow for two-way HGV movements to occur; that is, a HGV can enter the junction while a second HGV is waiting to exit the bellmouth.
- 2.14.4 SAPs have also been assessed through a swept path analysis for the largest vehicle associated with the haul road (i.e. a crane or alternative AIL). These vehicles require the full bellmouth area to make the manoeuvre. This (infrequent) operation will take place with the appropriate traffic management, which will be agreed with the

appropriate the relevant Local Highway Authorities and/or National Highways, in place.

- 2.14.5 Security fencing and gates are proposed for all SAPs to secure the works area, the construction corridor and haul roads. Security gates are to be set back a minimum of 20 m from the edge of the carriageway to allow for vehicles transitioning between the works area and public highway to stop outside of the gate while not impeding the public highway. A illustrative site access point layout including tracking of construction vehicles, visibility splays and fencing arrangements can be found in the Illustrative details drawings (document reference 2.6.3). In accordance with GG29 in the Outline CoCP (document reference 7.2), working areas will be appropriately fenced.
- 2.14.6 All SAPs can be constructed from the highway with temporary traffic management. When forming SAPs, the internal haul road does not need to be constructed before works commence.
- 2.14.7 All temporary and permanent SAPs have been designed in accordance with relevant highways standards and a Stage 1 Road Safety Audit undertaken on preliminary designs. A summary of all Road Safety Audits undertaken for the Project are provided within Appendix A.

2.15 Crossover Points

- 2.15.1 In addition to site access points, haul roads cross the public highway network at various locations. At major roads, the haul roads are discontinuous. On the LRN, an 'at grade'¹ crossing of the public highway is proposed. Construction traffic is proposed to use these 'crossover points' to cross the public highway. No HGV construction traffic is proposed to use these crossover points to access the haul road from the public highway under typical operation, and vice versa. SARs are being considered for specific movements for light vehicles moving between adjacent haul road.
- 2.15.2 The crossover points have been designed to allow for emergency vehicles to access the haul roads from the public highway. In emergency situations, access for most construction traffic will be possible at crossover points.
- 2.15.3 In the event that a haul road intersects a PRow, the management of vehicles and usage of gates will be followed as per the Outline Public Right of Way Management Plan (document reference 7.6)
- 2.15.4 In the event that a haul road is blocked due to unforeseen circumstances, resulting in a site location becoming inaccessible from a site access point, an alternative access would be facilitated from a suitable crossover point. The haul road would be reinstated as soon as reasonably practical.
- 2.15.5 At crossover points, construction traffic will 'give way' to the public highway traffic. At locations where temporary traffic signals are proposed, the impact of these traffic management measures will be monitored and managed, with priority given to the flow of traffic on the public highway.
- 2.15.6 Preliminary designs of the haul road crossover points have been designed in accordance with relevant highways standards and a Stage 1 Road Safety Audit

¹ 'At grade' means the crossing is at the same height as the public highway, with no bridges.

undertaken. A summary of all Road Safety Audits undertaken for the Project are provided within Appendix A.

2.16 Secondary Access Roads

- 2.16.1 SARs will be considered for specific movements of light vehicles (cars and vans) only moving between adjacent haul road sections, where the haul road is not continuous due to a river, main road, railway or other obstruction.

2.17 Contingency Routes

- 2.17.1 There may be circumstances, such as those listed below, where traffic movements on the road network are compromised, impacting the use of the agreed PARs and SAPs:
- A traffic or other similar incident on the highway network that disrupts the normal operation of the highway network or results in the closure of the highway network
 - A breakdown of an HGV enroute to the authorised access point
 - Work requested to be completed out of hours by a third party such as the relevant Local Highway Authority or Network Rail
 - Emergency health and safety incidents
 - Planned or emergency highway works.
- 2.17.2 In the event of any incident occurring which impacts on the safe and efficient operation of the road network, additional mitigation measures would be considered, which could include contingency routes. Contingency routes would be provided by pre-established traffic diversions and diversions as set out by National Highways, the relevant Local Highway Authorities and the police.
- 2.17.3 In addition, the Main Works Contractor(s) would utilise the website OneNetwork and liaise with National Highways or the relevant Local Highway Authority directly, to establish where pre-defined construction routes may be disrupted by other works or events. They would seek to establish alternative routes that, as far as practicable, are consistent with those set out above. Where required, the Main Works Contractor(s) would propose the estimated frequency of the use of the contingency routes and share information with the relevant Local Highway Authority.

2.18 Abnormal Loads

- 2.18.1 National Highways, the relevant Local Highway Authorities and police would be notified of all the AIL routes and appropriate forms would be completed for AIL routeing. It is anticipated that this and the relevant documentation and authorisation would be completed through the Electronic Service Delivery for Abnormal Loads (ESDAL) system. This includes notifications to stakeholders (relevant Local Highway Authorities, police and Network Rail) and advising of timings, routes and any asset protection measures appropriate to the type of road. When the response to each abnormal load movement order is received, the defined route agreed with stakeholders would be strictly followed. A detailed AIL Access Strategy is provided within Appendix A of the Outline CTMP (document reference 7.3).

- 2.18.2 The construction access and routeing strategy for this Project is set out in Outline CTMP (document reference 7.3) and aims to manage the impact of construction traffic on the LRN, MRN and SRN on sensitive receptors. The Outline CTMP (document reference 7.3) has been developed through engagement with the relevant Local Highway Authorities, and their highways teams and National Highways to understand and gain information on their local road networks. Restrictions to reduce impacts to other road users from construction traffic related to the Project have been identified. The appointed Main Works Contractor(s) would be responsible for implementing the measures outlined in the Outline CTMP (document reference 7.3) and complying with the subsequently agreed final CTMP.

2.19 Multi-modal Strategy

- 2.19.1 A multi-modal assessment has been undertaken to examine opportunities to use rail and water-borne transport modes to supply materials for the construction of the Project and reduce movements on the wider highway network. The aim of the assessment was to identify options to mitigate the number of long-distance trips travelled by commercial vehicles on the wider national road network, with delivery using more sustainable modes. Ports and railway sidings in the vicinity of the Project alignment were identified and sifted to determine options which would be suitable for use. Suitable sites were investigated further, and the existing operators engaged to determine a credible throughput in each location. These credible throughputs have been used to derive trip generation data for onwards movements by road in each location. Further details are provided within Section 6.19 and Appendix G.

2.20 Coordination with Other Developments/Events

- 2.20.1 Where construction works would take place at the same time as other developments such as North Falls Offshore Wind Farm, Five Estuaries Offshore Wind Farm and Lower Thames Crossing (LTC), National Grid will ensure liaison takes place between the Main Works Contractor(s), Local Highway Authority and National Highways. Additionally, this liaison with the Main Works Contractor(s) will occur with organisers of significant local events within the area of the Project such as the Tendring Show.

Construction Schedule

- 2.20.2 The TA is based on the construction schedule presented in ES Chapter 4 Project: Description (document reference 6.4).
- 2.20.3 Should consent be granted in 2027, it is anticipated that construction of the Project would commence in 2027, likely starting with pre-commencement works including site clearance activities, the installation of temporary construction compounds and access roads. It is expected the construction works would continue through to 2031 (four years). Prior to the pre-commencement works starting and before consent, a number of pre-construction environmental surveys would be undertaken in 2026.
- 2.20.4 Pre-commencement operations would be undertaken in advance of the main construction, prior to the approval of detailed requirements. The Outline CTMP (document reference 7.3) will be applicable to the pre-commencement works. Some of this is development work necessary to inform the detailed design and therefore needs to be carried out ahead of the design being completed and approved. Other non-development activities can be carried out in advance to prevent delay in

commencing development or to enable seasonally constrained activities to be completed in the correct season.

2.20.5 Pre-commencement operations include:

- Engineering investigations and surveys
- Environmental (including archaeological) investigations and monitoring
- Surveys and monitoring investigations associated with assessing ground conditions
- Diversion and laying of services, protection works comprising utilities protection works or fencing and protection slabs
- Site clearance
- Environmental mitigation measures
- Remediation associated with contamination or other adverse ground conditions
- Site set up works associated with the establishment of temporary construction compounds and temporary laydown areas
- Temporary accesses (including bellmouths)
- Erection of temporary enclosures or temporary demarcation fencing marking out site boundaries and the temporary display of site notices or advertisements.

2.20.6 This TA has therefore considered the Project trip generation and traffic impacts on each of the PARs, and other roads where appropriate, for the peak traffic year during construction. The peak year for each PAR would differ depending on the construction programme and level of activities.

2.21 Transport Assessment Study Area

2.21.1 The TA Study Area comprises:

- All roads along the PARs, to and from the Project SAPs up to where it connects to the SRN/MRN
- Wider road network (SRN/MRN) that might experience changes in traffic patterns resulting from the Project
- PRow and WCH routes that interact with the haul roads within the Order Limits and the PARs.

2.21.2 The Study Area was agreed with the relevant Local Highway Authorities and is shown on Figure 1: Traffic and Transport Study Area in Appendix I.

3. Key Planning Policy Context

3.1 Introduction

- 3.1.1 This chapter provides a high-level summary of the key relevant policy context relating to transport for the Project at the national, regional, and local levels. Further information regarding planning policy can be found in ES Chapter 2: Key Legislation and Planning Policy Context (document reference 6.2), the Planning Statement (document reference 5.6), and Policy Compliance Document (document reference 5.7).

3.2 National Planning Policy

3.3 National Policy Statements

- 3.3.1 ES Chapter 2: Key Legislation and Planning Policy Context (document reference 6.2) sets out the overarching policy relevant to the Project including the Overarching NPS EN-1 (DESNZ, 2024a) which is the key overarching policy relevant to the Project. This is supported by National Policy Statement for Electricity Networks Infrastructure (EN-5) (DESNZ, 2024b). The NPS sets out the basis under which an energy sector NSIP will be considered during the DCO application process. In particular, NPS EN-1 Section 5.14 discusses transport impacts and states that energy projects have the potential to have a variety of impacts on traffic and transport.

Overarching NPS for Energy (EN-1)

- 3.3.2 NPS EN-1 (DESNZ, 2024a) contains the following paragraphs relating to Traffic and Transport which have been considered within this TA.
- 3.3.3 NPS EN-1 Paragraph 5.14.1 states *‘The transport of materials, goods and personnel to and from a development during all project phases can have a variety of impacts on the surrounding transport infrastructure and potentially on connecting transport networks, for example through increased congestion. Impacts may include economic, social and environmental effects’.*
- 3.3.4 Paragraph 5.14.4 states *‘The consideration and mitigation of transport impacts is an essential part of Government’s wider policy objectives for sustainable development as set out in Section 2.6 of this NPS’.*
- 3.3.5 Paragraph 5.14.5 states *‘If a project is likely to have significant transport implications, the applicant’s ES (see Section 4.3) should include a transport appraisal’.*
- 3.3.6 Paragraph 5.14.6 states *‘National Highways and Highways Authorities are statutory consultees on NSIP applications including energy infrastructure where it is expected to affect the strategic road network and / or have an impact on the local road network. Applicants should consult with National Highways and Highways Authorities as appropriate on the assessment and mitigation to inform the application to be submitted’.*

- 3.3.7 Paragraph 5.14.7 states *‘The applicant should prepare a travel plan including demand management and monitoring measures to mitigate transport impacts. 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 transport network*
 - *improve user travel options by offering genuine modal choice’*
- 3.3.8 Paragraph 5.14.8 states: *‘The assessment should also consider any possible disruption to services and infrastructure (such as road, rail and airports).’*
- 3.3.9 Paragraph 5.14.11 states *‘Where mitigation is needed, possible demand management measures must be considered. This could include identifying opportunities to:*
- *Reduce the need to travel by consolidating trips*
 - *Locate development in areas already accessible by active travel and public transport*
 - *Provide opportunities for shared mobility*
 - *Re-mode by shifting travel to a sustainable mode that is more beneficial to the network*
 - *Retime travel outside of the known peak times*
 - *Reroute to use parts of the network that are less busy.’*
- 3.3.10 Paragraph 5.14.12 states *‘If feasible and operationally reasonable, such mitigation should be required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts. All stages of the project should support and encourage a modal shift of freight from road to more environmentally sustainable alternatives, such as rail, cargo bike, maritime and inland waterways, as well as making appropriate provision for and infrastructure needed to support the use of alternative fuels including charging for electric vehicles’.*
- 3.3.11 Paragraph 5.14.14 states that *‘the Secretary of State may attach requirements to a consent where there is likely to be substantial HGV traffic that:*
- *control numbers of HGV movements to and from the site in a specified period during its construction and possibly on the routing of such movements*
 - *make sufficient provision for HGV parking, and associated high quality drive facilities either on the site or at dedicated facilities elsewhere, to support driver welfare, avoid ‘overspill’ parking on public roads, prolonged queuing on approach roads and uncontrolled on-street HGV parking in normal operating conditions*
 - *ensure satisfactory arrangements for reasonably foreseeable abnormal disruption, in consultation with network providers and the responsible police force.’*
- 3.3.12 Paragraph 5.14.15 states that *‘the Secretary of State should have regard to the cost-effectiveness of demand management measures compared to new transport infrastructure, as well as the aim to secure more sustainable patterns of transport development when considering mitigation measures’.*

- 3.3.13 Paragraph 5.14.17 clarifies that *‘If an applicant suggests that the costs of meeting any obligations or requirements would make the proposal economically unviable this should not in itself justify the relaxation by the Secretary of State of any obligations or requirements needed to secure the mitigation.’*
- 3.3.14 Paragraph 5.14.21 states that *‘The Secretary of State should only consider refusing development on highways grounds if there would be an unacceptable impact on highway safety, residual cumulative impacts on the road network would be severe, or it does not show how consideration has been given to the provision of adequate active public or shared transport access and provision.’*

NPS for Electricity Networks Infrastructure (EN-5)

- 3.3.15 Section 2.5 of the NPS EN-5 (DESNZ, 2024b) is also relevant to this Project. Paragraph 2.5.1 states that *‘When planning and evaluating the proposed development’s contribution to environmental and biodiversity net gain, it will be important – for both the applicant and the Secretary of State – to supplement the generic guidance set out in EN-1 (Section 4.6) with recognition that the linear nature of electricity networks infrastructure can allow for excellent opportunities to:*
- *reconnect important habitats via green corridors, biodiversity stepping zones, and reestablishment of appropriate hedgerows; and/or*
 - *connect people to the environment, for instance via footpaths and cycleways constructed in tandem with environmental enhancements.’*

3.4 2025 Revisions to National Policy Statements

- 3.4.1 In April 2025, the government launched a consultation on proposed changes to EN-1 and EN-5 that ended on 29 May 2025. The consultation covers updates to:
- Draft: Overarching National Policy Statement for Energy (EN-1) (DESNZ, 2025a)
 - Draft: National Policy Statement for Electricity Networks Infrastructure (EN-5) (DESNZ, 2025b)
- 3.4.2 Changes consulted upon in the draft 2025 updates to the energy infrastructure NPSs include alignment with Clean Power 2030 targets and endorsement of the Centralised Strategic Network Plan. The 2025 revisions have strengthened the process for delivering major new infrastructure, reinforcing the government’s ambition to deliver clean power by 2030.
- 3.4.3 The transitional provisions on the status of the 2025 revisions say:
- ‘While the review is undertaken, the current suite of energy NPS remain relevant government policy and EN-1 to EN05 have effect for the purposes of the Planning Act 2008. The Secretary of State has decided that for any application accepted for examination before amending the energy NPSs, the current suite of energy NPS, published in 2024, should have effect. The amended energy NPSs will therefore only have effect in relation to those applications for development consent accepted for examination after the publication of the final amended energy NPSs. The amended energy NPSs will therefore only have effect in relation to those applications for development consent accepted for examination after the publication of the final amended energy NPSs. However, any emerging draft energy NPSs (or those amended but not having effect) are potentially capable of being important and*

relevant considerations in the decision-making process. The extent to which they are relevant is a matter for the relevant Secretary of State to consider within the framework of the Planning Act 2008 and with regard to the specific circumstances of each development consent order application.'

- 3.4.4 At the point of submission of the Project, the NPSs designated in January 2024 were government policy. The application for development consent is accompanied by this ES (document reference 6.1 to 6.18) which provides the final assessment of the likely significant effects, associated with the Project during its construction and operation (including maintenance), after the mitigation hierarchy has been applied. The ES was prepared in accordance with the relevant requirements of NPS EN-1 and EN-5 in force as of 1 April 2025.
- 3.4.5 The emerging draft of the Overarching NPS for Energy (EN-1) reinforces the approach taken in the ES. The draft revised EN-1 and EN-5 reiterate the government's commitment to the Clean Power Action Plan 2030, which aims for at least 95% of the UK's electricity generation to come from clean sources by 2030 and emphasises the urgency and critical national priority (CNP) of developing low-carbon infrastructure, thereby supporting the need case established in the ES.
- 3.4.6 The draft revised EN-1 and EN-5 maintain the assessment principles and generic impact considerations outlined in the current EN-1 and EN-5, ensuring continuity in evaluating environmental effects. They also introduce enhanced guidance on biodiversity, flood risk, and climate resilience and the mitigation hierarchy. The ES is considered to be in compliance with these emerging draft NPSs.
- 3.4.7 If the revised NPSs are designated prior to a decision being made on the application for development consent, the ES and Planning Statement would be reviewed for consistency with the newly-designated NPSs, and any additional requirements would be captured within an errata document post submission. It was confirmed in Section 51 advice received from the Planning Inspectorate that if the new NPSs are adopted after the application has been submitted, the Examining Authority can issue procedural decisions to ask all parties for views on the impacts of new NPSs.

3.5 Other National Legislation, Policy

- 3.5.1 Although the Project has been considered against National Policy stated above, the TA has also been undertaken in accordance with, and with reference to, the following national legislation and policy:
- Transport Act 2000
 - Highways Act 1980
 - National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2025) and accompanying Planning Practice Guidance

3.6 Regional and Local Planning Policy

- 3.6.1 ES Chapter 2: Key Legislation and Planning Policy Context (document reference 6.2) sets out relevant regional and local policy. Further key local strategies relevant to Traffic and Transport, that have informed this TA comprise:
- Local Transport Plan 4, 2021-2036 (Norfolk County Council, 2022a)

- The Greater Norwich Local Plan, 2018-2038 (Greater Norwich Development Partnership, 2024)
- Suffolk Local Transport Plan 2025-2040 (Suffolk County Council, 2024)
- Essex Transport Strategy: The Local Transport Plan for Essex (Essex County Council, 2011)
- Thurrock Transport Strategy 2013-2026 (Thurrock Council, 2013).

3.7 Guidance

3.7.1 This TA has been prepared with reference to the following guidance:

- Travel Plans, Transport Assessments and Statements (Department for Communities and Local Government, 2014)
- Transport Analysis Guidance (TAG), (Department for Transport, 2024)
- Road Safety Engineering Manual (Royal Society for the Prevention of Accidents (RoSPA), 2023)
- Design Manual for Roads and Bridges (DMRB) LA 104 Environmental Assessment and Monitoring (National Highways, 2020a)
- Environmental Assessment of Traffic and Movement ('Institute of Environmental Management and Assessment (IEMA) Guidelines') (IEMA, 2023)
- The Essex County Council Developers' Guide to Infrastructure Contributions (Essex County Council, 2024)
- Developers Guide to Infrastructure Contributions in Suffolk, currently in consultation (Suffolk County Council, April 2025)
- Department for Transport Circular 01/2022 - Strategic road network and the delivery of sustainable development (Department for Transport (DfT), 2022).

4. Existing Baseline Transport Conditions

4.1 Introduction

- 4.1.1 This chapter presents an overview of the traffic and transport baseline conditions which are referred to within ES Chapter 16: Traffic and Transport (document reference 6.16) in relation to the identified PARs and the LRN characteristics, existing traffic flows, sensitive receptors, personal injury collision data, bus and rail services, and road sensitivities.

4.2 Strategic Road Network

- 4.2.1 The SRN / MRN that provide access to the PARs are presented in Table 4.1.

Table 4.1 PARs – strategic road network / major road network

Project Section	Region	Road
Section A	Norfolk	A47 Norwich Southern Bypass
	Norfolk	A11 Wymondham Bypass
	Norfolk	A140 Ipswich Road
	Suffolk	A14
Section B	Norfolk	A47 Norwich Southern Bypass
	Norfolk / Suffolk	A140 Ipswich Road / Roman Road
	Suffolk	A14
	Suffolk	A143 Diss Road
Section C	Suffolk	A14
	Suffolk / Essex	A12 Ipswich Road
	Essex	A120
Section D	Suffolk	A14
	Essex	A12
	Essex	A120
Section E	Essex	A120
	Essex	A12
Section F	Essex	A12 Chelmsford Bypass
	Essex	A120
Section G	Essex	A12 Brentwood Bypass / Mountnessing Bypass
	Essex	A127 Southend Arterial Bypass
Section H	Essex	A127 Southend Arterial Bypass
	Thurrock	A13 Stanford-Le-Hope Bypass
	Thurrock	A1089 Dock Approach Road

- 4.2.2 Additionally, the SRN / MRN junctions that have been included in the assessment as agreed with the Local Highway Authorities and National Highways are presented in Table 4.2.

Table 4.2 SRN/ MRN junctions

Project Section	Region	Site No.	Road
Section A	Norfolk	Site 1	A47 Norwich Southern Bypass/ A140 Ipswich Road
		Site 2	A140 Ipswich Rd / Mangreen Lane
		Site 4	A140 Ipswich Rd / B1134 Station Road
		Site 5	A140 Ipswich Rd / A1066 Diss Road
		Site 12	A11 Thetford Bypass / A1066 Mundford Road
Section B	Suffolk	Site 16	A140 Ipswich Rd / A143 Old Bury Road
		Site 19	A143 / B1113 Finningham Road
		Site 21	A14 J50 Cedars Interchange
		Site 26	A14 J52 Claydon Roundabout
		Site 35	A140 Stoke Ash
Section C	Suffolk /Essex	Site 29	A14 J55 Copdock Interchange
		Site 33	A12 / B1070
		Site 36	A12 / Birchwood Road
		Site 39	A120 Harwick Road / Bentley Road
Section D	Essex	Site 38	A120 Ardleigh Crown Interchange
		Site 40	A12 Severalls Interchange
		Site 46	A12 Eight Ash Green Interchange
		Site 47	A120 Coggeshall Rd / Great Tey Road
Section E	Essex	Site 48	A120 Braintree Bypass / B1018 Braintree Road
		Site 56	A120 Braintree Bypass / A131 Great Notley Bypass
Section F	Essex	Site 62	A12 J15 Webbs Farm Interchange
Section G	Essex	Site 73	A127 Southend Arterial Rd / A176 Noak Hill Road
		Site 83	A127 Southend Arterial Rd / B148 West Mayne
		Site 84	A127 Southend Arterial Rd /A128 Tilbury Road
Section H	Thurrock	Site 85	A13 Stanford le Hope Bypass / A1013 Stanford Road / A128 Brentwood Road
		Site 89	A1089 Dock Approach Road / Thurrock Parkway (Asda Roundabout)
		Site 90	M25 J30

4.3 Baseline SRN / MRN Traffic Flows

- 4.3.1 The DfT 2023 traffic counts have been used to determine the existing baseline traffic flows on the SRN / MRN routes.
- 4.3.2 Manual classified turning counts were undertaken in October / November 2024 and in May 2025 on the junctions presented in Table 4.2 to identify peak hours.
- 4.3.3 Traffic survey locations on the SRN/MRN are shown on Figure 3: Traffic Counts and PRow User Survey Locations in Appendix I.

4.4 Personal Injury Collision Data

- 4.4.1 The latest three-year personal injury collision data (2021-2023) has been obtained from DfT Road Safety Data for the SRN / MRN for the PARs. Collisions are shown on Figure 4: Personal Injury Collision Data in Appendix I.
- 4.4.2 A collision cluster has been determined by the following assessment criteria outlined within ES Chapter 16: Traffic and Transport (document reference 6.16):
 - A location where six or more injury collisions have occurred within a junction or a 100 m section of road
 - A location with three or more fatal and/or serious collisions happening either within a junction or within a 100 m section of road.
- 4.4.3 The following collision clusters have been identified at SRN/MRN junctions that connect to PARs:
 - A14 J50 Cedars Interchange – A total of nine collisions have been recorded at this junction, two of which have been classified as serious in severity, and the remainder as slight in severity. On the A14 off-slip (eastern arm), three collisions were recorded: one of serious severity (recorded in 2021) and two of slight severity (recorded in 2023). All three collisions occurred on the approach to the junction where there is a notable bend in the road alignment
 - A14 J52 Claydon Roundabout – A total of eight collisions have been recorded at this junction, all of which were classified as slight in severity. On the A14 off-slip (southern arm), four collisions were recorded, all of slight severity (one collision occurred in 2021, and three in the year 2022). All four collisions occurred on the approach to the junction where there is a notable bend in the road alignment
 - A14 J55 Copdock Interchange – A total of 12 collisions have been recorded at this junction, all of which were classified as slight in severity. On the A1214 approach (PAR 22), three collisions of slight severity were recorded (two occurred in 2022, and one in the year 2023). All three collisions occurred on the approach to the junction where there is a notable bend in the road alignment
 - A12 J29 / A120 Ardleigh Crown Interchange – A total of six collisions have been recorded at this junction, of which one has been classified as serious in severity, and the remainder as slight in severity. These collisions were not concentrated at any one location
 - A12 J26 Eight Ash Green Interchange – A total of 11 collisions have been recorded at this junction, of which two have been classified as serious in severity, and the remainder as slight in severity. On the A12 on-slip (western arm), four

collisions were recorded, all of slight severity (three recorded in 2021, and one in the year 2023). Similarly, on the A12 on-slip (eastern arm), three collisions were recorded, all of slight severity (two recorded in 2022, and one in the year 2021). All seven collisions recorded on the A12 on-slip roads occurred on the approach to the junction where there is a notable bend

- A12 J25 Marks Tey Interchange – A total of eight collisions have been recorded at this junction, of which one has been classified as serious in severity, and the remainder as slight in severity. Two of these collisions involved non-motorised road users: one of these collisions involved a pedestrian casualty, and the other involved a cyclist casualty. Both collisions were recorded on the A120 on the section fronting Marks Tey Railway Station, at/or in close proximity to controlled crossing facilities
- A120 Galleys Corner Roundabout – A total of 24 collisions recorded at this junction. Three of these collisions were classified as serious, and the remaining 21 collisions were classified as slight in severity. None of these collisions involved pedestrians or cyclists. There is a notable collision pattern of nine collision on the circulatory/B1018 exit (PAR 41), two of which are serious in severity, and seven of which were classified as slight in severity
- A127 Southern Arterial Road / A176 Noak Hill Road Interchange – A total of seven collisions have been recorded at this junction, however they were not concentrated at any one location. Two of these collisions were classified as serious in severity, and the remainder were classified as slight in severity. One collision of serious severity involved a pedestrian casualty
- A127 Southern Arterial Road / A128 Tilbury Road Interchange – A total of six collisions have been recorded at this junction, however they were not concentrated at any one location. Two of these collisions were classified as serious in severity, and the remainder as slight in severity
- A13 Stanford-Le-Hope Bypass (Orsett Cock Roundabout) – A total of 13 collisions have been recorded at this junction, however they were not concentrated at any one location. Three of these collisions have been classified as serious in severity, and the remainder as slight in severity. One collision of slight severity involved a pedestrian casualty.

4.4.4 Further analysis has been undertaken to consider up to a five-year period for the SRN junctions as National Highways typically consider this length of time for personal injury collision data to better understand any causation factors. However, due to COVID-19, only data from 2019 (pre-COVID) has been considered, as 2020 data is likely to be impacted by the COVID-19 lockdown periods. This exercise has identified a further collision cluster based on the criteria stated in Paragraph 4.4.2.

- A47 Norwich Southern Bypass/ A140 Ipswich Road Interchange – A total of seven collisions have been recorded at this junction between 2019 and 2023 (excluding 2020), however they were not concentrated at any one location. One of these collisions has been classified as serious in severity, and the remainder as slight in severity. None of these collisions involved pedestrians or cyclists.

4.5 Local Road Network

4.5.1 The road links located on the LRN that are affected by the Project are listed in Table 4.3 and shown on Figure 1: Traffic and Transport Study Area in Appendix I.

Table 4.3 PARs - local road network

Project Section	Region	Road (PAR Reference Number)
Section A	Norfolk	A140 Ipswich Road (Link PAR 1)
	Norfolk	Mangreen Lane (Link PAR 2)
	Norfolk	Stansfield Road / Wymondham Road (Link PAR 3)
	Norfolk	B1113 (Link PAR 4)
	Norfolk	Wymondham Road (Link PAR 5)
	Norfolk	Fundenhall Road (Link PAR 6)
	Norfolk	B1134 Station Road / B1134 Long Row (Link PAR 7)
	Norfolk	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road (Link PAR 8)
	Norfolk	A1066 High Road / A1066 Low Road / A1066 Diss Road / A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road (Link PAR 9)
Section B	Suffolk	A143 Old Bury Road (Link PAR 10)
	Suffolk	Lion Road (Link PAR 11)
	Suffolk	B1113 Finningham Road / B1113 Walsham Road (Link PAR 12)
	Suffolk	Wickham Road (Link PAR 13)
	Suffolk	Eastland Lane (Link PAR 14)
	Suffolk	Thornham Road (Link PAR 15)
	Suffolk	A1120 Church Road / A1120 Bell's Lane (Link PAR 16)
	Suffolk	A1120 south of A14 J50 (Link PAR 17)
	Suffolk	Mill Lane (Link PAR 18)
	Suffolk	B1113 Needham Road / B1113 Stowmarket Road (Link PAR 19)
	Suffolk	B1113 Bramford Road / B1113 Loraine Way (Link PAR 20)
	Suffolk	Bullen Lane (Link PAR 21)
Section C	Suffolk	A1214 London Road (Link PAR 22)
	Suffolk	A1071 (Link PAR 23)

Project Section	Region	Road (PAR Reference Number)
	Suffolk	B1070 (A12 access) (Link PAR 24)
	Suffolk	B1070 Hadleigh Road (Link PAR 25)
	Essex	Ipswich Road (Link PAR 26)
	Essex	Birchwood Road (Link PAR 27)
	Essex	Wick Road / Grove Hill (Link PAR 28)
	Essex	Perry Lane (Link PAR 29)
	Essex	Bentley Road (Link PAR 30)
	Essex	Ardleigh Road / Little Bromley Road (Link PAR 31)
	Essex	Wick Lane (Link PAR 32)
	Essex	Old Ipswich Road (Link PAR 33)
	Essex	Turnpike Close (Link PAR 34)
Section D	Essex	A1341 Via Urbis Romanae (Link PAR 35)
	Essex	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway (Link PAR 36)
	Essex	A1124 Halsted Road (Link PAR 37)
	Essex	Mill Road (Link PAR 38)
	Essex	Great Tey Road (Link PAR 39)
Section E	Essex	A120 Colchester Road (Link PAR 40)
	Essex	B1018 Braintree Road / B1018 Witham Road (Link PAR 41)
	Essex	B1389 Hatfield Road (Link PAR 42)
	Essex	Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill (Link PAR 43)
	Essex	A131 Great Notley Bypass (Link PAR 44)
Section F	Essex	A131 Great Leighs Bypass / A131 Braintree Road (Link PAR 44)
	Essex	B1008 Essex Regiment Way (Link PAR 45)
	Essex	B1008 Braintree Road / B1008 Main Road (Link PAR 46)
	Essex	Chatham Hall Lane (Link PAR 47)
	Essex	Chelmsford Road (Link PAR 48)
	Essex	A414 Three Mile Hill / A1114 London Road (Link PAR 49)
	Essex	A1016 Waterhouse Lane / A1016 Rainsford Lane (Link PAR 50)

Project Section	Region	Road (PAR Reference Number)
	Essex	A1060 Rainsford Road / A1060 Roxwell Road (Link PAR 51)
	Essex	Vicarage Road (Link PAR 52)
	Essex	A414 Greenbury Way / A414 Ongar Road (Link PAR 53)
Section G	Essex	B1002 Main Road (Link PAR 54)
	Essex	Wantz Road (Link PAR 55)
	Essex	Ivy Barns Lane (Link PAR 56)
	Essex	Church Lane (Link PAR 57)
	Essex	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (Link PAR 58)
	Essex	A129 Sun Street / A129 London Road / A129 Rayleigh Road (Link PAR 59)
	Essex	Dunton Road / Brentwood Road (Link PAR 60)
	Essex	B148 West Mayne (Link PAR 61)
	Essex	Lower Dunton Road (Link PAR 62)
Section H	Thurrock	A128 Brentwood Road (Link PAR 63)
	Thurrock	A1013 Stanford Road (east of Orsett Cock Roundabout) (Link PAR 64)
	Thurrock	Buckingham Hill Road (Link PAR 65)
	Thurrock	Brentwood Road (Link PAR 66)
	Thurrock	A1013 Stanford Road (west of Orsett Cock Roundabout) (Link PAR 67)
	Thurrock	Heath Road (Link PAR 68)
	Thurrock	Chadwell Hill (Link PAR 69)
	Thurrock	Linford Road (Link PAR 70)
	Thurrock	Muckingford Road (Link PAR 71)

4.5.2 Additionally, the LRN junctions that have been included in the assessment are listed in Table 4.4 and shown on Figure 3: Traffic Counts and PRow User Survey Locations in Appendix I.

Table 4.4 LRN junctions

Project Section	Region	Site No.	Road
Section A	Norfolk	Site 3	B1113/ Wymondham Rd
		Site 6	A1066 Victoria Rd / B1077 Stunston Rd
		Site 7	A1066 Victoria Rd / Tesco access
		Site 8	A1066 Victoria Rd / Morrisons access
		Site 9	A1066 Park Rd / Denmark St
		Site 10	A1066 Park Rd / Denmark St
		Site 11	A1066 High Road / Old High Road
		Site 13	A1066 Mundford Road / Wyatt Way
		Site 14	A1066 Mundford Road / A1075 Norwich Road
		Site 15	A1066 Hurth Way / A1066 Thetford Road
Section B	Suffolk	Site 17	A143 Old Bury Rd / B1077 Stunston Rd
		Site 18	A143 Old Bury Rd / Lion Rd
		Site 20	B1113 Walsham Rd / Wickham Rd
		Site 22	A1120 Church Rd / B1115 Stowmarket Rd
		Site 23	A1120 Church Rd / Thorney Green
		Site 24	A1120 / Gun Cotton Way
		Site 25	A1120 / B1113 Needham Rd
		Site 27	B1113 Bramford Rd / Bramford Rd
		Site 28	B1113 Loraine Way / B1067 The Street
Section C	Suffolk	Site 30	A1214 London Rd / Scrivener Dr
		Site 31	A1214 London Rd / A1071
		Site 32	A1071 / B1113 Swan Hill
	Essex	Site 37	Wick Rd / St. Margaret's Cross
Section D	Essex	Site 41	A1341 Via Urbis Romanae / United Way
		Site 42	A1341 Via Urbis Romanae / Olympic Blv
		Site 43	A1341 Via Urbis Romanae / Whitmore Dr
		Site 44	A1341 Via Urbis Romanae / A134 Northern Approach Rd
		Site 45	A134 Northern Approach Rd / Boxted Rd
Section E	Essex	Site 49	B1018 Braintree Rd / Millenium Way
		Site 50	B1389 Hatfield Road / Spinks Lane
		Site 51	Spinks Ln / Highfields Rd
		Site 52	Highfields Rd / Guithavon Rd
		Site 53	Spa Rd / Highfields Rd
		Site 54	Spa Rd / Humber Rd
		Site 55	Spa Rd / Powers Hall End
		Site 57	A131 Great Notley Bypass / London Rd

Project Section	Region	Site No.	Road
Section F	Essex	Site 58	A131 Great Notley Bypass / Main Rd
		Site 59	A131 Braintree Rd/ B1008 Essex Regiment Way
		Site 60	B1008 Main Rd/ Chatham Hall Ln
		Site 61	B1008 Main Rd/ The Street / Chelmsford
		Site 63	A414 Three Mile Hill / A1114 London Rd
		Site 64	A1114 London Rd / A1016 Westway
		Site 65	A1016 Westway / Writtle Rd
		Site 66	A1016 Waterhouse Ln / Forest Dr
		Site 67	A1016 Waterhouse Ln / Beeches Rd
		Site 68	A1016 Waterhouse Ln / A1060 Rainsford Rd
		Site 69	A1060 Roxwell Rd / Lordship Rd
		Site 70	A1060 Rainsford Rd / Park Avenue
		Site 71	A414 Greenbury Way / Highwood Road
		Site 72	B1002 Main Rd / Wantz Rd
Section G	Essex	Site 74	A176 Noak Hill Rd / Wash Rd
		Site 75	A176 Noak Hill Rd / Church St
		Site 76	A176 Noak Hill Rd / Laindon Common Rd
		Site 77	A176 Noak Hill Rd / A176 Laindon Rd
		Site 78	A176 / A129 Southend Rd
		Site 79	A129 Southend Rd / A129 Sun St
		Site 80	A129 Sun St / A176 Laindon Rd
		Site 81	A129 London Rd / Western Rd
		Site 82	A129 London Rd / Mountessing Rd
Section H	Thurrock	Site 88	A1013 Stanford Road / Buckingham Hill Road

4.6 Baseline LRN Traffic Flows

- 4.6.1 The latest DfT traffic flow data for 2023 has been used where available.
- 4.6.2 Automatic traffic counts (ATC) and manual classified counts (MCC) were undertaken in October / November 2023 and in October / November 2024 during school term time on the road links forming the PARs where DfT traffic count data was not available.
- 4.6.3 Manual Classified Counts were undertaken in October / November 2024 during school term time at the junctions listed in Table 4.2 and Table 4.4.
- 4.6.4 Traffic survey site locations are shown on Figure 3: Traffic Counts and PRow User Survey Locations in Appendix I.
- 4.6.5 The baseline data from the traffic surveys indicated that the AM peak hour and the PM peak hour vary between the sites. The assessment presented in Chapter 7 of this

TA has considered these different peak hours to determine the traffic impacts from the Project.

4.7 Personal Injury Collision Data

- 4.7.1 Personal Injury Collision data has been obtained from DfT Road Safety Data for the roads along the PARs. The latest three-year personal injury collision data (2021-2023) has been summarised within Appendix A for all road links on the PARs and includes a summary of collisions involving pedestrian and cyclist casualties. The location of all collisions is shown on Figure 4: Personal Injury Collision Data in Appendix I.
- 4.7.2 Within the Study Area, a total of 161 collisions were reported on the road links forming the PARs over the three-year period 2021-2023. From these collisions 110 were classified as slight, 48 as serious and three as fatal.
- 4.7.3 From the collision data analysis, the following collision clusters have been identified along the PARs and connecting LRN junctions:
- PAR 9: A1066 – To the east of the junction with Brettenham Road, a total of three serious collisions were recorded within a 100 m stretch located on a bend in the carriageway. None of these collisions involved pedestrian or cyclists
 - PAR 36: A134 – A total of four collisions were recorded on the A134 / Boxted Road roundabout, however they were not concentrated at any one location. Three of these collisions were classified as serious in severity, and one as slight. Three of these collisions involved cyclists, of which two were serious in severity and one slight in severity
 - PAR 41: B1018 – To the south of the junction with Temple Lane, a cluster of three collisions have been recorded located on a bend in the carriageway. Two of these collisions was classified as serious in severity, and one was fatal. None of these collisions involved pedestrians or cyclists
 - A1016 Rainsford Lane / A1016 Parkway junction – A total of 12 collisions have been recorded at this junction, however they were not concentrated at any one location. Nine of these collisions have been classified as slight in severity, and the remainder as serious in severity.
- 4.7.4 In addition, the collision data has been analysed along the full length of the links to identify patterns in collision locations in order to establish any areas of safety concerns. The light conditions, weather conditions and road surface conditions for the personal injury collision data over the three-year period 2021–2023 is presented in Table A16.2.76 within ES Appendix 16.2: Traffic and Transport Baseline Conditions (document reference 6.16.A2).
- 4.7.5 An analysis of the collisions involving WCH indicates that, on the road links forming the PARs over the three-year period 2021–2023, there were 13 collisions recorded as involving pedestrians. From these collisions, seven were classified as slight and six as serious. There were five collisions recorded involving cyclists, with two of those being slight, two serious and one fatal.

4.7.6 A detailed analysis of the collisions involving WCH is described below:

Section A

- There is one serious collision involving pedestrians, registered in A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road (Link PAR 8). The data indicates that the pedestrian was on the footway or the verge in A1066 Victoria Road

Section B

- There is one serious collision involving pedestrians was recorded on A1120 Church Road / A1120 Bell's Lane (Link PAR 16). The data indicates that the pedestrian movement or location is unknown

Section C

- There is one serious collision involving cyclists recorded on Bentley Road (Link PAR 30), where the data indicates that the cyclist was hit by the car when overtaking

Section D

- There are two slight collisions involving pedestrians which occurred on A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway (Link PAR 36). The data indicates that in both cases the pedestrians were crossing the carriageway, one at the signalised pedestrian crossing located east of A134 Northern Approach Road / Boxted Road roundabout and the other in the middle of the carriageway under the A12

Section E

- A fatal collision involving a cyclist occurred at the B1018 Braintree Rd / B1018 Witham Rd (Link PAR 41). The data indicates that the cyclist was in the footway in B1018 Braintree Rd
- There is one slight collision involving a pedestrian on the B1018 Braintree Rd / B1018 Witham Rd (Link PAR 41) where the data indicates that the pedestrian was standing in carriageway, not crossing
- Two serious collisions involving pedestrians were recorded on Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill (Link PAR 43). The data indicates that in one of the collisions the pedestrian was crossing on the pedestrian crossing facility in the Adult Community Learning centre at Witham and in the other the pedestrian was standing in carriageway, not crossing

Section F

- One slight collision involving a cyclist on B1008 Braintree Road / B1008 Main Road (Link PAR 46) where further details are unknown

- One slight collision involving a cyclist was recorded on A414 Three Mile Hill / A1114 London Road (Link PAR 49) where the data indicates that the cyclist was hit by a car when overtaking
- Five collisions involved pedestrians, recorded on A1016 Waterhouse Lane / A1016 Rainsford Lane (Link PAR 50), of which one is serious and four are slight. At the signalised pedestrian crossing in A1016 Waterhouse Lane north of Forest Drive there one serious and one slight collision occurred where the movement of the pedestrian is unknown. In the uncontrolled crossing of A1016 Rainsford Lane north of Rainsford Lane there is one slight collision where the pedestrian was crossing. Additionally, there are two slight collisions recorded at the uncontrolled crossing of A1016 Waterhouse Lane south of Meteor Way, where the pedestrian was crossing or walking along the carriageway
- One serious collision involving a cyclist on A1060 Rainsford Road / A1060 Roxwell Road (Link PAR 51) where the data indicates that the cyclist was hit by an HGV when crossing in the vicinity of the Tower Gardens Car Park
- Two slight collisions involving cyclists were recorded at the junction of A127 Southend Arterial Road / B148 West Mayne. Both collisions occurred in the eastbound A127 offslip road and data indicates that in both cases a car entering the roundabout hit a cyclist riding in the roundabout.

4.7.7 The DfT Table RAS0302: Reported Road Collision and Casualty Numbers and Rates by Severity, Road Type (urban and rural) and Class, Great Britain, shows the following national collision rate per billion vehicle kilometres for 2023:

- Urban A roads: 389
- Urban Other roads: 362
- Rural A roads: 102
- Rural Other roads: 188.

4.7.8 The comparison of the road links forming the PARs with the collision rate of personal injury collisions (PIC) per annum (p.a.) per billion vehicle kilometres for the period 2021-2023 shows that there are 14 links with an annual collision rate higher than or similar to the national average, listed below:

- Lion Road (Link PAR 11), Wickham Road (Link PAR 13) and B1008 Essex Regiment Way (Link PAR 45) and Dunton Road / Brentwood Road (Link PAR 62) where the length of these road links is relatively short with 1 km or less which might distort the annual collision rate values
- Mill Lane (Link PAR 18), with two recorded collisions classified as slight. The total daily traffic is under 1,000 vehicles, which might distort the annual collision rate value
- A1071 (Link PAR 23), Bentley Road (Link PAR 30), A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway (Link PAR 36) and A1060 Rainsford Road / A1060 Roxwell Road (Link PAR 51) where the estimated number of total collisions considering a PIC p.a. per billion vehicle km equal to the national average for those roads is similar to the existing recorded collisions on these links
- A1066 High Road / A1066 Low Road / A1066 Diss Road / A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road (Link PAR 9),

A143 Old Bury Road (Link PAR 10) and A120 Colchester Road (Link PAR 40) where the collision rate is similar to the national average with a PIC p.a. per billion vehicle km respectively

- Old Ipswich Road (Link PAR 33), with two collisions recorded as slight and one recorded as serious
- Muckingford Road (Link PAR 71), with two collisions recorded as slight and two recorded as serious.

- 4.7.9 Therefore, most of the road links forming part of the PARs have a collision rate below or similar to the national collision rate per billion vehicle kilometres.
- 4.7.10 Where the collision rates exceed the national average, these can be influenced by various factors and should be interpreted with caution. For those road links where there is only one or two recorded collisions and the length of the section at the PAR is relatively short, there are no more collisions registered in the full length of the road link. These collisions do not suggest a significant pattern on those road links.
- 4.7.11 On Mill Lane, the low baseline traffic volume should be considered in relation to the number of collisions (two). These collisions do not suggest a significant pattern or a presence of a hotspot on this link and should be interpreted with caution.
- 4.7.12 On Old Ipswich Road and Muckingford Road the values are similar to the national average. On Old Ipswich Road two collisions occurred on the A12 southbound arm approaching Ardleigh Crown Interchange. For one of the collisions a car hit the car ahead when both were slowing or stopping, and in the other collision a motorcycle over 500cc was overtaking another vehicle. No specific collision patterns were identified based on conditions for both collisions.
- 4.7.13 On Muckingford Road, the collisions occurred in the section between Hoford Road and High House Lane with no lighting and all with good weather conditions. In two of the collisions the vehicles skidded with a dry road surface.

4.8 Existing Bus Network

- 4.8.1 The bus services that operate on the PARs are summarised in Appendix C, and bus stops are shown on Figure 1: Traffic and Transport Study Area in Appendix I. The roads with higher frequencies, e.g. where one or more buses an hour are operating on the PARs, are provided in Table 4.5.

Table 4.5 PARs – main bus routes

Project Section	Region	Road
Section A	Norfolk	A140 Ipswich Road (Link PAR 1)
	Norfolk	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road (Link PAR 8)
	Norfolk	A1066 High Road / A1066 Low Road / A1066 Diss Road / A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road (Link PAR 9)

Project Section	Region	Road
Section B	Suffolk	B1113 Needham Road / B1113 Stowmarket Road (Link PAR 19)
Section C	Suffolk	A1214 London Road (Link PAR 22)
	Suffolk	A1071 (Link PAR 23)
Section D	Essex	A1341 Via Urbis Romanae (Link PAR 35)
	Essex	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway (Link PAR 36)
	Essex	A1124 Halsted Road (Link PAR 37)
Section E	Essex	B1018 Braintree Road / B1018 Witham Road (Link PAR 41)
	Essex	B1389 Hatfield Road (Link PAR 42)
	Essex	Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill (Link PAR 43)
Section F	Essex	A131 Great Leighs Bypass / A131 Braintree Road (Link PAR 44)
	Essex	B1008 Essex Regiment Way (Link PAR 45)
	Essex	B1008 Braintree Road / B1008 Main Road (Link PAR 46)
	Essex	A414 Three Mile Hill / A1114 London Road (Link PAR 49)
	Essex	A1016 Waterhouse Lane / A1016 Rainsford Lane (Link PAR 50)
	Essex	A1060 Rainsford Road / A1060 Roxwell Road (Link PAR 51)
Section G	Essex	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (Link PAR 58)
	Essex	A129 Sun Street / A129 London Road / A129 Rayleigh Road (Link PAR 59)
Section H	Thurrock	A1013 Stanford Road (east of Orsett Cock Roundabout) (Link PAR 64)
	Thurrock	A1013 Stanford Road (west of Orsett Cock Roundabout) (Link PAR 67)

4.9 Walkers, Cyclists and Horse Riders

Public Rights of Way

- 4.9.1 There are a number of PRoW that interact with the Project within the Order Limits as shown on Figure 1: Traffic and Transport Study Area in Appendix I, and on the Access, Rights of Way and Public Rights of Navigation Plans (document reference 2.5).
- 4.9.2 The following long distance trails, recreational circular routes or Local Planning Authority promoted routes overlap with the Project:
- Angles Way is a 150 km long distance walking trail between Great Yarmouth and Thetford.
 - Gislingham Circular Route 1
 - Gislingham Circular Route 2
 - The Wimble Circular Walk
 - Mid Suffolk Footpath
 - Earl Stonham Circular Walks Gold Route
 - Needham Market to Stowmarket Gipping Valley River Path
 - St Edmund Way and Stour Valley Path, West of Stratford St Mary
 - Langham Circular Walk, west of Stratford St Mary
 - The Essex Way Walk, at Langham (West of Stratford St Mary)
 - The Essex Way Walk, at Great Horkesley
 - The Essex Way Walk, between Fordstreet and Mill House
 - The Essex Way Walk, between Coggeshall and East Goves
 - White Notley Circular Walk
 - The John Ray Walk, between Silver End and Rivenhall
 - The Essex Way Walk, between Fairstead and White Notley
 - The Essex Way Walk, between Great Leigh and Terling
 - Little Waltham and Broomfield Circular and Pleshey and Great Waltham loop
 - Little Waltham and Broomfield Circular
 - Saffron Trail
 - Pleshey and Great Waltham loop
 - The St Peter's Way Walk, between Mill Green and Margaretting.
- 4.9.3 PRoW usage data was collected in September / October 2024 to capture recreational use over a 12-hour period (07:00-19:00) during one weekday and for one weekend (Saturday or Sunday). However, it is understood that the number of users of the PRoW may be higher in the spring/summer months when the weather is more

favourable and daylight hours are greater. This has been considered within our impact assessment of users of the PRow.

- 4.9.4 A summary of the survey results is presented within Table 4.6 and survey locations are shown on Figure 3: Traffic Counts and PRow User Survey Locations in Appendix I. The overall use of the monitored PRow network during the weekday surveyed was low except for the Saffron Trail PRow Broomfield 1 where 92 users were recorded of which 70 were walkers and 22 were cyclists. On St Edmund Way and Stour Valley Path, West of Stratford St Mary PRow Langham 1 a higher number of users was also recorded with a total of 52 users of which 30 were horse-riders and 22 were walkers.
- 4.9.5 In general, an increase in the number of users was observed at the weekend, with Gislingham Circular Route 1 W-267/021/0 recording 94 walkers, and The Essex Way Walk, at Langham (West of Stratford St Mary) PRow Langham 43 recording 53 users of which 35 were walkers and 18 were horse-riders.

Table 4.6 PRow user surveys on long distance trails, recreational circular routes or Local Planning Authority promoted routes

PRow Ref. No.	Project Section	Region	Location	Weekday	Weekend
Roydon South Norfolk FP14	Section A	Norfolk	Angles Way Long Distance Trail, section Diss Mere to Redgrave B1113 at Roydon	Walkers: 1 Cyclists: 0 Horse-Riders: 0 Total: 1	Walkers: 17 Cyclists: 0 Horse-Riders: 0 Total: 17
W-267/021/0	Section B	Suffolk	Gislingham Circular Route 1	Walkers: 22 Cyclists: 0 Horse-Riders: 0 Total: 22	Walkers: 94 Cyclists: 0 Horse-Riders: 0 Total: 94
W-267/022/0	Section B	Suffolk	Gislingham Circular Route 1	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0	Walkers: 13 Cyclists: 0 Horse-Riders: 0 Total: 13
W-267/014/0	Section B	Suffolk	Gislingham Circular Route 2	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0	Walkers: 11 Cyclists: 0 Horse-Riders: 0 Total: 11
W-392/001/0	Section B	Suffolk	The Wimble Circular Walk	Walkers: 2 Cyclists: 0 Horse-Riders: 0 Total: 2	Walkers: 8 Cyclists: 0 Horse-Riders: 0 Total: 8
W-499/007/0	Section B	Suffolk	Mid Suffolk Footpath	Walkers: 0 Cyclists: 0	Walkers: 1 Cyclists: 0

PRoW Ref. No.	Project Section	Region	Location	Weekday	Weekend
				Horse-Riders: 1 Total: 1	Horse-Riders: 1 Total: 2
E-227/063/0	Section B	Suffolk	Earl Stonham Circular Walks Gold Route	Walkers: 6 Cyclists: 0 Horse-Riders: 0 Total: 6	Walkers: 24 Cyclists: 1 Horse-Riders: 0 Total: 25
E-227/062/0	Section B	Suffolk	Earl Stonham Circular Walks Gold Route	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0	Walkers: 3 Cyclists: 0 Horse-Riders: 0 Total: 3
W-209/023/0	Section B	Suffolk	Needham Market to Stowmarket Gipping Valley River Path	Walkers: 6 Cyclists: 0 Horse-Riders: 0 Total: 6	Walkers: 28 Cyclists: 0 Horse-Riders: 0 Total: 28
Langham 1	Section C	Essex	St Edmund Way and Stour Valley Path, West of Stratford St Mary	Walkers: 22 Cyclists: 0 Horse-Riders: 30 Total: 52	Walkers: 18 Cyclists: 0 Horse-Riders: 5 Total: 23
Langham 2	Section C	Essex	Langham Circular Walk, west of Stratford St Mary	Walkers: 3 Cyclists: 0 Horse-Riders: 4 Total: 7	Walkers: 22 Cyclists: 0 Horse-Riders: 2 Total: 24
Langham 3	Section C	Essex	Langham Circular Walk, west of Stratford St Mary	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0	Walkers: 2 Cyclists: 0 Horse-Riders: 2 Total: 4
Langham 43	Section C	Essex	The Essex Way Walk, at Langham (West of Stratford St Mary)	Walkers: 35 Cyclists: 0 Horse-Riders: 1 Total: 36	Walkers: 35 Cyclists: 0 Horse-Riders: 18 Total: 53
Great Horkesley 31	Section D	Essex	The Essex Way Walk, at Great Horkesley	Walkers: 14 Cyclists: 1 Horse-Riders: 0 Total: 15	Walkers: 26 Cyclists: 0 Horse-Riders: 0 Total: 26

PRoW Ref. No.	Project Section	Region	Location	Weekday	Weekend
Great Horkesley 32	Section D	Essex	The Essex Way Walk, at Great Horkesley	Walkers: 19 Cyclists: 0 Horse-Riders: 0 Total: 19	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0
Fordham 33	Section D	Essex	The Essex Way Walk, between Fordstreet and Mill House	Walkers: 25 Cyclists: 0 Horse-Riders: 0 Total: 25	Walkers: 2 Cyclists: 0 Horse-Riders: 0 Total: 2
Fordham 34	Section D	Essex	The Essex Way Walk, between Fordstreet and Mill House	Walkers: 2 Cyclists: 0 Horse-Riders: 0 Total: 2	Walkers: 9 Cyclists: 1 Horse-Riders: 0 Total: 10
Great Tey 42	Section D	Essex	The Essex Way Walk, between Coggeshall and East Goves	Walkers: 11 Cyclists: 0 Horse-Riders: 0 Total: 11	Walkers: 12 Cyclists: 0 Horse-Riders: 0 Total: 12
White Notley 15	Section E	Essex	White Notley Circular Walk	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0	Walkers: 7 Cyclists: 0 Horse-Riders: 0 Total: 7
Cressing 19	Section E	Essex	The John Ray Walk, between Silver End and Rivenhall	Walkers: 1 Cyclists: 0 Horse-Riders: 0 Total: 1	Walkers: 2 Cyclists: 0 Horse-Riders: 2 Total: 4
Great And Little Leighs 40	Section F	Essex	The Essex Way Walk, between Great Leigh and Terling	Walkers: 1 Cyclists: 1 Horse-Riders: 0 Total: 2	Walkers: 7 Cyclists: 0 Horse-Riders: 0 Total: 7
Great Waltham 76	Section F	Essex	Little Waltham and Broomfield Circular and Pleshey and Great Waltham loop	Walkers: 19 Cyclists: 0 Horse-Riders: 0 Total: 19	Walkers: 1 Cyclists: 0 Horse-Riders: 0 Total: 1
Great Waltham 74	Section F	Essex	Little Waltham and Broomfield Circular	Walkers: 5 Cyclists: 0 Horse-Riders: 0 Total: 5	Walkers: 11 Cyclists: 0 Horse-Riders: 0 Total: 11
Broomfield 1	Section F	Essex	Saffron Trail	Walkers: 70	Walkers: 40

PRoW Ref. No.	Project Section	Region	Location	Weekday	Weekend
				Cyclists: 22 Horse-Riders: 0 Total: 92	Cyclists: 1 Horse-Riders: 0 Total: 41
Broomfield 5	Section F	Essex	Pleshey and Great Waltham loop	Walkers: 14 Cyclists: 0 Horse-Riders: 2 Total: 16	Walkers: 5 Cyclists: 0 Horse-Riders: 0 Total: 5
Broomfield 9	Section F	Essex	Saffron Trail crossing	Walkers: 7 Cyclists: 0 Horse-Riders: 1 Total: 8	Walkers: 6 Cyclists: 0 Horse-Riders: 0 Total: 6
Margaretting 13	Section F	Essex	The St Peter's Way Walk, between Mill Green and Margaretting	Walkers: 3 Cyclists: 0 Horse-Riders: 0 Total: 3	Walkers: 11 Cyclists: 0 Horse-Riders: 0 Total: 11

- 4.9.6 Additional PRoW user surveys were undertaken in March 2025 at the request of the PRoW officers within Essex County Council and Thurrock Council. These sites were specifically selected at the request of Essex County Council and Thurrock Council through tailored engagement. Although these routes were not necessarily long distance trails or key recreational/circular routes, they were chosen as they were deemed to provide an insight into more types of users. Horse-riders and cyclists are considered more vulnerable users as they have fewer opportunities for alternative routes if temporary closures are required. Using the LRN as an alternative is not seen as a reasonable alternative for them, particularly when construction would affect the PRoW (byways and bridleways) for more than two weeks.
- 4.9.7 A summary of the survey results is presented in Table 4.7. The overall use of the monitored PRoW network during the weekday surveyed was low, with a maximum of 47 users recorded at Footpath 11 and Footpath 12, of which 45 were walkers and two were cyclists. Of the remaining 18 sites surveyed, five recorded between 25 and 33 users, whilst the rest recorded 13 users or below.
- 4.9.8 The overall use of the monitored PRoW network during the weekend surveyed was also low, with the exception of Footpath 11 and Footpath 12 which recorded 72 users, of which 71 were walkers and one was a cyclist. The remaining 18 sites surveyed recorded 28 users or less in the weekend, with nine sites recording 10 users or less. The equipment at two sites during the weekend were vandalised and unable to record any data, however, both sites recorded a relatively low number of users during the weekday.

Table 4.7 Additional surveyed PRowWs in Thurrock and Essex

PRow Ref. No.	Project Section	Region	Location	Weekday	Weekend
Ardleigh 2	Section C	Essex	Bridleway	Walkers: 30 Cyclists: 1 Horse-Riders: 0 Total: 31	Walkers: 7 Cyclists: 3 Horse-Riders: 1 Total: 11
Aldham 20	Section D	Essex	Bridleway	Walkers: 13 Cyclists: 0 Horse-Riders: 0 Total: 13	Walkers: 17 Cyclists: 0 Horse-Riders: 0 Total: 17
Feering 2	Section E	Essex	Bridleway	Walkers: 0 Cyclists: 0 Horse-Riders: 3 Total: 3	n/a (Vandalised equipment)
Kelvedon 10	Section E	Essex	Bridleway	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0
Rivenhall 11	Section E	Essex	Footpath	Walkers: 2 Cyclists: 0 Horse-Riders: 0 Total: 2	Walkers: 6 Cyclists: 0 Horse-Riders: 0 Total: 6
Writtle 13	Section F	Essex	Footpath	Walkers: 2 Cyclists: 0 Horse-Riders: 7 Total: 9	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0
Writtle 97	Section F	Essex	Byway	Walkers: 4 Cyclists: 2 Horse-Riders: 0 Total: 6	n/a (Vandalised equipment)
Ingatestone And Fryerning 43	Section G	Essex	Footpath	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0	Walkers: 4 Cyclists: 2 Horse-Riders: 0 Total: 6
Brentwood 96	Section G	Essex	Footpath	Walkers: 25 Cyclists: 0 Horse-Riders: 0 Total: 25	Walkers: 24 Cyclists: 0 Horse-Riders: 0 Total: 24

PRoW Ref. No.	Project Section	Region	Location	Weekday	Weekend
Brentwood 53	Section G	Essex	Bridleway	Walkers: 2 Cyclists: 0 Horse-Riders: 2 Total: 4	Walkers: 7 Cyclists: 3 Horse-Riders: 0 Total: 10
Little Burstead 17	Section G	Essex	Byway	Walkers: 0 Cyclists: 0 Horse-Riders: 4 Total: 4	Walkers: 14 Cyclists: 4 Horse-Riders: 5 Total: 23
Little Burstead 56	Section G	Essex	Byway	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0
Footpath 91	Section H	Thurrock	Footpath	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0
Footpath 84	Section H	Thurrock	Footpath	Walkers: 25 Cyclists: 0 Horse-Riders: 0 Total: 25	n/a ²
Footpath 81	Section H	Thurrock	Footpath	Walkers: 25 Cyclists: 0 Horse-Riders: 0 Total: 25	Walkers: 28 Cyclists: Horse-Riders: 0 Total: 28
Footpath 11 and Footpath 12	Section H	Thurrock	Footpath	Walkers: 45 Cyclists: 2 Horse-Riders: 0 Total: 47	Walkers: 71 Cyclists: 1 Horse-Riders: 0 Total: 72
Footpath 12 Saffron Bridge	Section H	Thurrock	Shared access road - Saffron Road to Stanford Road, crossing the A13 (connection Horndon and Stanford)	Walkers: 33 Cyclists: 0 Horse-Riders: 0 Total: 33	Walkers: 14 Cyclists: 1 Horse-Riders: 0 Total: 15

² Land owner permission not received

PRoW Ref. No.	Project Section	Region	Location	Weekday	Weekend
Hoford Road	Section H	Thurrock	Non-motorised road used by walkers and cyclists between Buckingham Hill Road and Muckingford Road	Walkers: 4 Cyclists: 0 Horse-Riders: 0 Total: 4	Walkers: 0 Cyclists: 0 Horse-Riders: 0 Total: 0
Bridleway 63	Section H	Thurrock	Bridleway	Walkers: 8 Cyclists: 0 Horse-Riders: 0 Total: 8	Walkers: 3 Cyclists: 3 Horse-Riders: 0 Total: 6

Open Access Land

- 4.9.9 The Countryside and Rights of Way Act 2000 (CRoW Act) gives a public right of access to land mapped as ‘open country’ (mountain, moor, heath and down) or registered common land. These areas are known as ‘open access land’.
- 4.9.10 Details on OAL (excluding roadside verges) can be found within the Outline PRoW Management Plan (document reference 7.6) and ES Chapter 15: Socio-economics, Recreation and Tourism (document reference 6.15), with Table 15.16: Recreational land within the Local Study Area identifying the sensitivity of each CRoW.
- 4.9.11 The affected areas of OAL are shown in the Open Access Land Plans (document reference 2.15) and as identified in Schedule 15.

Existing National Cycle Network (NCN) / Regional Cycle Network (RCN) Cycling Network

- 4.9.12 There are 11 national and regional cycle routes that are located on or cross PARs that would experience an increase in traffic during construction of the Project. These routes are shown on Figure 1: Traffic and Transport Study Area in Appendix I and comprise:
- NCN Route 30, on A1066 Victoria Road between Lower Rose Lane and Station Road, in a shared use path on both sides of the road
 - NCN Route 13 crosses the A1066 Mundford Road at Croxton Road, with an uncontrolled crossing and a segregated shared path on both sides of the approach to the crossing.
 - NCN Route 30, on a short section of A143 Old Bury Road with a segregated cycleway on the southern side of the A143 for cyclists after crossing
 - NCN Route 51, on B1113 Needham Road / B1113 Stowmarket Road between the A1120 and the site access, in a shared use path on the north verge
 - NCN Route 1, on Grovel Hill between Perry Lane and St. Margaret’s Cross, with no dedicated cycling infrastructure

- NCN Route 16, on Spa Road between Spinks Lane and Highfield Road, with no dedicated cycling infrastructure
- NCN Route 13, on A176 Noak Hill Road in the southern section between St. Agnes Road and Wash Road, with no dedicated cycling infrastructure
- NCN Route 13, on A176 Laindon Road between A129 London Road and School Road, with no dedicated cycling infrastructure
- RCN South Suffolk Route B, on B1070 between A12 and Sandspit Lane, with no dedicated cycling infrastructure
- Wolf Way, on A1214 London Road, in a dedicated shared use path for pedestrians and cyclists
- Cathedrals Cycle Route 15: St Edmundsbury Cathedral to Chelmsford Cathedral, on A12 between Hatfield Peverel and B1389 Hatfield Road (Witham) and between Rivenhall End and B1024 London Road (Kelvedon) and between A12 J24 and A12 J25 (Marks Tey interchange), in a dedicated shared use path for pedestrians and cyclists.

4.9.13 For those cycle routes where dedicated cycling infrastructure (e.g. cycle lanes) are not provided, baseline traffic flows from ATC surveys were reviewed with the number of users presented within Table 4.8. It can be seen that the number of existing cyclists along these roads is notably low.

Table 4.8 **Surveyed number of cyclists during peak hours**

Route	Road link	Baseline traffic AM Peak	Baseline traffic PM Peak	Daily Cycle Flow (Max weekday)*
NCN Route 1	Grove Hill	2	0	43 (2019)
NCN Route 16	Spa Road	0	2	6
NCN Route 13	A176 Noak Hill Road	3	1	65
	A176 Laindon Road	0	3	9
RCN South Suffolk Route B	B1070	2	0	21

**Based on the latest DfT raw manual data counts available*

Existing Cycling on the Highway Network

4.9.14 The number of cyclists using each of the junctions identified in Table 4.2 and Table 4.4 are reported in Table 4.9. It can be seen that the number of existing cyclists on these junctions are notably low. There are three junctions (two in Essex and one in Thurrock) where over 10 cycle trips were recorded during both peak hours, with the highest number recorded in Thurrock with 21 cycle trips during the PM peak at Site 89, A1089 Dock Approach Road / Thurrock Parkway roundabout in Thurrock.

Table 4.9 Surveyed number of cyclists at all junctions during peak hours

Region	Junction ID	Location	Baseline traffic AM Peak	Baseline traffic PM Peak
Norfolk	Site 1	A47 Norwich Southern Bypass/ A140 Ipswich Rd	0	1
	Site 2	A140 Ipswich Rd / Mangreen Lane	1	0
	Site 3	B1113/ Wymondham Rd	1	3
	Site 4	A140 Ipswich Rd / B1134 Station Road	0	0
	Site 5	A140 Ipswich Rd / A1066 Diss Road	0	0
	Site 6	A1066 Victoria Rd / B1077 Stunston Rd	1	2
	Site 7	A1066 Victoria Rd / Tesco access	3	0
	Site 8	A1066 Victoria Rd / Morrisons access	1	2
	Site 9	A1066 Park Rd / Denmark St	3	7
	Site 10	A1066 Park Rd / Denmark St	4	6
	Site 11	A1066 High Road / Old High Road	0	1
	Site 12	A11 Thetford Bypass / A1066 Mundford Road	0	0
	Site 13	A1066 Mundford Road / Wyatt Way	0	0
	Site 14	A1066 Mundford Road / A1075 Norwich Road	1	0
	Site 15	A1066 Hurth Way / A1066 Thetford Road	0	1
Suffolk	Site 16	A140 Ipswich Rd / A143 Old Bury Rd	0	0
	Site 17	A143 Old Bury Rd / B1077 Stunston Rd	2	4
	Site 18	A143 Old Bury Rd / Lion Rd	0	0
	Site 19	A143 / B1113 Finningham Rd	0	1
	Site 20	B1113 Walsham Rd / Wickham Rd	1	0
	Site 21	A14 J50 Cedars Interchange	0	0
	Site 22	A1120 Church Rd / B1115 Stowmarket Rd	0	1
	Site 23	A1120 Church Rd / Thorney Green	1	2
	Site 24	A1120 / Gun Cotton Way	0	0

Region	Junction ID	Location	Baseline traffic AM Peak	Baseline traffic PM Peak
	Site 25	A1120 / B1113 Needham Rd	2	4
	Site 26	A14 J52 Claydon Roundabout	2	2
	Site 27	B1113 Bramford Rd / Bramford Rd	3	3
	Site 28	B1113 Loraine Way / B1067 The Street	6	5
	Site 29	A14 J55 Copdock Interchange	0	0
	Site 30	A1214 London Rd / Scrivener Dr	0	0
	Site 31	A1214 London Rd / A1071	3	2
	Site 32	A1071 / B1113 Swan Hill	0	8
	Site 35	A140 Stoke Ash	1	0
Essex	Site 36	A12 / Birchwood Road	0	0
	Site 37	Wick Rd / St. Margaret's Cross	0	0
	Site 38	A120 Ardleigh Crown Interchange	0	0
	Site 39	A120 Harwick Road / Bentley Road	0	0
	Site 40	A12 Severalls Interchange	1	1
	Site 41	Via Urbis Romanae / United Way	2	0
	Site 42	Via Urbis Romanae / Olympic Blv	0	0
	Site 43	Via Urbis Romanae / Whitmore Dr	0	0
	Site 44	Via Urbis Romanae / A134 Northern Approach Rd	1	1
	Site 45	A134 Northern Approach Rd / Boxted Rd	10	14
	Site 46	A12 Eight Ash Green Interchange	1	0
	Site 47	A120 Coggeshall Rd / Great Tey Rd	0	0
	Site 48	A120 Braintree Bypass / B1018 Braintree Rd	0	0
	Site 49	B1018 Braintree Rd / Millenium Way	0	4
	Site 50	B1389 Hatfield Road / Spinks Lane	7	4
	Site 51	Spinks Ln / Highfields Rd	0	3

Region	Junction ID	Location	Baseline traffic AM Peak	Baseline traffic PM Peak
	Site 52	Highfields Rd / Guithavon Rd	0	3
	Site 53	Spa Rd / Highfields Rd	0	2
	Site 54	Spa Rd / Humber Rd	0	0
	Site 55	Spa Rd / Powers Hall End	2	4
	Site 56	A120 Braintree Bypass / A131 Great Notley Bypass	1	2
	Site 57	A131 Great Notley Bypass / London Rd	1	1
	Site 58	A131 Great Notley Bypass / Main Rd	2	0
	Site 59	A131 Braintree Rd/ B1008 Essex Regiment Way	4	0
	Site 60	B1008 Main Rd/ Chatham Hall Ln	0	2
	Site 61	B1008 Main Rd/ The Street / Chelmsford	4	4
	Site 62	A12 J15 Webbs Farm Interchange	0	0
	Site 63	A414 Three Mile Hill / A1114 London Rd	2	0
	Site 64	A1114 London Rd / A1016 Westway	0	0
	Site 65	A1016 Westway / Writtle Rd	7	8
	Site 66	A1016 Waterhouse Ln / Forest Dr	0	5
	Site 67	A1016 Waterhouse Ln / Beeches Rd	5	7
	Site 68	A1016 Waterhouse Ln / A1060 Rainsford Rd	10	6
	Site 69	A1060 Roxwell Rd / Lordship Rd	5	3
	Site 70	A1060 Rainsford Rd / Park Avenue	12	18
	Site 71	A414 Greenbury Way / Highwood Road	0	3
	Site 72	B1002 Main Rd / Wantz Rd	1	0
	Site 73	A127 Southend Arterial Rd / A176 Noak Hill Rd	1	1
	Site 74	A176 Noak Hill Rd / Wash Rd	3	0
	Site 75	A176 Noak Hill Rd / Church St	2	1
	Site 76	A176 Noak Hill Rd / Laindon Common Rd	3	4

Region	Junction ID	Location	Baseline traffic AM Peak	Baseline traffic PM Peak
	Site 77	A176 Noak Hill Rd / A176 Laindon Rd	5	6
	Site 78	A176 / A129 Southend Rd	0	4
	Site 79	A129 Southend Rd / A129 Sun St	0	0
	Site 80	A129 Sun St / A176 Laindon Rd	4	3
	Site 81	A129 London Rd / Western Rd	1	6
	Site 82	A129 London Rd / Mountessing Rd	0	1
	Site 83	A127 Southend Arterial Rd / B148 West Mayne	3	3
	Site 84	A127 Southend Arterial Rd / A128 Tilbury Road	0	0
Thurrock	Site 85	A13 Stanford le Hope Bypass / A1013 Stanford Rd	1	1
	Site 88	A1013 Stanford Road / Buckingham Hill Road	5*	9*
	Site 89	A1089 Dock Approach Road / Thurrock Parkway	10*	21*
	Site 90	M25 J30	0*	0*

**Based on the latest DfT raw manual data counts available on site approach roads, 2022 or 2023.*

5. Future Baseline

5.1 Introduction

5.1.1 An assessment has been carried out to evaluate the projected changes to baseline conditions by 2027 to 2031, the period for Project construction activities with peak activities expected in 2028 and 2029. This analysis considers the anticipated growth in travel demand using TEMPro National Trip End Model (NTEM) dataset v7.2³, known committed developments on the LRN and SRN, and the impacts of planned interventions on the transport network.

5.2 Strategic Road Network / Major Road Network

- 5.2.1 The future baseline traffic on the SRN / MRN has been estimated applying appropriate growth factors derived from TEMPro NTEM dataset v7.2 with baseline year 2023 when the DfT traffic data is available. The TEMPro growth factors are summarised in Table 5.1.
- 5.2.2 The data was extracted for the four Local Highway Authorities as the routes to the PARs combine multiple different Middle Super Output Areas (MSOAs) and for rural trunk and principal roads. The factors have been extracted for an average weekday and indicate an average increase in traffic levels in the AM peak hour between 6-10% in Norfolk, between 4.7-7.2% in Suffolk, between 4.6-7.2% in Essex, and between 6.1-10.2% in Thurrock for the period 2023 to 2027-2031. In the PM peak hour, the average traffic increase is between 6.2-10.3% in Norfolk, between 4.8-7.4% in Suffolk, between 4.8-7.5% in Essex and between 6.4-10.8% in Thurrock for the period 2023 to 2027-2031.

Table 5.1 TEMPro (v7.2) – SRN/MRN growth factors

Time Period	Location	Road Type	2027	2028	2029	2030	2031
AM peak	Norfolk	Trunk	1.064	1.074	1.084	1.094	1.105
		Principal	1.056	1.066	1.075	1.084	1.094
	Suffolk	Trunk	1.050	1.057	1.063	1.070	1.077
		Principal	1.043	1.049	1.054	1.060	1.067
	Essex	Trunk	1.050	1.057	1.064	1.071	1.077
		Principal	1.042	1.049	1.055	1.061	1.067
	Thurrock	Trunk	1.065	1.076	1.086	1.097	1.107
		Principal	1.058	1.067	1.077	1.087	1.097

³ This version of TEMPro was requested by the Local Highway Authorities

Time Period	Location	Road Type	2027	2028	2029	2030	2031
PM peak	Norfolk	Trunk	1.065	1.076	1.086	1.097	1.108
		Principal	1.058	1.068	1.077	1.087	1.097
	Suffolk	Trunk	1.052	1.058	1.065	1.072	1.079
		Principal	1.044	1.050	1.056	1.062	1.069
	Essex	Trunk	1.051	1.059	1.066	1.073	1.080
		Principal	1.044	1.050	1.057	1.063	1.070
	Thurrock	Trunk	1.068	1.079	1.091	1.102	1.113
		Principal	1.061	1.071	1.081	1.092	1.103

5.3 Local Road Network

- 5.3.1 The future baseline traffic on the LRN has been estimated applying appropriate growth factors derived from TEMPro NTEM dataset v7.2 with baseline year 2024, as the base year when MCCs have been carried out. The TEMPro growth factors are summarised in Table 5.2.
- 5.3.2 The data was extracted for the four Local Highway Authorities as the routes combine multiple different MSOAs and for rural, urban and all type of roads. The factors have been extracted for an average weekday and indicate an average increase in traffic levels in the AM peak hour between 3.7-7.7% in Norfolk, between 2.7-5.3% in Suffolk, between 2.7-5.4% in Essex, and between 3.8-7.9% in Thurrock for the period 2024 to 2027-2031. In the PM peak hour, the average traffic increase is between 3.9-7.9% in Norfolk, between 2.8-5.5% in Suffolk, between 2.8-5.6% in Essex and between 4-8.4% in Thurrock for the period 2024 to 2027-2031.

Table 5.2 TEMPro (v7.2) – LRN growth factors

Time Period	Location	Road Type	2027	2028	2029	2030	2031
AM peak	Norfolk	Rural	1.038	1.048	1.057	1.067	1.077
		Urban	1.036	1.045	1.055	1.064	1.075
		All	1.037	1.047	1.057	1.066	1.077
	Suffolk	Rural	1.028	1.034	1.040	1.046	1.053
		Urban	1.026	1.032	1.038	1.044	1.051
		All	1.027	1.034	1.040	1.046	1.053
	Essex	Rural	1.028	1.034	1.041	1.047	1.054
		Urban	1.026	1.032	1.038	1.045	1.052
		All	1.027	1.034	1.040	1.047	1.054

Time Period	Location	Road Type	2027	2028	2029	2030	2031
PM peak	Thurrock	Rural	1.039	1.049	1.059	1.068	1.079
		Urban	1.037	1.047	1.056	1.066	1.077
		All	1.038	1.048	1.058	1.068	1.079
	Norfolk	Rural	1.039	1.049	1.059	1.069	1.079
		Urban	1.037	1.047	1.057	1.066	1.077
		All	1.039	1.049	1.059	1.069	1.079
	Suffolk	Rural	1.029	1.035	1.042	1.048	1.055
		Urban	1.027	1.033	1.039	1.045	1.053
		All	1.028	1.035	1.042	1.048	1.055
	Essex	Rural	1.029	1.036	1.042	1.049	1.057
		Urban	1.027	1.034	1.040	1.047	1.054
		All	1.028	1.035	1.042	1.049	1.056
	Thurrock	Rural	1.041	1.052	1.062	1.073	1.084
		Urban	1.039	1.049	1.060	1.070	1.082
		All	1.040	1.051	1.062	1.072	1.084

5.4 Committed Developments and Transport Schemes

- 5.4.1 Committed developments considered within this TA are set out within Appendix D and shown on Figure 5: Committed development in Appendix I as presented and discussed with the Local Highway Authorities. Against each development a commentary is provided as to whether it needs to be included within the assessment of traffic and transport as set out within Chapter 7.
- 5.4.2 The trip generation for all committed developments identified to be included within the TA is summarised in Appendix D, with a traffic flow against each of the links where publicly available data was obtained from the Local Planning Authority planning portals. Also included in Appendix D is a summary table identifying the committed development flows that are included in each of the SRN junctions assessed.
- 5.4.3 Detailed information on the construction, operation and decommissioning activities for some committed developments was found to be limited. Therefore, where data was not found a qualitative high-level assessment was deemed appropriate noting the potential for effects. The qualitative assessment involved:
- Describing overlapping effects: Use available information to describe potential combined impacts (e.g. additional traffic)
 - Highlighting uncertainty: Explaining limitations in data and explain how this may affect the assessment's conclusions

- Professional judgement: To identify key receptors and potential effects, even without detailed data.

5.5 Transport Schemes

- 5.5.1 Key transport schemes where construction programmes or operational scenarios are likely to overlap with the Project peak construction activities were identified and discussed with Local Highway Authorities. These are set out below.
- 5.5.2 **Chelmsford North East Bypass (CNEB)** (located on the A12 between Chelmsford and Marks Tey) is a consented 4.6 km single carriageway bypass between Beaulieu Parkway in Chelmsford and a new roundabout on the A131 at Chatham Green. The CNEB intersects with the Project Order Limits to the east of Chatham Green. The CNEB (shown on Image 5.1) develops a link between the A131 at Deres Bridge and the A12 J19 Boreham Interchange. The first phase of the CNEB (Section 1A) will connect Beaulieu Parkway in the south and the future Chelmsford Garden Community in the north and it is expected to commence in early 2025 and be finished by Spring 2026. It will provide access to the new Beaulieu Park Station, which is currently under construction and due to open in 2025, and junction 19 of the A12 at Boreham Interchange via the new Beaulieu Parkway Bridge. The remaining phases of the CNEB (Sections 1B and 2) will be carried out in the future subject to alternative funding being secured. The Transport Assessment Addendum for CNEB found that Section 1A of is expected to have a smaller impact on strategic traffic patterns than the full consented scheme. An increase of traffic is expected at Sheepcotes and Wheelers Hill Roundabouts (A131) that are not part of the PARs. For the sake of assessing future baseline, it has been assumed that Phase 1 has been constructed, however as a worst case the existing future baseline flows have not reflected the decrease in traffic anticipated by the scheme.
- 5.5.3 The **Long Stratton Bypass** involves the construction of a single-carriageway road that bypasses the town to the east. The bypass will begin at a new junction at Church Lane and rejoin the A140 near Oakside Farm. The bypass is expected to be completed in late 2025 and would not appear to impact the Project.
- 5.5.4 **A120/A133 new link road scheme**, inclusive of a grade separated dumbbell junction at the A120, with new accesses to an existing petrol station (Ardleigh South Services) and Colchester Waste Transfer Station; a new roundabout at the junction with the A133; and two intermediate roundabouts along the link road. Together with other associated works and landscaping. Development consents granted in 2021 with construction of the first phase to be completed in 2026 and baseline flows noted to increase at the A120 Ardleigh Crown Interchange.
- 5.5.5 Work on the **LTC** project, linking Essex and Kent, was expected to begin in 2024 and be completed by 2029. Development consent has been granted; however, it is understood that the programme now has a completion date of 2032. LTC construction activities would therefore overlap with the Project. Collaboration with LTC on alignment of construction programmes and trip numbers would continue to ensure the level of impact is mitigated through a combined approach.
- 5.5.6 These key transport schemes are set out within Appendix D and shown on Figure 5: Committed Development in Appendix I.

- 5.5.7 In addition to key transport schemes, the following planning applications propose changes to the local transport network and have been identified through discussion with the relevant Local Highway Authorities.
- 5.5.8 As part of the planning application **Proposed Residential Development Land off Braintree Road and Long Green Braintree, Essex Ref 18/00549/OUT**, granted in 2020, a new five-arm roundabout located south of the B1018 Braintree Road / Millenium Way roundabout has been proposed to access B1018 Braintree Road from the development site. The proposal includes the realignment of the main route of B1018 Braintree Road.
- 5.5.9 As part of the approval for the hybrid planning application for a healthcare campus and related amenities known as Colchester Northern Gateway South, Colchester Ref 190665, granted in December 2022, a requirement for the outline planning application includes the improvement of the existing Via Urbis Romanae / United Way roundabout into a signalised junction as well as junction improvements to A12 Junction 28. A proposal is provided as part of the planning application. The improvement plans are expected to be in place during the Project peak construction activity.
- 5.5.10 As part of the approval for the planning application for the **Land North of the A1071, Ipswich (Wolsey Grange) Ref DC/21/02671** granted in 2023, it is planned to convert the existing Swan Hill / A1071 / B1113 junction to a traffic signal controlled crossroad. Changes to the existing signalised A1214/A1071/Scrivener Drive signalised junction are also planned which includes carriageway widening to allow two lanes of traffic to turn right from the A1071 (Eastbound (EB)) to the A1214 (Southbound (SB)).
- 5.5.11 As part of the outline planning application for the **development of modern facilities to support Lotus' production requirements for the Land West of Hethel Ref 2023/2037**, approved with conditions in 2024, it is planned to provide highway access arrangements along B1135 Wymondham Road which includes a new roundabout.
- 5.5.12 As part of the Bloor Homes planning application for **Land East of Chadwell St Mary Ref 25/00333/SCO, Environmental Impact Assessment (EIA) required in 2025**, it is planned to locate a main access to the residential development site on Lindford Road and Brentwood Road.

5.6 Assessment of Committed Developments

- 5.6.1 Future baseline traffic flows with committed developments for all PARs are summarised in Appendix E. The net increase in traffic flows due to the construction of the Project has been identified.

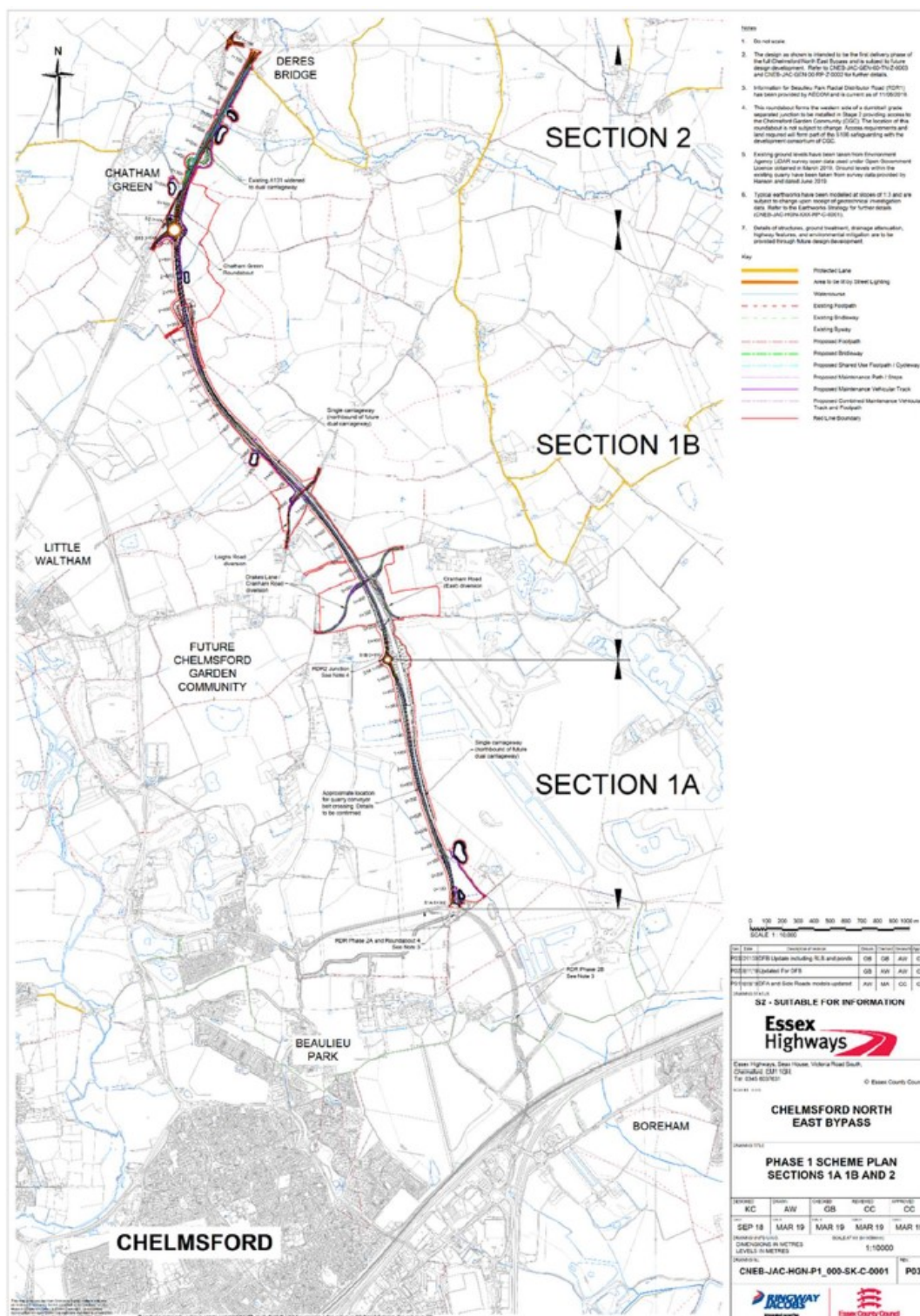
5.7 Bus Routes

- 5.7.1 No planned changes were identified to the bus network during engagement held with Local Highway Authorities, that could potentially impact the future baseline for the purposes of the assessment in this TA.

5.8 Walkers, Cyclists and Horse Riders

5.8.1 No planned changes were identified to the existing PRow and WCH network during engagement held with Local Highway Authorities and PRow officers that could potentially impact the future baseline for the purposes of the assessment in this TA.

Image 5.1 Alignment of the full CNEB scheme⁴



⁴ Source: Chelmsford North East Bypass Transport Assessment Addendum (CNEB-JAC-GE-P1_S1A-RP-TR-0001 | Final)

6. Methodology

6.1 Introduction

- 6.1.1 This chapter outlines the methodology followed in this TA to assess the temporary impact of the Project on the transport network during the construction phase. The TA guidance does not establish specific thresholds for assessment and the methodology here proposed is based on professional judgement and experience on similar projects.
- 6.1.2 The impact during operation and decommissioning phases has been scoped out in this TA as they are not expected to introduce significant changes to the traffic volumes and therefore their impact is typically negligible.
- 6.1.3 In addition to the main assessment which utilises a standard road-only approach, referred to as a 'road-only (strategy)', an additional multi-modal assessment has been undertaken to consider the use of more sustainable modes of transport to deliver materials to the Project. The multi-modal assessment is considered as a sensitivity test and the associated traffic generation, routeing and methodology is set out within Section 6.8.

6.2 Construction Traffic Generation and Routeing

6.3 Construction Vehicles Overview

- 6.3.1 A trip generation estimation has been undertaken to evaluate the daily two-way (one in and one out) traffic trips associated with construction activities for the overhead line, cables, substations, and CSE compounds. The estimation is based on a worst-case scenario, identifying peak-day vehicle movements for each construction activity to ensure a robust and conservative impact assessment. This approach highlights the maximum potential impact of the Project on each PAR during the construction period. The activities included in this assessment (not an exhaustive list), include:
- Bellmouth construction
 - Continuous haul road construction
 - Overhead line main and satellite compound construction
 - Pylon construction
 - Underground cabling
 - Underground cabling compound construction
 - Substations construction
 - CSE compounds construction
 - UK Power Networks (UKPN) diversion and other statutory undertakers.

- 6.3.2 The programme and order of construction activities has been determined through collaboration between all technical teams. In common with other NSIPs, the detailed construction programme will be subject to change from factors such as procurement, system access requirements (outages), resource and material availability, weather and ground conditions.
- 6.3.3 The Project would be constructed by multiple gangs working sequentially along the route, with activities at different PARs generally staggered over time. Consequently, the impacts identified for the worst-case day may occur in different months, reflecting the phased nature of the construction programme.
- 6.3.4 HGV movements would normally take place during the core working hours. Where required, vehicle movements for certain time critical activities (such as the joining of underground cables) may take place outside of the core working hours. It is anticipated that construction LGV/HGV vehicles would be scheduled to arrive throughout the core working hours. Should delivery of AILs be required outside of the core working hours (Section 3.3), prior notice for AIL movements will be given to the relevant Local Highway Authority 72 hours in advance before such traffic movements commence.
- 6.3.5 It is proposed that HGVs would not be permitted to arrive at site before 07:00 or depart after 19:00 (Monday to Friday) and arrive before 07:00 or depart after 17:00 (Saturday, Sunday and Bank Holidays). However, this would mean that HGVs could be travelling to or from the site outside of the working hours. Any HGVs which are projected to arrive on site prior to 07:00 would be required to park at an appropriate lorry park, services or other designated overnight parking location until they can complete their journey within appropriate restrictions. These locations would be agreed with the relevant Local Highway Authorities prior to the commencement of construction and would be communicated to drivers within their delivery instructions.
- 6.3.6 Where a PAR is located directly past Freeman Primary School (Stowupland) and Margaretting Church of England Primary School (Margaretting), construction vehicles will travel outside the weekday drop-off/pick-up times.
- 6.3.7 HGVs will not be permitted to travel through Diss during the road network peak hours, with 100% of HGV traffic to be routed via Thetford. Outside of peak hours, HGV traffic will be split 50/50 between Diss and Thetford, and LGV movements are expected to travel through Diss. AIL movements are anticipated to travel through Thetford.
- 6.3.8 It is anticipated that the HGV deliveries are to take place across the core working hours, with deliveries managed by the Main Works Contractor(s) to avoid concentration of movements in any particular hour, and provide a consistent level of movements throughout the core working hours. The timing of HGV deliveries would be monitored by the Main Works Contractor(s) and potential mitigation measures will be discussed with the relevant Local Highway Authority, where bunching of HGV deliveries is occurring over a prolonged period of time.
- 6.3.9 The number of HGV movements would be re-examined when the appointed Main Works Contractor(s) has sufficiently progressed its construction method and detailed programming of the works are sufficiently progressed.
- 6.3.10 It is proposed that the Main Works Contractor(s) implement a booking system to manage, where necessary and practicable, the spread of deliveries across the whole day to reduce the impact of HGV traffic during peak periods.

Vehicle Movements to Site

- 6.3.11 It is proposed that the Main Works Contractor(s) and National Grid prepare documentation to implement the strategies set out in Section 5.4 of the Outline CTMP (document reference 7.3) to manage construction related movements to and from site. This may include the following:
- Implement a delivery management system
 - Implement a Construction Employee Management Plan
 - Implement a Construction Logistics Plan.

6.4 Construction Staff Overview

- 6.4.1 Staff involved in the construction of the Project will hold a variety of different roles. There will be mobile gangs working on construction tasks across the Project, staff based at main and satellite temporary construction compounds and staff who are office-based elsewhere who may visit the site. Staff would access their work location via a series of PARs, as defined in the Outline CTMP (document reference 7.3).
- 6.4.2 The majority of the workforce would be split into mobile gangs, which would normally consist of between four and six employees. It is expected that there will be multiple gangs working on site at any one time, typically undertaking different elements of work in parallel at different locations. Construction is expected to occur in stages, with gangs starting work at a number of locations and then working their way along the proposed alignment.
- 6.4.3 Often, workers belonging to the same gang will chose to reside together during the week in either the same temporary accommodation or in close proximity to each other for ease. Therefore, it is anticipated that the mobile gangs will travel together to their relevant work site. In line with general working practices in the industry, overhead line gangs are expected to sign in at their allocated temporary construction compound first and to then travel on to their relevant work site, while cables and substation workers will travel directly to their work site.
- 6.4.4 The assessment of the impact on the road network has assumed different vehicle occupancies depending on the type of worker as follows:
- Office-based staff (National Grid and Main Works Contractor(s) staff) have an assumed vehicle occupancy of one
 - Overhead line construction workers to compounds have a vehicle occupancy of two, with the movement from compound to site having a vehicle occupancy of six (assumed to be a crew van vehicle).
 - Cables and substation construction staff have an assumed vehicle occupancy of two. Worker movements will be designed and managed around shift patterns and commuting times.
- 6.4.5 Where practicable, construction worker LGV vehicles would arrive before 07:00 and after 19:00 each day and outside the traditional peak periods (i.e., 08:00-09:00 and 17:00-18:00 Monday to Friday). It is assumed that office-based workers would work on site within the traditional hours (09:00-17:00), with vehicles travelling within the peak hours.

- 6.4.6 An Outline CWTP has been prepared as part of the DCO application and is contained within Appendix B of the Outline CTMP (document reference 7.3). The Outline CWTP would be developed into a final detailed CWTP by the Main Works Contractor(s) following the submission of the DCO application. The measures will be included within the final CWTP would be developed through consultation with the relevant Local Highway Authority and National Highways.
- 6.4.7 The Outline CWTP (Annex B of the Outline CTMP (document reference 7.3)) sets out the framework and principles proposed for the management of construction worker travel to mitigate potential impacts. The final CWTP would set out the management measures, procedures and best practices that would be implemented to manage and reduce the impact of construction worker travel on the local and strategic road networks during the construction phase.
- 6.4.8 The Outline CWTP (Annex B of the Outline CTMP (document reference 7.3)) sets out the indicative staff numbers, based on currently available construction programmes and trip estimates, anticipated during construction, and the primary objectives that would be followed by this plan as it is developed.
- 6.4.9 The overall objectives of the Outline CWTP are to:
- Reduce congestion and overall construction worker trips associated with the planned construction activity, especially in the peak construction periods
 - Enhance safety for all users involved in the construction phases and for people local to the working areas and access routes
- 6.4.10 Where practicable, reduce disruption to local communities and stakeholders.

Sustainable Travel Awareness

- 6.4.11 All construction staff will be made aware of the measures and initiatives that are detailed within the final CWTP, to help reduce the number of car borne trips and promote alternative sustainable modes of travel.
- 6.4.12 The final CWTP will aim to ensure all construction staff are aware of the advantages and potential to travel by more sustainable and environmentally friendly modes of transport, through raising awareness and the provision of information identifying travel options.
- 6.4.13 The TPC will monitor parking utilisation at the site reviewing the split between cars, vans and minibuses. The Main Works Contractor(s) will encourage its workers to travel to and from the site by the sustainable options provided in the final CWTP and targets will be developed.
- 6.4.14 The TPC will make Main Works Contractor(s) aware of the existence of the Travel Plan by providing them with an information pack. The information pack would be issued on appointment of their contract and would be included as part of induction onto the Project.
- 6.4.15 Parking management policies, including the enforcement procedure, are anticipated to be explained to members of staff during the induction process.
- 6.4.16 The information pack may include, though not be limited to, the following:
- A map showing the location of the Project in relation to the local area, highlighting nearby bus stops

- Bus and train journey planners/apps
- Information on car sharing principles, and process to sign up to car sharing
- A map showing local cycle routes
- Information on safety wear if travelling to site via active modes, including requirements for helmet, lights and high visibility jackets
- Information relating to traffic-related environmental concerns, congestion problems and car sharing to raise awareness.

6.4.17 It is anticipated that all staff will be actively encouraged to use public transport to access the site and will be informed of the limited parking available on site. Additionally, that they will be made aware of the local public transport provision through their welcome packs. Personal travel planning should also be offered

6.5 Visitor Travel

- 6.5.1 Dedicated visitor parking spaces are expected to be provided at all temporary construction compound locations. It is anticipated that these are clearly marked and monitored by the TPC to ensure these are not used by construction staff.
- 6.5.2 All visitors will be provided with information on public transport access to the site when arranging their visit.
- 6.5.3 When two or more visitors from the same company are due to attend the Project, they will be requested to car share where practicable.
- 6.5.4 All of the Applicant's staff will be encouraged to car share when visiting site.
- 6.5.5 When staff training at the facilities is being undertaken, it is proposed that groups of visitors will be brought to site by minibus or similar.

6.6 Trip Generation

- 6.6.1 The construction traffic generated by the Project construction phase has been compiled using a number of data sets for the underground cabling, substations and the overhead lines and includes:
- Utilising the construction programmes, broken down into individual activities, to understand when each activity would be generating construction trips
 - Connecting the appropriate PAR to each construction activity (shows which PARs would be impacted by each construction stage)
 - Assigning the worst-case daily (two way) trip numbers, to the applicable weeks, when the activity is undertaken, for each PAR, by vehicle types of HGVs, LGVs and AILs
 - The peak week per PAR has been calculated and therefore the peak week for PAR H01-A1 (for example) could be a different week than the peak week for vehicles using PAR H02-A1. This method has been adopted to reflect the differences in construction traffic, at each stage of the Project at each PAR and provide a more robust worst case for the impact assessment

- The resulting trip generation is a worst-case daily traffic flow, per PAR when Overhead Lines and underground cabling and substations (C&S) construction activities have been combined across the full programme for the Project.

6.6.2 An Outline CWTP (Annex B of the Outline CTMP (document reference 7.3)) has been prepared which encourages sustainable travel choices associated with all trips generated by the Project. However, for the purpose of the assessment a worst case has been used which assumes all trips would be completed by LGV, HGV or AIL. National Grid and the Main Works Contractor(s) will develop the Final CWTP following DCO with strategy and measures, subject to agreement with the Local Highway Authorities and National Highways.

6.7 Assumptions

- 6.7.1 The following assumptions have been made for each vehicle type to calculate the peak hour vehicle trips and are common with other Nationally Significant Infrastructure Projects. These will be monitored through the implementation of the CWTP and CTMP:
- Only Project/Office-based staff LGVs are to arrive within the AM peak hour; these LGVs would not leave until the PM peak hour
 - 8% of HGVs would arrive and depart within each peak hour (AM and PM)
 - 100% of AILs arrive and depart outside the peak hours
 - Construction workers would arrive before 07:00 and depart after 19:00
- 6.7.2 Summary of Construction Staff/Project Office-based staff Vehicle Movements
- 6.7.3 Based on the assumptions summarised above, Table 6.1 presents the estimated worst-case daily construction traffic for the peak week of each construction year, for two-way movements i.e. arrivals and departures.

Table 6.1 Total daily construction traffic for the peak week

Location	Total Construction	2027	2028	2029	2030	2031
Norfolk	Total daily peak construction staff LGV traffic (two-way movement)	422	386	168	326	168
	Total daily peak Project/office-based staff LGV traffic (two-way)	16	20	12	12	6
	Total daily peak additional LGV traffic (two-way)	268	266	132	272	138
	Total daily peak HGV traffic (two-way movements)	1,266	1,436	610	766	650
	Total daily peak traffic (two-way movements)	1,972	2,108	922	1,376	962

Location	Total Construction	2027	2028	2029	2030	2031
	Total (HGV/LGV) peak hour (two-way movements)	116	130	57	70	57
Suffolk	Total daily peak construction staff LGV traffic (two-way movement)	370	646	662	592	292
	Total daily peak Project/office-based staff LGV traffic (two-way)	180	348	312	216	98
	Total daily peak additional LGV traffic (two-way)	194	354	386	440	220
	Total daily peak HGV traffic (two-way movements)	406	1,656	1,318	1,524	1,134
	Total daily peak traffic (two-way movements)	1,150	3,004	2,678	2,772	1,744
	Total (HGV/LGV) peak hour (two-way movements)	128	312	266	273	144
Essex	Total daily peak construction staff LGV traffic (two-way movement)	920	1,300	634	1,226	812
	Total daily peak Project/office-based staff LGV traffic (two-way)	286	498	566	370	120
	Total daily peak additional LGV traffic (two-way)	528	760	296	936	600
	Total daily peak HGV traffic (two-way movements)	1,950	3,324	1,142	2,780	2,718
	Total daily peak traffic (two-way movements)	3,684	5,882	2,638	5,312	4,250
	Total (HGV/LGV) peak hour (two-way movements)	306	560	407	417	287
Thurrock	Total daily peak construction staff LGV traffic (two-way movement)	206	294	386	186	80
	Total daily peak Project/office-based staff LGV traffic (two-way)	44	164	120	78	0
	Total daily peak additional LGV traffic (two-way)	168	206	112	157	64
	Total daily peak HGV traffic (two-way movements)	572	586	164	684	232

Location	Total Construction	2027	2028	2029	2030	2031
	Total daily peak traffic (two-way movements)	990	1,250	782	1,105	376
	Total (HGV/LGV) peak hour (two-way movements)	70	131	85	96	19

6.8 Traffic Routeing

- 6.8.1 The construction traffic would use the SRN and MRN to access the construction areas as shown on Figure 1: Traffic and Transport Study Area in Appendix I. From the SRN / MRN construction vehicles would travel along the PARs up to the SAPs. From the SAPs, construction traffic would access the construction areas off the highway along the haul roads.
- 6.8.2 The haul roads are proposed to be constructed adjacent to the underground cable corridor or to provide a continuous access route between overhead lines pylons. The proposed haul roads are only discontinuous at major obstructions along the underground cable and overhead line corridor such as major roads, railways, areas of environmental or historical significance, and major watercourses. Each obstruction has been assessed on a case-by-case basis. The discontinuities are necessary to avoid disruption to critical infrastructure and to minimise environmental and heritage impacts.
- 6.8.3 The peak hourly construction traffic forecasts for the construction period 2027-2031 have been assigned to the PARs between the SRN / MRN and the SAPs.
- 6.8.4 A large quantity of stone would be required for the construction of the haul roads associated with the Project, sourced from quarries. The location of annual production (and reserve) of the quarries are identified in Oban (Scotland), two in Buxton (Peak District) and Mountsorrel (Leicester), suggesting that the main source of material would come from the north / north-west of the country. Further detail can be found in the Multi-Mode Transport Report within Appendix G. Considering the location of the quarries, the main routes of access along the SRN/MRN to the PARs have been identified. Where practicable, this material would be reused at other construction projects after completion of the Project. Opportunities to retain materials *in situ*, where specifically requested by landowners, would also be considered subject to any additional permission being obtained by the landowner. Other construction items such as works cabins and security fencing would be sourced from within the region (where practicable).

6.9 Construction Traffic Assessment Methodology

- 6.9.1 An assessment on the SRN/MRN and LRN has been carried out to estimate the percentage of traffic increase compared to the future baseline flows during the AM and PM peak hours for the road-only transport scenario using HGVs from quarries to the construction PARs. The assessment identifies the impact of committed development against the future baseline, and then the temporary impact the Project would have when combined with committed developments identified within Section 5.4.

- 6.9.2 The net and percentage increases in traffic volumes for each route were analysed to quantify the temporary impact of construction activities on the road network.

6.10 Junction Capacity

- 6.10.1 A preliminary junction capacity assessment has been carried out on those junctions defined in Table 4.2 and Table 4.4 on the future baseline traffic flows during the AM and PM peak hour with the Project. The assessment results for all 90 junctions are provided in Appendix F.
- 6.10.2 The preliminary junction capacity assessment was undertaken to establish whether there is a requirement to carry out a full assessment of the junctions with a traffic model. This preliminary assessment consisted in the estimation of the volume to capacity (V/C) ratio that defines the performance threshold that classifies the operational status of each arm of the junction:
- Free flow: $V/C < 0.70$
 - Approaching capacity: V/C between 0.70 and 0.85
 - At capacity: V/C between 0.85 and 1.00
 - Over capacity: $V/C > 1.00$.
- 6.10.3 If the junction V/C ratio was approaching capacity, at capacity or over capacity, a traffic model was required.
- 6.10.4 The preliminary assessment was conducted for priority junctions and roundabouts. However, it was assumed that traffic modelling was required by default for certain junction types. Consequently, a preliminary assessment was not carried out for these specific junctions:
- Signalised or partially signalised junctions
 - Mini-roundabouts
 - Grade separated roundabouts. A junction model was required to estimate if queues at the slip roads impact the mainline traffic
 - Dumbbell configuration roundabout.
- 6.10.5 The calculation of the V/C ratio for roundabouts was based on the formula defined in the DMRB CD 116 Geometric Design of Roundabouts Appendix B: Roundabout Capacity Formula (National Highways, 2023), that estimates the capacity of the roundabout entries. This formula depends on the entry and circulating flows and roundabout geometry parameters.
- 6.10.6 For priority junctions, the V/C ratio has been estimated based on gap acceptance that considers how drivers at minor or side roads accept gaps in traffic flows on major roads to execute manoeuvres such as entering, crossing, or merging into the major road. Default values for the critical gap and follow-up times are considered for each movement:
- Major right turn, critical gap of 4s and follow-up time of 2s
 - Minor left turn, critical gap of 6s and follow-up time of 3s
 - Minor ahead, critical gap of 6s and follow-up time of 4s
 - Minor right turn, critical gap of 7s and follow-up time of 4s.

6.11 Junction Modelling

6.11.1 Traffic modelling has been undertaken on those junctions connecting to or located along the PARs where the junction capacity assessment identified the need for traffic modelling. Of the initial long list of 87 junctions, 68 junctions were identified for further assessment. Table 6.2 and Table 6.3 provide a summary of these junctions, and the type of modelling package used.

Table 6.2 SRN / MRN junctions requiring traffic modelling

Project Section	Region	Site No.	Junction	Junction Type	Software Package
Section A	Norfolk	Site 1	A47 Norwich Southern Bypass/ A140 Ipswich Rd	Priority Roundabout	Junctions
	Norfolk	Site 12	A11 Thetford Bypass / A1066 Mundford Road	Priority Roundabout	Junctions
Section B	Suffolk	Site 16	A140 Ipswich Road / A143 Old Bury Road	Priority Roundabout	Junctions
	Suffolk	Site 21	A14 J50 Cedars Interchange	Priority Roundabout	Junctions
	Suffolk	Site 26	A14 J52 Claydon Roundabout	Roundabout	Junctions
	Suffolk	Site 35	A140 Stoke Ash	Priority crossroad	Junctions
Section C	Suffolk	Site 29	A14 J55 Copdock Interchange	Signalised roundabout	LinSig
	Essex	Site 36	A12 / Birchwood Road	Roundabout	Junctions
	Essex	Site 39	A120 Harwich Road / Bentley Road	Priority junction	Junctions
Section D	Essex	Site 38	A120 Ardleigh Crown Interchange	Partially Signalised Roundabout	LinSig
	Essex	Site 40	A12 Severalls Interchange	Priority Double Roundabout	Junctions
	Essex	Site 46	A12 Eight Ash Green Interchange	Signalised Roundabout	LinSig
	Essex	Site 47	A120 Coggeshall Road / Great Tey Road	Priority T-junction	Junctions
Section E	Essex	Site 48	A120 Braintree Bypass / B1018 Braintree Rd	Priority Roundabout	Junctions
	Essex	Site 56	A120 Braintree Bypass / A131 Great Notley Bypass	Priority Roundabout	Junctions

Project Section	Region	Site No.	Junction	Junction Type	Software Package
Section F	Essex	Site 62	A12 J15 Webbs Farm Interchange	Priority Roundabout	Junctions
Section G	Essex	Site 73	A127 Southend Arterial Rd / A176 Noak Hill Rd	Priority Roundabout	Junctions
	Essex	Site 83	A127 Southend Arterial Rd / B148 West Mayne	Priority Roundabout	Junctions
	Essex	Site 84	A127 Southend Arterial Rd / A128 Tilbury Road	Priority Roundabout	Junctions
Section H	Thurrock	Site 88	A13 Stanford le Hope Bypass / A1013 Stanford Rd (Orsett Cock roundabout)	Roundabout	VISSIM
	Thurrock	Site 89	A1089 Dock Approach Road / Thurrock Parkway (Asda Roundabout)	Roundabout	VISSIM
	Thurrock	Site 90	M25 J30	Signalised Roundabout	LinSig

Table 6.3 LRN junctions requiring traffic modelling

Project Section	Region	Site No.	Junction	Junction Type	Software Package
Section A	Norfolk	Site 2	A140 Ipswich Road / Mangreen Lane	Priority T-junction	Junctions
	Norfolk	Site 3	B1113/ Wymondham Road	Priority T-junction	Junctions
	Norfolk	Site 6	A1066 Victoria Road / B1077 Stunston Road	Priority T-junction	Junctions
	Norfolk	Site 7	A1066 Victoria Rd / Tesco access	Priority Roundabout	Junctions
	Norfolk	Site 8	A1066 Victoria Rd / Morrisons access	Priority Roundabout	Junctions
	Norfolk	Site 9	A1066 Park Rd / Denmark St	Roundabout	Junctions
	Norfolk	Site 10	A1066 Park Rd / Denmark St	Priority Crossroad	Junctions
	Norfolk	Site 13	A1066 Mundford Road / Wyatt Way	Priority Roundabout	Junctions
	Norfolk	Site 14	A1066 Mundford Road / A1075 Norwich Road	Priority Roundabout	Junctions
	Norfolk	Site 15	A1066 Hurth Way / A1066 Thetford Road	Priority Roundabout	Junctions

Project Section	Region	Site No.	Junction	Junction Type	Software Package
Section B	Suffolk	Site 17	A143 Old Bury Road / B1077 Stunston Road	Priority Roundabout	Junctions
	Suffolk	Site 18	A143 Old Bury Road / Lion Road	Priority T-junction	Junctions
	Suffolk	Site 22	A1120 Church Rd / B1115 Stowmarket Rd	Priority T-junction	Junctions
	Suffolk	Site 23	A1120 Church Road / Thorney Green	Priority T-junction	Junctions
	Suffolk	Site 24	A1120 / Gun Cotton Way	Priority Roundabout	Junctions
	Suffolk	Site 25	A1120 / B1113 Needham Rd	Signalised roundabout	LinSig
	Suffolk	Site 27	B1113 Bramford Rd / Bramford Rd	Partially signalised Junction	LinSig
Section C	Suffolk	Site 30	A1214 London Rd / Scrivener Dr	Partially Signalised Roundabout	LinSig
	Suffolk	Site 31	A1214 London Rd / A1071	Signalised T-Junction	LinSig
	Suffolk	Site 32	A1071 / B1113 Swan Hill	Priority Roundabout	Junctions
Section D	Essex	Site 41	A1341 Via Urbis Romanae / United Way	Priority Roundabout	Junctions
	Essex	Site 42	A1341 Via Urbis Romanae / Olympic Blv	Signalised Junction	LinSig
	Essex	Site 43	A1341 Via Urbis Romanae / Whitmore Dr	Signalised Junction	LinSig
	Essex	Site 44	A1341 Via Urbis Romanae / A134 Northern Approach Rd	Signalised Junction	LinSig
	Essex	Site 45	A134 Northern Approach Rd / Boxted Rd	Priority Roundabout	Junctions
Section E	Essex	Site 50	B1389 Hatfield Road / Spinks Lane	Signalised Crossroads	LinSig
	Essex	Site 52	Highfields Road / Guithavon Road	Priority T-junction	Junctions
Section F	Essex	Site 58	A131 Great Notley Bypass / Main Road	Priority Roundabout	Junctions
	Essex	Site 59	A131 Braintree Rd/ B1008 Essex Regiment Way	Priority Roundabout	Junctions

Project Section	Region	Site No.	Junction	Junction Type	Software Package
	Essex	Site 61	B1008 Main Road/ The Street / Chelmsford	Priority T-junction	Junctions
	Essex	Site 63	A414 Three Mile Hill / A1114 London Rd	Priority Roundabout	Junctions
	Essex	Site 64	A1114 London Rd / A1016 Westway	Roundabout	Junctions
	Essex	Site 65	A1016 Westway / Writtle Rd	Signalised Crossroads	LinSig
	Essex	Site 66	A1016 Waterhouse Ln / Forest Dr	Priority T-junction	Junctions
	Essex	Site 68	A1016 Waterhouse Ln / A1060 Rainsford Rd	Signalised	LinSig
	Essex	Site 69	A1060 Roxwell Rd / Lordship Rd	Priority Roundabout	Junctions
	Essex	Site 70	A1060 Rainsford Rd / Park Avenue	Signalised	LinSig
	Essex	Site 71	A414 Greenbury Way / Highwood Road	Roundabout	Junctions
	Essex	Site 74	A176 Noak Hill Road / Wash Road	Priority T-junction	Junctions
Section G	Essex	Site 75	A176 Noak Hill Road / Church St	Priority T-junction	Junctions
	Essex	Site 76	A176 Noak Hill Road / Laindon Common Road	Priority T-junction	Junctions
	Essex	Site 77	A176 Noak Hill Road / A176 Laindon Road	Priority Roundabout	Junctions
	Essex	Site 79	A129 Southend Road / A129 Sun St	Priority Roundabout	Junctions
	Essex	Site 81	A129 London Rd / Western Rd	Signalised Crossroads	LinSig
	Essex	Site 82	A129 London Rd / Mountnessing Rd	Priority T-junction	Junctions
Section H	Thurrock	Site 85	A1013 Stanford Road / Buckingham Hill Road	Signalised T-junction	LinSig

6.11.2 The aim of the junction modelling was to understand the temporary impact of the increase compared to future baseline traffic as a result of the Project and identifying whether this can either be managed due to the temporary nature of the disruption, or through some form of mitigation at the junction. The unsignalised junction assessment has considered the Ratio of Flow to Capacity (RFC), a measurement used to determine how busy an approach is at an unsignalised junction. An RFC of 0.85 or over indicates the junction is over its practical capacity, while an RFC of 1.0 or higher indicates it exceeds theoretical capacity. For signalised junctions a degree

of saturation (DoS) of under 90% is considered within practical capacity, between 90% and 100% the junction is considered to be over practical capacity, and anything over 100% is over theoretical capacity.

- 6.11.3 Practical capacity is the maximum flow a junction can handle under typical conditions, while theoretical capacity is the absolute maximum under ideal conditions.
- 6.11.4 The junctions consist of both priority-controlled and signal-controlled intersections. As such, the majority of junctions have been modelled in two different software packages, namely:
- Signalised junctions – ‘LinSig’ V3 software
 - Priority junctions – ‘Junctions’ V9/10 software.
- 6.11.5 The exception to the above consists of two particular locations where the LTC project holds one VISSIM model and one Junctions 10 model which have been used.
- 6.11.6 The following time periods were modelled, with each peak hour being identified locally for each junction:
- AM weekday peak hour 07:00-10:00 (all sites)
 - PM weekday peak hour 15:00-19:00 (all sites)
 - Saturday peak hour 09:00-19:00 (select sites only).
- 6.11.7 The following scenarios were modelled based on the existing highway layout:
- 2024 base year
 - Future Base year (TEMPro growth applied to the 2024 base year)
 - Future Base + Committed Development year
 - Future Base + Committed Development + Project worst case construction traffic
 - Future Base + Committed Development + 85th Percentile Project construction traffic (applicable to signalised junctions only).
- 6.11.8 Various construction traffic assessment scenarios were run as appropriate per junction, modelling the impact of peak hour construction traffic generated over different periods of time. These scenarios were:
- Peak (worst-case) – Shorter period with the greatest number of construction vehicles estimated
 - 85th percentile (longer period) – Longer impact on junction performance experienced more frequently with lower number of construction vehicles
 - Second Peak (longer period) – Recognised second peak over a longer period with lower number of construction vehicles
 - Sensitivity test (50% of worst-case peak traffic).
- 6.11.9 Image 6.1 and Image 6.2 below demonstrate the trip distribution in relation to the peak scenario, 85th percentile and second peak. The values presented in the trip distribution and modelling outputs are presented in Passenger Car Units (PCUs). This is a unit used to represent general traffic where vehicle types are assigned a conversion factor to the equivalent number of cars based on the amount of road space they take up.

Image 6.1 Peak and 85th percentile trip distribution demand profile

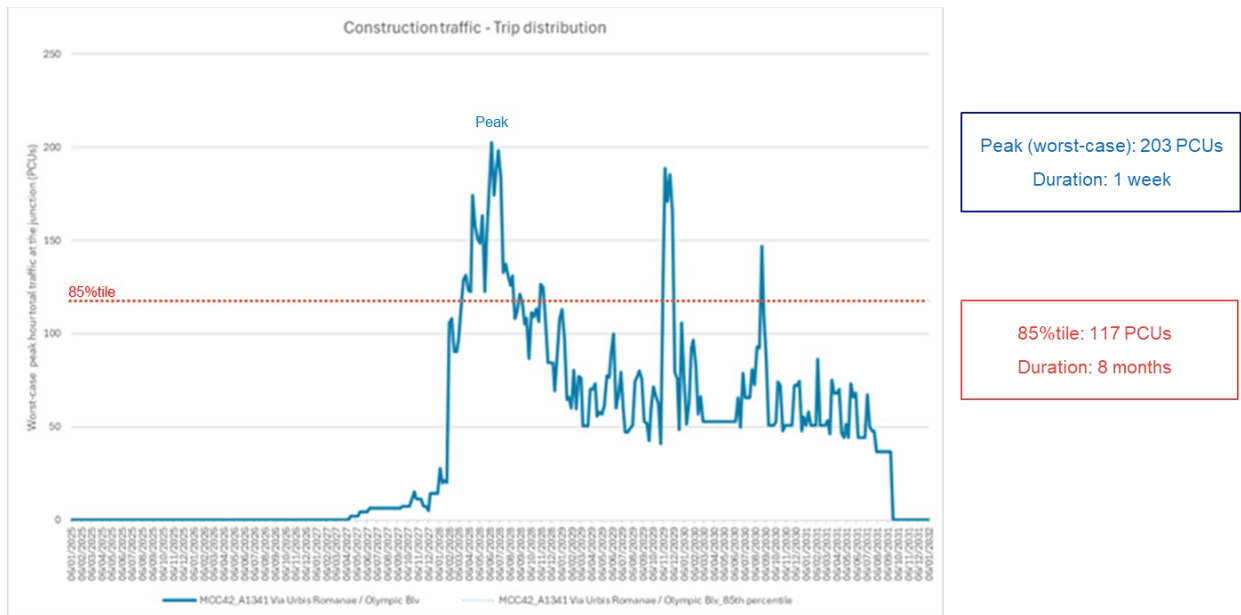
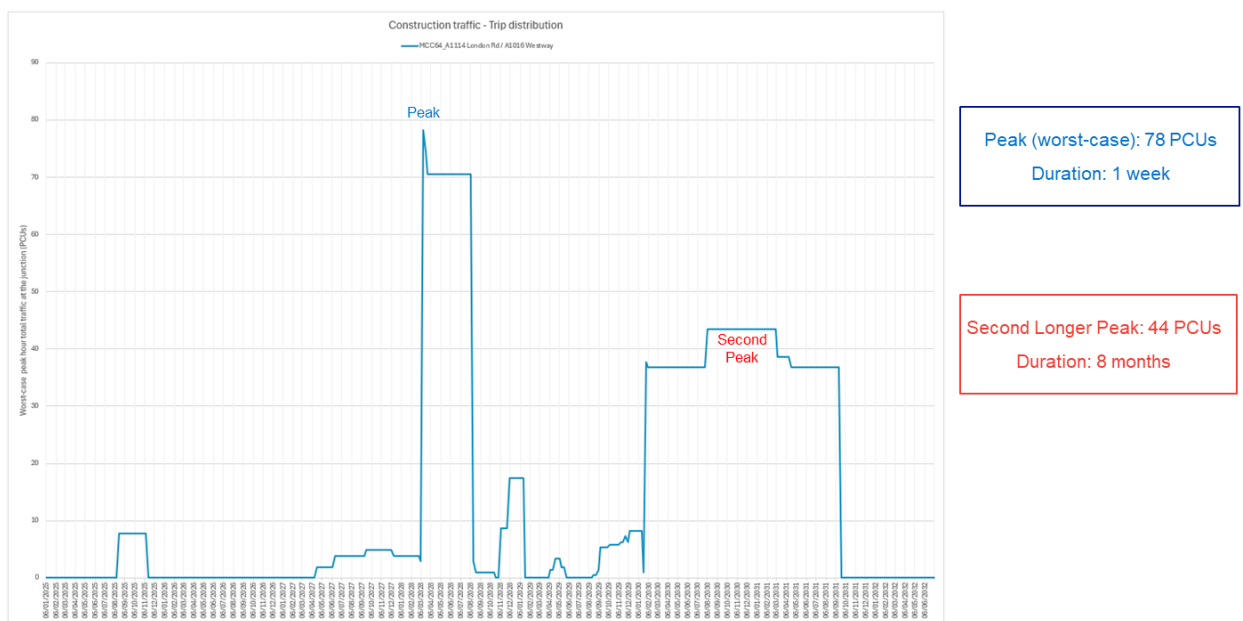


Image 6.2 Peak and second peak trip distribution demand profile



- 6.11.10 The 85th percentile assumes that most of the time the traffic generated by construction would be at or below this level. This helps to look at the demand level that is experienced more frequently and for a longer duration than the absolute peak (worst-case) and provides a more robust understanding of the longer impact on junction performance.
- 6.11.11 The 85th percentile helps to identify a demand level that is reached or exceeded by 15% for a short period of time, suggesting a more significant deviation from the norm due to construction activities. This allows for proactive mitigation for the period of construction that would be more representative of the user experience over a longer period.
- 6.11.12 Designing infrastructure or mitigation measures solely based on the absolute peak (worst-case) demand could lead to over-engineering and inefficient use of resources, especially if that peak is very short.

- 6.11.13 Using the 85th percentile and/or second peak allows for a more realistic comparison of the potential impacts and the effectiveness of any proposed mitigation measures. The 85th percentile is a statistically derived value and provides a more objective and defensible basis for analysis compared to arbitrarily choosing a high demand value.
- 6.11.14 Both the 85th percentile and worst-case scenarios of construction traffic were modelled for signalised junctions where capacity issues were identified.
- 6.11.15 The following validation criteria has been applied:
- For priority junction models, subject to queue length data or observations being available, modelled queues to be of similar order of magnitude to survey footage or publicly available information for the relevant approaches, as far as reasonably practicable.
 - For signalised LinSig models, degree of saturation for all links to be 100% or lower. Under-utilised green time and validation of modelled against observed degree of saturation has been undertaken for critical arms where video footage allows, as far as reasonably practicable.
 - The VISSIM model provided by LTC is assumed to be fit-for-purpose, and as such no new validation exercise has been undertaken.
- 6.11.16 In addition to using the collected MCC traffic surveys, the following information has been used for the modelling assessment as discussed with the Local Highway Authority and National Highways:
- Ordnance Survey or topographical survey data for the existing highway
 - For LinSig signalised junctions - traffic signals controller specification and layout drawing
 - For LinSig signalised junctions - on-street stage lengths, cycle times, number of times demand dependent stages called, stage sequences from the Local Highway Authority
 - AM and PM VISSIM models for the two identified locations, and associated files
 - Recent traffic data from relevant planning applications.

6.12 Traffic Surveys

- 6.12.1 A suite of traffic surveys were undertaken by Intelligent Data in Norfolk, Suffolk, Essex and Thurrock. The MCC surveys were conducted between October and November 2024.
- 6.12.2 Manual classified turning counts for sites 88 and 89 were collected separately by the LTC project and shared for use as part of this assessment.

6.13 Signal Data

- 6.13.1 Signal controller specification documents and as-built drawings were requested for each of the signalised junctions. This documentation was used to inform the phasing, staging, intergreens and other signal controller related inputs for the LinSig traffic modelling. This was done in conjunction with video observations of the on-site conditions where possible.

6.14 Potential Mitigation

- 6.14.1 Where the need for mitigation has been identified, the following scenarios have been modelled:
- ‘Future Base + Committed Development’ year (traffic growth plus committed development)
 - ‘Future Base + Committed Development + Project’ (traffic growth plus committed development plus Project construction flows).
- 6.14.2 Table 6.4 presents a hierarchy of proposed mitigation measures, based on the duration and impact on the junctions from construction traffic as determined from the assessment scenarios.

Table 6.4 Hierarchy of mitigation measures for traffic assessment

Aspect	Duration	Details	Objective	Action
Worst-case peak flows	1 week to 1 month	Short-lived peaks tested for severe impacts (e.g., queues affecting key junctions)	Identify severe impacts and key locations	Monitor and mitigate to maintain network integrity
Temporary impacts	≥ 3 months	Modelled 85 th percentile construction traffic demand or notable longer duration	Understand sustained worst-case impacts	Develop mitigation plans where required
Proportionate mitigation		Temporary impacts require proportional mitigation	Minimise disruption during temporary construction	Signal improvements, traffic monitoring, and moving specific construction vehicle movements outside of peak hours

- 6.14.3 Where junctions are near or over capacity in the future baseline, and future baseline with committed development scenarios, National Grid has adopted a proportionate approach given the Project construction traffic would generally have a minor incremental impact.
- 6.14.4 The choice of any mitigation has been driven by the temporary nature of the impact of the Project construction traffic and potential disruption that would be caused by the implementation of physical measures.
- 6.14.5 Mitigation has been proposed for a longer period than just the peak (worst-case) week for construction activity, which would be more representative of the user experience.

6.15 Collisions

- 6.15.1 A qualitative assessment of junctions where collision clusters have been identified or the roads that exceed the national collision rate per billion vehicle kilometres was

carried out to establish the potential temporary impact that the Project construction traffic would have on road traffic collisions. This assessment has been undertaken for roads forming the PARs and the connecting SRN/LRN junctions, the approach used as set out in ES Chapter 16: Traffic and Transport (document reference 6.16).

6.15.2 The collision criteria was defined in Section 4.2.

6.16 On-Street Parking

6.16.1 The assessment of the parking and loading impacts has been set out in ES Chapter 16: Traffic and Transport (document reference 6.16). The parking and loading impacts have been analysed on those road links forming the PARs where any formal or informal parking has been identified. The magnitude of impact has been defined based on the loss of more than four weeks in any 12-month period of one or more on-street loading bay, five or more on-street residential / business bays; five or more cycle / motorcycle spaces or 20 general parking spaces or equivalent length of unrestricted kerbside spaces.

6.17 Bus Network

6.17.1 The assessment of the public transport delay to passengers has been set out in ES Chapter 16: Traffic and Transport (document reference 6.16). The magnitude of the impact is based on the expected changes to bus services, bus stops or taxi facilities for over four weeks in any 12-month period during the construction period 2027 – 2031.

6.17.2 Additionally, the traffic increases on the road links in the PARs with more bus services operating have been assessed to determine if the magnitude of these increases would result in any significant impacts on the bus services using these roads. Each PAR has been assessed considering the change in total traffic or HGV flows of 30%, 60% and 90% as a result of the Project, which are considered to be minor, moderate and major changes in magnitude of impact, respectively.

6.18 Walkers, Cyclists and Horse Riders Network

6.18.1 The assessment of WCH impacts has been set out in ES Chapter 16: Traffic and Transport (document reference 6.16). This involved an assessment of the Project impacts on WCH delay, WCH severance, WCH amenity and fear and intimidation.

6.18.2 The following has been considered as part of the assessment:

- WCH journey length – This has considered the additional length added to journeys made by WCH as a result of the Project during construction (e.g. due to temporary PRow closures), and the expected duration of the impact
- WCH severance – This has considered Project impacts related to temporary changes in traffic flow on roads during construction, which could hinder WCH when crossing the road. Severance impacts on PRow are effectively covered in the WCH journey length assessment. Changes in total traffic flows of 30%, 60% and 90% are considered minor, moderate and major changes in magnitude of impact, respectively

- The WCH amenity has been analysed on the PARs and is defined as the relative pleasantness of a journey and is considered to be affected by traffic flow, traffic composition and footway width/separation from traffic and where a temporary increase is forecast of more than 30% in HGVs or total flow on a route intersecting a PRow, bridleway or near an equestrian centre for more than four weeks in any 12-month period. The pedestrian, cyclist and horse-rider amenity threshold, as set out in the IEMA Guidelines: Environmental Assessment of Traffic Movements (EATM) (2023) to assess the significance of change, is where the traffic flow is doubled (increase over 100%). Professional judgement has also been used to assess where the HGV flows are 30-60%, 60-90% and >90% (considered to have minor, moderate, and major impacts respectively).
- Fear and intimidation occur through a combination of traffic flow, speed, HGV composition and its proximity to people or lack of protection caused by factors such as narrow pavements. The assessment has been based on the sensitivity established for the WCH amenity and severance and a weighting system defined in the IEMA Guidelines Environmental Assessment of Traffic and Movement. This weighting system is based on the average hourly traffic flow, 18-hour heavy vehicle flow and average speed over an 18-hour day
- The WCH delays have been analysed for those PRow where it is expected a temporary maximum increase in journey length for more than four weeks in any 12-month period. The magnitude of impact considered for the pedestrian, cyclist and horse-rider delay depends on the journey length increase as defined in the (DMRB) LA 104 Environmental Assessment and Monitoring. An increase of more than 500 m is major, between 250 and 500 m is moderate, between 50 and 250 m is minor and under 50 m is negligible. The magnitude of the impact is adjusted based on the duration of the impact, if the temporary increase in journey length along a road or other PRow is less than four weeks in any 12-month period.
- The cycle routes located along the PARs affected by traffic increases due to construction activities have been assessed to determine whether the magnitude of these increases would result in any significant impacts on cyclists using these routes.

6.19 Multi-modal Assessment (Sensitivity Test)

- 6.19.1 Whilst the main assessment scenario described is the road-only strategy, in relation to the need to consider transport impacts, as set out within NPS EN-1 (DESNZ, 2024a), a review of more sustainable modes of transport to deliver materials to the Project was undertaken. This assessment is considered as a sensitivity test.
- 6.19.2 A multi-modal transport assessment was undertaken to examine opportunities to utilise rail and port modes to supply materials for the construction of the proposed works. This identified options for the reduction of distances travelled by commercial vehicles on the SRN in the delivery of the Project. A Multi-Mode Transport Report for the Project is provided within Appendix G.
- 6.19.3 This included the potential use of the River Stour and the River Waveney. However, it was found that neither of the waterways, which intersect the Project alignment, are considered feasible at this stage of Project development to use for the transport of construction materials.

- 6.19.4 Ports and railway sidings in the vicinity of the Project alignment have been identified and sifted to determine options which would be suitable for use, as shown within Appendix G. This included engaging with existing operators to determine a credible throughput in each location. These credible throughputs have been utilised to derive trip generation data for onwards movements by road in each location.
- 6.19.5 It is assumed that the 'last mile' of any delivery utilising rail or ports would be required to be made by road, using the public highway (along the PAR) and/or construction haul roads as required.
- 6.19.6 Therefore, it is appropriate for the rail and port options to consider deliveries to a number of railhead and port locations rather than necessarily directly to the Project alignment by those modes. On this basis, the scope for the multi-modal assessment is as follows:
- Assessment of material delivery requirements on the basis of outline materials and programme information in line with the information utilised to produce the Trip Generation set out in Section 6 of the Transport Assessment
 - Outline identification of potential material source locations for use with multi-modal delivery solutions
 - Assessment of existing and disused railway siding locations to determine the feasibility of utilising these to support Project delivery
 - Assessment of materials delivery capacity for any existing or disused railway siding locations determined to be feasible, including analysis of railway network capacity and engagement with relevant facility owners or operators
 - Assessment of ports to determine the feasibility of utilising these to support Project delivery
 - Assessment of materials delivery capacity for any ports or inland waterways determined to be feasible, including engagement with relevant facility owners or operators
 - Assessment of highway connections between identified suitable ports and railway sidings to the SRN for suitability to accommodate construction vehicles other than AILs. Movement of AILs on the public highway is assessed within the AIL Access Strategy found within Appendix A of the Outline CTMP (document reference 7.3).
- 6.19.7 This assessment identified a number of opportunities to potentially make use of rail and port infrastructure to deliver materials for the Project. It should be noted that these sources of materials have not been secured as part of the DCO and would be agreed should the multi-modal option be taken forward. Engagement with existing operators of each facility would be maintained. These findings are summarised in Table 6.5 with further details found in Appendix G.

Table 6.5 Summary of identified opportunities to utilise multi-modal facilities

Identified Facility	Bulk Materials Credible Throughput	Abnormal Loads Capability	Comments
Port of King's Lynn	2no. 4,450 tonne deliveries per week; Total: 8,900 t/wk; (Equivalent 445 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port on the River Great Ouse with facilities for handling both bulk cargo and abnormal loads, operated by Associated British Ports (ABP).
Trowse Newton Sidings	7no. 1,500 tonne deliveries per week; Total: 10,500 t/wk; (Equivalent 525 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead serving Tarmac Trowse Newton Asphalt Plant.
Port of Great Yarmouth	2no. 18,000 tonne deliveries per week; Total 36,000 t/wk; (Equivalent 1,800 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port at the mouth of the River Yare with facilities for handling both bulk cargos and abnormal loads, operated by Peel Ports.
Port of Lowestoft	2no. 4,450 tonne deliveries per week; Total: 8,900 t/wk; (Equivalent 445 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling both bulk cargo and abnormal loads, operated by ABP.
Brandon Sidings	7no. 1,800 tonne deliveries per week; Total 12,600 t/wk; (Equivalent 630 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead operated by Rory J Holbrook Ltd.
Kennett Sidings	6no. 1,800 tonne deliveries per week; Total: 10,800 t/wk; (Equivalent 540 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead serving Tarmac Higham Asphalt Plant.
Barham Sidings	7no. 1,300 tonne deliveries per week; Total: 9,100 t/wk; (Equivalent 455 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead serving Tarmac Barham Asphalt Plant.

Identified Facility	Bulk Materials Credible Throughput	Abnormal Loads Capability	Comments
Port of Ipswich	2no. 8,900 tonne deliveries per week; Total 17,800 t/wk; (Equivalent 890 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port on the River Orwell with facilities for handling both bulk cargo and abnormal loads, operated by ABP. Option to export material by rail from this location to the Marks Tey Sidings via the Port of Ipswich Sidings.
Port of Ipswich Sidings	<i>No material import train paths identified</i>	No – abnormal loads not suitable for rail infrastructure	Established aggregates export railhead operated by Brett Aggregates within the Port of Ipswich. No materials import capacity. Identified usage for transfer of additional materials imported by sea from the Port of Ipswich to the Marks Tey Sidings only. See Marks Tey Sidings discussion for details.
Port of Felixstowe	<i>Not suitable for bulk materials import – facilities for handling containerised loads and Project cargo only</i>	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling containerised cargos and abnormal loads only, operated by Hutchinson Ports.
Port of Harwich	2no. 18,200 tonne deliveries per week; Total: 36,400 t/wk (Equivalent 1,820 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling both bulk cargo and abnormal loads, operated by Hutchison Ports.
Marks Tey Sidings	<u>Using Existing Paths Only:</u> 6no. 1,000 tonne deliveries per week; Total: 6,000 t/wk; (Equivalent 300 HGVs/wk) <u>Including Additional Throughput from Ipswich:</u> 18no. 1,000 tonne deliveries per week;	No – abnormal loads not suitable for rail infrastructure	Established aggregates handling facility owned and operated by Tarmac. Potential option to provide additional throughput by rail in this location using transfers from the Port of Ipswich. If making use of this additional throughput from Ipswich, approx. 12,000 tonnes per week of material would be required to be delivered through the port to provide the

Identified Facility	Bulk Materials Credible Throughput	Abnormal Loads Capability	Comments
	Total: 18,000 t/wk; (Equivalent 900 HGVs/wk)		additional throughput at Marks Tey.
Chelmsford Sidings	6no. 1,200 tonne deliveries per week; Total 7,200 t/wk; (Equivalent 360 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead operated by Holcim (trading as Aggregate Industries prior to March 2025)
London Gateway Port	<i>Not suitable for bulk materials import – facilities for handling containerised loads and Project cargo only</i>	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling containerised cargo and abnormal loads only, operated by DP World.
Port of Tilbury	1no. 37,200 tonne delivery per week; Total: 37,200 t/wk (Equivalent 1,860 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling both bulk cargo and abnormal loads, operated by Forth Ports.

- 6.19.8 All of the 15 facility options identified would utilise an already established facility, with a number of different operators across the region. Of these, 12 could be utilised for the import of bulk materials (predominantly Type 1 aggregates) and eight utilised for the import of abnormally large and heavy items, namely underground cable conductor drums and large electrical equipment.
- 6.19.9 As part of sensitivity testing, the multi-modal route options have been analysed to determine the potential construction traffic distribution, particularly HGV movements, and assess the capacity of affected road networks to accommodate these changes. The analysis focuses on the SRN, MRN, and local roads that access the multi-modal ports / sidings impacted by the construction logistics. The routes assessed between the ports / sidings and the SRN/MRN junctions connecting to the PARs are shown on Figure 6: Multi-Modal Routeing in Appendix I.
- 6.19.10 Within the multi-modal assessment two scenarios were analysed:
- Scenario 1: This scenario assumes a 'just-in-time' delivery profile, aligned with the anticipated construction programme. Materials are assumed to be delivered at a consistent rate to match the needs of each construction activity. It does not account for the stockpiling of materials within the proposed construction laydown areas or the Order Limits
 - Scenario 2: This scenario assumes a 'front-loaded' delivery profile, in which materials are delivered at the maximum feasible rate, as determined by the credible throughput capacity of multi-modal facilities (e.g., ports and rail sidings).

Deliveries commence with the first activity at each PAR and continue until the full quantity of material required for that PAR has been supplied.

- 6.19.11 The multi-modal route scenarios have been analysed to determine the potential increases in traffic volumes, particularly HGV movements, and assess the capacity of affected road networks to accommodate these changes. The analysis focuses on the SRN, MRN, PARs and local roads that access the multi-modal ports / sidings impacted by the construction logistics. Full details of the multi-modal assessment sensitivity test can be found within Appendix G.
- 6.19.12 If the comparison with the full road scenario showed an absolute flow increase of 10 PCUs or more on any junction arm in either of the multi-modal scenarios, the multi-modal scenario was modelled to assess the impact of construction traffic on junction capacity.

7. Transport Assessment

7.1 Introduction

- 7.1.1 This chapter assesses the temporary impacts related to the Project construction traffic flows on the transport network, applying the methodology set out in Chapter 6, on the following:
- SRN / MRN
 - LRN
 - Bus network
 - WCH network.
- 7.1.2 An assessment of the operation and performance of the SRN/MRN and LRN junctions has also been undertaken for the two multi-modal scenarios as summarised in Chapter 6.
- 7.1.3 Traffic modelling has been undertaken to determine the junctions that are likely to be impacted by the Project's construction traffic on the PARs and connection to the SRN/MRN. The modelling has been used to identify junctions where potential mitigation measures may be required to alleviate any notable impacts on junction operation.
- 7.1.4 The junctions consist of both priority-controlled and signal-controlled intersections. The majority of junctions have been modelled in two different software packages, namely:
- Signalised junctions – LinSig V3 software
 - Priority junctions – Junctions V9 software
- 7.1.5 The exceptions to the above consists of:
- Site 88 which utilised a VISSIM model provided by LTC
 - Site 89 which utilised a Junctions 10 model provided by LTC.
- 7.1.6 This chapter presents the modelling methodology, results and mitigation that has been applied.

7.2 Modelled Junctions

- 7.2.1 A total of 68 sites were modelled across Norfolk, Suffolk, Essex and Thurrock. The locations of the sites which were identified as requiring traffic modelling are reported in Table 6.2 and Table 6.3. The locations of the junctions are shown on Figure 3: Traffic Counts and PRow User Survey Locations in Appendix I.

7.3 Model Assumptions

Junctions Software Models

- 7.3.1 The following assumptions were applied to the traffic modelling using TRL Junctions software.
- Modelling was undertaken using PCU values
 - All junctions were modelled in isolation
 - Lane simulation was not used in the assessment
 - Where available, traffic data input as 15-minute direct intervals covering modelled peak hour plus 15 minute warm up and cool down periods
 - Geometries were measured from Ordnance Survey data, and cross referenced with aerial and streetside imagery to take account of road markings and other features as appropriate.
- 7.3.2 The modelled scenarios were:
- Base (2024)
 - Future Base
 - Future Base + Committed Development
 - Future Base + Committed Development + The Project
 - Future Base + Committed Development + The Project Multi-modal Scenario 1 (where appropriate at select junctions)
 - Future Base + Committed Development + The Project Multi-modal Scenario 2 (where appropriate at select junctions).
- 7.3.3 Models were compared with typical traffic congestion data to as far as possible ensure the base outputs reflected on-street conditions. Where there appeared to be significant discrepancies between model results and typical traffic data, the video survey footage was reviewed to determine changes required.
- 7.3.4 Where junctions were predicted to operate close to capacity, sensitivity tests were undertaken on a case-by-case basis.
- 7.3.5 It should be noted that a Junctions 10 model covering Site 89 - A1089 Dock Approach Road / Thurrock Parkway (ASDA roundabout) was provided by the LTC project. Junction geometries in this provided model remain unchanged, only traffic flows were updated. The Do Minimum (DM) model geometries were used for this assessment as they matched baseline 2024 roundabout layout. Pedestrian crossing assumptions contained within the model remain unchanged.

7.4 LinSig Software Models

- 7.4.1 The following assumptions were applied to the LinSig models:
- Signal data (phases, stages, intergreens, phase delays, phase minima) were input as per latest controller specification

- Signal stage sequences, frequency of demand dependent stages, stage lengths and cycle times were input as per on-street data, if available from the Local Highway Authority
- If unavailable, this data was input as per video observations. Where neither Local Highway Authority data nor video footage was available, the model was optimised with minor adjustments made such that the validation criteria above were met
- Saturation flow data derived from RR67 formula. Available footage was used to collect on-site Degree of Saturation (DoS).

7.4.2 Where junctions were predicted to operate close to capacity, sensitivity tests were undertaken on a case-by-case basis.

7.5 VISSIM Software Model

7.5.1 A VISSIM model was used to assess the impact of construction traffic on A13 Stanford le Hope Bypass / A1013 Stanford Rd (Orsett Cock Roundabout). The model was originally developed for the LTC project and shared for this assessment. This model covers the study junction only. The following assumptions were applied to the modelling methodology in VISSIM.

- PTV VISSIM 2020 SP13 was used, to match the provided LTC model version
- Network coding provided for the LTC Do Minimum (DM) and Do Something (DS) scenarios were used
- The LTC DM AM network was compared against online aerial imagery and assumed to be representative of existing 2024 conditions. Network coding including links, signal locations and give way parameters remain unchanged as per the provided LTC model. Vehicle compositions were updated to match available 3D models
- The LTC 2045 future year was not modelled
- 2024 traffic turning count data was collected separately by LTC and circulated for this assessment. This dataset did not capture A13 mainline flows. A13 flows were sourced from neighbouring Department for Transport (DfT) count sites and factored up to the 2024 base year using TEMPro growth factors
- Future year traffic was added to this 2024 base
- Flows were calculated in vehicles for Cars, LGVs and HGVs
- Bus routeing was updated utilising latest available 2025 timetabling at the time of the assessment
- Signal timings already coded into the LTC model were used
- Dynamic Assignment Parameters remained the same as the LTC DM model. The zoning system was updated to match provided turning count data
- Model time periods were updated to cover a one-hour peak plus a 30-minute warm up and cool down period
- The model was run across 20 seeds with results reported on the average of these runs.

7.6 Strategic Road Network / Major Road Network Operation and Performance

- 7.6.1 An assessment of the temporary impact of the Project construction traffic on the SRN under the road-only strategy has been undertaken. It was found that the sections of SRN that are expected to carry the highest volumes of construction traffic are as follows due to servicing multiple PARs along the Project:
- A14 (between J49 and J50)
 - A14 (between J50 and J51).
- 7.6.2 Table 7.1 summarises the forecast changes in traffic flow by direction on these segments due to the Project in the peak construction year and within the AM and PM peak hours. The change is shown for total traffic flow and for HGVs. Table 7.1 shows that the percentage increases on these segments would be less than 15% for total traffic and less than 52% for HGVs in both directions in the AM peak hour. It would also be less than 15% for total traffic and less than 50% for HGVs in the PM peak hour. However, it should be noted that these are only estimated for the duration of the peak construction period (e.g. one week). There are sections of the SRN / MRN (e.g. A127 between M25 and A121 or the A13 between A1012 and A128) where the duration is expected to be for a longer period of time, however it is noted that the associated construction traffic flows are notably lower. Therefore, based on professional judgement, the Project would not have a substantial temporary impact upon the operation of the SRN during the full extent of the construction period.
- 7.6.3 The traffic forecasts summarised in Chapter 6 have been used as the basis for an assessment of junction capacity impacts in the Study Area, for those junctions where construction routes join the SRN. Full details of this assessment are provided in Appendix F.
- 7.6.4 An assessment of the temporary impact of the Project construction traffic on the SRN under the multi-modal scenarios has been undertaken. Full details can be found within Appendix G.

Table 7.1 Summary of change in traffic on key SRN segments during the AM and PM peak hours

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
AM Peak	A47 (between A11 and A140)	2028	4,791	216	115	47	68	2.39%	31.32%	1
	A11 (between A47 and Tuttle Lane Interchange)	2028	3,672	219	34	2	32	0.92%	14.51%	1
	A140 (between A47 and A1066)	2028	1,612	81	85	43	42	5.24%	51.04%	1
	A140 (between A1066 and A143)	2028	1,125	83	85	43	42	7.51%	49.90%	1
	A140 (between A143 and A1120)	2028	1,071	119	85	43	42	7.89%	34.98%	1
	A140 (between A1120 and A14)	2028	1,247	127	85	43	42	6.78%	32.56%	1
	A14 (between J49 and J50)	2028	3,457	527	518	270	248	14.99%	47.10%	1
	A14 (between J50 and J51)	2028	3,568	490	474	281	193	13.27%	39.25%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
	A14 (between J51 and J52)	2028	4,569	583	421	238	183	9.22%	31.42%	1
	A14 (between J52 and J53)	2028	5,026	641	370	206	164	7.36%	25.60%	1
	A14 (between J54 and J55)	2028	4,752	643	370	206	164	7.79%	25.53%	1
	A12 (between A14 and B1070)	2028	4,064	414	345	206	139	8.49%	33.63%	1
	A12 (between B1070 and B1068)	2028	4,330	405	345	206	139	7.97%	34.40%	1
	A12 (between A1232 and A120)	2028	4,435	420	358	210	148	8.07%	35.14%	1
	A12 (between J28 and J29)	2028	5,220	453	181	104	77	3.46%	16.94%	1
	A12 (between J27 and J28)	2028	5,159	457	110	48	62	2.12%	13.46%	1
	A12 (between J26 and J27)	2028	6,891	492	110	48	62	1.59%	12.51%	1
	A12 (between J25 and J26)	2029	6,977	489	97	68	29	1.38%	5.83%	1
	A12 (between J21 and J22)	2028	5,174	472	17	0	17	0.33%	3.60%	2
	A120 (between	2028	3,284	226	187	162	25	5.71%	11.22%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
	A133 and A1232)									
	A120 (between A130 and A131)	2028	2,707	174	200	153	47	7.39%	26.90%	1
	A120 (between A131 and B1256)	2029	3,053	157	94	65	29	3.06%	18.20%	1
	A120 (between B1024 and A12)	2029	1,835	129	97	67	30	5.28%	23.08%	1
	A12 (between J14 and J15)	2028	5,486	410	75	0	75	1.37%	18.31%	5
	A127 (between M25 and A128)	2028	5,709	282	48	3	45	0.84%	15.89%	1
	A127 (between M25 and A121)	2028	4,924	212	15	0	15	0.29%	6.84%	7
	A13 (between A1012 and A1089)	2028	6,598	838	89	60	29	1.36%	3.51%	4
	A13 (between A1089 and A128)	2028	6,323	561	89	60	29	1.41%	5.24%	4

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
PM peak	A47 (between A11 and A140)	2028	5,248	237	115	47	68	2.18%	28.59%	1
	A11 (between A47 and Tuttle Lane Interchange)	2028	4,022	240	34	2	32	0.84%	13.24%	1
	A140 (between A47 and A1066)	2028	1,765	89	85	43	42	4.79%	46.60%	1
	A140 (between A1066 and A143)	2028	1,231	91	85	43	42	6.86%	45.60%	1
	A140 (between A143 and A1120)	2028	1,172	130	85	43	42	7.21%	31.96%	1
	A140 (between A1120 and A14)	2028	1,365	139	85	43	42	6.19%	29.75%	1
	A14 (between J49 and J50)	2028	3,784	577	518	270	248	13.70%	43.04%	1
	A14 (between J50 and J51)	2028	3,905	537	474	281	193	12.13%	35.86%	1
	A14 (between J51 and J52)	2028	5,001	638	421	238	183	8.42%	28.71%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
	A14 (between J52 and J53)	2028	5,501	702	370	206	164	6.73%	23.39%	1
	A14 (between J54 and J55)	2028	5,200	704	370	206	164	7.12%	23.33%	1
	A12 (between A14 and B1070)	2028	4,448	453	345	206	139	7.76%	30.73%	1
	A12 (between B1070 and B1068)	2028	4,739	443	345	206	139	7.28%	31.43%	1
	A12 (between A1232 and A120)	2028	4,858	461	358	210	148	7.36%	32.08%	1
	A12 (between J28 and J29)	2028	5,718	496	181	104	77	3.16%	15.46%	1
	A12 (between J27 and J28)	2028	5,651	500	110	48	62	1.94%	12.29%	1
	A12 (between J26 and J27)	2028	7,549	539	110	48	62	1.45%	11.42%	1
	A12 (between J25 and J26)	2029	7,643	536	97	68	29	1.26%	5.32%	1
	A12 (between J21 and J22)	2028	5,667	517	17	0	17	0.30%	3.29%	2
	A120 (between A133 and A1232)	2028	3,597	247	187	162	25	5.21%	10.25%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
	A120 (between A130 and A131)	2028	2,965	191	200	153	47	6.74%	24.56%	1
	A120 (between A131 and B1256)	2029	3,344	172	94	65	29	2.80%	16.62%	1
	A120 (between B1024 and A12)	2029	2,010	142	97	67	30	4.82%	21.07%	1
	A12 (between J14 and J15)	2028	6,009	449	75	0	75	1.25%	16.71%	5
	A127 (between M25 and A128)	2028	6,254	309	48	3	45	0.76%	14.51%	1
	A127 (between M25 and A121)	2028	5,394	232	15	0	15	0.27%	6.24%	7
	A13 (between A1012 and A1089)	2028	7,234	919	89	60	29	1.24%	3.20%	4
	A13 (between A1089 and A128)	2028	6,932	615	89	60	29	1.29%	4.78%	4

7.7 Strategic Road Network / Major Road Junction Capacity Assessment Results

- 7.7.1 Traffic modelling has been undertaken to determine those junctions that are likely to be impacted by the Project's construction traffic on the PARs and connection to the SRN/MRN. The modelling has been used to identify junctions where potential mitigation measures may be required to alleviate any notable impacts on junction operation. A summary of all junctions modelled within their respective region has been provided. Full details of this assessment are provided in Appendix H.

Norfolk Junctions

Site 1 - A47 Norwich Southern Bypass/ A140 Ipswich Rd Grade-separated roundabout

- 7.7.2 The A47 Norwich Southern Bypass/ A140 Ipswich Rd junction is a large grade-separated roundabout located to the south of Norwich, Norfolk. The roundabout consists of six arms, providing entry and exit slips onto the A47 in the eastbound and westbound directions, connecting the A140 Ipswich Road which runs north to south between Norwich and Ipswich and access to the Harford Park and Ride site situated adjacent to the roundabout.
- 7.7.3 Aerial imagery of the junction is presented in Image 7.1 and was assessed using Junctions V9 software. The capacity assessments are presented in Table 7.2.

Image 7.1 A47 Norwich Southern Bypass/ A140 Ipswich Rd grade-separated roundabout



- 7.7.4 The Junctions assessment shows that the roundabout is within capacity in the Base, Future Base and Future Base plus Committed Development scenarios.
- 7.7.5 With the Project flows included the capacity increases over the practical capacity in the AM only with an RFC of 0.95. In Multi-modal Scenarios 1 and 2 this is a marginal increase from RFC of 0.83 to 0.87. The model does not predict a material increase in queuing as a result of the addition of the Project's construction traffic.

Table 7.2 Site 1 A47 Norwich Southern Bypass/A140 Ipswich Road grade-separated roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Ipswich Road (North (N))	0.5	2.30	0.34	1.1	3.09	0.52
A47 (North-east (NE))	0.7	3.21	0.41	0.7	4.15	0.40
Markshall Road	0.8	9.21	0.43	0.3	8.44	0.25
A140 (South (S))	1.4	4.00	0.57	0.7	2.66	0.42
A47 (South-west (SW))	2.2	9.26	0.68	0.9	3.87	0.47
Park and Ride	0.1	7.40	0.04	0.1	4.59	0.06
Future Base						
Ipswich Road (N)	0.6	2.42	0.37	1.3	3.39	0.56
A47 (NE)	0.8	3.42	0.44	0.8	4.57	0.44
Markshall Road	0.9	10.73	0.48	0.4	9.53	0.28
A140 (S)	1.6	4.48	0.61	0.8	2.83	0.44
A47 (SW)	3.0	11.78	0.74	1.1	4.23	0.51
Park and Ride	0.1	7.85	0.05	0.1	4.83	0.07
Future Base plus Committed Developments						
Ipswich Road (N)	0.8	2.81	0.43	1.6	4.13	0.61
A47 (NE)	1.2	4.54	0.54	1.0	5.22	0.48
Markshall Road	1.6	19.66	0.63	0.5	11.20	0.31
A140 (S)	2.0	5.23	0.66	1.3	3.64	0.55
A47 (SW)	4.7	16.99	0.83	1.6	5.89	0.61
Park and Ride	0.1	8.49	0.05	0.1	5.76	0.08
Future Base plus Committed Developments and Project						
Ipswich Road (N)	0.9	3.17	0.46	1.8	4.65	0.64
A47 (NE)	1.4	5.38	0.58	1.1	5.80	0.51
Markshall Road	2.6	32.00	0.74	0.5	12.97	0.35
A140 (S)	2.5	6.17	0.71	1.7	4.12	0.61

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
A47 (SW)	11.7	33.35	0.95	2.1	7.15	0.67
Park and Ride	0.1	9.18	0.05	0.1	6.14	0.09
Scenario 1 Multi-modal Flows						
Ipswich Road (N)	0.8	2.97	0.44	1.6	4.20	0.61
A47 (NE)	1.4	4.97	0.57	1.0	5.38	0.50
Markshall Road	1.9	22.95	0.66	0.4	11.27	0.31
A140 (S)	2.1	5.39	0.67	1.4	3.91	0.58
A47 (SW)	6.2	20.98	0.87	1.6	6.04	0.61
Park and Ride	0.1	8.54	0.05	0.1	5.75	0.08
Scenario 2 Multi-modal Flows						
Ipswich Road (N)	0.8	3.01	0.44	1.7	4.52	0.63
A47 (NE)	1.5	5.20	0.59	1.2	6.03	0.54
Markshall Road	2.0	24.23	0.68	0.5	12.44	0.34
A140 (S)	2.4	5.96	0.70	1.5	4.05	0.58
A47 (SW)	6.1	21.71	0.87	1.8	6.56	0.63
Park and Ride	0.1	8.65	0.05	0.1	6.04	0.09

7.7.6 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction for a longer duration compared with a short-lived, worst-case maximum. Table 7.37 provides a comparison of the Future Base with Committed Developments and Norwich to Tilbury scenario flows, both with and without the reduced Norwich to Tilbury flows.

Table 7.37 Site 1 A47 Norwich Southern Bypass/A140 Ipswich Road Grade-separated roundabout capacity assessment with reduced peak hour flows

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
Ipswich Road (N)	0.9	3.17	0.46	1.8	4.65	0.64
A47 (NE)	1.4	5.38	0.58	1.1	5.80	0.51
Markshall Road	2.6	32.00	0.74	0.5	12.97	0.35
A140 (S)	2.5	6.17	0.71	1.7	4.12	0.61
A47 (SW)	11.7	33.35	0.95	2.1	7.15	0.67
Park and Ride	0.1	9.18	0.05	0.1	6.14	0.09
Future Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)						
Ipswich Road (N)	0.8	2.98	0.44	1.7	4.37	0.62
A47 (NE)	1.3	4.93	0.56	1.0	5.45	0.49
Markshall Road	2.0	23.87	0.67	0.5	11.90	0.33
A140 (S)	2.3	5.67	0.68	1.4	3.87	0.58
A47 (SW)	7.2	23.24	0.89	1.8	6.47	0.64
Park and Ride	0.1	8.62	0.05	0.1	5.89	0.09

7.7.7 The reduced flow assessment shows that with 50% worst-case Project flows during the peak hours, queue lengths, delays, and RFC all decrease. While the A47 (SW) remains over capacity in the AM, the RFC reduces from 0.95 to 0.89.

7.7.8 It is proposed that information signs are provided on approach to the junction informing drivers of potential increase in delays due to the Project. No physical layout changes are proposed due to the short duration of peak activity. The disruption incurred for any physical changes to the junction would not be proportionate to the relative short-term impact.

Site 12 - A11 Thetford Bypass / A1066 Mundford Road roundabout

- 7.7.9 The A11 Thetford Bypass and A1066 Mundford Road roundabout is located to the north of Thetford, Norfolk. The junction operates as a four-arm roundabout, connecting the A11, A1066 and A134 and providing routes to other towns in Norfolk and Suffolk.
- 7.7.10 Aerial imagery of the junction is presented in Image 7.2 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.4.

Image 7.2 A11 Thetford Bypass / A1066 Mundford Road roundabout



- 7.7.11 The Junctions assessment indicates that the A11 Thetford Bypass (E) is predicted to operate above practical capacity in all modelled AM peaks. The A11 Thetford Bypass (W) is predicted to operate above practical capacity in all modelled PM peaks. Future Base plus Committed Development traffic is expected to cause capacity concerns on the A134 (N) arm in the AM peak with RFC exceeding 0.85.
- 7.7.12 The introduction of the Project flows has a negligible impact on the capacity of the junction, with RFC values predicted to increase by two percentage points on aforementioned arms already experiencing capacity issues. A re-assignment of flows in the multi-modal scenario 2 does not materially impact these conclusions.

Table 7.4 Site 12 Thetford Bypass / A1066 Mundford Road roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A11 Thetford Bypass (East (E))	5.9	10.87	0.85	1.9	4.62	0.64
A1066 Mundford Road (S)	2.6	15.25	0.68	2.7	11.75	0.73
A11 Thetford Bypass (W)	3.2	6.93	0.74	6.0	12.40	0.85
A134 (N)	5.0	21.62	0.84	3.6	20.11	0.76
Future Base						
A11 Thetford Bypass (E)	8.8	15.49	0.90	2.2	5.22	0.68
A1066 Mundford Road (S)	3.6	20.19	0.75	3.7	15.42	0.79
A11 Thetford Bypass (West (W))	4.0	8.22	0.78	9.4	18.76	0.91
A134 (N)	8.1	33.20	0.91	5.4	29.55	0.84
Future Base plus Committed Developments						
A11 Thetford Bypass (E)	8.8	15.49	0.90	2.2	5.22	0.68
A1066 Mundford Road (S)	3.6	20.19	0.75	3.7	15.42	0.79
A11 Thetford Bypass (W)	4.0	8.22	0.78	9.4	18.76	0.91
A134 (N)	8.1	33.20	0.91	5.4	29.55	0.84
Future Base plus Committed Developments and Project						
A11 Thetford Bypass (E)	10.0	17.66	0.92	2.3	5.47	0.69
A1066 Mundford Road (S)	4.7	24.84	0.80	4.7	18.75	0.83
A11 Thetford Bypass (W)	4.5	9.06	0.80	11.9	23.37	0.93
A134 (N)	9.7	39.42	0.93	6.3	34.43	0.87
Scenario 2 Multi-modal Flows						
A11 Thetford Bypass (E)	8.8	15.57	0.90	2.2	5.25	0.68
A1066 Mundford Road (S)	3.9	20.99	0.76	3.9	15.79	0.80
A11 Thetford Bypass (W)	3.9	8.21	0.78	9.1	18.44	0.91
A134 (N)	7.9	32.64	0.90	5.3	29.24	0.84

- 7.7.13 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.5 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.5 Site 12 Thetford Bypass / A1066 Mundford Road roundabout capacity assessment with reduced peak hour flows

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
A11 Thetford Bypass (E)	10.0	17.66	0.92	2.3	5.47	0.69
A1066 Mundford Road (S)	4.7	24.84	0.80	4.7	18.75	0.83
A11 Thetford Bypass (W)	4.5	9.06	0.80	11.9	23.37	0.93
A134 (N)	9.7	39.42	0.93	6.3	34.43	0.87
Future Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)						
A11 Thetford Bypass (E)	9.4	16.51	0.91	2.3	5.34	0.68
A1066 Mundford Road (S)	4.1	22.33	0.77	4.2	16.96	0.81
A11 Thetford Bypass (W)	4.2	8.62	0.79	10.5	20.86	0.92
A134 (N)	8.8	36.10	0.92	5.8	31.83	0.85

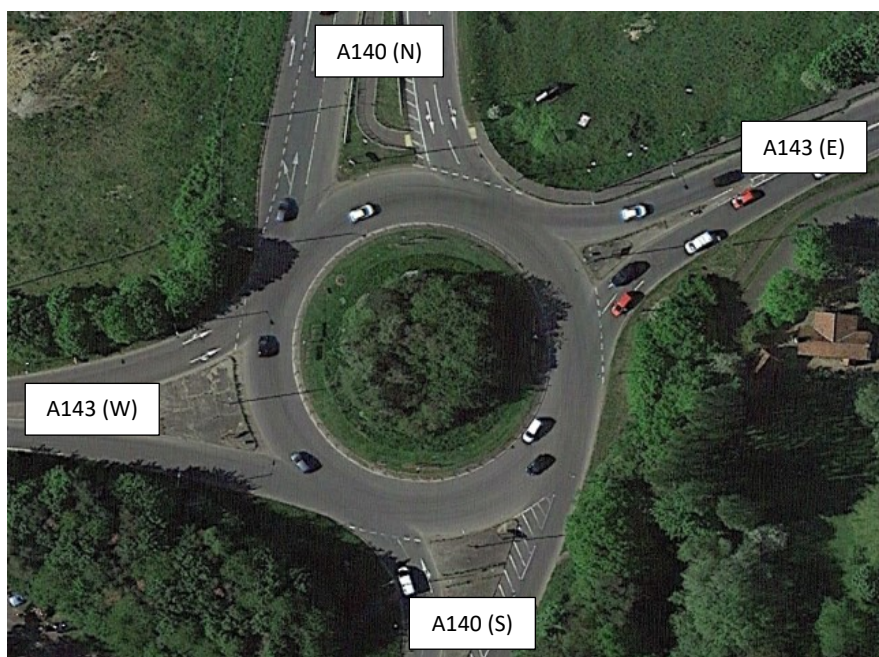
- 7.7.14 The reduced flow assessment shows that with 50% of worst-case Project flows there is a negligible improvement on junction operation compared to full construction flows. Existing capacity issues prior to the introduction of Project construction traffic still remain.
- 7.7.15 Given the negligible increase in RFC values following the addition of Project traffic and the short duration of the worst-case peak hour flows, no mitigation is proposed at this location.

Suffolk Junctions

Site 16 - A140 Ipswich Rd / A143 Old Bury Rd roundabout

- 7.7.16 The A140 Ipswich Rd / A143 Old Bury Rd junction is a large roundabout located between Ipswich and Norwich and approximately 20 miles south-east of Thetford. The roundabout consists of four arms and connects the A140 to the A143, which runs between Bury St Edmunds to Great Yarmouth.
- 7.7.17 Aerial imagery of the junction is presented in Image 7.37.3 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.6.

Image 7.3 Site 16 - A140 Ipswich Rd / A143 Old Bury Rd roundabout



- 7.7.18 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios during the PM peak, with no significant delays. During the AM peak, the A143 (E) arm is marginally over capacity in the Base year with an RFC of 0.88.
- 7.7.19 Overall, the introduction of the Project traffic in the AM peak has a minor impact upon junction capacity. The RFC value on the A143 (E) arm increases from 0.93 to 0.99 with the Project flows. The delay at this arm rises from 33 seconds to 70 seconds between the Base scenario and Future Base with Committed Development and Project scenario.
- 7.7.20 The results of the Multi-Modal Scenario 2 assessment indicate that the A143 (E) arm is still predicted to operate near capacity in the AM peak with an RFC value of 0.95.

Table 7.6 Site 16 A140 Ipswich Rd / A143 Old Bury Rd roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A140 (N)	1.1	3.80	0.50	0.8	3.11	0.42
A143 (E)	6.5	33.15	0.88	1.7	10.12	0.62
A140 (S)	1.1	4.48	0.49	1.2	4.34	0.52
A143 (W)	2.8	10.17	0.73	1.8	8.22	0.62
Future Base						
A140 (N)	1.2	4.02	0.53	0.8	3.26	0.44
A143 (E)	9.4	45.18	0.93	1.9	11.08	0.65
A140 (S)	1.2	4.67	0.51	1.3	4.57	0.54
A143 (W)	3.3	11.70	0.76	2.1	9.16	0.65
Future Base plus Committed Developments						
A140 (N)	1.2	4.02	0.53	0.8	3.26	0.44
A143 (E)	9.4	45.18	0.93	1.9	11.08	0.65
A140 (S)	1.2	4.67	0.51	1.3	4.57	0.54
A143 (W)	3.3	11.70	0.76	2.1	9.16	0.65
Future Base plus Committed Developments and Project						
A140 (N)	1.5	4.63	0.58	1.0	3.66	0.48
A143 (E)	14.6	70.58	0.99	2.3	12.88	0.68
A140 (S)	1.5	5.48	0.55	1.5	5.10	0.58
A143 (W)	4.2	14.36	0.81	2.8	11.09	0.72
Scenario 2 Multi-modal Flows						
A140 (N)	1.3	4.30	0.55	0.9	3.46	0.46
A143 (E)	10.6	51.15	0.95	2.0	11.60	0.66
A140 (S)	1.2	4.81	0.52	1.3	4.72	0.55
A143 (W)	4.1	13.60	0.80	2.5	10.41	0.69

- 7.7.21 Given the small increase in RFC values as a result of the Project traffic and the short duration of the worst-case peak flows modelled above, no mitigation is proposed at this junction.

Site 21 - A14 J50 Cedars Interchange

- 7.7.22 The A14 J50 Cedars Interchange is a large grade-separated roundabout located east of Stowmarket, Suffolk. The five-arm junction facilitates local access to the A14, a major trunk road that runs from the Midlands to the Port of Felixstowe.
- 7.7.23 Aerial imagery of the junction is presented in Image 7.4 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.7.

Image 7.4 A14 J50 Cedars Interchange



- 7.7.24 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.7.25 The addition of the Project traffic has a negligible impact upon junction capacity. The highest RFC occurs in the PM Future Base plus Committed Development and Project flows on the A14 WB offslip, with a delay of 5 seconds and an RFC of 0.57.

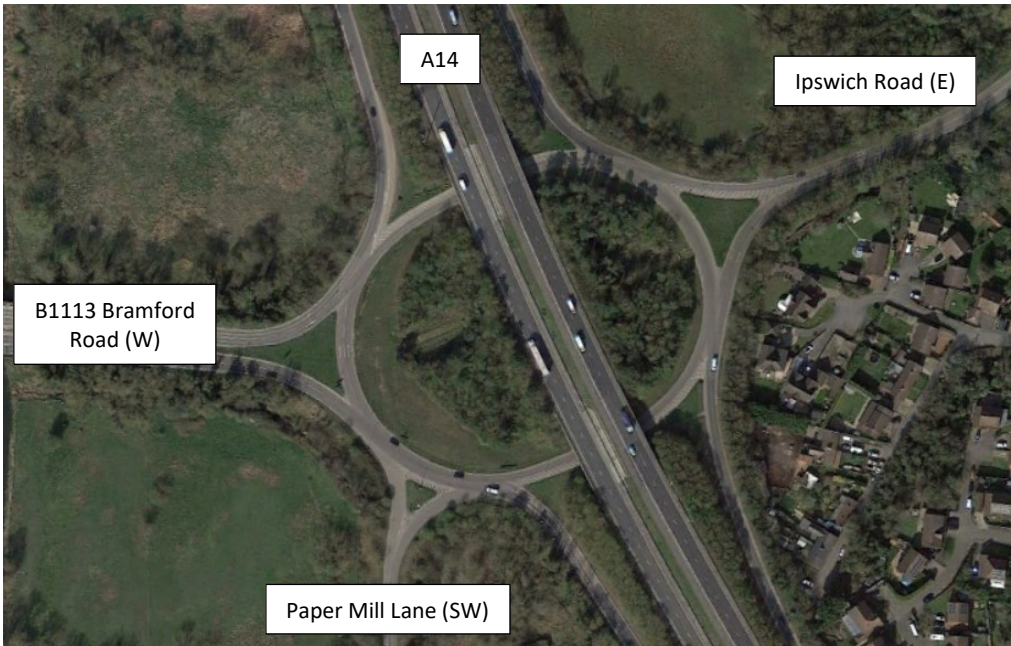
Table 7.7 Site 21 A14 J50 Cedars Interchange capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A1120 (NE)	0.6	2.82	0.35	0.4	2.26	0.26
A14 WB offslip	0.5	3.24	0.34	0.9	3.84	0.47
A1120 (S)	0.9	2.60	0.45	0.7	2.54	0.41
Mill Street	0.1	2.82	0.12	0.0	2.46	0.05
A14 EB offslip	0.3	2.85	0.24	0.5	2.66	0.33
Future Base						
A1120 (NE)	0.6	2.95	0.37	0.4	2.33	0.28
A14 WB offslip	0.6	3.37	0.36	1.0	4.07	0.49
A1120 (S)	0.9	2.70	0.47	0.7	2.64	0.42
Mill Street	0.1	2.89	0.12	0.1	2.51	0.05
A14 EB offslip	0.4	2.95	0.26	0.5	2.77	0.35
Future Base plus Committed Developments						
A1120 (NE)	0.8	3.24	0.43	0.4	2.41	0.30
A14 WB offslip	0.7	3.58	0.39	1.2	4.54	0.54
A1120 (S)	1.0	2.79	0.48	0.8	2.85	0.44
Mill Street	0.2	2.97	0.13	0.1	2.64	0.05
A14 EB offslip	0.4	3.04	0.26	0.6	2.97	0.36
Future Base plus Committed Developments and Project						
A1120 (NE)	0.9	3.53	0.46	0.5	2.60	0.33
A14 WB offslip	0.7	3.85	0.41	1.3	5.05	0.57
A1120 (S)	1.1	3.01	0.50	0.9	3.10	0.47
Mill Street	0.2	2.97	0.13	0.1	2.64	0.05
A14 EB offslip	0.5	3.41	0.31	0.7	3.29	0.40

Site 26 - A14 J52 Claydon roundabout

- 7.7.26
- The A14 J52 Claydon roundabout is a grade-separated roundabout located to the west of Claydon and north of Ipswich. It is a large roundabout consisting of five arms and connects the A14 to Ipswich Road, Bramford Road and Paper Mill Lane which provide access to local towns and villages.
- 7.7.27
- Aerial imagery of the junction is presented in Image 7.5 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.8.

Image 7.5 A14 J52 Claydon roundabout



- 7.7.28
- The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.7.29
- The addition of the Project traffic has a negligible impact on junction capacity. The highest RFC occurs in the PM peak on B1113 Bramford Road (W), with a delay of 6 seconds and an RFC of 0.66.

Table 7.8 Site 26 A14 J52 Claydon roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A14 (N)	0.6	4.79	0.35	0.4	4.43	0.28
Ipswich Road (E)	0.8	3.59	0.45	0.9	4.05	0.49
A14 (S)	1.0	3.84	0.47	1.0	3.79	0.50

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Paper Mill Lane (SW)	0.1	3.02	0.09	0.2	3.55	0.14
B1113 Bramford Road (W)	1.7	5.08	0.60	1.5	5.03	0.60
Future Base						
A14 (N)	0.7	5.24	0.38	0.5	4.79	0.31
Ipswich Road (E)	1.0	3.89	0.48	1.1	4.47	0.52
A14 (S)	1.1	4.14	0.50	1.2	4.12	0.53
Paper Mill Lane (SW)	0.1	3.16	0.09	0.2	3.76	0.15
B1113 Bramford Road (W)	1.9	5.60	0.64	1.8	5.61	0.64
Future Base plus Committed Developments						
A14 (N)	0.7	5.24	0.38	0.5	4.79	0.31
Ipswich Road (E)	1.0	3.88	0.48	1.1	4.47	0.52
A14 (S)	1.1	4.14	0.50	1.2	4.12	0.53
Paper Mill Lane (SW)	0.1	3.16	0.09	0.2	3.76	0.15
B1113 Bramford Road (W)	1.9	5.60	0.64	1.8	5.61	0.64
Future Base plus Committed Developments and Project						
A14 (N)	1.0	6.10	0.46	0.6	5.21	0.34
Ipswich Road (E)	1.1	4.31	0.51	1.1	4.68	0.54
A14 (S)	1.2	4.66	0.53	1.2	4.32	0.54
Paper Mill Lane (SW)	0.1	3.38	0.10	0.2	3.86	0.16
B1113 Bramford Road (W)	2.1	5.99	0.66	2.0	6.04	0.66

Site 29 - A14 J55 Copdock Interchange

- 7.7.30 The A14 Junction 55 Copdock Interchange is a large, four-arm signalised roundabout located southwest of Ipswich, Suffolk. It is a key junction which connects the A14 with the A12, connecting routes towards Colchester and Felixstowe, a particularly important freight route.
- 7.7.31 Aerial imagery of the junction is presented in Image 7.6 and has been assessed using LinSig. The capacity assessments are presented in Table 7.9 and Table 7.10.

Image 7.6 A14 J55 Copdock Interchange



- 7.7.32 The assessment indicates that the roundabout is predicted to operate within theoretical capacity for all arms, scenarios and time periods. DoS values are above practical capacity with Project construction traffic in both the AM and PM peaks for the A12 northbound ahead left and A14 eastbound off slip ahead approaches. The highest DoS is predicted in the worst case Project traffic PM scenario of 99.5% on the A12 northbound ahead left approach. This is compared with 83.7% in the future base with committed development scenario. It should be noted that the worst case scenario is temporary, and the duration would be one week.
- 7.7.33 The 85th percentile Project traffic demand has also been modelled at this location to understand what the more sustained impact of the Project construction traffic would likely be, with a duration of approximately 6 months. The modelling results indicate that the A12 northbound ahead left approach would operate with a DoS of 98.3% in the PM. It should also be noted that the A1214 has existing queuing issues with long queues originating from the Copdock Roundabout that can extend back to the A1214/Scrivener Drive Roundabout (Site 30). Whilst the Project construction traffic is not the cause of the predicted issues at the junction, it does not result in a step change in forecasted capacity at the junction and the impacts of the construction traffic are temporary in nature, there are two recommendations that will improve the junction operation that were identified as part of this assessment.

Table 7.9 Site 29 A14 J55 Copdock Interchange AM peak capacity assessment

Lane Description	Forecast AM Peak Hour								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM 85 th %	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM 85 th %	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM 85 th %
A1214 (SB) Ahead Left	82.8 : 82.8%	88.3 : 88.3%	82.5 : 82.5%	11.5	15.1	11.2	26.1	34.4	25.2
A1214 (SB) Ahead	56.50%	67.00%	54.40%	7.1	9.4	6.7	22.2	27.9	21.2
A14 (WB) Left	61.10%	84.40%	80.90%	7.4	12.6	11	23.6	40.6	33
A14 (WB) Ahead Left	84.9 : 56.6%	84.7 : 65.5%	76.5 : 61.0%	11.6	11.5	9.4	22.6	28.3	22.9
A12 (NB) Ahead Left	87.5 : 87.5%	96.4 : 96.4%	93.1 : 93.1%	17.6	34.7	24.4	14.6	31.5	22
A12 (NB) Ahead	72.80%	77.00%	78.60%	13	16.2	15.3	11.3	12.6	13.2
A14 EB Off Slip Left	40.6 : 40.6%	37.3 : 37.3%	38.1 : 38.1%	4.1	4.5	4	19.4	18.2	17.2
A14 EB Off Slip Ahead	84.1 : 79.6%	94.1 : 84.5%	88.7 : 88.3%	11.7	18.1	14.8	27.5	31.5	29.3

Table 7.10 Site 29 A14 J55 Copdock Interchange PM peak capacity assessment

Lane Description	Forecast PM Peak Hour								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM 85 th %	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM 85 th %	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM 85 th %
A1214 (SB) Ahead Left	73.9 : 73.9%	81.7 : 81.7%	81.8 : 81.8%	8.7	11.3	9.2	20	26.5	24.3
A1214 (SB) Ahead	46.50%	56.9%	57.2%	5.9	7.7	5.9	18.1	23.4	21.6
A14 (WB) Left	64.10%	82.1%	85.2%	7.7	11.5	10.5	25.2	38.2	36.5
A14 (WB) Ahead Left	87.4 : 63.4%	88.8 : 71.5%	83.7 : 70.7%	12	12.2	9.3	24.5	29.8	24
A12 (NB) Ahead Left	83.7 : 83.7%	99.5 : 99.5%	98.3 : 98.3%	12	45	34.3	12.2	49.4	38.1
A12 (NB) Ahead	74.40%	84.9%	75.5%	13.7	20.2	12.2	12.4	16.4	11.7
A14 EB Off Slip Left	39.7 : 39.7%	43.5 : 43.5%	41.3 : 41.3%	4.1	4.9	3.8	18.6	20.7	16.4
A14 EB Off Slip Ahead	80.1 : 84.0%	98.8 : 99.2%	89.3 : 89.9%	12.1	28.3	13.4	26.7	64	29.1

7.7.34 Shown in Image 7.7, the existing arrangement of the A1214 is a two lane link which flares to three lanes on the approach to the junction with the nearside lane being shared for ahead and left. There is a very heavy left turn movement in both the AM and PM peak hours to the A14 eastbound. This significantly impacts the capacity and safety of this approach as follows:

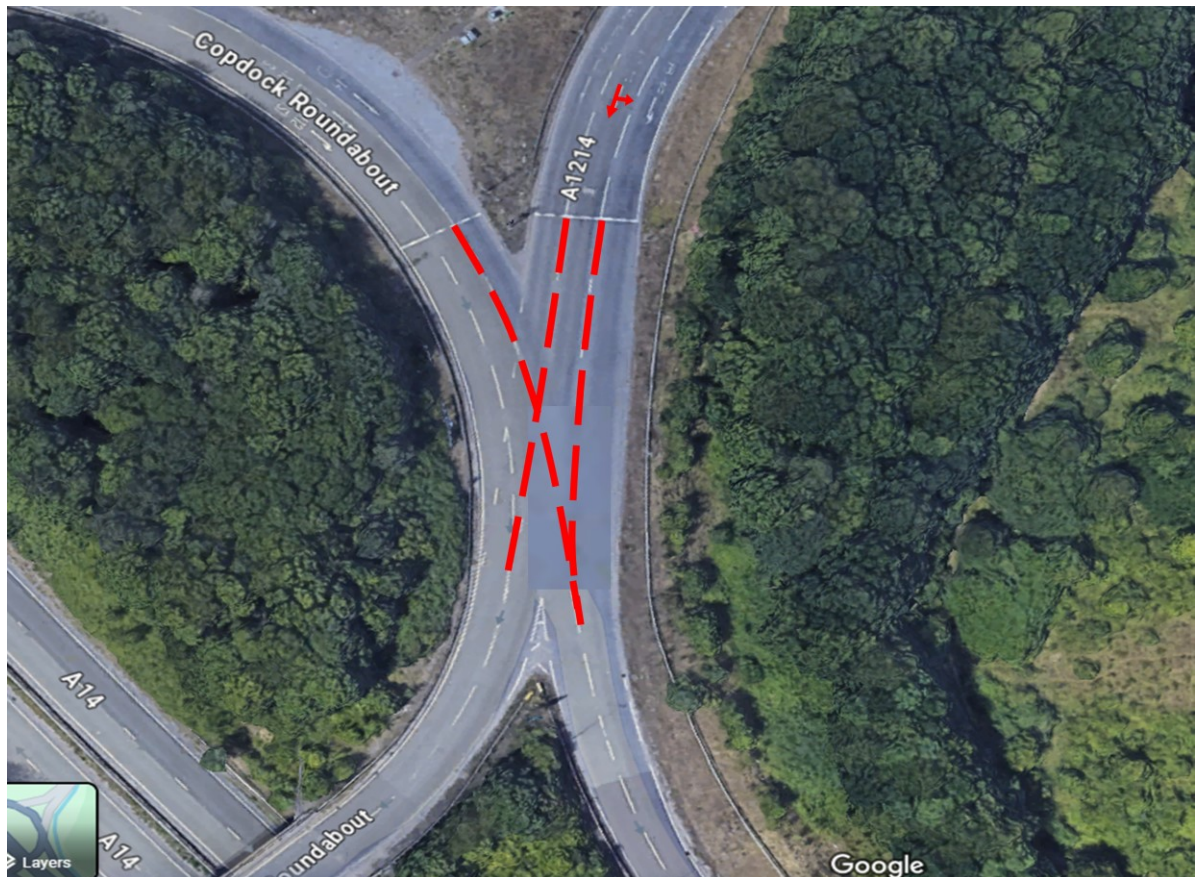
- When the nearside lane queue extends beyond ~40 m, which occurs frequently in the peak hours, the flare is no longer accessible, and lane starvation occurs. This is particularly obvious when left turning traffic is blocking ahead traffic in the nearside lane from entering the middle flare lane. Ahead traffic also can block left turning traffic from entering the nearside left turn flare, however this happens less frequently.
- Driver frustration on this approach leads to conflicting weaving movements with vehicles from both lanes attempting to squeeze past queued vehicles to access the middle ahead flare lane. Observations indicated that these aggressive manoeuvres were quite frequent and that the existing lining and lane designations can be improved to assist drivers and also improve capacity on the approach.

7.7.35 The first recommendation at this location (shown in Image 7.8) is to make the middle flare lane shared for ahead and left and to update the guidance markings between the approach and the A14 eastbound on-slip. The A14 on-slip is already two lanes so does not require any physical alterations. Updating the road markings would remove the existing issue of left turning traffic having to choose between the nearside and middle flare lanes. This will ensure that the flare is fully utilised and remove the need for traffic to make aggressive and potentially dangerous weaving movements on the approach. In addition to this, the high left turn movement does require the additional capacity of sharing the middle flare lane.

Image 7.7 A14 J55 Copdock A1214 approach issues

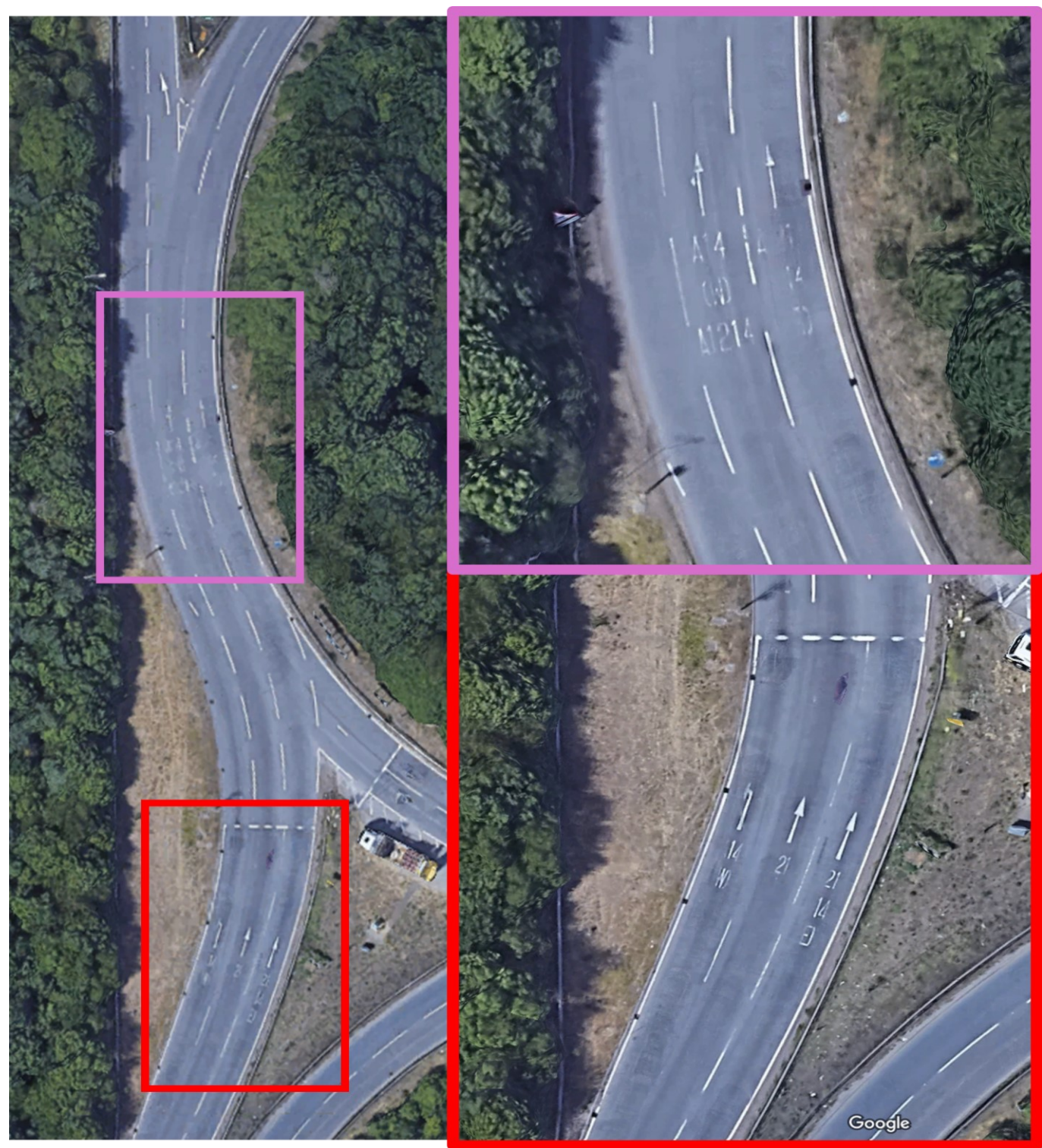


Image 7.8 A14 J55 Copdock Interchange A1214 approach recommendation



- 7.7.36 The second recommendation is on the A12 approach to the Copdock Roundabout, shown in Image 7.9. This approach has a similar arrangement to the A1214 except that the guidance markings for the A14 westbound on the circulatory section are already marked and designated as a two-lane. However, this two-lane designation and road marking is not carried back onto the A12 approach. It is recommended that the middle flare lane marking be updated to be shared left and ahead on the A12 approach.

Image 7.9 A14 J55 Copdock Interchange A12 approach lane designations



7.7.37 The Do Something (DS) modelling results for the Project worst case and 85th percentile traffic demand with these two recommendations are presented in Table 7.11 and Table 7.12.

Table 7.11 Site 29 A14 J55 Copdock Interchange AM peak capacity assessment with recommendations

Lane Description	Forecast AM Peak Hour								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM 85 th %	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM 85 th %	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM 85 th %
A1214 (SB) Ahead Left	82.8 : 82.8%	89.2 : 89.2%	80.5 : 80.5%	11.5	14.4	11.8	26.1	36.3	24.5
A1214 (SB) Ahead	56.50%	64.70%	47.50%	7.1	8.5	6.5	22.2	29.1	20.4
A14 (WB) Left	61.10%	84.80%	84.20%	7.4	12.7	12.5	23.6	41.1	40.4
A14 (WB) Ahead Left	84.9 : 56.6%	84.2 : 65.5%	84.8 : 65.5%	11.6	11.5	11.6	22.6	28.2	28.3
A12 (NB) Ahead Left	87.7 : 87.7%	88.3 : 88.3%	87.0 : 87.0%	18.1	14.7	14.2	14.8	14.2	14
A12 (NB) Ahead	72.80%	74.60%	73.70%	13	15	14.8	11.3	12.4	12.8
A14 EB Off Slip Left	40.6 : 40.6%	37.3 : 37.3%	36.5 : 36.5%	4.1	4.5	4.4	19.4	18.2	18.1
A14 EB Off Slip Ahead	84.1 : 79.6%	89.2 : 89.4%	83.9 : 85.8%	11.7	17	15	27.5	31.4	28

Table 7.12 Site 29 A14 J55 Copdock Interchange PM peak capacity assessment with recommendations

Lane Description	Forecast PM Peak Hour								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD PM	FB+CD+Project PM (DS)	FB+CD+Project PM 85 th % (DS)	FB+CD PM	FB+CD+Project PM (DS)	FB+CD+Project PM 85 th % (DS)	FB+CD PM	FB+CD+Project PM (DS)	FB+CD+Project PM 85 th % (DS)
A1214 (SB) Ahead Left	73.9 : 73.9%	79.4 : 79.4%	81.0 : 81.0%	8.7	9.1	10.7	20	21.6	27.2
A1214 (SB) Ahead	46.50%	53.0%	57.6%	5.9	5.7	7.9	18.1	19.1	24.6
A14 (WB) Left	64.10%	84.0%	84.0%	7.7	10.2	12.8	25.2	35.2	38.9
A14 (WB) Ahead Left	87.4 : 63.4%	84.9 : 70.7%	76.5 : 67.2%	12	9.5	10.3	24.5	24.2	26.4
A12 (NB) Ahead Left	88.9 : 88.9%	89.4 : 89.4%	89.2 : 89.2%	19.3	12	16.3	16.4	14.7	15.6
A12 (NB) Ahead	74.40%	86.3%	79.3%	13.7	17.2	17.2	12.4	17.5	14.7
A14 EB Off Slip Left	39.7 : 39.7%	38.2 : 38.2%	38.8 : 38.8%	4.1	3.6	4.6	18.6	14.6	19.1
A14 EB Off Slip Ahead	80.1 : 84.0%	86.2 : 87.3%	83.8 : 84.6%	12.1	13	14.3	26.7	24.6	28.5

- 7.7.38 The traffic modelling results indicate that the proposed recommendations alongside signal and cycle time optimisation would improve junction capacity compared with the reference case. In the Project worst-case traffic demand scenario the junction is still predicted to operate above practical capacity but within theoretical capacity with all DoS values on all approaches under 100%. There is an improvement in performance compared with the future base with committed development scenario on all approaches. This improvement is more evident in the 85% percentile scenario which typically performs slightly better than the other two scenarios.
- 7.7.39 Whilst it is not considered that these recommendations are a requirement or prerequisite for Project construction traffic, given their potential benefits and ease of implementation, it is assumed that they would be carried forward as the preferred improvements at the junction.
- 7.7.40 Two additional scenarios have also been tested using this arrangement, these are Multimodal Scenario 1 and Multimodal Scenario 2. The results of these two scenarios are presented in Table 7.13 and Table 7.14. The results indicate that both multimodal scenarios are viable at the junction and have similar results. The performance of both are better than the future base with committed development scenario which does not include the recommended network changes to the junction.

Table 7.13 Site 29 A14 J55 Copdock Interchange AM peak capacity assessment with recommendations - multi-modal scenarios

Lane Description	Forecast AM Peak Hour								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD AM	Multimodal scenario 1 (DS)	Multimodal scenario 2 (DS)	FB+CD AM	Multimodal scenario 1 (DS)	Multimodal scenario 2 (DS)	FB+CD AM	Multimodal scenario 1 (DS)	Multimodal scenario 2 (DS)
A1214 (SB) Ahead Left	82.8 : 82.8%	77.7 : 77.7%	77.3 : 77.3%	11.5	9.3	9.2	26.1	21.6	21.5
A1214 (SB) Ahead	56.50%	43.40%	44.30%	7.1	5.5	5.6	22.2	18.2	18.4
A14 (WB) Left	61.10%	84.80%	83.30%	7.4	11.7	11.7	23.6	39.3	36.5
A14 (WB) Ahead Left	84.9 : 56.6%	86.3 : 68.9%	81.8 : 65.6%	11.6	11.1	10.4	22.6	27.4	25.3
A12 (NB) Ahead Left	87.7 : 87.7%	83.5 : 83.5%	82.0 : 82.0%	18.1	10.4	9.4	14.8	13.4	12.3
A12 (NB) Ahead	72.80%	79.10%	78.20%	13	15.8	15.3	11.3	15.9	14.9
A14 EB Off Slip Left	40.6 : 40.6%	36.0 : 36.0%	37.6 : 37.6%	4.1	3.9	4	19.4	17.2	18.1
A14 EB Off Slip Ahead	84.1 : 79.6%	84.6 : 85.9%	88.4 : 88.2%	11.7	13.9	14.7	27.5	27.2	30.4

Table 7.14 Site 29 A14 J55 Copdock Interchange PM Peak capacity assessment with recommendations – multi-modal scenarios

Lane Description	Forecast PM Peak Hour								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD PM	Multimodal scenario 1 (DS)	Multimodal scenario 2 (DS)	FB+CD PM	Multimodal scenario 1 (DS)	Multimodal scenario 2 (DS)	FB+CD PM	Multimodal scenario 1 (DS)	Multimodal scenario 2 (DS)
A1214 (SB) Ahead Left	73.9 : 73.9%	79.5 : 79.5%	83.1 : 83.1%	8.7	9.3	10.2	20	25	27.7
A1214 (SB) Ahead	46.50%	58.4%	60.7%	5.9	7.2	7.3	18.1	23.4	24.8
A14 (WB) Left	64.10%	74.3%	80.2%	7.7	9.7	10.8	25.2	28.8	33.3
A14 (WB) Ahead Left	87.4 : 63.4%	77.7 : 66.0%	81.1 : 69.1%	12	10.1	10.4	24.5	23.4	25
A12 (NB) Ahead Left	88.9 : 88.9%	89.8 : 89.8%	88.0 : 88.0%	19.3	15.7	13.2	16.4	16.2	14.7
A12 (NB) Ahead	74.40%	78.5%	80.1%	13.7	15.3	16.1	12.4	14.4	15.1
A14 EB Off Slip Left	39.7 : 39.7%	41.6 : 41.6%	39.7 : 39.7%	4.1	4.2	4.1	18.6	19.5	18.6
A14 EB Off Slip Ahead	80.1 : 84.0%	86.9 : 85.0%	76.6 : 87.5%	12.1	12.9	12.7	26.7	29.9	26.7

Site 35 - A140 Stoke Ash Priority Crossroad

- 7.7.41 The A140, Stoke Road and Workhouse Road junction is a small priority crossroad consisting of four arms located near to Stoke Ash, Suffolk. The area is rural and the junction intersects the main A140 route with minor roads providing local access to villages.
- 7.7.42 Aerial imagery of the junction is presented in Image 7.10 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.15.

Image 7.10 A140 Stoke Ash priority crossroad



- 7.7.43 In the AM peak, the Junctions assessment indicates that the junction operates within capacity in all scenarios; however, base scenario delays are recorded on the Stoke Road (E) Right and Ahead movement at 41 seconds and the Workhouse Road (W) Right and Ahead movement at 42 seconds. These delays increase in subsequent scenarios. During the PM peak none of the junction movements are predicted to operate above capacity in any scenario.
- 7.7.44 The addition of the Project traffic is predicted to increase delays on Stoke Road and Workhouse Road by approximately 33 and 25 seconds respectively in the AM peak. However, the assessment does not predict any capacity issues once construction traffic is applied to Future Base plus Committed Development flows.

Table 7.15 Site 35 A140 Stoke Ash priority crossroad capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Stoke Road (E) Left and Ahead	0.2	22.45	0.14	0.2	22.13	0.17
Stoke Road (E) Right and Ahead	0.4	40.74	0.28	0.2	26.21	0.18
A140 (N) All Directions	1.4	4.98	0.32	1.6	6.85	0.41
Workhouse Road (W) Left and Ahead	0.6	19.34	0.37	0.4	18.44	0.29
Workhouse Road (W) Right and Ahead	0.6	41.93	0.40	0.3	30.71	0.26
A140 (S) All Directions	0.3	4.39	0.11	0.2	4.34	0.09
Future Base						
Stoke Road (E) Left and Ahead	0.2	25.21	0.16	0.2	24.33	0.18
Stoke Road (E) Right and Ahead	0.4	48.68	0.31	0.2	28.95	0.20
A140 (N) All Directions	1.7	5.06	0.35	1.8	7.12	0.44
Workhouse Road (W) Left and Ahead	0.7	22.85	0.41	0.5	20.75	0.32
Workhouse Road (W) Right and Ahead	0.8	50.89	0.46	0.4	35.28	0.30
A140 (S) All Directions	0.3	4.37	0.12	0.2	4.29	0.10
Future Base plus Committed Developments						
Stoke Road (E) Left and Ahead	0.2	25.21	0.16	0.2	24.33	0.18
Stoke Road (E) Right and Ahead	0.4	48.68	0.31	0.2	28.95	0.20
A140 (N) All Directions	1.7	5.06	0.35	1.8	7.12	0.44
Workhouse Road (W) Left and Ahead	0.7	22.85	0.41	0.5	20.75	0.32
Workhouse Road (W) Right and Ahead	0.8	50.89	0.46	0.4	35.28	0.30

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
A140 (S) All Directions	0.3	4.37	0.12	0.2	4.29	0.10
Future Base plus Committed Developments and Project						
Stoke Road (E) Left and Ahead	0.3	35.64	0.22	0.3	32.74	0.22
Stoke Road (E) Right and Ahead	0.6	81.42	0.40	0.3	40.32	0.24
A140 (N) All Directions	2.2	5.40	0.41	2.4	7.58	0.48
Workhouse Road (W) Left and Ahead	1.0	32.97	0.51	0.6	28.21	0.40
Workhouse Road (W) Right and Ahead	1.1	76.15	0.58	0.6	50.98	0.38
A140 (S) All Directions	0.4	4.24	0.15	0.3	4.24	0.11

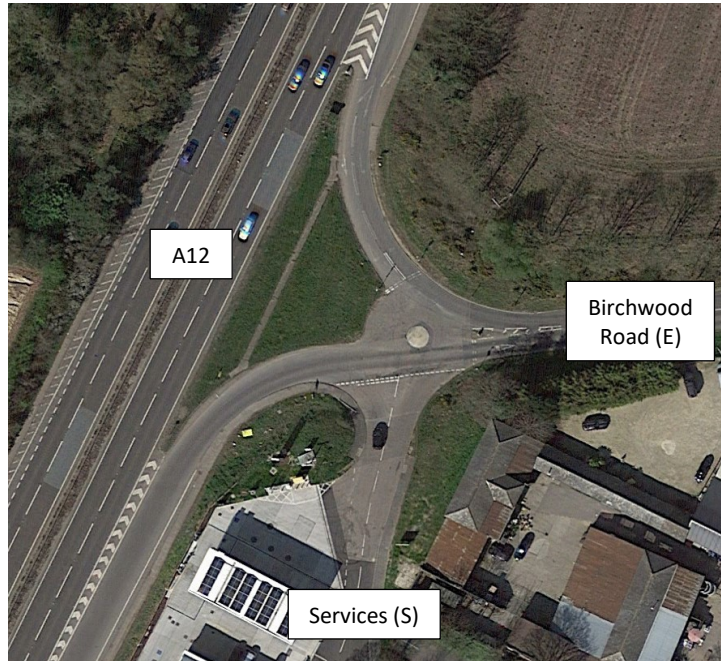
- 7.7.45 Safety concerns have been raised by the relevant Local Highway Authority at this junction. As a result some mitigation measures to reduce user risk may be identified and implemented in the future. These may be in the form of speed reductions; however, these are yet to be agreed with relevant stakeholders. No mitigation has been proposed based solely upon capacity results presented above.

Essex Junctions

Site 36 – A12/Birchwood Road mini-roundabout

- 7.7.46 The A12 and Birchwood Road junction is a mini-roundabout located between Junctions 29 and 30 of the A12, west of Lamb Corner, Essex. It is a four-arm roundabout and connects entry and exit slips of the A12 to local villages and towns.
- 7.7.47 Aerial imagery of the junction is presented in Image 7.11 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.16.

Image 7.11 A12/Birchwood Road mini-roundabout



- 7.7.48 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.7.49 The addition of the Project traffic has a negligible impact on junction operation. The highest RFC occurs in the AM on Birchwood Road (E), with a delay of 7 seconds and an RFC of 0.45.

Table 7.16 Site 36 A12/Birchwood Road mini-roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A12 Ipswich Road SB (N)	0.3	5.68	0.24	0.5	6.34	0.34
Birchwood Road (E)	0.6	6.23	0.39	0.4	5.36	0.29
Services (S)	0.1	4.70	0.12	0.1	4.63	0.12
A12 Ipswich Road SB (W)	0.0	0.00	0.00	0.0	0.00	0.00
Future Base						
A12 Ipswich Road SB (N)	0.4	5.76	0.25	0.6	6.48	0.35
Birchwood Road (E)	0.7	6.41	0.41	0.4	5.47	0.30
Services (S)	0.1	4.78	0.12	0.1	4.68	0.12
A12 Ipswich Road SB (W)	0.0	0.00	0.00	0.0	0.00	0.00
Future Base plus Committed Developments						
A12 Ipswich Road SB (N)	0.4	5.76	0.25	0.6	6.48	0.35
Birchwood Road (E)	0.7	6.41	0.41	0.4	5.47	0.30
Services (S)	0.1	4.78	0.12	0.1	4.68	0.12
A12 Ipswich Road SB (W)	0.0	0.00	0.00	0.0	0.00	0.00
Future Base plus Committed Developments and Project						
A12 Ipswich Road SB (N)	0.5	6.64	0.33	0.7	7.22	0.39
Birchwood Road (E)	0.8	7.08	0.45	0.6	6.30	0.37
Services (S)	0.1	4.93	0.13	0.1	4.93	0.13
A12 Ipswich Road SB (W)	0.0	0.00	0.00	0.0	0.00	0.00

Site 38 - A120 Ardleigh Crown Interchange

- 7.7.50 The A120 Ardleigh Crown Interchange junction is a large partially signalised roundabout located in the north of Colchester, Essex. It is a four-arm junction which connects Junction 29 of the A12 to the A120 and the A1232 local road into Colchester.
- 7.7.51 Aerial imagery of the junction is presented in Image 7.12 and has been assessed using LinSig. The capacity assessments are presented in Table 7.17 and Table 7.18.

Image 7.12 A120 Ardleigh Crown Interchange



- 7.7.52 The assessment results provided in Table 7.16 and Table 7.17, indicates that the roundabout is predicted to operate above capacity in the AM and PM peak for all scenarios. In particular the A1232 Ipswich Road northbound which is predicted to operate with a DoS above 100% and with long queues and delays. The junction does have notable queue storage on the slip roads and approaches, however the queue on A120 single lane approach is predicted to block back past the A12 diverge in the future base with committed development scenario. This queue is predicted to worsen with the addition of the Project traffic.

Table 7.17 Site 38 A120 Ardleigh Crown Interchange AM peak capacity assessment

Approach	AM Peak								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM 85th %	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM 85th %	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM 85th %
A12 (SB) Ahead Left	79.1 : 78.6%	98.6 : 98.6%	97.8 : 97.8%	1.8	23.8	20.9	5.9	39.5	34.2
A12 (SB) Ahead	63.9%	67.8%	66.4%	0.9	1.0	1.0	7.0	7.7	7.5
A120 (WB) Ahead Left	94.6%	97.8%	97.8%	21.4	25.8	25.8	40.7	56.8	56.8
A120 (WB) Ahead	73.2%	82.4%	78.4%	10.5	13.4	11.9	18.1	23.2	21.0
A1232 Ipswich Road (NB) Left	15.6%	16.9%	16.2%	0.4	0.5	0.4	7.5	9.1	8.3
A1232 Ipswich Road (NB) Ahead	112.5%	121.4%	116.7%	45.3	58.2	51.3	253.2	367.1	307.6
A1232 Ipswich Road (NB) Ahead	112.5%	121.4%	116.7%	45.3	58.2	51.3	253.2	367.1	307.6
A120 (EB) Ahead Left	135.7%	139.7%	137.6%	125.4	132.3	128.7	523.6	564.0	542.8

Table 7.18 Site 38 A120 Ardleigh Crown Interchange PM peak capacity assessment

Approach	PM Peak								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM 85th %	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM 85th %	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM 85th %
A12 (SB) Ahead Left	83.7 : 90.0%	102.9 : 102.9%	86.7 : 94.2%	3.7	56.6	6.7	10.3	85.6	13.9
A12 (SB) Ahead	55.1%	59.1%	57.1%	0.6	0.7	0.7	6.2	6.7	6.4
A120 (WB) Ahead Left	88.9%	88.9%	62.8%	14.0	14.0	8.4	36.5	36.5	13.2
A120 (WB) Ahead	56.2%	71.8%	51.5%	6.1	8.8	6.1	19.3	23.5	11.4
A1232 Ipswich Road (NB) Left	73.6%	80.2%	80.0%	4.8	7.4	5.6	13.1	19.7	17.5
A1232 Ipswich Road (NB) Ahead	86.4%	94.2%	93.9%	9.8	13.9	11.4	23.8	46.9	42.8
A1232 Ipswich Road (NB) Ahead	90.0%	98.1%	97.8%	11.5	18.2	17.9	30.2	68.5	63.3
A120 (EB) Ahead Left	137.9%	153.8%	153.3%	129.6	154.8	154.0	547.1	691.0	685.4

7.7.53 An assessment of the multi-modal Scenario 2 is provided in Table 7.19 and Table 7.20, the modelling results indicate that there would continue to be long queues on the A1232 northbound and A120 eastbound. All arms are predicted operate above capacity in the AM peak, and the A1232 northbound and A120 eastbound above capacity in the PM peak. Queueing would not reach the mainlines on the A12 southbound or A120 westbound approaches.

Table 7.19 Site 38 A120 Ardleigh Crown Interchange AM peak multi-modal capacity assessment with mitigation – multi-modal scenario 2

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	Multimodal 2	FB+CD AM	Multimodal 2	FB+CD AM	Multimodal 2
A12 (SB) Ahead Left	79.1 : 78.6%	100.7 : 100.7%	1.8	50.9	5.9	57.6
A12 (SB) Ahead	63.9%	66.2%	0.9	1.0	7.0	7.5
A120 (WB) Ahead Left	94.6%	97.8%	21.4	25.8	40.7	56.8
A120 (WB) Ahead	73.2%	75.7%	10.5	11.1	18.1	19.8
A1232 Ipswich Road (NB) Left	15.6%	15.8%	0.4	0.4	7.5	7.7
A1232 Ipswich Road (NB) Ahead	112.5%	113.8%	45.3	46.9	253.2	269.8
A1232 Ipswich Road (NB) Ahead	112.5%	114.3%	45.3	47.9	253.2	276.5
A120 (EB) Ahead Left	135.7%	136.4%	125.4	126.6	523.6	530.9

Table 7.20 Site 38 A120 Ardleigh Crown Interchange PM peak multi-modal capacity assessment with mitigation – multi-modal scenario 2

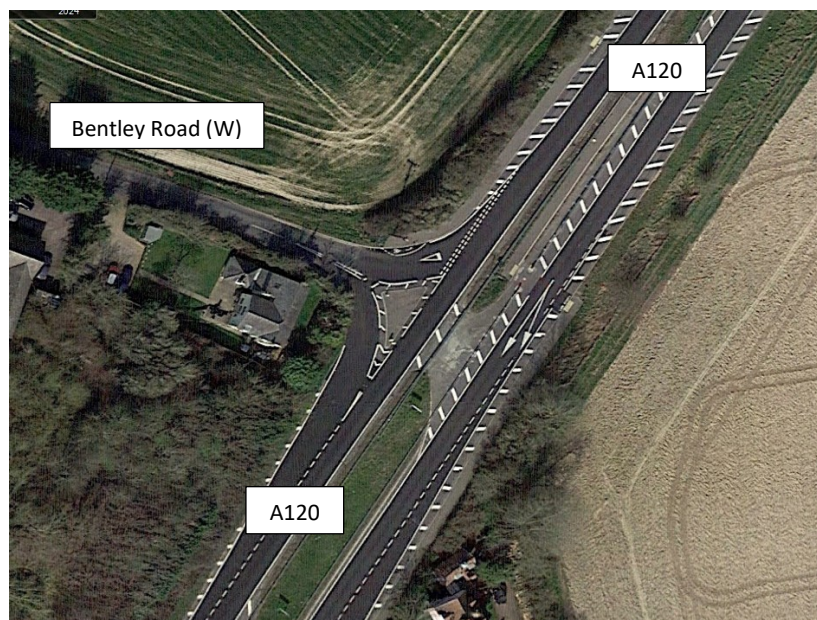
Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	Multimodal 2	FB+CD PM	Multimodal 2	FB+CD PM	Multimodal 2
A12 (SB) Ahead Left	83.7 : 90.0%	81.2 : 87.4%	3.7	4.1	10.3	8.5
A12 (SB) Ahead	55.1%	56.2%	0.6	0.6	6.2	6.2
A120 (WB) Ahead Left	88.9%	88.9%	14.0	14.0	36.5	36.5
A120 (WB) Ahead	56.2%	77.5%	6.1	10.2	19.3	26.0

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	Multimodal 2	FB+CD PM	Multimodal 2	FB+CD PM	Multimodal 2
A1232 Ipswich Road (NB) Left	73.6%	81.4%	4.8	7.6	13.1	21.7
A1232 Ipswich Road (NB) Ahead	86.4%	95.6%	9.8	15.2	23.8	54.4
A1232 Ipswich Road (NB) Ahead	90.0%	99.6%	11.5	20.1	30.2	80.8
A120 (EB) Ahead Left	137.9%	156.7%	129.6	158.9	547.1	714.4

Site 39 - A120 Harwich Road / Bentley Road Priority Junction

- 7.7.54 The A120 Harwich Road and Bentley Road junction is a small priority T-junction located approximately 10 km west of Colchester, Essex. The junction provides access to the A120 northbound towards Harwich for traffic travelling from local rural routes as well an exit for northbound traffic travelling along the A120.
- 7.7.55 Aerial imagery of the junction is presented in Image 7.13 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.21.

Image 7.13 A120 Harwich Road / Bentley Road priority junction



- 7.7.56 The Junctions assessment indicates that during the AM peak, none of the junction movements are predicted to operate above capacity in any scenario.
- 7.7.57 In the PM peak, the Bentley Road (W) left turn is estimated to experience 100 seconds of delay and exceed capacity with an RFC of 0.93 in the Future Base plus Committed Developments and Project flow scenario. This left turn movement is predicted to operate over capacity in both multi-modal flow scenarios.

Table 7.21 Site 39 A120 Harwich Road / Bentley Road priority junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Bentley Road (W) Left Turn	0.1	7.93	0.07	0.1	10.17	0.08
Future Base						
Bentley Road (W) Left Turn	0.1	8.09	0.07	0.1	10.63	0.08
Future Base plus Committed Developments						
Bentley Road (W) Left Turn	0.6	21.79	0.29	1.3	27.34	0.54
Future Base plus Committed Developments and Project						
Bentley Road (W) Left Turn	1.5	32.92	0.48	8.9	100.65	0.93
Scenario 1 Multi-modal Flows						
Bentley Road (W) Left Turn	0.7	24.68	0.33	18.4	196.91	1.06
Scenario 2 Multi-modal Flows						
Bentley Road (W) Left Turn	0.6	23.24	0.30	13.7	152.06	1.02

7.7.58 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.22 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.22 Site 39 A120 Harwich Road / Bentley Road priority junction capacity assessment with reduced peak hour flows

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
Bentley Road (W) Left Turn	1.5	32.92	0.48	8.9	100.65	0.93
Future Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)						
Bentley Road (W) Left Turn	1.0	26.62	0.39	2.5	36.20	0.69

- 7.7.59 The lower construction traffic flow assessment illustrates the RFC on the Bentley Road (W) left turn movement operates within capacity at 0.69.
- 7.7.60 This junction is also expected to be used by construction traffic relating to the proposed North Falls and Five Estuaries wind farm projects. It is noted that separate mitigation measures consisting of a lengthening of the merge taper onto the A120 northbound are being considered to cater for the Project and/or the wind farms, whichever becomes operational first. The impacts of this merge taper lengthening could not be accurately modelled within Junctions software. It is proposed to monitor the operation of the junction, in particular the operation of the lengthened merge taper.

Site 40 - A12 Severalls Interchange

- 7.7.61 The A12 Severalls Interchange is a large, grade-separated roundabout located on the northern edge of Colchester, Essex. It is a five-arm dumbbell-shaped roundabout which connects the A134 with Junction 28 of the A12.
- 7.7.62 Aerial imagery of the junction is presented in Image 7.14 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.23.

Image 7.14 A12 Severalls Interchange



- 7.7.63 The Junctions assessment indicates that the roundabouts are generally operating within capacity with no significant delays. The one exception is the Via Urbis Romanae (S) arm on the southern roundabout, which is over capacity in both the AM and PM peaks and experiences high queue lengths and delays in the PM peak. In the AM peak, the Via Urbis Romanae (S) arm is marginally above capacity in the Base scenario with an RFC of 0.85, increasing to 0.88 in the Future Base. This arm performs poorly in the PM base with high queuing and delays, subsequently worsening in all PM future year scenarios.
- 7.7.64 The addition of the Project traffic has a marginal impact upon capacity when compared with the Future Base plus Committed Development scenario. On the Via Urbis Romanae (S) arm on the southern roundabout, RFC increases from 0.88 to 0.93 in the AM, and 1.07 to 1.12 in the PM. This arm was already above practical capacity in the AM and theoretical capacity in the AM with Committed Development

traffic. The queuing and delays estimated in the PM peak are large in magnitude, with 186 PCU (1,070 m) of queuing predicted, however it should be noted that queuing and delay results increase exponentially above an RFC of 1 and thus may be overestimated in the modelling.

Table 7.23 Site 40 A12 Severalls Interchange capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
North Rbt – Park and Ride	0.5	6.09	0.31	0.8	7.17	0.44
North Rbt – Via Urbis Romanae	1.1	5.53	0.51	1.9	7.30	0.65
North Rbt – A12 Off Slip (EB)	0.8	3.49	0.43	0.7	3.54	0.42
South Rbt – Via Urbis Romanae (N)	0.7	3.11	0.40	0.7	3.10	0.41
South Rbt – A12 Off Slip (WB)	0.7	3.34	0.41	0.6	2.94	0.36
South Rbt – Via Urbis Romanae (S)	5.4	17.49	0.85	43.4	112.23	1.03
South Rbt – Access Road	0.2	5.22	0.13	0.1	5.91	0.10
Future Base						
North Rbt – Park and Ride	0.5	6.39	0.33	0.9	7.60	0.47
North Rbt – Via Urbis Romanae	1.2	5.73	0.53	1.8	7.14	0.64
North Rbt – A12 Off Slip (EB)	0.8	3.63	0.45	0.8	3.67	0.44
South Rbt – Via Urbis Romanae (N)	0.7	3.18	0.42	0.7	3.18	0.42
South Rbt – A12 Off Slip (WB)	0.8	3.48	0.43	0.6	3.04	0.37
South Rbt – Via Urbis Romanae (S)	6.7	20.97	0.88	76.8	207.75	1.07
South Rbt – Access Road	0.2	5.41	0.14	0.1	5.98	0.11
Future Base plus Committed Developments						
North Rbt – Park and Ride	0.5	6.39	0.33	0.9	7.60	0.47
North Rbt – Via Urbis Romanae	1.2	5.73	0.53	1.8	7.14	0.64
North Rbt – A12 Off Slip (EB)	0.8	3.63	0.45	0.8	3.67	0.44
South Rbt – Via Urbis Romanae (N)	0.7	3.18	0.42	0.7	3.18	0.42

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
South Rbt – A12 Off Slip (WB)	0.8	3.48	0.43	0.6	3.04	0.37
South Rbt – Via Urbis Romanae (S)	6.7	20.97	0.88	76.8	207.75	1.07
South Rbt – Access Road	0.2	5.41	0.14	0.1	5.98	0.11
Future Base plus Committed Developments and Project						
North Rbt – Park and Ride	0.6	6.81	0.34	1.0	8.38	0.48
North Rbt – Via Urbis Romanae	1.5	6.53	0.58	1.9	7.36	0.66
North Rbt – A12 Off Slip (EB)	0.9	3.79	0.46	0.8	3.80	0.45
South Rbt – Via Urbis Romanae (N)	0.7	3.18	0.42	0.7	3.18	0.42
South Rbt – A12 Off Slip (WB)	0.9	3.79	0.46	0.7	3.31	0.41
South Rbt – Via Urbis Romanae (S)	10.2	29.88	0.93	185.9	487.76	1.12
South Rbt – Access Road	0.2	5.68	0.14	0.1	6.15	0.11

7.7.65 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.24 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.24 Site 40 A12 Severalls Interchange capacity assessment with reduced peak hour flows

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
North Rbt – Park and Ride	0.6	6.81	0.34	1.0	8.38	0.48
North Rbt – Via Urbis Romanae	1.5	6.53	0.58	1.9	7.36	0.66

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
North Rbt – A12 Off Slip (EB)	0.9	3.79	0.46	0.8	3.80	0.45
South Rbt – Via Urbis Romanae (N)	0.7	3.18	0.42	0.7	3.18	0.42
South Rbt – A12 Off Slip (WB)	0.9	3.79	0.46	0.7	3.31	0.41
South Rbt – Via Urbis Romanae (S)	10.2	29.88	0.93	185.9	487.76	1.12
South Rbt – Access Road	0.2	5.68	0.14	0.1		6.15
Future Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)						
North Rbt – Park and Ride	0.6	6.59	0.34	0.9	7.93	0.47
North Rbt – Via Urbis Romanae	1.3	6.11	0.55	1.8	7.18	0.64
North Rbt – A12 Off Slip (EB)	0.9	3.71	0.45	0.8	3.73	0.44
South Rbt – Via Urbis Romanae (N)	0.7	3.18	0.42	0.7	3.18	0.42
South Rbt – A12 Off Slip (WB)	0.9	3.63	0.45	0.7	3.18	0.39
South Rbt – Via Urbis Romanae (S)	8.2	24.84	0.91	125.3	335.73	1.09
South Rbt – Access Road	0.2	5.54	0.14	0.1	6.07	0.11

- 7.7.66 The lower construction traffic flow sensitivity assessment illustrates that Via Urbis Romanae is still predicted to operate significantly over theoretical capacity in the PM peak (RFC>1.0) with significant queuing, however these capacity issues are predicted to occur as a result of background traffic growth and other committed developments rather than being triggered by the temporary Project traffic.
- 7.7.67 It is proposed that temporary signage warning of potential congestion as a result of the Project traffic be provided on approach to this junction. However, given capacity issues are predicted to occur prior to the addition of construction traffic and short duration of the modelled worst-case peak flows, no other mitigation has been proposed at this junction.

- 7.7.68 As described in Section 5.4 this junction along with site 41 (A1341 Via Urbis Romanae / United Way) immediately to the south are proposed to be signalised. A proposal for these is provided as part of planning application reference 190665 in support of a new local development. The improvement plans are expected to be in place during the Project peak construction activity.

Site 46 – A12 J26 Eight Ash Green Interchange

- 7.7.69 The A12 Junction 26 Eight Ash Green Interchange is a large signalised, four-arm roundabout located west of Colchester, near Stanway, Essex. It facilitates access between surrounding villages, residential developments and commercial areas to the A12.
- 7.7.70 Aerial imagery of the junction is presented in Image 7.15 and has been assessed using LinSig. The capacity assessments are presented in Table 7.25 and Table 7.26.

Image 7.15 A12 J26 Eight Ash Green Interchange



- 7.7.71 The assessment indicates that the signalised junction operates within capacity across all scenarios and time periods, with no significant delays. The highest DoS occurs in the PM Future Base plus Committed Development and Project flows on the Ahead Lane of the A12 EB, with a delay of 50.5 seconds and a DoS of 84%.

Table 7.25 Site 46 A12 J26 Eight Ash Green Interchange AM peak capacity assessment

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
A1124 Halstead Road (SB) Ahead Left	68.9%	69.4%	11.4	12	24.5	23.1
A1124 Halstead Road (SB) Ahead	60.8%	58.9%	9.4	9.3	22.4	20.5
A12 (WB) Left	77.0%	78.5%	12.8	13.5	25.8	25.8
A12 (WB) Ahead Left	77.0%	78.4%	12.8	13.4	25.8	25.7
A1124 Essex Yeomanry Way (NB) Ahead Left	71.4%	72.9%	13	13.4	25.8	25.7
A1124 Essex Yeomanry Way (NB) Ahead	65.4%	67.5%	11.8	12.1	20.3	21.6
A12 (EB) Ahead Left	39.7%	39.7%	2.9	2.9	34.4	34.4
A12 (EB) Ahead	72.8%	72.8%	6.4	6.4	46	46

Table 7.26 Site 46 A12 J26 Eight Ash Green Interchange PM peak capacity assessment

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
A1124 Halstead Road (SB) Ahead Left	65.1%	69.5%	9.9	11.1	26.4	26.9
A1124 Halstead Road (SB) Ahead	57.4%	56.3%	8.2	8.2	24.6	23.5
A12 (WB) Left	71.5%	76.5%	12	13.4	20.3	23
A12 (WB) Ahead Left	71.4%	76.4%	11.9	13.4	20.2	23
A1124 Essex Yeomanry Way (NB) Ahead Left	73.4%	72.8%	13.9	13.6	21.6	21.3
A1124 Essex Yeomanry Way (NB) Ahead	74.4%	74.9%	14.7	14.8	21.6	21.8
A12 (EB) Ahead Left	38.7%	38.7%	3.4	3.4	30.2	30.2
A12 (EB) Ahead	84.0%	84.0%	10	10	50.5	50.5

Site 47 - A120 Coggeshall Rd / Great Tey Rd Priority Junction

- 7.7.72 The junction between the A120 Coggeshall Road and Great Tey Road is a priority T-junction located to the west of Marks Tey, Essex. The junction connects rural areas of Essex to the A120, a key route through Essex.
- 7.7.73 Aerial imagery of the junction is presented in Image 7.16 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.27.

Image 7.16 A120 Coggeshall Rd / Great Tey Rd priority junction



- 7.7.74 The Junctions assessment indicates that Great Tey Road would operate over practical capacity in the AM Future Base plus Committed Development scenario with an RFC value of 0.93 on the right and ahead turn. In the PM peak, noticeable delays are predicted on the Access Road and Great Tey Road, however both are predicted to operate within capacity.
- 7.7.75 The introduction of the Project traffic has a minor impact on capacity when compared with the Future Base plus Committed Development scenario. In the AM peak, Great Tey Road RFC values increase to 1.49 and 1.55, which is above theoretical capacity. In the PM, delay increases along the Access Road and Great Tey Road however RFC values remain below capacity.

Table 7.27 Site 47 A120 Coggeshall Rd / Great Tey Rd priority junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Access Road (S) Left and Ahead	0.1	16.15	0.05	0.0	0.00	0.00
Access Road (S) Right and Ahead	0.0	0.00	0.00	0.2	66.34	0.10
A120 Coggeshall Road (E) All Directions	0.3	10.51	0.23	0.3	11.01	0.25
Great Tey Road (N) Left and Ahead	0.3	17.15	0.22	0.3	11.20	0.20
Great Tey Road (N) Right and Ahead	1.5	76.38	0.64	0.4	41.66	0.28
A120 Coggeshall Road (W) All Directions	0.0	0.00	0.00	0.0	0.00	0.00
Future Base						
Access Road (S) Left and Ahead	0.1	16.79	0.05	0.0	0.00	0.00
Access Road (S) Right and Ahead	0.0	0.00	0.00	0.3	81.95	0.12
A120 Coggeshall Road (E) All Directions	0.3	11.02	0.24	0.4	11.58	0.27
Great Tey Road (N) Left and Ahead	0.6	34.04	0.37	0.3	12.27	0.23
Great Tey Road (N) Right and Ahead	2.4	120.39	0.82	0.5	52.97	0.34
A120 Coggeshall Road (W) All Directions	0.0	0.00	0.00	0.0	0.00	0.00
Future Base plus Committed Developments						
Access Road (S) Left and Ahead	0.1	17.03	0.05	0.0	0.00	0.00
Access Road (S) Right and Ahead	0.0	0.00	0.00	0.3	93.32	0.14

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
A120 Coggeshall Road (E) All Directions	0.3	11.31	0.25	0.4	11.81	0.27
Great Tey Road (N) Left and Ahead	1.9	102.66	0.69	0.3	12.85	0.24
Great Tey Road (N) Right and Ahead	3.2	167.90	0.93	0.5	60.87	0.37
A120 Coggeshall Road (W) All Directions	0.0	0.00	0.00	0.0	0.00	0.00
Future Base plus Committed Developments and Project						
Access Road (S) Left and Ahead	0.1	17.65	0.06	0.0	0.00	0.00
Access Road (S) Right and Ahead	0.0	0.00	0.00	0.5	165.95	0.23
A120 Coggeshall Road (E) All Directions	0.4	12.46	0.27	0.4	12.46	0.28
Great Tey Road (N) Left and Ahead	13.9	525.49	1.55	0.6	18.33	0.34
Great Tey Road (N) Right and Ahead	9.0	622.34	1.49	0.9	105.01	0.48
A120 Coggeshall Road (W) All Directions	0.0	0.00	0.00	0.0	0.00	0.00

7.7.76 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.28 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.28 Site 47 A120 Coggeshall Rd / Great Tey Rd priority junction capacity assessment with reduced peak hour flows

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
Access Road (S) Left and Ahead	0.1	17.65	0.06	0.0	0.00	0.00
Access Road (S) Right and Ahead	0.0	0.00	0.00	0.5	165.95	0.23
A120 Coggeshall Road (E) All Directions	0.4	12.46	0.27	0.4	12.46	0.28
Great Tey Road (N) Left and Ahead	13.9	525.49	1.55	0.6	18.33	0.34
Great Tey Road (N) Right and Ahead	9.0	622.34	1.49	0.9	105.01	0.48
A120 Coggeshall Road (W) All Directions	0.0	0.00	0.00	0.0	0.00	0.00
Future Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)						
Access Road (S) Left and Ahead	0.1	17.33	0.05	0.0	0.00	0.00
Access Road (S) Right and Ahead	0.0	0.00	0.00	0.4	119.68	0.17
A120 Coggeshall Road (E) All Directions	0.3	11.86	0.26	0.4	12.12	0.28
Great Tey Road (N) Left and Ahead	6.7	277.53	1.18	0.4	14.90	0.28
Great Tey Road (N) Right and Ahead	5.1	338.59	1.15	0.7	77.45	0.40
A120 Coggeshall Road (W) All Directions	0.0	0.00	0.00	0.0	0.00	0.00

7.7.77 The reduced flow assessment illustrates that Great Tey Road is still predicted to operate over capacity in the AM Peak. Further discussion surrounding mitigation options is expected to take place with both Essex County Council Local Highway Officers and National Highways to determine the feasibility of potential options to improve junction operation.

Site 48 - A120 Braintree Bypass / B1018 Braintree Rd roundabout

- 7.7.78 The A120 Braintree Bypass and B1018 Braintree Rd Roundabout, also known as Galleys Corner roundabout, is located on the south-eastern edge of Braintree. It is a five-arm roundabout which connects the A120 to local routes to access Braintree town centre and surrounding villages.
- 7.7.79 Aerial imagery of the junction is presented in Image 7.17 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.29.

Image 7.17 A120 Braintree Bypass / B1018 Braintree Rd roundabout



- 7.7.80 The Junctions assessment indicates that during the AM peak, the 2024 Base scenario shows the A120 (NE) and Long Green (E) arms to be over capacity, with RFCs of 0.93 and 1.08 respectively. The Long Green (E) arm experiences 119 seconds of delay in the 2024 Base scenario. These issues persist into subsequent scenarios. During the AM and PM peak, the roundabout is marginally above capacity on the Cressing Road (North-west (NW)) arm in the Future Base scenario, with an RFC of 0.88 and 0.85 respectively. This increases to 0.90 in the AM and 0.89 in the PM with Committed Development flows.
- 7.7.81 The introduction of the Project traffic has a marginal impact upon capacity when compared with the Future Base plus Committed Developments scenario. In both peaks RFC values rise by 4-17 percentage points. This would exacerbate existing capacity issues already predicted to exist without any Project construction traffic. It should be noted that modelled delays and queuing rise exponentially above RFC values of 1, so the modelled results presented below may be over-estimated. However, the general conclusion that the junction is over capacity remains the same.

Table 7.29 Site 48 A120 Braintree Bypass / B1018 Braintree Rd roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A120 (NE)	11.1	27.15	0.93	2.3	5.57	0.68
Long Green (E)	17.0	118.56	1.08	1.2	15.16	0.55
B1018 (S)	1.7	10.19	0.62	1.8	6.86	0.64
A120 (W)	1.8	3.75	0.63	1.9	4.00	0.63
Cressing Road (NW)	4.3	28.66	0.82	3.2	27.21	0.77
Future Base						
A120 (NE)	17.1	41.18	0.97	2.6	6.18	0.71
Long Green (E)	40.5	387.50	1.21	1.5	18.36	0.60
B1018 (S)	2.0	11.40	0.65	2.1	7.65	0.68
A120 (W)	2.0	3.97	0.65	2.1	4.31	0.66
Cressing Road (NW)	6.4	41.90	0.88	5.0	42.32	0.85
Future Base plus Committed Developments						
A120 (NE)	18.9	45.09	0.98	2.7	6.50	0.73
Long Green (E)	69.8	648.40	1.29	1.8	20.86	0.64
B1018 (S)	2.3	12.50	0.69	2.2	7.94	0.69
A120 (W)	2.1	4.05	0.66	2.2	4.47	0.67
Cressing Road (NW)	7.4	48.67	0.90	6.3	53.57	0.89
Future Base plus Committed Developments and Project						
A120 (NE)	45.4	86.80	1.04	3.4	7.68	0.76
Long Green (E)	112.9	1119.36	1.46	2.4	28.90	0.72
B1018 (S)	2.6	14.17	0.72	2.6	9.14	0.72
A120 (W)	2.5	4.65	0.70	2.6	5.06	0.71
Cressing Road (NW)	19.9	127.25	0.99	13.8	113.68	0.98

7.7.82 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a

longer duration compared with a short-lived, worst-case maximum. Table 7.30 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.30 Site 48 A120 Braintree Bypass / B1018 Braintree Rd roundabout capacity assessment with reduced peak hour flows

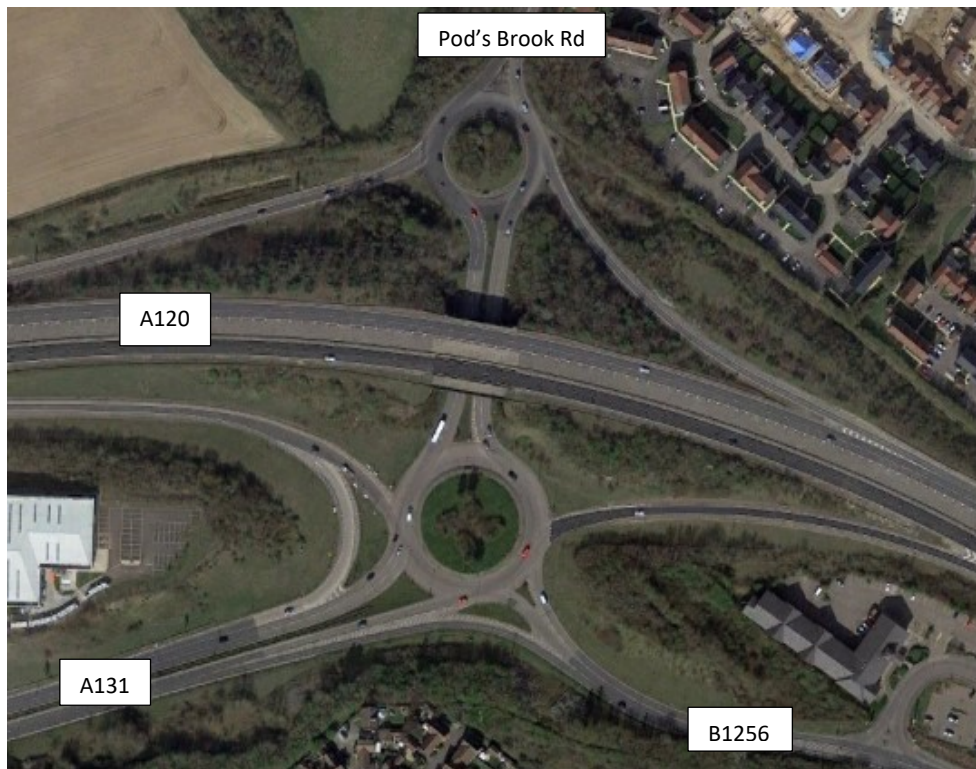
Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
A120 (NE)	45.4	86.80	1.04	3.4	7.68	0.76
Long Green (E)	112.9	1119.36	1.46	2.4	28.90	0.72
B1018 (S)	2.6	14.17	0.72	2.6	9.14	0.72
A120 (W)	2.5	4.65	0.70	2.6	5.06	0.71
Cressing Road (NW)	19.9	127.25	0.99	13.8	113.68	0.98
Future Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)						
A120 (NE)	27.7	62.56	1.01	3.0	7.06	0.74
Long Green (E)	92.6	882.19	1.35	2.1	24.17	0.68
B1018 (S)	2.4	13.34	0.70	2.4	8.51	0.70
A120 (W)	2.3	4.34	0.68	2.4	4.75	0.69
Cressing Road (NW)	11.3	74.74	0.94	8.9	75.45	0.93

- 7.7.83 The assessment over a lower, more representative construction traffic flow indicates that the A120 (NE), Long Green (E) and Cressing Road (NW) arms are still expected to operate over capacity.
- 7.7.84 It is noted that, as part of a new development to the south of the junction, a new spine road is being constructed that would connect Long Green to the B1018. This spine road is expected to be open to the general public, resulting in the potential for vehicles queuing on Long Green to divert towards the B1018. The potential for re-assigned flow along the spine road may alleviate queuing concerns on Long Green but in turn may contribute to additional congestion on the B1018. An assessment of this potential re-assignment at a strategic level has not been conducted as part of this study due to uncertainty of future baseline conditions.
- 7.7.85 Further to the above, it is proposed to monitor the operation of the junction and provide temporary signage to warn general traffic of peak hour congestion.

Site 56 - A120 Braintree Bypass / A131 Great Notley Bypass roundabout

- 7.7.86 The A120 Braintree Bypass and A131 Great Notley Bypass junction is a grade-separated roundabout located west of Braintree, near the Great Notley area. It is a five-arm roundabout which connects the A120 with the A131, providing access to routes towards Puckering, Harwich and Chelmsford as well as other local developments.
- 7.7.87 Aerial imagery of the junction is presented in Image 7.18 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.31.

Image 7.18 A120 Braintree Bypass / A131 Great Notley Bypass roundabout



- 7.7.88 The Junctions assessment indicates that the roundabouts operate within capacity across all scenarios and time periods, with no significant delays.
- 7.7.89 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the Future Base plus Committed Developments and Project scenario along Pod's Brook Road in the AM and the A120 (W) in the PM, both connected to the north roundabout. Both arms have an RFC of 0.78, with 13 seconds of delay along Pod's Brook Road and 15 seconds of delay along the A120 (W).

Table 7.31 Site 56 A120 Braintree Bypass / A131 Great Notley Bypass roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
North Rbt – Pod’s Brook Road	2.1	8.32	0.68	1.5	6.90	0.60
North Rbt – A131	1.1	3.45	0.51	0.9	3.14	0.47
North Rbt – A120 (W)	1.3	7.49	0.52	1.9	8.80	0.65
South Rbt – A131	1.3	4.13	0.56	1.1	3.83	0.52
South Rbt – A120 (W)	0.8	4.85	0.45	0.6	4.36	0.34
South Rbt – B1256	0.6	4.79	0.36	0.2	3.71	0.18
South Rbt – A131 (SW)	0.7	2.47	0.41	0.7	2.28	0.41
Future Base						
North Rbt – Pod’s Brook Road	2.4	9.16	0.71	1.7	7.44	0.62
North Rbt – A131	1.1	3.58	0.53	0.9	3.24	0.48
North Rbt – A120 (W)	1.4	8.06	0.55	2.2	9.87	0.69
South Rbt – A131	1.4	4.32	0.58	1.2	3.99	0.54
South Rbt – A120 (W)	0.9	5.11	0.47	0.6	4.56	0.36
South Rbt – B1256	0.6	5.04	0.38	0.2	3.82	0.19
South Rbt – A131 (SW)	0.8	2.56	0.43	0.7	2.35	0.42
Future Base plus Committed Developments						
North Rbt – Pod’s Brook Road	2.7	10.00	0.73	1.8	8.21	0.65
North Rbt – A131	1.2	3.67	0.54	1.1	3.53	0.53
North Rbt – A120 (W)	1.5	8.44	0.57	2.5	11.49	0.72
South Rbt – A131	1.5	4.49	0.59	1.3	4.11	0.55
South Rbt – A120 (W)	1.1	5.76	0.53	0.7	4.78	0.38
South Rbt – B1256	0.7	5.40	0.39	0.2	3.87	0.19
South Rbt – A131 (SW)	0.8	2.62	0.44	0.9	2.57	0.47

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project						
North Rbt – Pod’s Brook Road	3.5	13.04	0.78	2.0	8.90	0.67
North Rbt – A131	1.2	3.67	0.54	1.1	3.53	0.53
North Rbt – A120 (W)	2.4	11.60	0.70	3.5	14.71	0.78
South Rbt – A131	2.2	5.68	0.67	1.5	4.52	0.58
South Rbt – A120 (W)	1.3	6.65	0.56	0.7	4.98	0.39
South Rbt – B1256	0.7	6.17	0.42	0.3	4.00	0.20
South Rbt – A131 (SW)	0.8	2.62	0.44	0.9	2.57	0.47
Scenario 2 Multi-modal Flows						
North Rbt – Pod’s Brook Road	3.1	11.72	0.76	1.9	8.42	0.65
North Rbt – A131	1.3	3.82	0.56	1.2	3.67	0.54
North Rbt – A120 (W)	1.7	9.31	0.63	2.6	11.86	0.72
South Rbt – A131	1.8	4.92	0.63	1.3	4.08	0.54
South Rbt – A120 (W)	1.3	6.60	0.57	0.7	5.07	0.40
South Rbt – B1256	0.7	5.86	0.41	0.2	3.91	0.19
South Rbt – A131 (SW)	0.9	2.70	0.45	1.0	2.65	0.48

Site 62 - A12 J15 Webbs Farm Interchange

- 7.7.90 The A12 Junction 15 Webbs Farm Interchange is a large grade-separated double roundabout located near Margaretting, Essex. The six-arm junction facilitates access to various destinations within Essex and Suffolk via the A12, as well as providing connections to Three Mile Hill towards Chelmsford and to local routes via the B1002.
- 7.7.91 Aerial imagery of the junction is presented in Image 7.19 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.32.

Image 7.19 A12 J15 Webbs Farm Interchange



- 7.7.92 The Junctions assessment indicates that the roundabouts operate within capacity across all scenarios and time periods, with no significant delays.
- 7.7.93 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the Future Base plus Committed Developments and Project scenario flows during the AM on South Rbt – A12 (E), with a delay of 18 seconds and an RFC of 0.85.

Table 7.32 Site 62 A12 J15 Webbs Farm Interchange capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
North Rbt – Three Mile Hill	1.1	3.39	0.52	1.8	4.45	0.64
North Rbt – A414	1.6	6.12	0.61	0.6	3.78	0.38
North Rbt – A12 (W)	0.9	3.81	0.46	0.7	3.07	0.41
North Rbt – Golf Access	0.0	0.00	0.00	0.0	12.94	0.04
South Rbt – A414	1.0	3.87	0.50	0.7	3.31	0.41
South Rbt – A12 (E)	3.3	11.26	0.77	0.4	3.89	0.31
South Rbt – B1002	0.6	8.58	0.35	0.6	5.89	0.38

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base						
North Rbt – Three Mile Hill	1.2	3.53	0.54	2.0	4.75	0.66
North Rbt – A414	1.7	6.46	0.63	0.7	3.86	0.40
North Rbt – A12 (W)	1.0	4.00	0.48	0.8	3.19	0.43
North Rbt – Golf Access	0.0	0.00	0.00	0.0	13.92	0.05
South Rbt – A414	1.1	4.01	0.52	0.8	3.40	0.43
South Rbt – A12 (E)	4.0	13.27	0.80	0.5	4.02	0.32
South Rbt – B1002	0.6	9.34	0.37	0.7	6.20	0.40
Future Base plus Committed Developments						
North Rbt – Three Mile Hill	1.5	4.08	0.59	2.0	4.75	0.66
North Rbt – A414	1.9	7.15	0.65	0.7	3.86	0.40
North Rbt – A12 (W)	1.1	4.49	0.51	0.8	3.19	0.43
North Rbt – Golf Access	0.0	0.00	0.00	0.0	13.92	0.05
South Rbt – A414	1.1	4.01	0.52	0.8	3.40	0.43
South Rbt – A12 (E)	4.0	13.27	0.80	0.5	4.02	0.32
South Rbt – B1002	0.6	9.34	0.37	0.7	6.20	0.40
Future Base plus Committed Developments and Project						
North Rbt – Three Mile Hill	1.8	4.61	0.62	2.4	5.48	0.70
North Rbt – A414	1.9	7.14	0.65	0.7	3.86	0.40
North Rbt – A12 (W)	1.5	5.33	0.58	1.0	3.68	0.48
North Rbt – Golf Access	0.0	0.00	0.00	0.1	16.73	0.05
South Rbt – A414	1.4	4.69	0.57	1.0	3.91	0.48
South Rbt – A12 (E)	5.2	17.65	0.85	0.5	4.35	0.34
South Rbt – B1002	0.9	12.56	0.44	0.9	7.51	0.45

Site 73 - A127 Southend Arterial Rd / A176 Noak Hill Rd roundabout

- 7.7.94 The A127 Southend Arterial Road and A176 Noak Hill Road junction is a large grade-separated roundabout located in Basildon, Essex. The junction has six arms that connect the local A176 road and Noak Hill Road to the A127, a major route connecting Romford to Southend-on-Sea.
- 7.7.95 Aerial imagery of the junction is presented in Image 7.20 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.33.

Image 7.20 A127 Southend Arterial Rd / A176 Noak Hill Rd roundabout



- 7.7.96 The Junctions assessment indicates that the roundabouts operate within capacity with no significant delays during the AM peak across all scenarios. However, during the PM peak 2024 Base scenario, the A176 (South) arm of the northern roundabout is marginally above capacity with an RFC of 0.87. This increases to 0.91 in the Future Base plus Committed Developments scenario.
- 7.7.97 With the Project flows the roundabout continues to operate within capacity with no significant delays during the AM peak. The A176 (South) arm of the northern roundabout in the PM marginally increases from 0.91 to 0.92 RFC.
- 7.7.98 Given the negligible increase in capacity issues due to the addition of the Project traffic and modelling indicating that capacity issues are already present on site, no physical mitigation is proposed at this junction. The operation of the junction would be monitored during the construction phase.

Table 7.33 Site 73 A127 Southend Arterial Rd / A176 Noak Hill Rd roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
North Rbt – S Wash Road (N)	1.9	8.04	0.64	2.0	8.48	0.67
North Rbt – A127 EB Slips (E)	0.1	2.80	0.07	0.1	2.37	0.10
North Rbt – A176 (S)	2.5	6.14	0.71	6.4	12.92	0.87
North Rbt – A176 (W)	1.5	4.60	0.59	1.3	5.18	0.57
South Rbt – A176 (S)	3.4	8.37	0.77	2.1	5.31	0.67
South Rbt – Burches (E)	0.6	6.85	0.36	2.1	11.98	0.68
South Rbt – A176 Upper Mayne (S)	1.3	3.28	0.55	2.0	4.68	0.67
South Rbt – A127 WB Slips (W)	0.4	2.80	0.29	0.3	2.86	0.23
Future Base						
North Rbt – S Wash Road (N)	2.2	8.92	0.67	2.3	9.54	0.70
North Rbt – A127 EB Slips (E)	0.1	2.85	0.07	0.1	2.41	0.10
North Rbt – A176 (S)	2.8	6.70	0.74	8.3	16.23	0.91
North Rbt – A176 (W)	1.6	4.91	0.61	1.5	5.62	0.60
South Rbt – A176 (S)	4.0	9.62	0.80	2.3	5.75	0.70
South Rbt – Burches (E)	0.7	7.37	0.38	2.6	14.23	0.73
South Rbt – A176 Upper Mayne (S)	1.4	3.45	0.57	2.3	5.14	0.70
South Rbt – A127 WB Slips (W)	0.4	2.88	0.30	0.3	2.96	0.24
Future Base plus Committed Developments						
North Rbt – S Wash Road (N)	2.2	8.92	0.67	2.3	9.54	0.70
North Rbt – A127 EB Slips (E)	0.1	2.85	0.07	0.1	2.41	0.10
North Rbt – A176 (S)	2.8	6.70	0.74	8.3	16.23	0.91
North Rbt – A176 (W)	1.6	4.91	0.61	1.5	5.62	0.60

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
South Rbt – A176 (S)	4.0	9.62	0.80	2.3	5.75	0.70
South Rbt – Burches (E)	0.7	7.37	0.38	2.6	14.23	0.73
South Rbt – A176 Upper Mayne (S)	1.4	3.45	0.57	2.3	5.14	0.70
South Rbt – A127 WB Slips (W)	0.4	2.88	0.30	0.3	2.96	0.24
Future Base plus Committed Developments and Project						
North Rbt – S Wash Road (N)	2.2	9.14	0.68	2.4	9.80	0.71
North Rbt – A127 EB Slips (E)	0.1	2.87	0.08	0.1	2.43	0.10
North Rbt – A176 (S)	3.0	6.99	0.75	9.2	17.67	0.92
North Rbt – A176 (W)	1.7	5.08	0.62	1.6	5.83	0.61
South Rbt – A176 (S)	4.3	10.19	0.81	2.4	5.97	0.71
South Rbt – Burches (E)	0.7	7.53	0.39	2.7	14.84	0.74
South Rbt – A176 Upper Mayne (S)	1.4	3.51	0.58	2.3	5.25	0.70
South Rbt – A127 WB Slips (W)	0.4	2.88	0.30	0.3	2.96	0.24

Site 83 - A127 Southend Arterial Rd / B148 West Mayne roundabout

- 7.7.99 The A127 Southend Arterial Road and B148 West Mayne junction is a five-arm grade-separated roundabout located in the west of Basildon, near Dunton Waylets. Rural settlements to the north are connected to the A127 via Dunton Road as well as the commercial area south of the junction via West Mayne.
- 7.7.100 Aerial imagery of the junction is presented in Image 7.21 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.34.

Image 7.21 A127 Southend Arterial Rd / B148 West Mayne roundabout



- 7.7.101 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.7.102 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the AM on the A127 (West) arm, with a delay of 5 seconds and an RFC of 0.60.

Table 7.34 Site 83 A127 Southend Arterial Rd / B148 West Mayne roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Brentwood Road (N)	1.0	5.43	0.50	0.5	4.39	0.35
A127 (E)	0.5	4.64	0.35	0.1	2.59	0.12
Dunton Technical Centre (South-east (SE))	0.1	2.15	0.09	0.3	2.51	0.24
B148 West Mayne (S)	0.8	2.33	0.44	0.9	2.59	0.47
A127 (W)	1.3	4.10	0.56	0.9	3.56	0.46
Future Base						
Brentwood Road (N)	1.1	5.87	0.53	0.6	4.66	0.37
A127 (E)	0.6	4.97	0.37	0.1	2.67	0.12

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Dunton Technical Centre (SE)	0.1	2.20	0.09	0.3	2.61	0.26
B148 West Mayne (S)	0.8	2.42	0.45	1.0	2.72	0.49
A127 (W)	1.4	4.40	0.58	1.0	3.77	0.49
Future Base plus Committed Developments						
Brentwood Road (N)	1.1	5.87	0.53	0.6	4.66	0.37
A127 (E)	0.6	4.97	0.37	0.1	2.67	0.12
Dunton Technical Centre (SE)	0.1	2.20	0.09	0.3	2.61	0.26
B148 West Mayne (S)	0.8	2.42	0.45	1.0	2.72	0.49
A127 (W)	1.4	4.40	0.58	1.0	3.77	0.49
Future Base plus Committed Developments and Project						
Brentwood Road (N)	1.2	6.23	0.55	0.6	4.91	0.39
A127 (E)	0.6	5.15	0.38	0.1	2.73	0.13
Dunton Technical Centre (SE)	0.1	2.25	0.09	0.4	2.67	0.26
B148 West Mayne (S)	0.9	2.50	0.46	1.0	2.81	0.50
A127 (W)	1.6	4.64	0.60	1.0	3.97	0.51

Site 84 - A127 Southend Arterial Rd /A128 Tilbury Road roundabout

- 7.7.103 The A127 Southend Arterial Road and A128 Tilbury Road junction is a four-arm grade-separated roundabout located in the west of Basildon, near Herongate. It is a large junction which provides access to the A127, connecting to Hornchurch to the west and Basildon to the east.

7.7.104 Aerial imagery of the junction is presented in Image 7.22 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.35.

Image 7.22 A127 Southend Arterial Rd /A128 Tilbury Road roundabout



- 7.7.105 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods with no significant delays.
- 7.7.106 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the Multi-modal Scenario 2 flows during the AM peak on the A127 Southend Arterial Road (East) arm, with a delay of 4 seconds and an RFC of 0.50.

Table 7.35 Site 84 A127 Southend Arterial Rd /A128 Tilbury Road roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A128	0.6	2.56	0.38	0.7	3.28	0.41
A127 Southend Arterial Road (E)	0.9	3.63	0.45	0.5	2.97	0.35
Tilbury Road	0.7	2.58	0.40	0.7	2.27	0.41
A127 Southend Arterial Road (W)	0.4	3.98	0.28	0.6	4.45	0.35

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base						
A128	0.7	2.70	0.40	0.8	3.55	0.44
A127 Southend Arterial Road (E)	1.0	3.93	0.49	0.6	3.16	0.37
Tilbury Road	0.8	2.73	0.43	0.8	2.42	0.44
A127 Southend Arterial Road (W)	0.5	4.28	0.31	0.7	4.90	0.38
Future Base plus Committed Developments						
A128	0.7	2.70	0.40	0.8	3.55	0.44
A127 Southend Arterial Road (E)	1.0	3.93	0.49	0.6	3.16	0.37
Tilbury Road	0.8	2.73	0.43	0.8	2.42	0.44
A127 Southend Arterial Road (W)	0.5	4.28	0.31	0.7	4.90	0.38
Future Base plus Committed Developments and Project						
A128	0.7	2.72	0.41	0.8	3.58	0.44
A127 Southend Arterial Road (E)	1.0	3.98	0.49	0.6	3.18	0.38
Tilbury Road	0.8	2.76	0.43	0.8	2.44	0.44
A127 Southend Arterial Road (W)	0.5	4.35	0.32	0.7	4.99	0.39
Scenario 1 Multi-modal Flows						
A128	0.7	2.73	0.41	0.8	3.60	0.44
A127 Southend Arterial Road (E)	1.0	4.03	0.49	0.6	3.23	0.38
Tilbury Road	0.9	2.77	0.44	0.8	2.45	0.44
A127 Southend Arterial Road (W)	0.5	4.34	0.31	0.7	4.99	0.39
Scenario 2 Multi-modal Flows						
A128	0.7	2.74	0.41	0.8	3.59	0.44
A127 Southend Arterial Road (E)	1.0	4.05	0.50	0.6	3.26	0.39
Tilbury Road	0.9	2.78	0.44	0.8	2.46	0.44
A127 Southend Arterial Road (W)	0.5	4.34	0.31	0.7	4.96	0.38

Thurrock Junctions

Site 88 - Orsett Cock A13 Stanford le Hope Bypass / A1013 Stanford

- 7.7.107 The Orsett Cock A13 Stanford-le-Hope Bypass and A1013 Stanford junction is a large, signalised roundabout located between Chafford Hundred and Stanford-le-Hope, Thurrock. It is a six-arm junction which connects the A13, A1013 and the A128, facilitating access towards Tilbury and other locations in Essex.
- 7.7.108 The junction is presented in Image 7.23 and has been assessed using VISSIM.

Image 7.23 Orsett Cock A13 Stanford le Hope Bypass / A1013 Stanford



VISSIM Model

- 7.7.109 The Site 88 VISSIM model is a standalone model derived from the provided LTC VISSIM model, as detailed in Section 7.3. Updated flows for a base year of 2024 were input into the model using survey data collected by LTC.
- 7.7.110 The surveys collected by LTC provided information on turning movements only, meaning mainline flows on the A13 were not captured. To address this, 2023 mainline flows were obtained using DfT counters located on either side of the junction. The 2023 counts were factored up to 2024 using TEMPro growth factors. These flows were then integrated with the turning count data to accurately represent the number of vehicles entering and exiting the A13 via the on and off slips.
- 7.7.111 The junction was tested under four scenarios, consisting of: road-only access route (AR) one; road-only AR two; multi-modal scenario one; and multi-modal scenario two.
- 7.7.112 In AR1, the Project LGVs route via the A13 west to Brentwood Road (S) during the AM peak and return in the PM peak. In AR2, these LGVs travel via the A13 west to the A1013 Stanford Road (E) in the AM peak and return in the PM peak. Additionally, in AR1, the Project HGVs route via the A13 west to/from Brentwood Road (S) during both the AM and PM peaks, while in AR2, these HGVs route to/from the A1013 Stanford Road (E) during the same periods.

- 7.7.113 As part of the model scenario testing, GEH checks were completed to ensure a good fit between observed and modelled traffic flows. A GEH value <5 is considered a good fit. A summary of the GEH turning movements can be found in Table 7.36 to Table 7.43.

Table 7.36 Site 88 Orsett Cock - A13 Stanford le Hope Bypass / A1013 Stanford turning count GEH results road-only strategy AM

From	To	Base			Future Base			FB+CD			FB+CD+Project Access Route 1 (AR1)			FB+CD+Project Access Route 2 (AR2)		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A128	A13 Eastbound Onslip	79	78	0.12	83	81	0.16	133	132	0.10	133	132	0.10	133	132	0.11
A128	A13 Westbound Onslip	189	187	0.16	198	196	0.15	198	196	0.14	198	195	0.23	198	195	0.21
A128	A1013 East	55	54	0.15	58	56	0.18	69	68	0.07	69	67	0.18	69	67	0.16
A128	Brentwood Road	66	65	0.10	69	69	0.02	69	69	0.05	69	68	0.13	69	68	0.14
A128	A1013 West	88	87	0.13	92	90	0.21	95	93	0.27	95	92	0.33	95	92	0.33
A13 Westbound Offslip	A128	135	134	0.06	142	141	0.04	210	209	0.04	210	209	0.03	210	209	0.04
A13 Westbound Offslip	A13 Eastbound Onslip	2	2	0.07	2	2	0.10	2	2	0.14	2	2	0.07	2	2	0.10
A13 Westbound Offslip	A13 Westbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Westbound Offslip	A1013 East	18	18	0.09	19	18	0.10	19	18	0.10	19	18	0.10	19	18	0.11
A13 Westbound Offslip	Brentwood Road	155	154	0.09	162	162	0.01	162	162	0.07	162	161	0.09	162	162	0.07
A13 Westbound Offslip	A1013 West	454	447	0.33	476	467	0.40	483	475	0.37	483	474	0.40	483	474	0.41
A1013 East	A128	72	72	0.01	75	76	0.08	88	89	0.09	88	89	0.10	88	90	0.11
A1013 East	A13 Eastbound Onslip	6	6	0.04	6	6	0.08	6	6	0.12	6	6	0.12	6	6	0.14
A1013 East	A13 Westbound Onslip	292	291	0.05	306	306	0.03	353	351	0.12	353	351	0.12	356	355	0.08
A1013 East	A1013 East	0	0	0.00	0	0	0.00	6	6	0.08	6	6	0.06	6	6	0.15
A1013 East	Brentwood Road	71	71	0.01	74	75	0.07	74	74	0.03	74	74	0.00	74	74	0.00
A1013 East	A1013 West	144	149	0.38	151	153	0.19	182	185	0.25	182	185	0.23	182	186	0.26
A1013 West	A128	98	98	0.03	103	103	0.05	103	103	0.05	103	103	0.04	103	103	0.05
A1013 West	A13 Eastbound Onslip	234	234	0.00	245	245	0.01	250	251	0.06	250	251	0.05	250	251	0.06
A1013 West	A13 Westbound Onslip	58	57	0.09	61	61	0.02	61	60	0.05	82	81	0.05	82	81	0.03
A1013 West	A1013 East	65	67	0.19	68	69	0.11	80	81	0.06	80	81	0.09	80	81	0.10
A1013 West	Brentwood Road	26	26	0.06	27	28	0.07	27	27	0.04	27	27	0.09	27	27	0.11
A1013 West	A1013 West	0	0	0.00	0	0	0.00	2	2	0.15	2	2	0.04	2	2	0.00
A13 East (Mainline)	A13 East (Mainline)	3,476	3490	0.24	3,644	3659	0.25	3,661	3677	0.26	3,661	3676	0.25	3,661	3676	0.24
A13 Eastbound Offslip	A128	210	212	0.14	220	222	0.14	220	223	0.17	220	223	0.19	220	223	0.17
A13 Eastbound Offslip	A13 Eastbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Eastbound Offslip	A13 Westbound Onslip	3	3	0.00	3	3	0.00	3	3	0.00	3	3	0.00	3	3	0.00

From	To	Base			Future Base			FB+CD			FB+CD+Project Access Route 1 (AR1)			FB+CD+Project Access Route 2 (AR2)		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A13 Eastbound Offslip	A1013 East	175	173	0.18	183	181	0.19	203	200	0.16	203	199	0.27	246	238	0.53
A13 Eastbound Offslip	Brentwood Road	85	84	0.13	89	88	0.12	95	93	0.16	138	131	0.61	95	92	0.28
A13 Eastbound Offslip	A1013 West	35	35	0.04	37	37	0.03	42	42	0.03	63	64	0.06	63	64	0.08
A13 West (Mainline)	A13 West (Mainline)	2,125	2121	0.09	2,228	2224	0.08	2,244	2240	0.10	2,244	2240	0.09	2,244	2241	0.08
Brentwood Road	A128	202	202	0.04	212	212	0.01	215	214	0.03	215	212	0.21	215	212	0.21
Brentwood Road	A13 Eastbound Onslip	264	259	0.31	277	273	0.25	285	279	0.32	285	277	0.48	285	276	0.52
Brentwood Road	A13 Westbound Onslip	87	86	0.10	91	91	0.03	102	102	0.02	105	103	0.16	102	100	0.21
Brentwood Road	A1013 East	60	58	0.24	63	62	0.11	65	63	0.18	65	61	0.49	65	61	0.47
Brentwood Road	Brentwood Road	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Brentwood Road	A1013 West	104	101	0.31	109	105	0.36	112	108	0.37	112	106	0.59	112	106	0.59
A13 EB	A13 EB	2,633	2631	0.05	2,760	2759	0.03	2,807	2804	0.04	2,872	2868	0.08	2,872	2868	0.07
A13 WB	A13 WB	4,105	4119	0.22	4,303	4317	0.21	4,378	4390	0.19	4,402	4410	0.12	4,402	4412	0.14
A13 EB	A13 EB	2,710	2698	0.24	2,841	2830	0.21	2,921	2907	0.25	2,921	2905	0.29	2,921	2903	0.32
A13 WB	A13 WB	4,240	4244	0.06	4,445	4448	0.05	4,537	4541	0.05	4,537	4541	0.05	4,537	4540	0.05

Table 7.37 Site 88 Orsett Cock - A13 Stanford le Hope Bypass / A1013 Stanford turning count GEH results road-only strategy PM

From	To	Base			Future Base			FB+CD			FB+CD+Project Access Route 1 (AR1)			FB+CD+Project Access Route 2 (AR2)		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A128	A13 Eastbound Onslip	106	107	0.06	111	114	0.21	138	140	0.09	138	140	0.10	138	139	0.05
A128	A13 Westbound Onslip	131	130	0.11	138	137	0.08	138	137	0.03	138	138	0.02	138	138	0.01
A128	A1013 East	49	50	0.09	52	53	0.27	69	70	0.16	69	70	0.14	69	70	0.16
A128	Brentwood Road	155	155	0.03	163	163	0.01	163	164	0.09	163	163	0.03	163	163	0.03
A128	A1013 West	117	116	0.07	123	124	0.10	126	126	0.03	126	126	0.03	126	126	0.01
A13 Westbound Offslip	A128	64	63	0.08	67	67	0.03	91	92	0.03	91	91	0.02	91	91	0.03
A13 Westbound Offslip	A13 Eastbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Westbound Offslip	A13 Westbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Westbound Offslip	A1013 East	31	30	0.19	33	32	0.11	33	32	0.15	33	32	0.16	33	32	0.15
A13 Westbound Offslip	Brentwood Road	250	250	0.02	263	263	0.01	265	265	0.02	265	265	0.01	265	265	0.00
A13 Westbound Offslip	A1013 West	291	284	0.44	306	299	0.42	318	310	0.45	318	310	0.45	318	309	0.50
A1013 East	A128	49	49	0.07	52	51	0.06	59	58	0.08	59	58	0.11	59	58	0.05
A1013 East	A13 Eastbound Onslip	8	8	0.02	8	8	0.06	8	8	0.20	8	8	0.16	8	8	0.14
A1013 East	A13 Westbound Onslip	205	202	0.21	215	213	0.15	243	242	0.11	244	241	0.18	287	287	0.02
A1013 East	A1013 East	0	0	0.00	0	0	0.00	6	5	0.11	6	6	0.06	6	6	0.11
A1013 East	Brentwood Road	46	47	0.19	48	49	0.13	48	50	0.22	48	50	0.21	48	50	0.20
A1013 East	A1013 West	84	87	0.35	88	92	0.40	90	94	0.37	90	94	0.35	90	94	0.38
A1013 West	A128	69	69	0.02	73	73	0.08	73	73	0.00	73	73	0.04	73	73	0.02
A1013 West	A13 Eastbound Onslip	343	346	0.14	361	361	0.03	363	364	0.06	363	364	0.09	363	364	0.07
A1013 West	A13 Westbound Onslip	49	50	0.14	52	53	0.18	52	53	0.14	73	74	0.12	73	74	0.11
A1013 West	A1013 East	37	43	0.95	39	46	1.05	43	48	0.81	43	48	0.82	43	48	0.82
A1013 West	Brentwood Road	55	55	0.03	58	57	0.17	58	58	0.01	58	58	0.01	58	58	0.01
A1013 West	A1013 West	0	0	0.00	0	0	0.00	2	2	0.10	2	2	0.04	2	2	0.04
A13 East (Mainline)	A13 East (Mainline)	2,641	2644	0.05	2,776	2779	0.05	2,793	2794	0.03	2,793	2795	0.05	2,793	2796	0.06
A13 Eastbound Offslip	A128	328	323	0.26	345	339	0.34	345	339	0.32	345	338	0.35	345	338	0.37
A13 Eastbound Offslip	A13 Eastbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Eastbound Offslip	A13 Westbound Onslip	1	1	0.05	1	1	0.00	1	1	0.05	1	1	0.05	1	1	0.00

From	To	Base			Future Base			FB+CD			FB+CD+Project Access Route 1 (AR1)			FB+CD+Project Access Route 2 (AR2)		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A13 Eastbound Offslip	A1013 East	391	389	0.11	411	408	0.16	454	453	0.08	455	451	0.15	458	455	0.14
A13 Eastbound Offslip	Brentwood Road	138	137	0.06	145	144	0.08	151	149	0.09	154	152	0.11	151	149	0.14
A13 Eastbound Offslip	A1013 West	36	36	0.08	38	37	0.08	43	43	0.01	64	64	0.02	64	64	0.00
A13 West (Mainline)	A13 West (Mainline)	3,552	3553	0.03	3,733	3735	0.02	3,750	3751	0.02	3,750	3752	0.04	3,750	3752	0.03
Brentwood Road	A128	97	97	0.04	102	102	0.04	105	105	0.03	105	105	0.02	105	105	0.02
Brentwood Road	A13 Eastbound Onslip	132	132	0.00	139	140	0.09	145	146	0.07	145	146	0.06	145	146	0.08
Brentwood Road	A13 Westbound Onslip	94	93	0.08	99	98	0.07	109	109	0.06	152	154	0.15	109	109	0.07
Brentwood Road	A1013 East	39	39	0.00	41	41	0.05	43	43	0.05	43	42	0.09	43	43	0.07
Brentwood Road	Brentwood Road	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Brentwood Road	A1013 West	53	52	0.18	56	55	0.13	59	58	0.12	59	58	0.07	59	58	0.09
A13 EB	A13 EB	4,446	4444	0.03	4,673	4671	0.03	4,743	4740	0.05	4,767	4765	0.04	4,767	4765	0.03
A13 WB	A13 WB	3,121	3120	0.01	3,281	3282	0.02	3,336	3338	0.05	3,401	3406	0.09	3,401	3406	0.08
A13 EB	A13 EB	4,141	4146	0.09	4,353	4359	0.09	4,404	4410	0.10	4,404	4407	0.05	4,404	4410	0.09
A13 WB	A13 WB	3,277	3277	0.00	3,445	3445	0.00	3,499	3498	0.01	3,499	3499	0.00	3,499	3500	0.01

Table 7.38 Site 88 Orsett Cock - A13 Stanford le Hope Bypass / A1013 Stanford turning count GEH results scenario 1 AM

From	To	Base			Future Base			FB+CD			FB+CD+Project		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A128	A13 Eastbound Onslip	79	78	0.12	83	81	0.16	133	132	0.10	133	132	0.07
A128	A13 Westbound Onslip	189	187	0.16	198	196	0.15	198	196	0.14	198	195	0.19
A128	A1013 East	55	54	0.15	58	56	0.18	69	68	0.07	69	67	0.16
A128	Brentwood Road	66	65	0.10	69	69	0.02	69	69	0.05	69	69	0.08
A128	A1013 West	88	87	0.13	92	90	0.21	95	93	0.27	95	92	0.30
A13 Westbound Offslip	A128	135	134	0.06	142	141	0.04	210	209	0.04	210	210	0.00
A13 Westbound Offslip	A13 Eastbound Onslip	2	2	0.07	2	2	0.10	2	2	0.14	2	2	0.07
A13 Westbound Offslip	A13 Westbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Westbound Offslip	A1013 East	18	18	0.09	19	18	0.10	19	18	0.10	19	18	0.10
A13 Westbound Offslip	Brentwood Road	155	154	0.09	162	162	0.01	162	162	0.07	162	162	0.07
A13 Westbound Offslip	A1013 West	454	447	0.33	476	467	0.40	483	475	0.37	483	475	0.38
A1013 East	A128	72	72	0.01	75	76	0.08	88	89	0.09	88	90	0.13
A1013 East	A13 Eastbound Onslip	6	6	0.04	6	6	0.08	6	6	0.12	6	6	0.10
A1013 East	A13 Westbound Onslip	292	291	0.05	306	306	0.03	353	351	0.12	353	351	0.10
A1013 East	A1013 East	0	0	0.00	0	0	0.00	6	6	0.08	6	6	0.00
A1013 East	Brentwood Road	71	71	0.01	74	75	0.07	74	74	0.03	74	74	0.00
A1013 East	A1013 West	144	149	0.38	151	153	0.19	182	185	0.25	182	185	0.25
A1013 West	A128	98	98	0.03	103	103	0.05	103	103	0.05	103	103	0.04
A1013 West	A13 Eastbound Onslip	234	234	0.00	245	245	0.01	250	251	0.06	250	251	0.04
A1013 West	A13 Westbound Onslip	58	57	0.09	61	61	0.02	61	60	0.05	71	71	0.02
A1013 West	A1013 East	65	67	0.19	68	69	0.11	80	81	0.06	80	81	0.07
A1013 West	Brentwood Road	26	26	0.06	27	28	0.07	27	27	0.04	27	27	0.10
A1013 West	A1013 West	0	0	0.00	0	0	0.00	2	2	0.15	2	2	0.07
A13 East (Mainline)	A13 East (Mainline)	3,476	3490	0.24	3,644	3659	0.25	3,661	3677	0.26	3,661	3676	0.24
A13 Eastbound Offslip	A128	210	212	0.14	220	222	0.14	220	223	0.17	220	223	0.19
A13 Eastbound Offslip	A13 Eastbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Eastbound Offslip	A13 Westbound Onslip	3	3	0.00	3	3	0.00	3	3	0.00	3	3	0.00
A13 Eastbound Offslip	A1013 East	175	173	0.18	183	181	0.19	203	200	0.16	285	277	0.47

From	To	Base			Future Base			FB+CD			FB+CD+Project		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A13 Eastbound Offslip	Brentwood Road	85	84	0.13	89	88	0.12	95	93	0.16	95	93	0.24
A13 Eastbound Offslip	A1013 West	35	35	0.04	37	37	0.03	42	42	0.03	54	54	0.11
A13 West (Mainline)	A13 West (Mainline)	2,125	2121	0.09	2,228	2224	0.08	2,244	2240	0.10	2,244	2240	0.09
Brentwood Road	A128	202	202	0.04	212	212	0.01	215	214	0.03	215	213	0.11
Brentwood Road	A13 Eastbound Onslip	264	259	0.31	277	273	0.25	285	279	0.32	285	279	0.36
Brentwood Road	A13 Westbound Onslip	87	86	0.10	91	91	0.03	102	102	0.02	102	101	0.07
Brentwood Road	A1013 East	60	58	0.24	63	62	0.11	65	63	0.18	65	62	0.36
Brentwood Road	Brentwood Road	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Brentwood Road	A1013 West	104	101	0.31	109	105	0.36	112	108	0.37	112	107	0.45
A13 EB	A13 EB	2,633	2631	0.05	2,760	2759	0.03	2,807	2804	0.04	2,901	2898	0.07
A13 WB	A13 WB	4,105	4119	0.22	4,303	4317	0.21	4,378	4390	0.19	4,388	4399	0.16
A13 EB	A13 EB	2,710	2698	0.24	2,841	2830	0.21	2,921	2907	0.25	2,921	2906	0.27
A13 WB	A13 WB	4,240	4244	0.06	4,445	4448	0.05	4,537	4541	0.05	4,537	4541	0.06

Table 7.39 Site 88 Orsett Cock - A13 Stanford le Hope Bypass / A1013 Stanford turning count GEH results scenario 1 PM

From	To	Base			Future Base			FB+CD			FB+CD+Project		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A128	A13 Eastbound Onslip	106	107	0.06	111	114	0.21	138	140	0.09	138	140	0.11
A128	A13 Westbound Onslip	131	130	0.11	138	137	0.08	138	137	0.03	138	137	0.04
A128	A1013 East	49	50	0.09	52	53	0.27	69	70	0.16	69	70	0.13
A128	Brentwood Road	155	155	0.03	163	163	0.01	163	164	0.09	163	164	0.05
A128	A1013 West	117	116	0.07	123	124	0.10	126	126	0.03	126	126	0.01
A13 Westbound Offslip	A128	64	63	0.08	67	67	0.03	91	92	0.03	91	91	0.02
A13 Westbound Offslip	A13 Eastbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Westbound Offslip	A13 Westbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Westbound Offslip	A1013 East	31	30	0.19	33	32	0.11	33	32	0.15	33	32	0.17
A13 Westbound Offslip	Brentwood Road	250	250	0.02	263	263	0.01	265	265	0.02	265	265	0.00
A13 Westbound Offslip	A1013 West	291	284	0.44	306	299	0.42	318	310	0.45	318	310	0.45
A1013 East	A128	49	49	0.07	52	51	0.06	59	58	0.08	59	58	0.04
A1013 East	A13 Eastbound Onslip	8	8	0.02	8	8	0.06	8	8	0.20	8	8	0.18
A1013 East	A13 Westbound Onslip	205	202	0.21	215	213	0.15	243	242	0.11	244	242	0.10
A1013 East	A1013 East	0	0	0.00	0	0	0.00	6	5	0.11	6	6	0.04
A1013 East	Brentwood Road	46	47	0.19	48	49	0.13	48	50	0.22	48	50	0.17
A1013 East	A1013 West	84	87	0.35	88	92	0.40	90	94	0.37	172	174	0.14
A1013 West	A128	69	69	0.02	73	73	0.08	73	73	0.00	73	73	0.00
A1013 West	A13 Eastbound Onslip	343	346	0.14	361	361	0.03	363	364	0.06	363	363	0.04
A1013 West	A13 Westbound Onslip	49	50	0.14	52	53	0.18	52	53	0.14	63	65	0.13
A1013 West	A1013 East	37	43	0.95	39	46	1.05	43	48	0.81	43	48	0.82
A1013 West	Brentwood Road	55	55	0.03	58	57	0.17	58	58	0.01	58	58	0.02
A1013 West	A1013 West	0	0	0.00	0	0	0.00	2	2	0.10	2	2	0.00
A13 East (Mainline)	A13 East (Mainline)	2,641	2644	0.05	2,776	2779	0.05	2,793	2794	0.03	2,793	2795	0.05
A13 Eastbound Offslip	A128	328	323	0.26	345	339	0.34	345	339	0.32	345	338	0.34
A13 Eastbound Offslip	A13 Eastbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Eastbound Offslip	A13 Westbound Onslip	1	1	0.05	1	1	0.00	1	1	0.05	1	1	0.05
A13 Eastbound Offslip	A1013 East	391	389	0.11	411	408	0.16	454	453	0.08	454	452	0.10

From	To	Base			Future Base			FB+CD			FB+CD+Project		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A13 Eastbound Offslip	Brentwood Road	138	137	0.06	145	144	0.08	151	149	0.09	151	149	0.12
A13 Eastbound Offslip	A1013 West	36	36	0.08	38	37	0.08	43	43	0.01	53	53	0.05
A13 West (Mainline)	A13 West (Mainline)	3,552	3553	0.03	3,733	3735	0.02	3,750	3751	0.02	3,750	3750	0.01
Brentwood Road	A128	97	97	0.04	102	102	0.04	105	105	0.03	105	105	0.00
Brentwood Road	A13 Eastbound Onslip	132	132	0.00	139	140	0.09	145	146	0.07	145	146	0.07
Brentwood Road	A13 Westbound Onslip	94	93	0.08	99	98	0.07	109	109	0.06	110	109	0.06
Brentwood Road	A1013 East	39	39	0.00	41	41	0.05	43	43	0.05	43	43	0.08
Brentwood Road	Brentwood Road	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Brentwood Road	A1013 West	53	52	0.18	56	55	0.13	59	58	0.12	59	58	0.09
A13 EB	A13 EB	4,446	4444	0.03	4,673	4671	0.03	4,743	4740	0.05	4,754	4750	0.05
A13 WB	A13 WB	3,121	3120	0.01	3,281	3282	0.02	3,336	3338	0.05	3,348	3352	0.07
A13 EB	A13 EB	4,141	4146	0.09	4,353	4359	0.09	4,404	4410	0.10	4,404	4409	0.08
A13 WB	A13 WB	3,277	3277	0.00	3,445	3445	0.00	3,499	3498	0.01	3,499	3500	0.02

Table 7.40 Site 88 Orsett Cock - A13 Stanford le Hope Bypass / A1013 Stanford turning count GEH Results Scenario 2 AM

From	To	Base			Future Base			FB+CD			FB+CD+Project		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A128	A13 Eastbound Onslip	79	78	0.12	82	81	0.13	132	131	0.09	132	131	0.08
A128	A13 Westbound Onslip	189	187	0.16	196	194	0.17	196	194	0.16	209	205	0.23
A128	A1013 East	55	54	0.15	57	56	0.12	68	68	0.04	68	67	0.12
A128	Brentwood Road	66	65	0.10	69	68	0.13	69	68	0.02	69	68	0.05
A128	A1013 West	88	87	0.13	91	89	0.25	94	92	0.29	94	91	0.32
A13 Westbound Offslip	A128	135	134	0.06	140	141	0.03	208	208	0.03	208	208	0.03
A13 Westbound Offslip	A13 Eastbound Onslip	2	2	0.07	2	2	0.12	2	2	0.08	2	2	0.05
A13 Westbound Offslip	A13 Westbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Westbound Offslip	A1013 East	18	18	0.09	19	18	0.09	19	19	0.04	19	19	0.03
A13 Westbound Offslip	Brentwood Road	155	154	0.09	161	160	0.08	161	161	0.02	161	160	0.05
A13 Westbound Offslip	A1013 West	454	447	0.33	471	464	0.35	478	470	0.38	478	470	0.38
A1013 East	A128	72	72	0.01	75	76	0.14	88	89	0.09	88	89	0.08
A1013 East	A13 Eastbound Onslip	6	6	0.04	6	6	0.05	6	6	0.07	6	6	0.01
A1013 East	A13 Westbound Onslip	292	291	0.05	303	304	0.03	350	348	0.10	353	351	0.11
A1013 East	A1013 East	0	0	0.00	0	0	0.00	6	6	0.04	6	6	0.11
A1013 East	Brentwood Road	71	71	0.01	74	74	0.05	74	74	0.01	74	74	0.01
A1013 East	A1013 West	144	149	0.38	150	152	0.22	181	184	0.24	181	184	0.23
A1013 West	A128	98	98	0.03	102	102	0.01	102	102	0.04	102	102	0.02
A1013 West	A13 Eastbound Onslip	234	234	0.00	243	243	0.01	248	249	0.08	248	249	0.06
A1013 West	A13 Westbound Onslip	58	57	0.09	60	60	0.04	60	60	0.02	66	66	0.00
A1013 West	A1013 East	65	67	0.19	67	69	0.16	79	80	0.06	79	80	0.06
A1013 West	Brentwood Road	26	26	0.06	27	27	0.01	27	27	0.06	27	27	0.03
A1013 West	A1013 West	0	0	0.00	0	0	0.00	2	2	0.07	2	2	0.15
A13 East (Mainline)	A13 East (Mainline)	3,476	3490	0.24	3,609	3625	0.26	3,627	3641	0.23	3,627	3640	0.23
A13 Eastbound Offslip	A128	210	212	0.14	218	220	0.13	218	221	0.17	230	233	0.15
A13 Eastbound Offslip	A13 Eastbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Eastbound Offslip	A13 Westbound Onslip	3	3	0.00	3	3	0.02	3	3	0.02	3	3	0.02
A13 Eastbound Offslip	A1013 East	175	173	0.18	182	179	0.21	201	198	0.18	206	203	0.22

From	To	Base			Future Base			FB+CD			FB+CD+Project		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A13 Eastbound Offslip	Brentwood Road	85	84	0.13	88	87	0.13	94	92	0.15	97	96	0.12
A13 Eastbound Offslip	A1013 West	35	35	0.04	36	36	0.01	41	41	0.02	48	48	0.06
A13 West (Mainline)	A13 West (Mainline)	2,125	2121	0.09	2,207	2203	0.07	2,223	2218	0.11	2,223	2219	0.10
Brentwood Road	A128	202	202	0.04	210	210	0.00	213	213	0.02	213	212	0.06
Brentwood Road	A13 Eastbound Onslip	264	259	0.31	274	270	0.23	282	277	0.29	282	276	0.34
Brentwood Road	A13 Westbound Onslip	87	86	0.10	90	90	0.01	101	100	0.06	104	104	0.04
Brentwood Road	A1013 East	60	58	0.24	62	61	0.12	64	63	0.14	64	63	0.21
Brentwood Road	Brentwood Road	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Brentwood Road	A1013 West	104	101	0.31	108	104	0.42	111	107	0.43	111	106	0.48
A13 EB	A13 EB	2,633	2631	0.05	2,734	2732	0.05	2,781	2778	0.04	2,807	2804	0.06
A13 WB	A13 WB	4,105	4119	0.22	4,263	4277	0.22	4,337	4351	0.20	4,362	4373	0.16
A13 EB	A13 EB	2,710	2698	0.24	2,814	2802	0.23	2,894	2881	0.24	2,894	2879	0.27
A13 WB	A13 WB	4,240	4244	0.06	4,403	4407	0.06	4,495	4498	0.04	4,495	4498	0.04

Table 7.41 Site 88 Orsett Cock - A13 Stanford le Hope Bypass / A1013 Stanford turning count GEH results scenario 2 PM

From	To	Base			Future Base			FB+CD			FB+CD+Project		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A128	A13 Eastbound Onslip	106	107	0.06	110	112	0.20	137	139	0.14	137	139	0.12
A128	A13 Westbound Onslip	131	130	0.11	136	135	0.10	136	135	0.08	149	148	0.07
A128	A1013 East	49	50	0.09	51	52	0.14	68	69	0.18	68	70	0.21
A128	Brentwood Road	155	155	0.03	161	162	0.07	161	161	0.01	161	162	0.05
A128	A1013 West	117	116	0.07	122	122	0.02	125	126	0.14	125	126	0.14
A13 Westbound Offslip	A128	64	63	0.08	67	66	0.07	91	90	0.03	91	90	0.06
A13 Westbound Offslip	A13 Eastbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Westbound Offslip	A13 Westbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Westbound Offslip	A1013 East	31	30	0.19	32	32	0.12	32	31	0.17	32	31	0.16
A13 Westbound Offslip	Brentwood Road	250	250	0.02	260	259	0.05	262	263	0.03	262	263	0.05
A13 Westbound Offslip	A1013 West	291	284	0.44	303	296	0.38	315	306	0.48	315	307	0.46
A1013 East	A128	49	49	0.07	51	51	0.02	58	58	0.02	58	58	0.02
A1013 East	A13 Eastbound Onslip	8	8	0.02	8	8	0.08	8	8	0.04	8	8	0.01
A1013 East	A13 Westbound Onslip	205	202	0.21	213	211	0.17	241	239	0.15	244	242	0.18
A1013 East	A1013 East	0	0	0.00	0	0	0.00	6	6	0.00	6	5	0.04
A1013 East	Brentwood Road	46	47	0.19	48	49	0.19	48	50	0.24	48	50	0.28
A1013 East	A1013 West	84	87	0.35	87	91	0.40	89	93	0.34	91	95	0.34
A1013 West	A128	69	69	0.02	72	72	0.07	72	73	0.10	72	73	0.10
A1013 West	A13 Eastbound Onslip	343	346	0.14	357	358	0.08	359	360	0.07	359	360	0.07
A1013 West	A13 Westbound Onslip	49	50	0.14	51	52	0.12	51	52	0.13	57	58	0.17
A1013 West	A1013 East	37	43	0.95	38	44	0.86	42	49	0.98	42	49	0.98
A1013 West	Brentwood Road	55	55	0.03	57	57	0.00	57	56	0.18	57	56	0.21
A1013 West	A1013 West	0	0	0.00	0	0	0.00	2	2	0.07	2	2	0.04
A13 East (Mainline)	A13 East (Mainline)	2,641	2644	0.05	2,748	2750	0.03	2,764	2766	0.03	2,764	2766	0.04
A13 Eastbound Offslip	A128	328	323	0.26	341	336	0.31	341	335	0.37	354	347	0.37
A13 Eastbound Offslip	A13 Eastbound Onslip	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
A13 Eastbound Offslip	A13 Westbound Onslip	1	1	0.05	1	1	0.04	1	1	0.09	1	1	0.04
A13 Eastbound Offslip	A1013 East	391	389	0.11	407	404	0.14	450	448	0.12	453	451	0.11

From	To	Base			Future Base			FB+CD			FB+CD+Project		
		Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH	Survey flows	Observed Flows	GEH
A13 Eastbound Offslip	Brentwood Road	138	137	0.06	144	143	0.08	149	147	0.14	152	151	0.11
A13 Eastbound Offslip	A1013 West	36	36	0.08	37	37	0.08	42	42	0.05	49	48	0.07
A13 West (Mainline)	A13 West (Mainline)	3,552	3553	0.03	3,695	3696	0.01	3,712	3712	0.01	3,712	3713	0.02
Brentwood Road	A128	97	97	0.04	101	101	0.04	104	104	0.05	104	105	0.07
Brentwood Road	A13 Eastbound Onslip	132	132	0.00	137	139	0.11	143	144	0.06	143	144	0.06
Brentwood Road	A13 Westbound Onslip	94	93	0.08	98	97	0.04	108	108	0.06	111	111	0.07
Brentwood Road	A1013 East	39	39	0.00	41	39	0.20	43	42	0.14	43	42	0.14
Brentwood Road	Brentwood Road	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Brentwood Road	A1013 West	53	52	0.18	55	54	0.13	58	57	0.13	58	57	0.11
A13 EB	A13 EB	4,446	4444	0.03	4,626	4623	0.03	4,696	4693	0.04	4,721	4718	0.04
A13 WB	A13 WB	3,121	3120	0.01	3,247	3247	0.00	3,302	3303	0.01	3,327	3328	0.02
A13 EB	A13 EB	4,141	4146	0.09	4,308	4316	0.12	4,360	4366	0.10	4,360	4367	0.11
A13 WB	A13 WB	3,277	3277	0.00	3,410	3409	0.01	3,464	3464	0.01	3,464	3463	0.01

- 7.7.114 The data illustrates that all turning movements in all scenarios scored lower than a GEH of 3, which indicates a good fit between observed and modelled traffic turning count data.
- 7.7.115 An assessment of junction performance was completed by comparing average queue lengths on the roundabout approaches. A summary of the average queue lengths can be found in Table 7.42 and Table 7.43.

Table 7.42 Site 88 Orsett Cock - A13 Stanford le Hope Bypass / A1013 Stanford road-only strategy average queue length results

Arm	AM (Average Queue Length (m))					PM (Average Queue Length (m))				
	2024 Base	Future Base GEH	FB + CD GEH	FB+CD+Project GEH AR1	FB+CD+Project GEH AR2	2024 Base	Future Base GEH	FB + CD GEH	FB+CD+Project GEH AR1	FB+CD+Project GEH AR2
A13 West Approach	94	95	95	97	97	96	97	98	99	99
A128 North Approach	1	2	2	4	5	3	4	6	6	6
A13 East Approach	12	13	13	14	14	20	22	26	25	25
A1013 Stanford Rd East Approach	5	7	10	14	12	4	5	8	8	11
A128 South Approach	11	16	59	110	85	1	2	3	3	3
A1013 Stanford Rd West Approach	3	4	5	6	6	1	1	1	2	2
Orsett Cock Circulatory NW	10	11	13	12	12	10	10	11	11	11
Orsett Cock Circulatory SE	13	15	19	28	31	7	8	9	13	12

Table 7.43 Site 88 Orsett Cock - A13 Stanford le Hope Bypass / A1013 Stanford multi-modal average queue length results

Arm	AM (Average Queue Length (m))					PM (Average Queue Length (m))				
	2024 Base	Future Base GEH	FB + CD GEH	FB+CD+Project GEH SC1	FB+CD+Project GEH SC2	2024 Base	Future Base GEH	FB + CD GEH	FB+CD+Project GEH SC1	FB+CD+Project GEH SC2
A13 West Approach	94	95	95	97	96	96	97	98	98	98
A128 North Approach	1	2	2	4	3	3	4	6	6	6
A13 East Approach	12	13	13	13	13	20	22	26	24	23
A1013 Stanford Rd East Approach	5	7	10	12	12	4	5	8	10	9
A128 South Approach	11	16	59	86	70	1	2	3	3	2
A1013 Stanford Rd West Approach	3	4	5	6	6	1	1	1	1	1
Orsett Cock Circulatory NW	10	11	13	12	12	10	10	11	11	11
Orsett Cock Circulatory SE	13	15	19	32	20	7	8	9	11	12

7.7.116 The model and data indicate that, in all scenarios, queueing does not back up onto the A13 mainline and does not cause blocking on the roundabout circulatory. However, average queue lengths generally increase compared to the base year. Key observations from the data include:

- The Orsett Cock Circulatory SE (AM) experiences an increase of 13 meters in average queue length between the Future Base plus Committed Developments scenario and Multi-modal scenario 1
- The A128 South Approach experiences the greatest increase in average queue lengths as a result of the Project, primarily in the AM peak, while increases in the PM peak are minor. All other approaches at the junction would experience minor increases as a result of the Project
- Between the two road-only strategy access routes, AR2 results in less queueing during the AM peak compared to AR1 as a result of the Project, while queueing levels in the PM peak are similar, with only minor differences
- In the PM peak, AR1 and AR2 result in similar queueing levels compared to multi-modal scenarios one and two as a result of the Project. However, in the AM peak, multi-modal scenario two is predicted to have the least severe queueing
- Of the two multi-modal scenarios, Scenario 1 results in greater average queue lengths, though these increases are generally minimal, except for the A128 South Approach and Orsett Cock Circulatory SE in the AM peak.

Site 90 – M25 Junction 30 roundabout

7.7.117 The M25 Junction 30 is a large, signalised roundabout located north of the Dartford River Crossing in Thurrock. It provides direct access between the A13 and M25 and serves local destinations such as the Port of Tilbury and the Lakeside Shopping Centre.

7.7.118 The junction is presented in Image 7.24 and has been assessed using LinSig. The capacity assessments are presented in Table 7.44 and Table 7.45.

Image 7.24 M25 Junction 30 roundabout



Table 7.44 Site 90 – M25 Junction 30 roundabout AM peak capacity assessment

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
M25 SB Off Slip Left	53.9%	57.1%	0.6	0.7	2.1	2.2
M25 SB Off Slip Ahead Left	63.9%	63.5%	6.4	6.4	32.8	32.6
M25 SB Off Slip Ahead	83.5%	85.2%	10.1	10.8	35.9	37.6
A13 WB Off Slip Left	77.3%	77.3%	15.0	15.0	23.9	23.9
A13 WB Off Slip Left	76.5%	76.5%	14.2	14.2	23.9	23.9
A13 WB Off Slip Ahead	62.2%	62.2%	8.0	7.9	17.1	17.1
M25 NB Off Slip Ahead Left	105.4%	105.5%	69.4	69.9	134.0	135.4
M25 NB Off Slip Ahead	104.0%	103.9%	58.7	58.3	116.1	115.0
A13 EB Off Slip Left	36.5%	36.5%	0.3	0.3	1.5	1.5
A13 EB Off Slip Ahead	86.3%	86.1%	10.3	10.2	53.2	52.8
A13 EB Off Slip Ahead	89.6%	89.9%	11.5	11.6	59.7	60.2

Table 7.45 Site 90 – M25 Junction 30 roundabout PM peak capacity assessment

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
M25 SB Off Slip Left	67.4%	67.4%	1.0	1.0	2.9	2.9
M25 SB Off Slip Ahead Left	60.8%	60.6%	5.9	5.9	28.1	28.0

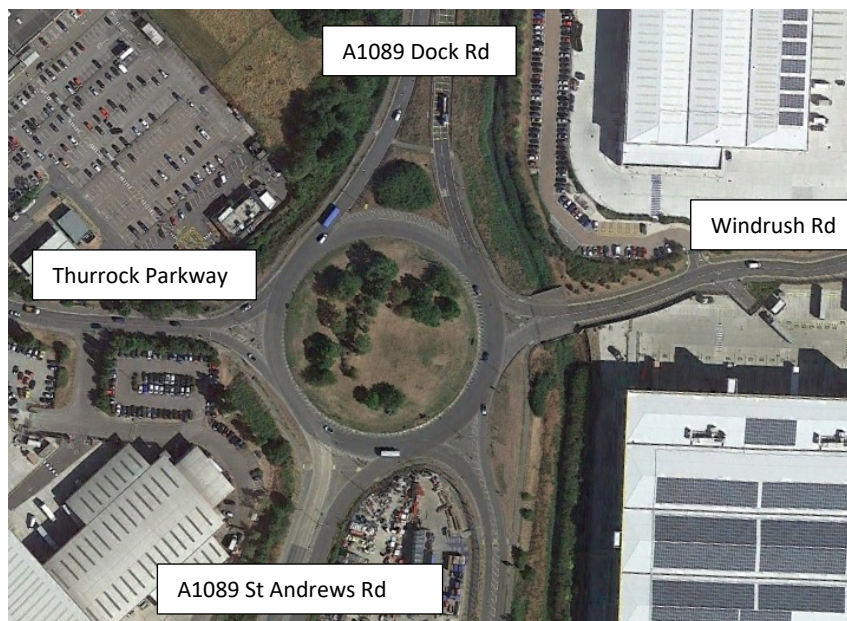
Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
M25 SB Off Slip Ahead	86.7%	86.6%	11.2	11.2	35.6	35.4
A13 WB Off Slip Left	81.0%	81.0%	14.4	14.4	26.4	26.4
A13 WB Off Slip Left	80.3%	80.3%	13.6	13.6	26.4	26.4
A13 WB Off Slip Ahead	71.0%	72.0%	9.5	9.6	19.2	19.4
M25 NB Off Slip Ahead Left	105.4%	105.6%	62.7	63.6	135.4	137.2
M25 NB Off Slip Ahead	104.0%	104.1%	52.8	53.3	118.3	118.9
A13 EB Off Slip Left	43.5%	43.5%	0.4	0.4	1.7	1.7
A13 EB Off Slip Ahead	89.6%	89.8%	11.9	12.0	52.4	52.8
A13 EB Off Slip Ahead	91.5%	91.3%	12.9	12.8	56.9	56.4

- 7.7.119 The traffic modelling results indicate that the junction is predicted to operate above theoretical capacity on the M25 northbound approach in all scenarios and peaks. There is no significant difference between the future base with committed development and future base with Project traffic. This is because the Project construction traffic at this location is so low that it does not have material impact on the junction operation. The junction is predicted to operate above capacity, however this is not a result of Project traffic.

Site 89 - Asda Roundabout - A1089 Dock Approach Road / Thurrock Parkway

- 7.7.120 The A1089 Dock Approach Road and Thurrock Parkway junction is a five-arm roundabout located near to Tilbury, Thurrock. The junction provides access to Tilbury Docks, Asda Supermarket and an Amazon warehouse as well as a number of industrial estates. This junction would be used under the multi-modal scenarios only.
- 7.7.121 The junction is presented in Image 7.25 and has been assessed in Junctions V10 software. This Junctions model was provided by LTC project, which was re-purposed as provided. Junction geometries present in the provided model were retained, only traffic flows matrices were updated. The capacity assessments are presented in Table 7.46.

Image 7.25 Asda Roundabout - A1089 Dock Approach Road / Thurrock Parkway



- 7.7.122 The modelling results indicate that the A1089 Dock Road north arm operates at theoretical capacity in the 2024 Base AM peak with an RFC of 0.99; this exceeds an RFC of 1 once Future Base plus Committed Development flows are applied. In the PM peak A1089 Dock Road North, A1089 St. Andrew's Road and Thurrock Park Way are predicted to also operate over practical capacity once Future Base and Committed Development flows are applied to the junction. Queue lengths materially worsen on both A1089 approaches within this increased traffic demand.
- 7.7.123 Given the proximity to the Port of Tilbury, both Multi-modal flow scenarios were assessed at this junction. The results show that the addition of the Project traffic does not have a materially detrimental impact upon the operation of the junction when compared with the capacity issues already predicted to occur before any construction traffic is applied. RFC values are predicted to increase by a few percentage points on most arms, the maximum predicted RFC value occurring on A1089 Dock Road North in Multi-modal Scenario 2 in the AM peak, with an RFC of 1.26.

Table 7.46 Site 89 Asda Roundabout A1089 Dock Approach Road / Thurrock Parkway junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A1089 Dock Road North	23.1	33.69	0.99	7.1	14.95	0.84
Amazon UK Service Access	0.2	9.18	0.08	0.2	7.93	0.11
Dock Road South	1.6	9.40	0.60	1.1	6.91	0.52
A1089 St Andrew's Road	1.6	5.97	0.49	4.1	9.79	0.76
Thurrock Park Way	0.8	6.02	0.40	2.8	14.54	0.73
Future Base						
A1089 Dock Road North	40.2	50.45	1.04	10.1	20.71	0.89
Amazon UK Service Access	0.2	9.69	0.09	0.2	8.32	0.12
Dock Road South	1.8	10.53	0.64	1.3	7.78	0.56
A1089 St Andrew's Road	1.8	6.32	0.52	5.4	12.28	0.81
Thurrock Park Way	0.9	6.43	0.43	4.1	19.64	0.81
Future Base plus Committed Developments						
A1089 Dock Road North	213.9	350.28	1.22	209.4	349.85	1.12
Amazon UK Service Access	0.2	10.72	0.10	0.3	10.21	0.15
Dock Road South	2.2	13.02	0.69	1.9	11.11	0.65
A1089 St Andrew's Road	7.6	17.68	0.82	44.4	64.07	1.05
Thurrock Park Way	1.5	10.78	0.57	14.8	58.16	1.01
Future Base plus Committed Developments and Project – Scenario 1						
A1089 Dock Road North	252.7	424.12	1.24	256.4	441.87	1.14
Amazon UK Service Access	0.2	10.70	0.10	0.3	10.29	0.15
Dock Road South	2.3	13.39	0.70	1.9	11.31	0.65
A1089 St Andrew's Road	8.7	19.92	0.84	55.7	76.49	1.07
Thurrock Park Way	1.6	11.41	0.59	15.9	61.95	1.02

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Scenario 2						
A1089 Dock Road North	291.0	488.98	1.26	311.1	528.46	1.16
Amazon UK Service Access	0.2	10.71	0.10	0.3	10.36	0.15
Dock Road South	2.3	13.60	0.70	1.9	11.46	0.65
A1089 St Andrew's Road	9.9	22.14	0.86	66.1	87.97	1.09
Thurrock Park Way	1.7	11.91	0.60	16.7	64.89	1.03

7.7.124 Overall, the junction is predicted to be very sensitive in the future year cases as it is also expected to service traffic related to the LTC project. Given the small increase in RFC values once the Project traffic is applied, no mitigation measures have been proposed at this stage. However, further discussions are expected to be held with National Highways and local stakeholders to understand how local conditions impact neighbouring land uses and business operations.

7.8 Summary of Multi-modal Strategy (Sensitivity Testing)

- 7.8.1 A summary of the change in traffic flows on key SRN segments during the AM and PM peak hours for multi-modal scenario 1 and scenario 2 are presented within Table 7.49 and Table 7.50 respectively. In the Multi-modal Scenario 1 the maximum increase in HGVs and total traffic remains below the 30% threshold across all the SRN and MRN assessed routes. Changes in net traffic flows and/or HGV flows of < 30%, 30 to 60%, 60 to 90% and > 90% are considered to have negligible, minor, moderate and major impacts respectively. This suggests that this scenario would maintain manageable traffic impacts during construction.
- 7.8.2 In contrast, Multi-modal Scenario 2 demonstrates significant increases in HGV volumes on several key routes such as the A47 (between A140 and A146), A140 (between A47 and A143) and A120 (between B1035 and A133), exceeding the 30% threshold. These increases are projected for durations ranging from 1 to 160 weeks, potentially causing impacts on traffic flow and road user experience. In this scenario, measures such as traffic management plans and scheduling strategies would be critical to minimise disruption during the construction period.
- 7.8.3 It is expected that the proposed accesses to the ports and sidings, including the road links and junctions, have been designed to accommodate the maximum operational movements anticipated for the ports / sidings future activity levels.
- 7.8.4 The A1016 Waterhouse Lane in Chelmsford is already over capacity and the preliminary capacity analysis for the junctions on this road indicates that several junctions are already operating at capacity in the baseline year (2024). Any additional traffic would likely cause these junctions to exceed their capacity. Junction capacity

assessment has been undertaken along the corridor to identify potential mitigation measures.

- 7.8.5 Where junctions have been identified as being at or over capacity, junction modelling has been undertaken to identify the potential temporary impact of additional construction traffic from the ports.
- 7.8.6 The number of HGV movements would be re-examined when the appointed Main Works Contractor(s) has sufficiently progressed its construction method and detailed programming of the works are sufficiently progressed.

Table 7.47 Summary of change in traffic on key SRN segments during the AM and PM peak hours – multi-modal scenario 1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
AM Peak	A47 (between A140 and A146)	2027	4,481	216	34	0	34	0.75%	15.64%	1
	A47 (between A11 and A140)	2027	4,747	214	54	45	9	1.13%	4.02%	12
	A11 (between A47 and Tuttle Lane Interchange)	2027	3,638	217	10	1	9	0.26%	3.96%	12
	A140 (between A47 and A1066)	2027	1,596	81	65	43	22	4.06%	27.11%	1
	A140 (between A1066 and A143)	2028	1,125	83	53	43	10	4.72%	12.09%	1
	A14 (between J49 and J50)	2028	3,457	527	294	283	11	8.51%	2.13%	1
	A14 (between J51 and J52)	2028	4,569	583	242	229	13	5.29%	2.18%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A14 (between A12 and A137)	2028	4,645	649	16	0	16	0.33%	2.40%	1
	A12 (between A14 and B1070)	2028	4,064	414	209	203	5	5.13%	1.32%	1
	A12 (between B1070 and B1068)	2028	4,330	405	209	203	5	4.82%	1.35%	1
	A12 (between A1232 and A120)	2028	4,435	420	215	209	5	4.84%	1.30%	1
	A12 (between J28 and J29)	2028	5,220	453	137	126	11	2.62%	2.45%	1
	A12 (between J27 and J28)	2027	5,125	454	29	21	8	0.57%	1.77%	2
	A12 (between J26 and J27)	2027	6,846	488	29	21	8	0.42%	1.64%	2
	A12 (between J25 and J26)	2027	6,886	483	25	21	4	0.37%	0.93%	2
	A12 (between J21 and J22)	2027	5,140	469	4	0	4	0.09%	0.95%	9
	A120 (between	2028	1,201	131	20	0	20	1.66%	15.27%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	B1035 and A133)									
	A120 (between A133 and A1232)	2028	3,284	226	174	158	17	5.31%	7.38%	1
	A120 (between A131 and B1256)	2027	3,013	155	28	16	12	0.94%	8.04%	2
	A120 (between B1024 and A12)	2027	1,811	128	38	19	19	2.12%	15.24%	2
	A12 (between J14 and J15)	2028	5,486	410	10	0	10	0.18%	2.43%	4
	A12 (between J11 and J12)	2028	5,872	449	10	0	10	0.17%	2.21%	4
	A127 (between A128 and A121)	2028	4,924	212	4	0	4	0.09%	2.03%	16
	A13 (between A1012 and A1089)	2028	6,598	838	84	74	10	1.27%	1.19%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A13 (between A1089 and A128)	2028	6,323	561	103	77	26	1.62%	4.60%	1
	A1089 (between A13 and A126)	2028	2,297	569	34	0	34	1.50%	6.06%	1
	A1089 (between A126 and Asda Roundabout)	2028	2,611	537	34	0	34	1.32%	6.42%	1
PM peak	A47 (between A140 and A146)	2027	4,903	236	34	0	34	0.69%	14.29%	1
	A47 (between A11 and A140)	2027	5,195	234	54	45	9	1.03%	3.68%	12
	A11 (between A47 and Tuttle Lane Interchange)	2027	3,981	238	10	1	9	0.24%	3.62%	12
	A140 (between A47 and A1066)	2027	1,749	88	65	43	22	3.71%	24.75%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A140 (between A1066 and A143)	2028	1,231	91	53	43	10	4.31%	11.05%	1
	A14 (between J49 and J50)	2028	3,784	577	294	283	11	7.78%	1.94%	1
	A14 (between J51 and J52)	2028	5,001	638	242	229	13	4.84%	1.99%	1
	A14 (between A12 and A137)	2028	5,083	710	16	0	16	0.31%	2.19%	1
	A12 (between A14 and B1070)	2028	4,448	453	209	203	5	4.69%	1.21%	1
	A12 (between B1070 and B1068)	2028	4,739	443	209	203	5	4.40%	1.24%	1
	A12 (between A1232 and A120)	2028	4,858	461	215	209	5	4.42%	1.19%	1
	A12 (between J28 and J29)	2028	5,718	496	137	126	11	2.39%	2.24%	1
	A12 (between J27 and J28)	2027	5,609	497	29	21	8	0.52%	1.62%	2

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A12 (between J26 and J27)	2027	7,492	535	29	21	8	0.39%	1.50%	2
	A12 (between J25 and J26)	2027	7,535	528	25	21	4	0.34%	0.85%	2
	A12 (between J21 and J22)	2027	5,625	513	4	0	4	0.08%	0.87%	9
	A120 (between B1035 and A133)	2028	1,316	143	20	0	20	1.52%	13.94%	1
	A120 (between A133 and A1232)	2028	3,597	247	174	158	17	4.85%	6.74%	1
	A120 (between A131 and B1256)	2027	3,297	169	28	16	12	0.86%	7.34%	2
	A120 (between B1024 and A12)	2027	1,982	140	38	19	19	1.94%	13.93%	2
	A12 (between J14 and J15)	2028	6,009	449	10	0	10	0.17%	2.22%	4

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A12 (between J11 and J12)	2028	6,432	492	10	0	10	0.15%	2.02%	4
	A127 (between A128 and A121)	2028	5,394	232	4	0	4	0.08%	1.85%	16
	A13 (between A1012 and A1089)	2028	7,234	919	84	74	10	1.16%	1.08%	1
	A13 (between A1089 and A128)	2028	6,932	615	103	77	26	1.48%	4.20%	1
	A1089 (between A13 and A126)	2028	2,519	623	34	0	34	1.37%	5.53%	1
	A1089 (between A126 and Asda Roundabout)	2028	2,862	589	34	0	34	1.20%	5.85%	1

Table 7.48 Summary of change in traffic on key SRN segments during the AM and PM peak hours – multi-modal scenario 2

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
AM Peak	A47 (between A140 and A146)	2027	4,481	216	75	0	75	1.68%	34.77%	1
	A47 (between A11 and A140)	2027	4,747	214	55	44	11	1.15%	5.00%	3
	A11 (between A47 and Tuttle Lane Interchange)	2027	3,638	217	12	1	11	0.32%	4.93%	1
	A140 (between A47 and A1066)	2027	1,596	81	66	0	66	4.11%	81.53%	1
	A140 (between A1066 and A143)	2027	1,118	83	43	5	38	3.85%	45.38%	160
	A14 (between J49 and J50)	2027	3,435	524	102	87	15	2.97%	2.86%	1
	A14 (between J51 and J52)	2028	4,569	583	238	225	13	5.21%	2.17%	1
	A14 (between A12 and A137)	2027	4,614	644	25	0	25	0.54%	3.84%	13

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A12 (between A14 and B1070)	2027	4,037	411	62	45	16	1.53%	4.01%	1
	A12 (between B1070 and B1068)	2027	4,301	402	62	45	16	1.44%	4.10%	1
	A12 (between A1232 and A120)	2027	4,405	418	64	47	16	1.45%	3.95%	1
	A12 (between J28 and J29)	2027	5,185	450	39	5	34	0.74%	7.50%	1
	A12 (between J27 and J28)	2027	5,125	454	25	2	22	0.48%	4.95%	1
	A12 (between J26 and J27)	2027	6,846	488	25	2	22	0.36%	4.60%	1
	A12 (between J25 and J26)	2027	6,886	483	21	8	13	0.30%	2.62%	2
	A12 (between J21 and J22)	2027	5,140	469	13	0	13	0.25%	2.70%	1
	A120 (between B1035 and A133)	2027	1,193	130	51	0	51	4.24%	38.95%	10

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A120 (between A133 and A1232)	2027	3,262	224	47	2	45	1.44%	20.04%	2
	A120 (between A131 and B1256)	2027	3,013	155	43	18	25	1.43%	16.18%	5
	A120 (between B1024 and A12)	2027	1,811	128	46	21	25	2.54%	19.60%	5
	A12 (between J14 and J15)	2027	5,450	407	20	0	20	0.37%	4.94%	1
	A12 (between J11 and J12)	2027	5,833	446	20	0	20	0.34%	4.50%	1
	A127 (between A128 and A121)	2027	4,891	211	8	0	8	0.17%	4.01%	1
	A13 (between A1012 and A1089)	2027	6,530	830	22	2	20	0.34%	2.42%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A13 (between A1089 and A128)	2027	6,258	556	46	2	44	0.74%	7.98%	1
	A1089 (between A13 and A126)	2027	2,274	563	60	0	60	2.65%	10.71%	1
	A1089 (between A126 and Asda Roundabout)	2027	2,584	531	60	0	60	2.33%	11.34%	1
PM peak	A47 (between A140 and A146)	2027	4,903	236	75	0	75	1.53%	31.77%	1
	A47 (between A11 and A140)	2027	5,195	234	55	44	11	1.05%	4.57%	3
	A11 (between A47 and Tuttle Lane Interchange)	2027	3,981	238	12	1	11	0.29%	4.50%	1
	A140 (between A47 and A1066)	2027	1,749	88	66	0	66	3.76%	74.43%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A140 (between A1066 and A143)	2027	1,224	90	43	5	38	3.51%	41.47%	160
	A14 (between J49 and J50)	2027	3,762	574	102	87	15	2.71%	2.61%	1
	A14 (between J51 and J52)	2028	5,001	638	238	225	13	4.76%	1.98%	1
	A14 (between A12 and A137)	2027	5,054	706	25	0	25	0.49%	3.50%	13
	A12 (between A14 and B1070)	2027	4,422	450	62	45	16	1.40%	3.66%	1
	A12 (between B1070 and B1068)	2027	4,712	440	62	45	16	1.31%	3.74%	1
	A12 (between A1232 and A120)	2027	4,821	457	64	47	16	1.32%	3.61%	1
	A12 (between J28 and J29)	2027	5,674	492	39	5	34	0.68%	6.85%	1
	A12 (between J27 and J28)	2027	5,609	497	25	2	22	0.44%	4.52%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A12 (between J26 and J27)	2027	7,492	535	25	2	22	0.33%	4.20%	1
	A12 (between J25 and J26)	2027	7,535	528	21	8	13	0.28%	2.39%	2
	A12 (between J21 and J22)	2027	5,625	513	13	0	13	0.22%	2.46%	1
	A120 (between B1035 and A133)	2027	1,306	142	51	0	51	3.87%	35.60%	10
	A120 (between A133 and A1232)	2027	3,570	245	47	2	45	1.31%	18.32%	2
	A120 (between A131 and B1256)	2027	3,297	169	43	18	25	1.30%	14.79%	5
	A120 (between B1024 and A12)	2027	1,982	140	46	21	25	2.32%	17.91%	5
	A12 (between J14 and J15)	2027	5,964	445	20	0	20	0.34%	4.51%	1

Peak period	Location	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak (weeks)
	A12 (between J11 and J12)	2027	6,384	488	20	0	20	0.31%	4.12%	1
	A127 (between A128 and A121)	2027	5,353	230	8	0	8	0.16%	3.66%	1
	A13 (between A1012 and A1089)	2027	7,160	909	22	2	20	0.31%	2.21%	1
	A13 (between A1089 and A128)	2027	6,861	609	46	2	44	0.68%	7.28%	1
	A1089 (between A13 and A126)	2027	2,493	617	60	0	60	2.42%	9.77%	1
	A1089 (between A126 and Asda Roundabout)	2027	2,833	583	60	0	60	2.13%	10.35%	1

7.9 Road Safety

7.9.1 As reported in Chapter 4 collision clusters were identified at the following junctions connecting the LRN:

- A47 Norwich Southern Bypass / A140 Ipswich Road Interchange
- A14 J50 Cedars Interchange
- A14 J52 Claydon Roundabout
- A14 J55 Copdock Interchange
- A12 J29 / A120 Ardleigh Crown Interchange
- A12 J26 Eight Ash Green Interchange
- A12 J25 Marks Tey Interchange
- A120 Galleys Corner Roundabout
- A127 Southern Arterial Road / A176 Noak Hill Road Interchange
- A127 Southern Arterial Road / A128 Tilbury Road Interchange
- A13 Stanford-Le-Hope Bypass (Orsett Cock Roundabout).

7.9.2 A rise in traffic flow can potentially increase the risk of collisions. However, it is considered that for the majority of road links the temporary increase in construction traffic associated with the Project is unlikely to materially affect safety. Mitigation measures are provided within the Outline CTMP (document reference 7.3). The overall effects on road user safety from the construction phase would be short-term minor adverse and not significant.

7.10 Local Road Network Operation and Performance

7.10.1 The impact of the construction flows on the road links forming the PARs during the AM and PM peak hours are listed in full in Appendix E. The total trip distribution for the peak hour has been presented for each PAR road link in Images E1 to E71 in Appendix E.

7.10.2 The forecast increase for traffic on the road links considered for the Project is presented in Table 7.49 for the AM peak and Table 7.50 for the PM peak hour for those PARs that are higher than 30% on non-sensitive roads or 10% on sensitive roads. The sensitivity of a road is assigned based on the presence of sensitive receptors on the highway link.

7.10.3 In both peak periods, some of the percentage increases are large, primarily due to the low future baseline traffic levels. However, the total future flows in these road links are not expected to have a material impact on the operation or performance of the network and generally occur over a short duration (e.g. one week). There are links (e.g. Link PAR14) where the duration is expected to be for a longer period of time, however it is noted that the associated construction traffic flows are notably lower.

- 7.10.4 In both peak periods, the largest increase in traffic is on the route along Bentley Road and Ardleigh Road / Little Bromley Road with an increase of 187 construction vehicles per hour. This is expected to have a maximum duration of one week. The Project is aware that Bentley Road is used by visitors to access the annual Tendring Show and would liaise with the Tendring Hundred Farmers' Club regarding the timings of construction traffic movements.

Table 7.49 Percentage increase in construction traffic numbers (AM peak)

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Norfolk	Link PAR 2	Mangreen Lane	2028	52	80	144	64	52	12	79%	1
Suffolk	Link PAR 10	A143 Old Bury Road	2028	655	655	762	107	80	27	16%	1
	Link PAR 13	Wickham Road	2028	217	217	243	26	0	26	12%	2
	Link PAR 14	Eastland Lane	2028	4	4	17	13	0	13	297%	22
	Link PAR 20	B1113 Bramford Road / B1113 Loraine Way	2030	628	633	723	90	62	28	14%	1
	Link PAR 21	Bullen Lane	2030	11	16	105	90	62	28	575%	1
Essex	Link PAR 26	Ipswich Road	2029	207	207	267	60	40	20	29%	1
	Link PAR 28	Wick Road / Grove Hill	2030	28	28	46	18	6	12	64%	1
	Link PAR 29	Perry Lane	2030	12	12	30	18	6	12	155%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 30	Bentley Road	2028	142	280	467	187	162	25	67%	1
	Link PAR 31	Ardleigh Road / Little Bromley Road	2028	22	46	233	187	162	25	409%	1
	Link PAR 56	Ivy Barns Lane	2028	122	122	136	14	0	14	11%	2
	Link PAR 57	Church Lane	2028	5	5	18	13	0	13	251%	6
Thurrock	Link PAR 66	A1013 Stanford Road (east of Orsett Cock Roundabout)	2028	735	809	896	88	74	14	11%	1
	Link PAR 67	Buckingham Hill Road	2028	665	805	893	88	74	14	11%	1
	Link PAR 70	Heath Road	2028	288	288	356	67	30	37	23%	2

Table 7.50 Percentage increase in construction traffic numbers (PM peak)

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Norfolk	Link PAR 2	Mangreen Lane	2028	66	94	158	64	52	12	68%	1
Suffolk	Link PAR 10	A143 Old Bury Road	2028	658	658	765	107	80	27	16%	1
	Link PAR 13	Wickham Road	2028	210	210	236	26	0	26	13%	2
	Link PAR 14	Eastland Lane	2028	3	3	16	13	0	13	372%	22
	Link PAR 20	B1113 Bramford Road / B1113 Loraine Way	2030	642	647	737	90	62	28	14%	1
	Link PAR 21	Bullen Lane	2030	11	16	105	90	62	28	574%	1
Essex	Link PAR 26	Ipswich Road	2029	183	183	242	60	40	20	33%	1
	Link PAR 28	Wick Road / Grove Hill	2030	28	28	46	18	6	12	64%	1
	Link PAR 29	Perry Lane	2030	16	16	34	18	6	12	114%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 30	Bentley Road	2028	93	231	418	187	162	25	81%	1
	Link PAR 31	Ardleigh Road / Little Bromley Road	2028	17	41	228	187	162	25	461%	1
	Link PAR 56	Ivy Barns Lane	2028	105	105	119	14	0	14	13%	2
	Link PAR 57	Church Lane	2028	4	4	17	13	0	13	329%	6
Thurrock	Link PAR 70	Heath Road	2028	356	356	424	67	30	37	19%	2

7.11 Local Road Network Junction Capacity Assessment Results

- 7.11.1 Traffic modelling has been undertaken to determine those junctions that are likely to be impacted by the Project's construction traffic on the PARs and connection to the LRN. The modelling has been used to identify junctions where potential mitigation measures may be required to alleviate any notable impacts on junction operation. A summary of all junctions modelled within their respective region has been provided. Full details of this assessment are provided in Appendix H.

Norfolk Junctions

Site 2 - A140 Ipswich Rd / Mangreen Lane priority junction

- 7.11.2 The A140 Ipswich Road and Mangreen Lane junction is priority T-junction located south of Norwich, near the village of Dunston. The junction connects local traffic to the A140, a major route connecting Ipswich and Norwich and facilitates access to the nearby A47 Norwich Southern Bypass.
- 7.11.3 Aerial imagery of the junction is presented in Image 7.26 and was assessed using Junctions V9 software. The capacity assessments are presented in Table 7.51.

Image 7.26 A140 Ipswich Rd / Mangreen Lane priority junction



- 7.11.4 The Junctions assessment shows that the junction operates within capacity in the Base and Future Base however delays are predicted along Mangreen Lane (W) in both the AM and PM peaks. In the Future Base plus Committed Development scenario there are no issues in the PM, however the A140 Ipswich Road (N) right turn movement is over practical capacity with an RFC of 0.93.
- 7.11.5 In the Base and Future Base scenarios, delays were observed along Mangreen Lane(W). The delays were primarily caused by the high traffic volumes on the A140,

vehicles waiting to make a right turn out of Mangreen Lane onto the A140 southbound created significant delays due to a significant volume of conflicting traffic. The number of vehicles turning right is notably low as per the survey data. This small volume of right turning traffic cannot navigate the junction in the modelling software accurately. To address this, the right turn out of Mangreen Lane has been removed in the Future Base plus Committed Development and onward scenarios for general traffic, reducing congestion for left turning traffic out of Mangreen Lane.

- 7.11.6 With the addition of Project flows the A140 Ipswich Road (N) right turn exceeds theoretical capacity (RFC >1) in the AM with the RFC value predicted to reach 1.12. In the PM the Mangreen Lane left turn increases over theoretical capacity with a predicted RFC of 1.09.
- 7.11.7 The results of the Multi-modal Scenario 2 assessment indicate that the Mangreen Lane left turn is still predicted to operate near capacity in the PM peak with an RFC value close to 1. A140 Ipswich Road (N) right turn into Mangreen Lane is predicted to operate over capacity in the AM peak with an RFC over 1. Whilst delay and queue length results exponentially increase when RFC values exceed 1 in Junctions software, the general trend observed in the modelling results indicate the existing right turn bay, which could accommodate approximately 13 PCUs, would have insufficient right turn capacity to accommodate predicted future year increased queues.

Table 7.51 Site 2 - A140 Ipswich Rd / Mangreen Lane priority junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Mangreen Lane Left Turn	0.1	12.91	0.11	0.2	9.78	0.17
Mangreen Lane Right Turn	0.1	73.09	0.08	0.1	56.41	0.07
A140 Ipswich Road (N)	0.2	13.29	0.14	0.1	9.33	0.07
Future Base						
Mangreen Lane Left Turn	0.2	13.46	0.11	0.2	10.22	0.18
Mangreen Lane Right Turn	0.1	114.06	0.12	0.1	76.80	0.08
A140 Ipswich Road (N)	0.2	14.07	0.15	0.1	9.60	0.07
Future Base plus Committed Developments						
Mangreen Lane Left Turn	1.1	35.92	0.45	2.5	30.81	0.71
Mangreen Lane Right Turn	0.0	0.00	0.00	0.0	0.00	0.00
A140 Ipswich Road (N)	10.4	75.88	0.93	0.5	17.61	0.27

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project						
Mangreen Lane Left Turn	2.1	57.39	0.60	15.5	159.38	1.09
Mangreen Lane Right Turn	0.0	0.00	0.00	0.0	0.00	0.00
A140 Ipswich Road (N)	85.5	386.20	1.12	0.8	22.89	0.38
Scenario 2 Multi-modal Flows						
Mangreen Lane Left Turn	7.3	142.92	0.84	13.2	129.83	0.97
Mangreen Lane Right Turn	0.0	0.00	0.00	0.0	0.00	0.00
A140 Ipswich Road (N)	24.4	178.78	1.02	0.5	19.21	0.29

7.11.8 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.52 provides a comparison of the Future Base with Committed Developments and Project scenario flows, against a scenario with these reduced flows.

Table 7.52 Site 2 - A140 Ipswich Rd / Mangreen Lane priority junction capacity assessment with reduced peak hour flows

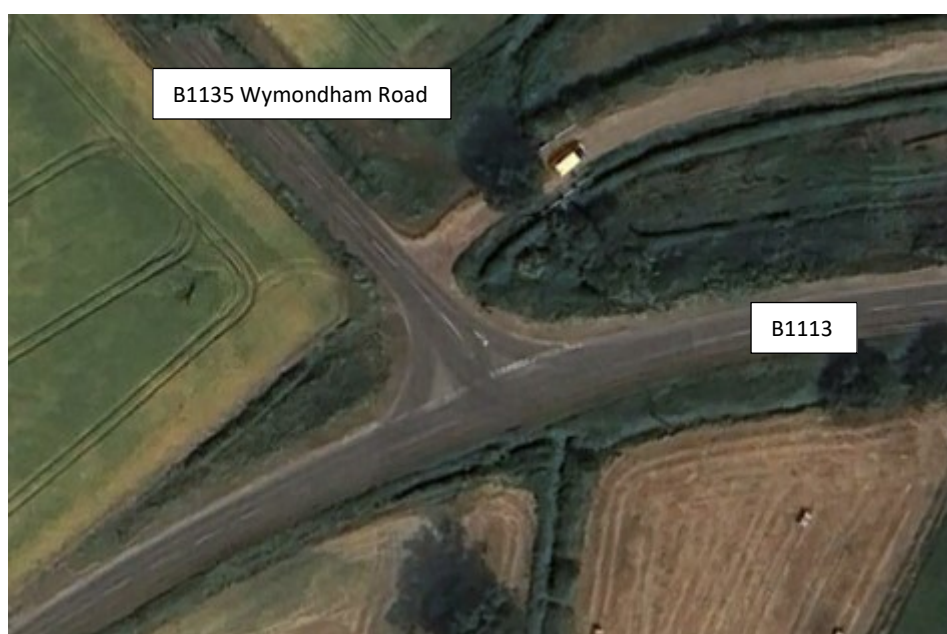
Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
Mangreen Lane Left Turn	2.1	57.39	0.60	15.5	159.38	1.09
Mangreen Lane Right Turn	0.0	0.00	0.00	0.0	0.00	0.00
A140 Ipswich Road (N)	85.5	386.20	1.12	0.8	22.89	0.38
Future Base plus Committed Developments and Project – Reduced Flows (50%)						
Mangreen Lane Left Turn	1.5	44.80	0.52	3.3	39.19	0.77
Mangreen Lane Right Turn	0.0	0.00	0.00	0.0	0.00	0.00
A140 Ipswich Road (N)	28.9	190.22	1.02	0.6	20.07	0.32

- 7.11.9 The sensitivity assessment shows that with 50% of worst-case peak flows during the peak hours, queue lengths, delays, and RFC values all decrease by a marginal amount. Existing capacity concerns remain in the AM along the A140 Ipswich Road (N) right turn.
- 7.11.10 Mitigation at the junction is to avoid the AM peak and redistribute the flows across off peak periods.

Site 3 - B1113/ Wymondham Rd Priority Junction

- 7.11.11 The B1113 and Wymondham Road junction is a small priority-controlled T-junction located south of Norwich and to the east of Wymondham. The 3-arm junction connects the two roads with traffic on the B1113 taking priority.
- 7.11.12 Aerial imagery of the junction is presented in Image 7.27 and has been assessed using Junctions V9 software. The capacity assessments are shown in Table 7.53.

Image 7.27 B1113/ Wymondham Rd Priority Junction



- 7.11.13 The Junctions assessment indicates that the priority junction operates within capacity across all PM peak hour scenarios. However, during the AM peak hour, the B1113 right turn into Wymondham Road slightly exceeds practical capacity in the Base scenario (RFC 0.86), rising to an RFC of 0.90 in the Future Base plus committed development scenario.
- 7.11.14 With the addition of AM peak hour Project traffic, the RFC increases marginally from 0.9 to 0.95. As the RFC increases, delays also worsen, growing from 34 seconds in the Base scenario to 56 seconds when accounting for Project flows.

Table 7.53 Site 3 B1113/ Wymondham Rd Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
B1135 Wymondham Road (N) (E) Left Turn	0.6	9.18	0.36	1.7	14.23	0.63
B1135 Wymondham Road (N) Right Turn	0.2	15.29	0.16	0.4	13.43	0.25
B1113 (E) Right and Ahead	5.4	34.02	0.86	0.4	7.02	0.26
Future Base						
B1135 Wymondham Road (N) (E) Left Turn	0.6	9.50	0.38	1.9	15.39	0.66
B1135 Wymondham Road (N) Right Turn	0.2	15.85	0.17	0.4	14.20	0.27
B1113 (E) Right and Ahead	7.0	41.03	0.90	0.5	7.10	0.27
Future Base plus Committed Developments						
B1135 Wymondham Road (N) (E) Left Turn	0.6	9.50	0.38	1.9	15.39	0.66
B1135 Wymondham Road (N) Right Turn	0.2	15.85	0.17	0.4	14.20	0.27
B1113 (E) Right and Ahead	7.0	41.03	0.90	0.5	7.10	0.27
Future Base plus Committed Developments and Project						
B1135 Wymondham Road (N) (E) Left Turn	0.8	11.62	0.44	2.6	20.48	0.73
B1135 Wymondham Road (N) Right Turn	0.5	23.13	0.29	0.8	21.90	0.41
B1113 (E) Right and Ahead	10.1	55.87	0.95	0.6	7.86	0.31

7.11.15 To accommodate the increase in delays and capacity concerns on this right turn movement, a sensitivity model assessing the impacts of providing a dedicated right turning bay into Wymondham Road was constructed. Table 7.54 provides a summary of the sensitivity model results.

Table 7.54 Site 3 B1113/ Wymondham Rd Priority Junction reduced peak hour flow capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
B1135 Wymondham Road (N) (E) Left Turn	0.6	9.33	0.37	1.7	14.45	0.64
B1135 Wymondham Road (N) Right Turn	0.2	16.20	0.17	0.4	13.77	0.26
B1113 (E) Right and Ahead	4.2	28.40	0.82	0.3	8.07	0.23
Future Base						
B1135 Wymondham Road (N) (E) Left Turn	0.6	9.68	0.38	1.9	15.66	0.66
B1135 Wymondham Road (N) Right Turn	0.2	16.86	0.18	0.4	14.59	0.28
B1113 (E) Right and Ahead	5.2	32.68	0.85	0.3	8.19	0.24
Future Base plus Committed Developments						
B1135 Wymondham Road (N) (E) Left Turn	0.6	9.68	0.38	1.9	15.66	0.66
B1135 Wymondham Road (N) Right Turn	0.2	16.86	0.18	0.4	14.59	0.28
B1113 (E) Right and Ahead	5.2	32.68	0.85	0.3	8.19	0.24
Future Base plus Committed Developments and Project						
B1135 Wymondham Road (N) (E) Left Turn	0.8	11.94	0.45	2.7	21.07	0.74
B1135 Wymondham Road (N) Right Turn	0.6	25.23	0.30	0.9	22.84	0.42
B1113 (E) Right and Ahead	7.3	42.63	0.91	0.4	9.13	0.28

7.11.16 The sensitivity model incorporating a dedicated 3 PCU right turn bay does not provide a material improvement upon predicted delays and RFC when compared with the assessment of the existing layout. Additionally, following talks with Norfolk Local Highway Authority officers, there is limited space to widen the carriageway at this location to provide a dedicated right turn bay. A speed reduction to 40 mph on approach to this junction was discussed as part of highway mitigation works.

Site 6 - A1066 Victoria Rd / B1077 Stuston Rd Priority Junction

- 7.11.17 The junction of the A1066 Victoria Road and B1077 Stuston Road is located on the eastern edge of Diss, Norfolk. It is a small priority junction which connects traffic travelling from nearby villages on the B1077 to the A1066, the main road through the town which connects to other major routes in the region.
- 7.11.18 Aerial imagery illustrating this junction is presented in Image 7.28. The junction has been modelled in Junction V9 software as a 3-arm junction, no data was available for Mission Road, the northern arm of the junction. The capacity assessments are presented in Table 7.55

Image 7.28 A1066 Victoria Rd / B1077 Stuston Rd



- 7.11.19 The Junctions assessment shows that the priority junction operates within capacity during the Base PM and weekend scenarios. However, the Stuston Road left turn exceeds practical capacity in all PM Future Year scenario. During the weekend, delays occur on the B1077 right turn in all Future Year scenarios, but RFC remains within capacity for this movement. In the AM, capacity issues for this same Stuston Road left turn arise in the Base scenario and worsen in subsequent scenarios.
- 7.11.20 The introduction of Project traffic has a marginal impact upon capacity when compared with the Future Base plus Committed development scenario. In both peaks RFC values rise by 1-5 percentage points. This would slightly exacerbate existing capacity issues in the AM peak already predicted to exist without any Project construction traffic.

Table 7.55 Site 6 A1066 Victoria Rd / B1077 Stuston Rd Priority Junction capacity assessment

Approach	AM Peak			PM Peak			Weekend Peak 11:15-12:45		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC
2024 Base									
B1077 Stuston Road (S) Left Turn	7.3	57.15	0.91	4.6	36.46	0.84	2.5	24.01	0.71
B1077 Stuston Road (S) Right Turn	1.0	108.19	0.56	0.4	64.05	0.26	0.5	35.13	0.32
A1066 Victoria Road (W) Right Turn	5.4	28.21	0.83	1.9	14.49	0.63	1.6	14.10	0.57
Future Base									
B1077 Stuston Road (S) Left Turn	11.4	81.20	0.98	6.5	47.57	0.90	3.2	29.42	0.77
B1077 Stuston Road (S) Right Turn	2.6	275.87	0.96	0.6	108.52	0.37	0.6	45.35	0.40
A1066 Victoria Road (W) Right Turn	7.4	35.47	0.88	2.3	15.52	0.66	1.8	15.05	0.60
Future Base plus Committed Developments									
B1077 Stuston Road (S) Left Turn	11.4	81.20	0.98	6.5	47.57	0.90	3.2	29.42	0.77
B1077 Stuston Road (S) Right Turn	2.6	275.87	0.96	0.6	108.52	0.37	0.6	45.35	0.40

Approach	AM Peak			PM Peak			Weekend Peak 11:15-12:45		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC
A1066 Victoria Road (W) Right Turn	7.4	35.47	0.88	2.3	15.52	0.66	1.8	15.05	0.60
Future Base plus Committed Developments and Project									
B1077 Stuston Road (S) Left Turn	14.1	98.81	1.01	7.6	55.10	0.92	3.7	33.25	0.80
B1077 Stuston Road (S) Right Turn	2.7	300.04	0.97	0.8	162.75	0.48	0.7	55.05	0.45
A1066 Victoria Road (W) Right Turn	8.8	39.69	0.90	2.5	16.09	0.68	2.0	15.54	0.62

- 7.11.21 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.56 provides a comparison of the Future Base with Committed Developments and Project scenario flows, against a scenario with these reduced flows.

Table 7.56 Site 6 A1066 Victoria Rd / B1077 Stuston Rd Priority Junction capacity assessment with reduced peak hour flows

Approach	AM Peak			PM Peak			Weekend Peak 11:15-12:45		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows									
B1077 Stuston Road (S) Left Turn	14.1	98.81	1.01	7.6	55.10	0.92	3.7	33.25	0.80
B1077 Stuston Road (S) Right Turn	2.7	300.04	0.97	0.8	162.75	0.48	0.7	55.05	0.45
A1066 Victoria Road (W) Right Turn	8.8	39.69	0.90	2.5	16.09	0.68	2.0	15.54	0.62
Future Base plus Committed Developments and Project - Reduced Worst-Case Peak Flows (50%)									
B1077 Stuston Road (S) Left Turn	12.6	89.08	1.00	7.0	51.07	0.91	3.4	31.20	0.78
B1077 Stuston Road (S) Right Turn	2.6	286.71	0.96	0.7	130.79	0.42	0.7	49.76	0.42
A1066 Victoria Road (W) Right Turn	8.1	37.44	0.89	2.4	15.80	0.67	1.9	15.29	0.61

- 7.11.22 The reduced flow assessment shows that with 50% Project flows during the peak hours, queue lengths, delays, and RFC values all decrease. However, the reduction in flows has a minimal impact on junction movements that are over capacity with significant delays. For instance, the B1077 left and right movements see their AM RFC values decrease slightly from 1.01 to 1.00 and 0.97 to 0.96, respectively. The reduction in Project flows has not resulted in any significant improvements as the high queue lengths, delays, and RFC values are already predicted to occur without any additional Project construction traffic.
- 7.11.23 Given the predicted capacity issues through Diss, it is proposed that construction traffic be routed through Thetford during peak hours to avoid exacerbating capacity issues through Diss during these time periods. Additionally, the Thetford junction capacity assessments (Site 12, Site 13, Site 14 and Site 15) demonstrate a lower RFC so should be able to accommodate 100% of construction traffic. This would equate to 32 two-way movements during peak construction activity over a three week period and 16 two-way movements during the second notable extended construction peak.
- 7.11.24 As per discussions held with the relevant Local Highway Authority, there would be a 50/50 split in construction traffic flow movements between Thetford and Diss outside of the road network peak hours. This aims to minimise any impact from the Project construction traffic through Diss, where there is generally less junction capacity available compared to Thetford. This would equate to 16 two-way movements during peak construction activity over a three week period and 8 two-way movements during the second notable extended construction peak.

Site 7 - A1066 Victoria Rd / Tesco access mini roundabout

- 7.11.25 The A1066 Victoria Road mini roundabout is located in Diss, Norfolk. The junction effectively operates as a 3-arm junction, facilitating direct access to the Tesco supermarket and connecting the main thoroughfare through Diss along the A1066.
- 7.11.26 Aerial imagery of the junction is presented in Image 7.29 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.57.

Image 7.29 A1066 Victoria Rd / Tesco access mini roundabout



- 7.11.27 The Junctions assessment indicates that the A1066 (E) arm exceeds theoretical capacity in all time periods and scenarios, resulting in delays. During the weekend Future scenarios, the A1066 (W) arm is slightly over practical capacity with an RFC of 0.86 in the Future Base and Future Base plus Committed Development scenarios, increasing to 0.91 with the addition of Project flows.
- 7.11.28 The introduction of the Project traffic worsens capacity issues in all modelled peak hours, particularly in the weekday AM and PM peaks where RFC increases by eight percentage points. This additional construction traffic is expected to exacerbate already existing capacity issues.
- 7.11.29 It is noted that blocking back queues from Site 8 Morrisons access to the west and an isolated signalised pedestrian crossing across the A1066 West arm impact this junction's capacity.

Table 7.57 Site 7 A1066 Victoria Rd / Tesco access mini roundabout capacity assessment

Approach	AM Peak			PM Peak			Weekend Peak		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC
2024 Base									
A1066 (E)	35.7	73.52	1.10	70.1	132.12	1.24	80.2	151.03	1.28
Tesco Superstore	0.6	12.22	0.39	1.4	17.78	0.60	1.5	17.97	0.61
A1066 (W)	2.2	11.95	0.68	3.7	17.96	0.80	4.1	20.00	0.82
Future Base									
A1066 (E)	48.2	93.07	1.15	86.4	159.62	1.31	98.8	230.62	1.35
Tesco Superstore	0.7	12.69	0.41	2.0	23.85	0.68	1.7	19.37	0.64
A1066 (W)	2.6	13.27	0.72	4.7	21.74	0.84	5.5	25.56	0.86
Future Base plus Committed Developments									
A1066 (E)	48.2	93.07	1.15	86.4	159.62	1.31	98.8	230.62	1.35
Tesco Superstore	0.7	12.69	0.41	2.0	23.85	0.68	1.7	19.37	0.64
A1066 (W)	2.6	13.27	0.72	4.7	21.74	0.84	5.5	25.56	0.86
Future Base plus Committed Developments and Project									
A1066 (E)	69.6	126.75	1.23	109.2	237.39	1.39	121.6	325.99	1.44
Tesco Superstore	0.7	13.23	0.42	2.1	25.14	0.70	1.8	20.26	0.65
A1066 (W)	3.3	15.99	0.76	6.5	28.75	0.88	8.1	36.39	0.91

7.11.30 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.58 provides a comparison of the Future Base scenario with committed developments and worst-case Project flows, both against a scenario with reduced peak hour traffic.

Table 7.58 Site 7 A1066 Victoria Rd / Tesco access mini roundabout capacity assessment with reduced peak hour flows

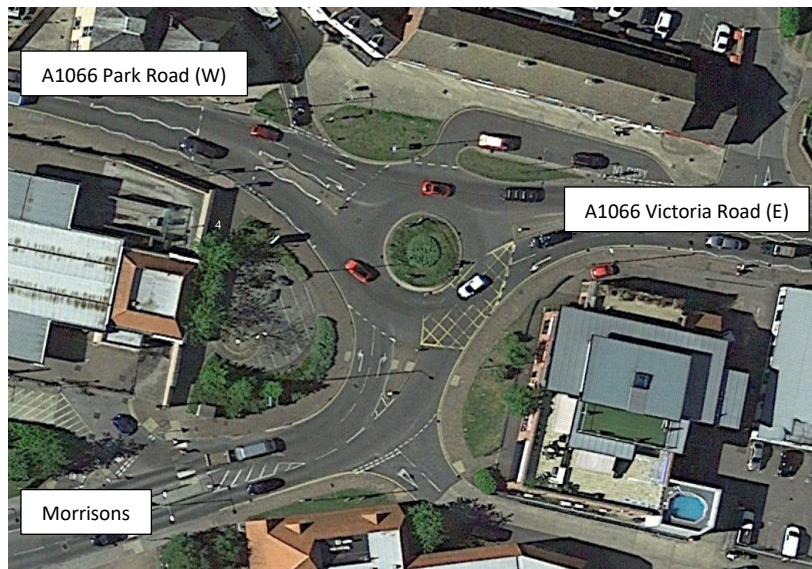
Approach	AM Peak			PM Peak			Weekend Peak		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows									
A1066 (E)	69.6	126.75	1.23	109.2	237.39	1.39	121.6	325.99	1.44
Tesco Superstore	0.7	13.23	0.42	2.1	25.14	0.70	1.8	20.26	0.65
A1066 (W)	3.3	15.99	0.76	6.5	28.75	0.88	8.1	36.39	0.91
Future Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)									
A1066 (E)	58.7	109.64	1.19	97.7	192.78	1.35	110.1	277.75	1.39
Tesco Superstore	0.7	12.97	0.41	2.1	24.61	0.69	1.7	19.82	0.64
A1066 (W)	2.9	14.52	0.74	5.5	24.85	0.86	6.6	30.14	0.89

- 7.11.31 The reduced flow assessment shows that with 50% of worst-case Project flows during the peak hours, queue lengths, delays, and RFC values all decrease. However, the reduction in flows has a minimal impact on arms that are already over predicted to operate over capacity with significant delays.
- 7.11.32 Given the predicted capacity issues through Diss, it is proposed that construction traffic be routed through Thetford during peak hours to avoid exacerbating capacity issues through Diss during these time periods. Additionally, the Thetford junction capacity assessments (Site 12, Site 13, Site 14 and Site 15) demonstrate a lower RFC so should be able to accommodate 100% of construction traffic. This would equate to 32 two-way movement during peak construction activity over a three week period and 16 two-way movements during the second notable extended construction peak.
- 7.11.33 As per discussions held with the Local Highway Authority, there would be a 50/50 split in construction traffic flow movements between Thetford and Diss outside of road network peak hours. This aims to minimise any impact from the Project construction traffic through Diss, where there is generally less junction capacity available compared to Thetford. This would equate to 16 two-way movements during peak construction activity over a three week period and 8 two-way movements during the second notable extended construction peak.

Site 8 - A1066 Victoria Rd / Morrisons access roundabout

- 7.11.34 The A1066 Victoria Road / Morrisons access junction is located in Diss. It is a four-arm roundabout, which facilitates access to the Morrisons supermarket as well as connecting the main thoroughfare through Diss along the A1066. The northern arm provides access to local shops along the northern carriageway edge
- 7.11.35 Aerial imagery of the junction is presented in Image 7.30 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.59.

Image 7.30 A1066 Victoria Rd / Morrisons access roundabout



- 7.11.36 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods when modelled in isolation, with no significant delays.
- 7.11.37 The highest RFC occurs in the Future Base plus Committed Development and Project flows during the weekend on the A1066 Park Road (W) arm, with a delay of 13 seconds and an RFC of 0.78.
- 7.11.38 Video survey footage indicates that blocking back queues as a result of the operation of isolated signalised pedestrian crossings on both A1066 exit arms impacts the junction's capacity but cannot be accurately modelled in Junctions. In reality the RFC and delay values are likely to be higher in practise given the complex traffic conditions on the road network.

Table 7.59 Site 8 A1066 Victoria Rd / Morrisons access roundabout capacity assessment

Approach	AM Peak			PM Peak			Weekend 10:45-12:15		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC
2024 Base									
A1066 Victoria Road (E)	1.1	6.56	0.50	1.3	6.94	0.56	1.5	7.86	0.60
Morrisons (S)	0.3	4.47	0.21	0.5	5.59	0.35	0.6	5.72	0.39
A1066 Park Road (W)	2.1	8.14	0.67	1.7	7.23	0.62	2.6	9.99	0.72
Future Base									
A1066 Victoria Road (E)	1.3	6.94	0.53	1.5	7.48	0.59	1.7	8.73	0.63
Morrisons (S)	0.3	4.61	0.23	0.6	5.88	0.37	0.7	6.07	0.41
A1066 Park Road (W)	2.4	8.96	0.70	1.9	7.89	0.65	3.1	11.70	0.76
Future Base plus Committed Developments									
A1066 Victoria Road (E)	1.3	6.94	0.53	1.5	7.48	0.59	1.7	8.73	0.63
Morrisons (S)	0.3	4.61	0.23	0.6	5.88	0.37	0.7	6.07	0.41
A1066 Park Road (W)	2.4	8.96	0.70	1.9	7.89	0.65	3.1	11.70	0.76
Future Base plus Committed Developments and Project									
A1066 Victoria Road (E)	1.5	7.66	0.57	1.7	8.41	0.62	2.1	9.98	0.67
Morrisons (S)	0.4	5.26	0.27	0.7	6.62	0.42	0.9	6.81	0.46
A1066 Park Road (W)	2.6	9.53	0.72	2.0	8.35	0.67	3.4	12.74	0.78

7.11.39 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.60 provides a comparison of this test against the full peak hour construction traffic assessed in Table 7.60.

Table 7.60 Site 8 A1066 Victoria Rd / Morrisons access roundabout capacity assessment with reduced peak hour flows

Approach	AM Peak			PM Peak			Weekend 10:45-12:15		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows									
A1066 Victoria Road (E)	1.5	7.66	0.57	1.7	8.41	0.62	2.1	9.98	0.67
Morrisons (S)	0.4	5.26	0.27	0.7	6.62	0.42	0.9	6.81	0.46
A1066 Park Road (W)	2.6	9.53	0.72	2.0	8.35	0.67	3.4	12.74	0.78
Future Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)									
A1066 Victoria Road (E)	1.4	7.29	0.55	1.6	7.92	0.61	1.9	9.32	0.65
Morrisons (S)	0.3	4.93	0.25	0.7	6.24	0.39	0.8	6.42	0.43
A1066 Park Road (W)	2.5	9.24	0.71	1.9	8.11	0.66	3.3	12.20	0.77

- 7.11.40 The 50% reduced flow assessment indicates that the roundabout operates within capacity with minimal delay for both scenarios. The highest RFC and delay are anticipated to occur on the A1066 Park Road (W) arm in both scenarios. As with other traffic modelling at this junction, the impacts of blocking back queues from neighbouring junctions cannot be accurately captured in Junctions V9 software.
- 7.11.41 Given the predicted capacity issues through Diss, it is proposed that construction traffic be routed through Thetford during peak hours to avoid exacerbating capacity issues through Diss during these time periods. Additionally, the Thetford junction capacity assessments (Site 12, Site 13, Site 14 and Site 15) demonstrate a lower RFC so should be able to accommodate 100% of construction traffic. This would equate to 32 two-way movements during peak construction activity over a three week period and 16 two-way movements during the second notable extended construction peak.
- 7.11.42 As per discussions held with the relevant Local Highway Authority, there would be a 50/50 split in construction traffic flow movements between Thetford and Diss outside of road network peak hours. This aims to minimise any impact from the Project construction traffic through Diss, where there is generally less junction capacity available compared to Thetford. This would equate to 16 two-way movements during peak construction activity over a three week period and 8 two-way movements during the second notable extended construction peak.

Site 9 - A1066 Park Rd / Denmark St mini-roundabout

- 7.11.43 The A1066 Park Road / Denmark Street junction is a 3-arm mini-roundabout located in the south of the town Diss. The junction connects traffic coming from residential areas in the north of Diss to the A1066 Park Road, the main thoroughfare through the town of Diss.
- 7.11.44 Aerial imagery of the junction is presented in Image 7.31 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.61.

Image 7.31 A1066 Park Rd / Denmark St mini-roundabout



- 7.11.45 The Junctions assessment indicates that the A1066 Park Road (E) arm is expected to operate at theoretical capacity in the PM peak ($RFC > 1$) and above practical capacity in the weekend peak ($RFC > 0.85$). The junction is predicted to operate within practical capacity in the AM peak before Project traffic is applied.
- 7.11.46 It is predicted that the addition of AM Project traffic would cause A1066 Stanley Road (W) to operate above practical capacity, increasing RFC on this arm from 0.85 to 0.89. Already existing capacity issues in the PM and weekend peak on the A1066 Park Road (E) arm are expected to be exacerbated, with a small predicted increase in RFC on this arm.

Table 7.61 Site 9 A1066 Park Rd / Denmark St mini roundabout capacity assessment

Approach	AM Peak			PM Peak			Weekend Peak		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base									
B1077 Denmark Street (N)	1.4	12.06	0.58	0.5	7.52	0.35	0.5	7.46	0.32
A1066 Park Road (E)	3.1	16.11	0.75	10.5	43.86	0.95	4.5	20.44	0.82
A1066 Stanley Road (W)	4.3	17.85	0.81	1.5	9.31	0.60	1.8	10.41	0.63
Future Base									
B1077 Denmark Street (N)	1.7	13.41	0.62	0.6	7.91	0.37	0.5	7.83	0.34
A1066 Park Road (E)	3.7	18.91	0.79	17.6	70.71	1.00	5.9	25.49	0.86
A1066 Stanley Road (W)	5.4	21.24	0.85	1.7	10.17	0.63	2.1	11.57	0.67
Future Base plus Committed Developments									
B1077 Denmark Street (N)	1.7	13.41	0.62	0.6	7.91	0.37	0.5	7.83	0.34
A1066 Park Road (E)	3.7	18.91	0.79	17.6	70.71	1.00	5.9	25.49	0.86
A1066 Stanley Road (W)	5.4	21.24	0.85	1.7	10.17	0.63	2.1	11.57	0.67
Future Base plus Committed Developments and Project									
B1077 Denmark Street (N)	1.8	14.68	0.64	0.6	8.34	0.38	0.7	9.16	0.40
A1066 Park Road (E)	5.0	24.29	0.84	31.4	115.24	1.04	7.0	30.44	0.89
A1066 Stanley Road (W)	7.3	27.01	0.89	2.2	11.85	0.68	2.6	13.61	0.71

7.11.47 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.62 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.62 Site 9 A1066 Park Rd / Denmark St mini roundabout capacity assessment with reduced peak hour flows

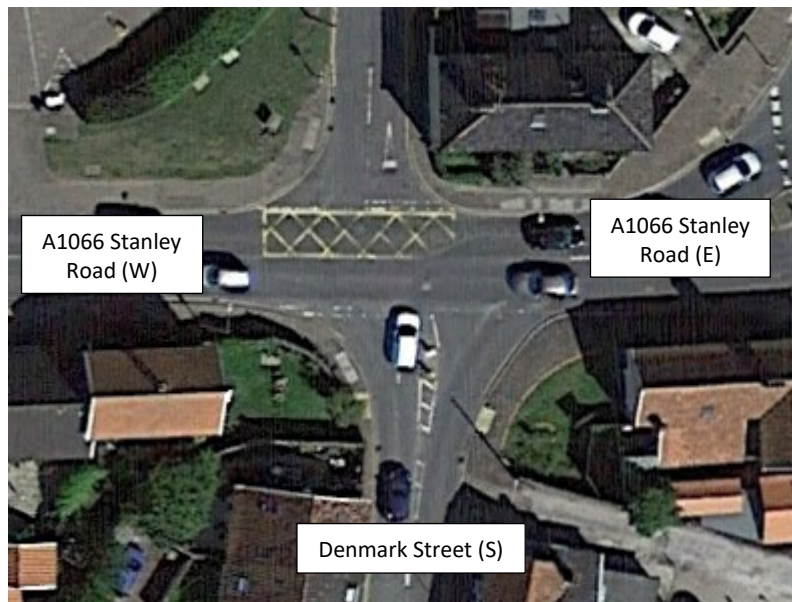
Approach	AM Peak			PM Peak			Weekend Peak		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay(s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows									
B1077 Denmark Street (N)	1.8	14.68	0.64	0.6	8.34	0.38	0.7	9.16	0.40
A1066 Park Road (E)	5.0	24.29	0.84	31.4	115.24	1.04	7.0	30.44	0.89
A1066 Stanley Road (W)	7.3	27.01	0.89	2.2	11.85	0.68	2.6	13.61	0.71
Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)									
B1077 Denmark Street (N)	1.7	14.02	0.63	0.6	8.12	0.37	0.6	8.48	0.37
A1066 Park Road (E)	4.3	21.32	0.82	23.5	90.69	1.02	6.4	27.78	0.88
A1066 Stanley Road (W)	6.2	23.68	0.87	1.9	10.96	0.66	2.3	12.53	0.69

- 7.11.48 The reduced flow assessment shows that, with 50% of worst-case Project flows during the peak hours, queue lengths, delays, and RFC values all decrease by a marginal amount. Existing capacity concerns remain in the PM and weekend peaks.
- 7.11.49 Given the predicted capacity issues through Diss, it is proposed that construction traffic be routed through Thetford during peak hours to avoid exacerbating capacity issues through Diss during these time periods. Additionally, the Thetford junction capacity assessments (Site 12, Site 13, Site 14 and Site 15) demonstrate a lower RFC so should be able to accommodate 100% of construction traffic. This would equate to 32 two-way movements during peak construction activity over a three week period and 16 two-way movements during the second notable extended construction peak.
- 7.11.50 As per discussions held with the relevant Local Highway Authority, there would be a 50/50 split in construction traffic flow movements between Thetford and Diss outside of road network peak hours. This aims to minimise any impact from the Project construction traffic through Diss, where there is generally less junction capacity available compared to Thetford. This would equate to 16 two-way movements during peak construction activity over a three week period and 8 two-way movements during the second notable extended construction peak.

Site 10 - A1066 Park Rd / Denmark St Priority Crossroad

- 7.11.51 The A1066 Park Road / Denmark Street junction is a priority crossroad located in the south of the town Diss, located immediately west of Site 9 mini-roundabout. The four-arm junction connects traffic coming from residential areas in the north of Diss to the A1066 Park Road, the main thoroughfare through the town of Diss. It also provides connections to villages south of Diss via Denmark Street.
- 7.11.52 Aerial imagery of the junction is presented in Image 7.32 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.63.

Image 7.32 A1066 Park Rd / Denmark St Priority Crossroad



- 7.11.53 The Junctions assessment indicates that the junction remains within capacity across all scenarios and time periods with RFC values predicted to be within practical capacity ($RFC < 0.85$).
- 7.11.54 The introduction of the Project traffic is predicted to increase delays during the AM peak at the Denmark Street (S) right and ahead movement, increasing from 27 seconds in the Base to 37 seconds with Future Base plus Committed Development plus Project flows. The movement remains within capacity with the Project flows (RFC of 0.58).

Table 7.63 Site 10 A1066 Park Rd / Denmark St Priority Crossroad capacity assessment

Approach	AM Peak			PM Peak			Weekend 10:45-12:15		
	Queue Length (PCU)	Delay(s)	RF C	Queue Length (PCU)	Delay(s)	RF C	Queue Length (PCU)	Delay(s)	RF C
2024 Base									
Denmark Street (S) Left and Ahead	0.4	14.72	0.30	0.6	15.14	0.40	0.4	11.86	0.27
Denmark Street (S) Right and Ahead	0.9	26.72	0.49	0.9	25.11	0.48	0.9	20.22	0.48
A1066 Stanley Road (E) All Directions	0.2	5.33	0.10	0.6	5.25	0.23	0.4	4.79	0.15
Croft Road (N) Left and Ahead	0.2	9.86	0.16	0.1	8.59	0.08	0.1	8.43	0.12
Croft Road (N) Right and Ahead	0.1	15.18	0.07	0.0	13.56	0.04	0.0	12.74	0.04
A1066 Stanley Road (W) All Directions	1.1	6.30	0.33	0.9	7.14	0.32	0.4	5.63	0.18
Future Base									
Denmark Street (S) Left and Ahead	0.5	16.81	0.34	0.8	17.43	0.45	0.4	13.07	0.31
Denmark Street (S) Right and Ahead	1.1	31.20	0.54	1.1	29.22	0.53	1.0	22.77	0.51
A1066 Stanley Road (E) All Directions	0.3	5.30	0.11	0.7	5.31	0.25	0.4	4.78	0.17
Croft Road (N) Left and Ahead	0.2	10.26	0.17	0.1	8.83	0.09	0.1	8.65	0.13
Croft Road (N) Right and Ahead	0.1	16.06	0.07	0.1	14.21	0.05	0.0	13.31	0.05
A1066 Stanley Road (W) All Directions	1.3	6.48	0.36	1.0	7.34	0.35	0.5	5.61	0.20
Future Base plus Committed Developments									
Denmark Street (S) Left and Ahead	0.5	16.81	0.34	0.8	17.43	0.45	0.4	13.07	0.31
Denmark Street (S) Right and Ahead	1.1	31.20	0.54	1.1	29.22	0.53	1.0	22.77	0.51
A1066 Stanley Road (E) All Directions	0.3	5.30	0.11	0.7	5.31	0.25	0.4	4.78	0.17

Approach	AM Peak			PM Peak			Weekend 10:45-12:15		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC
Croft Road (N) Left and Ahead	0.2	10.26	0.17	0.1	8.83	0.09	0.1	8.65	0.13
Croft Road (N) Right and Ahead	0.1	16.06	0.07	0.1	14.21	0.05	0.0	13.31	0.05
A1066 Stanley Road (W) All Directions	1.3	6.48	0.36	1.0	7.34	0.35	0.5	5.61	0.20
Future Base plus Committed Developments and Project									
Denmark Street (S) Left and Ahead	0.6	19.35	0.37	0.9	19.77	0.48	0.5	14.24	0.32
Denmark Street (S) Right and Ahead	1.3	36.77	0.58	1.3	34.26	0.57	1.0	25.55	0.51
A1066 Stanley Road (E) All Directions	0.3	5.26	0.12	0.8	5.37	0.27	0.5	4.78	0.18
Croft Road (N) Left and Ahead	0.2	10.77	0.18	0.1	9.21	0.09	0.1	9.01	0.13
Croft Road (N) Right and Ahead	0.1	17.35	0.08	0.1	15.22	0.05	0.0	14.18	0.05
A1066 Stanley Road (W) All Directions	1.5	6.65	0.38	1.2	7.47	0.37	0.6	5.61	0.21

- 7.11.55 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Sensitivity tests assessing this impact have been undertaken on other neighbouring junctions along this A1066 corridor. This reduced flow sensitivity test was also conducted on this junction for consistency as any reduction at neighbouring junctions would also impact construction traffic flow at this location. Table 7.64 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.64 Site 10 A1066 Park Rd / Denmark St Priority Crossroad capacity assessment with reduced peak hour flows

Approach	AM Peak			PM Peak			Weekend 10:45-12:15		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows									
Denmark Street (S) Left and Ahead	0.6	19.35	0.37	0.9	19.77	0.48	0.5	14.24	0.32
Denmark Street (S) Right and Ahead	1.3	36.77	0.58	1.3	34.26	0.57	1.0	25.55	0.51
A1066 Stanley Road (E) All Directions	0.3	5.26	0.12	0.8	5.37	0.27	0.5	4.78	0.18
Croft Road (N) Left and Ahead	0.2	10.77	0.18	0.1	9.21	0.09	0.1	9.01	0.13
Croft Road (N) Right and Ahead	0.1	17.35	0.08	0.1	15.22	0.05	0.0	14.18	0.05
A1066 Stanley Road (W) All Directions	1.5	6.65	0.38	1.2	7.47	0.37	0.6	5.61	0.21
Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)									
Denmark Street (S) Left and Ahead	0.5	17.96	0.36	0.8	18.50	0.46	0.4	13.62	0.31
Denmark Street (S) Right and Ahead	1.2	33.76	0.56	1.2	31.53	0.55	1.0	24.08	0.51
A1066 Stanley Road (E) All Directions	0.3	5.28	0.11	0.8	5.34	0.26	0.4	4.78	0.17
Croft Road (N) Left and Ahead	0.2	10.50	0.18	0.1	9.02	0.09	0.1	8.83	0.13

Approach	AM Peak			PM Peak			Weekend 10:45-12:15		
	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC	Queue Length (PCU)	Delay(s)	RFC
Croft Road (N) Right and Ahead	0.1	16.68	0.08	0.1	14.69	0.05	0.0	13.73	0.05
A1066 Stanley Road (W) All Directions	1.4	6.56	0.37	1.1	7.40	0.36	0.5	5.61	0.20

- 7.11.56 The Junctions assessment indicates that the junction remains within capacity in both scenarios when 50% of worst-case peak flows are tested.
- 7.11.57 Given the predicted capacity issues through Diss, it is proposed that construction traffic be routed through Thetford during peak hours to avoid exacerbating capacity issues through Diss during these time periods. Additionally, the Thetford junction capacity assessments (Site 12, Site 13, Site 14 and Site 15) demonstrate a lower RFC so should be able to accommodate 100% of construction traffic. This would equate to 32 two-way movements during peak construction activity over a three week period and 16 two-way movements during the second notable extended construction peak.
- 7.11.58 As per discussions held with the relevant Local Highway Authority, there would be a 50/50 split in construction traffic flow movements between Thetford and Diss outside of road network peak hours. This aims to minimise any impact from the Project construction traffic through Diss, where there is generally less junction capacity available compared to Thetford. This would equate to 16 two-way movements during peak construction activity over a three week period and 8 two-way movements during the second notable extended construction peak.

Site 13 - A1066 Mundford Road / Wyatt Way roundabout

- 7.11.59 The A1066 and Wyatt Way roundabout is located to the north of Thetford, Norfolk and just south of the A11 Thetford Bypass. The junction is a small four-arm roundabout, although effectively operates as a 3-arm junction as the western arm currently only provides access to a field.
- 7.11.60 Aerial imagery of the junction is presented in Image 7.33 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.65.

Image 7.33 A1066 Mundford Road / Wyatt Way roundabout



- 7.11.61 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.62 The introduction of the Project traffic has a negligible impact upon junction capacity, the worst performing arm is the A1066 Park Road (E) arm in the PM peak, with a delay of 13 seconds and an RFC of 0.69.

Table 7.65 Site 13 A1066 Mundford Road / Wyatt Way roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A1066 Mundford Road (N)	1.0	4.18	0.48	0.5	3.29	0.29
Wyatt Way	0.9	9.50	0.39	1.7	10.49	0.63
A1066 Mundford Road (S)	0.5	4.11	0.31	0.6	4.36	0.33
Future Base						
A1066 Mundford Road (N)	1.1	4.38	0.51	0.5	3.36	0.30
Wyatt Way	1.0	9.81	0.41	2.0	11.62	0.67
A1066 Mundford Road (S)	0.6	4.22	0.33	0.6	4.53	0.35
Future Base plus Committed Developments						
B1077 Denmark Street (N)	1.1	4.38	0.51	0.5	3.36	0.30
A1066 Park Road (E)	1.0	9.81	0.41	2.0	11.62	0.67
A1066 Stanley Road (W)	0.6	4.22	0.33	0.6	4.53	0.35
Future Base plus Committed Developments and Project						
B1077 Denmark Street (N)	1.2	4.70	0.53	0.6	3.57	0.33
A1066 Park Road (E)	1.0	10.17	0.42	2.1	12.46	0.69
A1066 Stanley Road (W)	0.7	4.53	0.36	0.7	4.93	0.38

Site 14 - A1066 Mundford Road / A1075 Norwich Road roundabout

- 7.11.63 The A1066 Mundford Road and A1075 Norwich Road roundabout is located in the centre of Thetford, Norfolk. It consists of four arms which connect to routes travelling in all compass directions, providing access towards other towns and villages in Norfolk and Suffolk.
- 7.11.64 Aerial imagery of the junction is presented in Image 7.34 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.66.

Image 7.34 A1066 Mundford Road / A1075 Norwich Road roundabout



- 7.11.65 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.66 The addition of the Project traffic has a negligible impact upon junction operation. The highest RFC occurs in the AM Future Base plus Committed Development and Project flows on the A1066 Mundford Road arm, with a delay of 5 seconds and an RFC of 0.62.

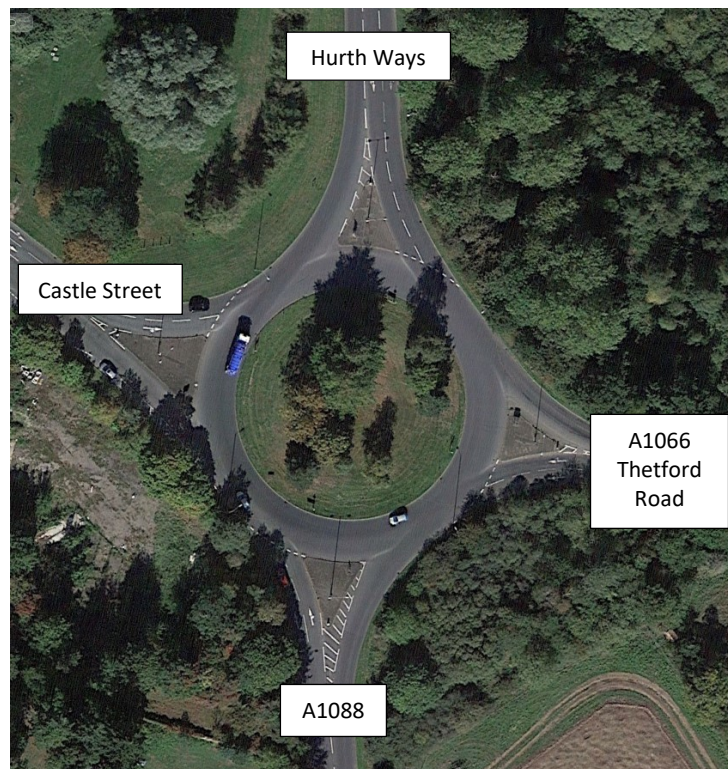
Table 7.66 Site 14 A1066 Mundford Road / A1075 Norwich Road roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A1075 Norwich Road	1.0	4.08	0.50	0.5	3.27	0.34
A1066 Hurth Way	0.9	3.85	0.45	1.3	4.35	0.55
Norwich Road (W)	0.7	3.17	0.39	0.9	3.69	0.48
A1066 Mundford Road	1.3	4.29	0.56	1.0	4.56	0.50
Future Base						
A1075 Norwich Road	1.1	4.41	0.53	0.6	3.44	0.37
A1066 Hurth Way	1.0	4.08	0.47	1.4	4.71	0.58
Norwich Road (W)	0.7	3.34	0.41	1.1	3.98	0.51
A1066 Mundford Road	1.5	4.63	0.59	1.2	4.99	0.54
Future Base plus Committed Developments						
A1075 Norwich Road	1.1	4.41	0.53	0.6	3.44	0.37
A1066 Hurth Way	1.0	4.08	0.47	1.4	4.71	0.58
Norwich Road (W)	0.7	3.34	0.41	1.1	3.98	0.51
A1066 Mundford Road	1.5	4.63	0.59	1.2	4.99	0.54
Future Base plus Committed Developments and Project						
A1075 Norwich Road	1.2	4.55	0.54	0.6	3.52	0.37
A1066 Hurth Way	1.1	4.38	0.50	1.6	5.06	0.60
Norwich Road (W)	0.7	3.42	0.42	1.1	4.11	0.52
A1066 Mundford Road	1.6	4.97	0.62	1.3	5.42	0.56

Site 15 - A1066 Hurth Way / A1066 Thetford Road roundabout

- 7.11.67 The A1066 Hurth Way and A1066 Thetford Road roundabout is located on the eastern edge of the town of Thetford, Norfolk. It consists of four arms which connect to routes that providing access towards the town centre, Diss to the east, as well as other towns and villages south of Thetford.
- 7.11.68 Aerial imagery of the junction is presented in Image 7.35 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.67.

Image 7.35 A1066 Hurth Way / A1066 Thetford Road roundabout



- 7.11.69 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.70 The addition of the Project traffic has a negligible impact upon junction operation. The highest RFC occurs in the AM Future Base plus Committed Development and Project flows on the northern Hurth Way arm, with a delay of 6 seconds and an RFC of 0.68.

Table 7.67 Site 15 A1066 Hurth Way / A1066 Thetford Road roundabout capacity assessment

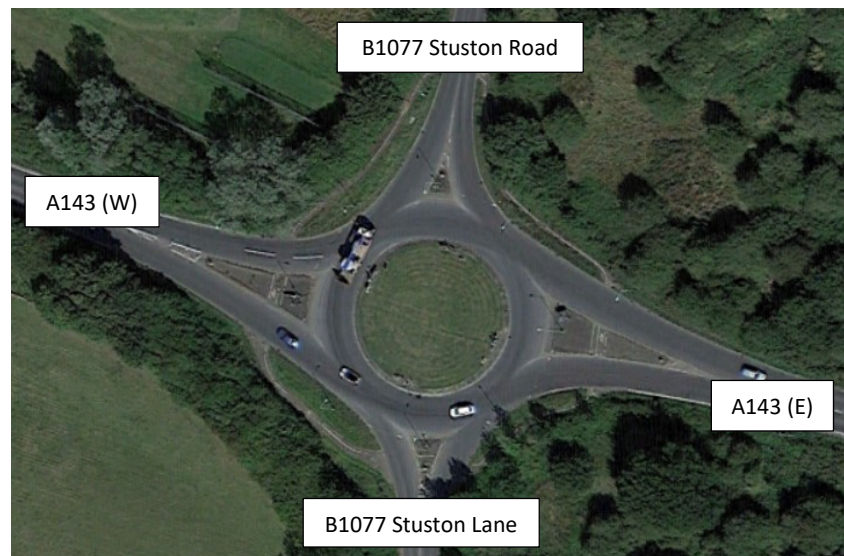
Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Hurth Way	1.8	4.79	0.63	0.7	3.01	0.41
A1066 Thetford Road	0.5	4.56	0.33	0.3	3.02	0.23
A1088	0.3	3.70	0.19	0.4	3.47	0.26
Castle Street	0.2	2.84	0.18	0.4	3.46	0.30
Future Base						
Hurth Way	2.0	5.22	0.66	0.8	3.12	0.43
A1066 Thetford Road	0.6	4.81	0.36	0.3	3.10	0.25
A1088	0.3	3.83	0.20	0.4	3.60	0.28
Castle Street	0.2	2.90	0.19	0.5	3.60	0.32
Future Base plus Committed Developments						
Hurth Way	2.0	5.22	0.66	0.8	3.12	0.43
A1066 Thetford Road	0.6	4.81	0.36	0.3	3.10	0.25
A1088	0.3	3.83	0.20	0.4	3.60	0.28
Castle Street	0.2	2.90	0.19	0.5	3.60	0.32
Future Base plus Committed Developments and Project						
Hurth Way	2.2	5.64	0.68	0.9	3.30	0.45
A1066 Thetford Road	0.7	5.23	0.39	0.4	3.35	0.27
A1088	0.3	3.92	0.21	0.4	3.69	0.29
Castle Street	0.2	2.96	0.19	0.5	3.69	0.33

Suffolk Junctions

Site 17 - A143 Old Bury Rd / B1077 Stuston Rd roundabout

- 7.11.71 The A143 and B1077 Stuston Road junction is located in Stuston, south of Diss. The junction is a four-arm roundabout and connects the A143 Old Bury Road to the B1077 to provide access to local villages.
- 7.11.72 Aerial imagery of the junction is presented in Image 7.36 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.68.

Image 7.36 A143 Old Bury Rd / B1077 Stuston Rd roundabout



- 7.11.73 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.74 The addition of the Project traffic has a negligible impact upon junction capacity. The highest RFC occurs in the AM Future Base plus Committed Development and Project flows on the B1077 Stuston Road north arm, with a delay of 5 seconds and an RFC of 0.42.
- 7.11.75 The results of the Multi-modal Scenario 2 assessment indicate that junction is predicted to continue operating within capacity.

Table 7.68 Site 17 A143 Old Bury Rd / B1077 Stuston Rd roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
B1077 Stuston Road	0.7	4.91	0.39	0.6	4.59	0.36
A143 (E)	0.5	3.11	0.32	0.4	2.91	0.27
B1077 Stuston Lane	0.5	4.37	0.31	0.4	3.79	0.27
A143 (W)	0.5	3.17	0.31	0.5	3.36	0.32
Future Base						
B1077 Stuston Road	0.7	5.09	0.41	0.6	4.75	0.37
A143 (E)	0.5	3.16	0.33	0.4	2.96	0.28
B1077 Stuston Lane	0.5	4.50	0.32	0.4	3.88	0.28
A143 (W)	0.5	3.24	0.32	0.5	3.44	0.33
Future Base plus Committed Developments						
B1077 Stuston Road	0.7	5.09	0.41	0.6	4.75	0.37
A143 (E)	0.5	3.16	0.33	0.4	2.96	0.28
B1077 Stuston Lane	0.5	4.50	0.32	0.4	3.88	0.28
A143 (W)	0.5	3.24	0.32	0.5	3.44	0.33
Future Base plus Committed Developments and Project						
B1077 Stuston Road	0.8	5.25	0.42	0.6	4.90	0.38
A143 (E)	0.7	3.44	0.39	0.5	3.11	0.30
B1077 Stuston Lane	0.5	4.93	0.34	0.4	3.98	0.29
A143 (W)	0.6	3.41	0.34	0.7	3.80	0.40
Scenario 2 Multi-modal Flows						
B1077 Stuston Road	0.8	5.28	0.42	0.6	4.93	0.38
A143 (E)	0.6	3.37	0.36	0.5	3.16	0.30
B1077 Stuston Lane	0.5	4.66	0.33	0.4	4.00	0.29
A143 (W)	0.6	3.47	0.35	0.6	3.68	0.36

Site 18 - A143 Old Bury Rd / Lion Rd Priority Junction

- 7.11.76 The junction of A143 Old Bury Road and Lion Road is a priority T-junction located in Suffolk, east of the village of Wortham. The A143 is a major route connecting Bury St Edmunds and Great Yarmouth that has priority over traffic on Lion Road, a small rural route.
- 7.11.77 Aerial imagery of the junction is presented in Image 7.37 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.69.

Image 7.37 A143 Old Bury Rd / Lion Rd Priority Junction



- 7.11.78 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.79 The addition of the Project traffic has a negligible impact upon junction capacity. The highest RFC occurs in the AM Future Base plus Committed Development and Project flows on the Lion Road (N) Right Turn, with a delay of 15 seconds and an RFC of 0.44. The Multi-modal Scenario 2 flows increase this RFC to 0.45.

Table 7.69 Site 18 A143 Old Bury Rd / Lion Rd Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Lion Road (N) Left Turn	0.0	0.00	0.00	0.0	6.27	0.01
Lion Road (N) Right Turn	0.7	13.75	0.41	0.6	13.84	0.36
A143 Old Bury Road (E) Right and Ahead	0.0	5.45	0.01	0.0	5.88	0.01
Future Base						
Lion Road (N) Left Turn	0.0	0.00	0.00	0.0	6.33	0.01
Lion Road (N) Right Turn	0.7	14.28	0.43	0.6	14.37	0.37
A143 Old Bury Road (E) Right and Ahead	0.0	5.49	0.01	0.0	5.94	0.01
Future Base plus Committed Developments						
Lion Road (N) Left Turn	0.0	0.00	0.00	0.0	6.33	0.01
Lion Road (N) Right Turn	0.7	14.28	0.43	0.6	14.37	0.37
A143 Old Bury Road (E) Right and Ahead	0.0	5.49	0.01	0.0	5.94	0.01
Future Base plus Committed Developments and Project						
Lion Road (N) Left Turn	0.1	14.11	0.05	0.1	14.43	0.05
Lion Road (N) Right Turn	0.8	14.79	0.44	0.6	14.90	0.38
A143 Old Bury Road (E) Right and Ahead	0.1	11.14	0.05	0.1	11.24	0.05
Scenario 2 Multi-modal Flows						
Lion Road (N) Left Turn	0.1	14.09	0.03	0.1	14.38	0.03
Lion Road (N) Right Turn	0.8	15.26	0.45	0.6	15.35	0.39
A143 Old Bury Road (E) Right and Ahead	0.0	11.08	0.03	0.1	10.53	0.03

Site 22 - A1120 Church Rd / B1115 Stowmarket Rd Priority Junction

- 7.11.80 The A1120 Church Road and B1115 Stowmarket Road is a priority T-junction. It is located to the north of the A14 Junction 50 in Stowupland, Suffolk. It is a small junction connecting northern Stowmarket to the key A1120 route, which traffic can use to access the A14 trunk road.
- 7.11.81 Aerial imagery of the junction is presented in Image 7.38 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.70.

Image 7.38 A1120 Church Rd / B1115 Stowmarket Rd Priority Junction



- 7.11.82 The Junctions assessment indicates that the junction would operate significantly over theoretical capacity in the Future Base plus committed development plus Project scenarios in both the AM and PM, with RFC values significantly over 1. This is due to an increase in mainline A1120 traffic reducing the number of available gaps for B1115 traffic to turn out of the side road.

Table 7.70 Site 22 A1120 Church Rd / B1115 Stowmarket Rd Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
B1115 (W) Left Turn	3.6	37.65	0.81	0.9	15.11	0.47
B1115 (W) Right Turn	2.6	69.92	0.76	1.5	34.78	0.62
A1120 Church Road (N) Right and Ahead	4.5	17.15	0.75	1.5	15.31	0.58
Future Base						
B1115 (W) Left Turn	6.2	58.61	0.92	1.0	17.13	0.51
B1115 (W) Right Turn	4.1	104.40	0.87	1.8	40.54	0.67
A1120 Church Road (N) Right and Ahead	5.5	18.36	0.78	1.8	16.07	0.61
Future Base plus Committed Developments						
B1115 (W) Left Turn	48.6	961.06	1.51	4.1	62.42	0.86
B1115 (W) Right Turn	47.2	699.09	1.33	5.5	88.37	0.94
A1120 Church Road (N) Right and Ahead	6.7	20.26	0.82	2.3	18.73	0.66
Future Base plus Committed Developments and Project						
B1115 (W) Left Turn	63.7	1219.99	1.66	7.8	104.51	1.02
B1115 (W) Right Turn	63.1	1113.73	1.41	7.4	113.46	1.01
A1120 Church Road (N) Right and Ahead	7.8	21.35	0.84	2.6	19.20	0.68

- 7.11.83 An off peak model scenario was tested to determine if construction traffic could instead be routed outside of the junction peak hours to reduce the impacts predicted in Table 7.70 above. To avoid the network peak hour and school pick-up and drop-off times, a test was undertaken to assess the impact of routeing construction traffic during 07:00-08:00 and 18:00-19:00 instead.
- 7.11.84 No committed development flows were input as part of this off peak test as committed development trips were not available outside the junction peak hours. Table 7.71 below provides a summary of the off peak model results.

Table 7.71 Site 22 A1120 Church Rd / B1115 Stowmarket Rd Priority Junction capacity assessment off peak model

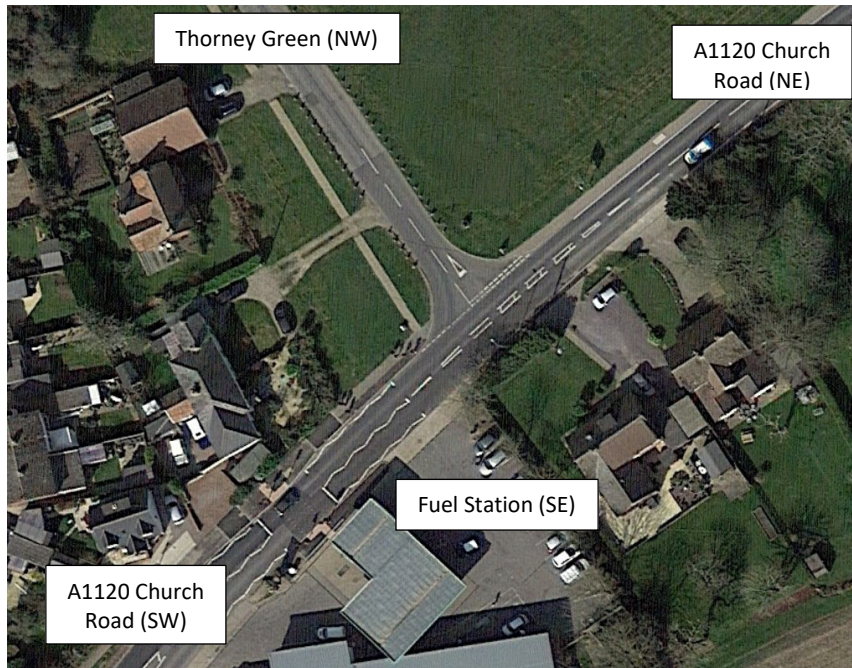
Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
B1115 (W) Left Turn	0.7	12.78	0.43	0.6	9.98	0.39
B1115 (W) Right Turn	1.4	27.77	0.59	0.5	16.38	0.34
A1120 Church Road (N) Right and Ahead	1.0	11.82	0.45	0.7	11.07	0.39
Future Base						
B1115 (W) Left Turn	0.8	13.90	0.46	0.7	10.40	0.41
B1115 (W) Right Turn	1.6	31.08	0.63	0.5	17.21	0.36
A1120 Church Road (N) Right and Ahead	1.1	12.05	0.47	0.7	11.35	0.41
Future Base plus Committed Developments						
B1115 (W) Left Turn	0.8	13.87	0.46	0.7	10.40	0.41
B1115 (W) Right Turn	1.6	31.15	0.63	0.5	17.21	0.36
A1120 Church Road (N) Right and Ahead	1.1	12.04	0.47	0.7	11.35	0.41
Future Base plus Committed Developments and Project						
B1115 (W) Left Turn	0.9	15.74	0.49	0.7	10.91	0.42
B1115 (W) Right Turn	2.0	37.67	0.68	0.6	18.85	0.38
A1120 Church Road (N) Right and Ahead	1.2	12.27	0.48	0.7	11.64	0.41

7.11.85 The results indicate that the model has spare capacity in these off peak hours to accommodate the Project traffic. As such following discussions with the relevant Local Highway Authority, it is proposed to move peak construction traffic flows outside of the junction peak hours.

Site 23 - A1120 Church Rd / Thorney Green Priority Junction

- 7.11.86 The A1120 Church Road and Thorney Green is a priority T-junction. It is located to the north of the A14 Junction 50 in Stowupland, Suffolk. It is a small junction connecting residential areas to the key A1120 route, which traffic can use to access the A14 trunk road.
- 7.11.87 Aerial imagery of the junction is presented in Image 7.39 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.72.

Image 7.39 A1120 Church Rd / Thorney Green Priority Junction



- 7.11.88 The Junctions assessment indicates that the junction operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.89 The addition of the Project traffic does not have a materially detrimental impact upon junction operation. The only notable delay occurs during the AM peak at the Thorney Green (NW) right and ahead movement, increasing from 26 seconds in the Base to 38 seconds with Project flows. This movement operates within capacity with the Project flows (RFC of 0.46).

Table 7.72 Site 23 A1120 Church Rd / Thorney Green Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Fuel Station (SE) All Directions	0.2	10.38	0.20	0.4	12.01	0.28
A1120 Church Road (NE) All Directions	0.0	4.52	0.03	0.1	5.05	0.05
Thorney Green (NW) Left and Ahead	0.0	13.59	0.05	0.0	13.67	0.04
Thorney Green (NW) Right and Ahead	0.6	25.67	0.36	0.3	16.67	0.24
A1120 Church Road (SW) All Directions	0.7	5.39	0.21	0.6	5.16	0.22
Future Base						
Fuel Station (SE) All Directions	0.3	10.80	0.21	0.4	12.56	0.30
A1120 Church Road (NE) All Directions	0.0	4.48	0.03	0.1	4.99	0.06
Thorney Green (NW) Left and Ahead	0.1	14.33	0.05	0.0	14.19	0.04
Thorney Green (NW) Right and Ahead	0.6	28.34	0.39	0.4	17.60	0.26
A1120 Church Road (SW) All Directions	0.9	5.37	0.22	0.7	5.19	0.24
Future Base plus Committed Developments						
Fuel Station (SE) All Directions	0.3	11.35	0.21	0.4	13.39	0.31
A1120 Church Road (NE) All Directions	0.0	4.44	0.04	0.1	4.77	0.06
Thorney Green (NW) Left and Ahead	0.1	15.61	0.05	0.0	15.00	0.04
Thorney Green (NW) Right and Ahead	0.7	32.47	0.42	0.4	18.84	0.28
A1120 Church Road (SW) All Directions	1.0	5.15	0.24	0.7	5.20	0.25

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project						
Fuel Station (SE) All Directions	0.3	12.12	0.22	0.5	14.34	0.33
A1120 Church Road (NE) All Directions	0.1	4.40	0.04	0.1	4.69	0.06
Thorney Green (NW) Left and Ahead	0.1	17.25	0.06	0.0	16.06	0.05
Thorney Green (NW) Right and Ahead	0.9	38.12	0.46	0.4	20.53	0.29
A1120 Church Road (SW) All Directions	1.2	5.11	0.26	0.8	5.24	0.26

Site 24 - A1120 / Gun Cotton Way roundabout

- 7.11.90 The A1120 and Gun Cotton Way junction is a five-arm roundabout located to the east of Stowmarket and to the south of the A14 Junction 50. The A1120 is a key route that connects Stowmarket with other parts of Suffolk and Gun Cotton Way serves as the main road through the mixed-use Cedars Park development.
- 7.11.91 Aerial imagery of the junction is presented in Image 7.40 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.73.

Image 7.40 A1120 / Gun Cotton Way roundabout



- 7.11.92 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.93 The addition of the Project traffic has a negligible impact upon junction capacity. The highest RFC occurs in the PM on Gun Cotton Way, with a delay of 5 seconds and an RFC of 0.51.

Table 7.73 Site 24 A1120 / Gun Cotton Way roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A1120 (NE)	0.5	1.89	0.34	0.7	2.15	0.42
Gateway Blvd	0.0	2.33	0.04	0.0	2.55	0.04
A1120 (SW)	0.4	1.66	0.28	0.3	1.61	0.25
Gun Cotton Way	0.9	5.04	0.46	0.9	4.94	0.47
Kestrel Drive	0.2	4.49	0.18	0.1	4.07	0.12
Future Base						
A1120 (NE)	0.6	1.93	0.35	0.8	2.22	0.44
Gateway Blvd	0.0	2.36	0.04	0.0	2.60	0.04
A1120 (SW)	0.4	1.69	0.29	0.4	1.64	0.26
Gun Cotton Way	0.9	5.27	0.48	1.0	5.17	0.49
Kestrel Drive	0.2	4.63	0.19	0.1	4.18	0.13
Future Base plus Committed Developments						
A1120 (NE)	0.6	1.96	0.36	0.8	2.24	0.44
Gateway Blvd	0.0	2.39	0.04	0.0	2.61	0.04
A1120 (SW)	0.4	1.69	0.29	0.4	1.65	0.26
Gun Cotton Way	0.9	5.28	0.48	1.0	5.20	0.49
Kestrel Drive	0.2	4.64	0.19	0.1	4.20	0.13
Future Base plus Committed Developments and Project						
A1120 (NE)	0.6	2.03	0.38	0.9	2.32	0.46
Gateway Blvd	0.1	2.76	0.06	0.1	3.07	0.05
A1120 (SW)	0.4	1.72	0.30	0.4	1.67	0.26
Gun Cotton Way	1.0	5.58	0.50	1.1	5.48	0.51
Kestrel Drive	0.2	4.75	0.19	0.2	4.29	0.13

Site 25 - A1120 / B1113 Needham Rd

- 7.11.94 The A1120 / B1113 Needham Rd junction is a signalised junction located south-east of Stowmarket and southwest of the A14 Junction 50. The A1308/A1120/B1113 are all key routes that connect Stowmarket to villages/small towns such as Woolpit and Needham Market, and locations further afield via the A14, such as, Bury St Edmunds and Ipswich.
- 7.11.95 Aerial imagery of the junction is presented in Image 7.41 and has been assessed using LinSig. The capacity assessments are presented in Table 7.74 and Table 7.75.

Image 7.41 A1120 / B1113 Needham Rd



- 7.11.96 The assessment indicates that the junction operates within capacity across all scenarios and time periods, with no significant delays. The highest DoS occurs in the AM Future Base plus Committed Development and Project flows on the B1113 Needham Road U-turn left, with a delay of 35 seconds and a DoS of 80.7%.

Table 7.74 Site 25 A1120 / B1113 Needham Rd AM peak capacity assessment

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
Access Road (N) Ahead U-Turn	21.9%	21.9%	0.9	0.9	52.5	52.5
A1120 (NE) Left	39.7%	43.9%	5.5	6.2	22	23.4
A1120 (NE) Right	69.5%	71.4%	11.8	12.2	28.9	30.5
B1113 Needham Road (SE) Ahead	34.4%	32.6%	2.9	2.9	38.6	37.1
B1113 Needham Road (SE) Ahead	34.4%	32.6%	2.9	2.8	38.5	37.1
B1113 Needham Road (SE) Right	74.4%	76.6%	7.7	8.4	52.8	52.9
B1113 Needham Road (NW) U-Turn Left	78.6: 78.6%	80.7: 80.7%	14.8	15.2	32.7	35
B1113 Needham Road (NW) Ahead	31.6%	32.4%	4.2	4.3	20.8	21.6

Table 7.75 Site 25 A1120 / B1113 Needham Rd PM peak capacity assessment

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
Access Road (N) Ahead U-Turn	31.9%	31.9%	1.4	1.4	54.9	54.9
A1120 (NE) Left	41.4%	45.9%	5.7	6.3	23.7	25.2
A1120 (NE) Right	75.1%	77.3%	13.1	13.4	33.1	35.1
B1113 Needham Road (SE) Ahead	38.8%	36.9%	3.6	3.5	37.1	35.7
B1113 Needham Road (SE) Ahead	38.8%	36.9%	3.6	3.5	37.1	35.7
B1113 Needham Road (SE) Right	76.8%	78.6%	8.8	9.5	51.5	51.6

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
B1113 Needham Road (NW) U-Turn Left	62.9: 62.9%	64.7: 64.7%	10	10.2	27.7	29
B1113 Needham Road (NW) Ahead	32.5%	33.4%	4.3	4.3	22.3	23.2

Site 27 - B1113 Bramford Rd / Bramford Rd

- 7.11.97 The junction of B1113 Bramford Road and Bramford Road is a 3-arm signalised T-junction located in the village of Bramford, north of Ipswich, Suffolk. It facilitates access from Bramford to Junction 52 of the A14 and Sproughton.
- 7.11.98 Aerial imagery of the junction is presented in Image 7.42 and has been assessed using LinSig. The capacity assessments are presented in Table 7.76 and Table 7.77.
- 7.11.99 The assessment indicates that the partially signalised three-arm junction operates within capacity across all scenarios and time periods, with no significant delays. The highest DoS occurs in the AM Future Base plus Committed Development and Project flows on the Ahead/Left Lane of B1113 Bramford Road EB, with a delay of 20 seconds and a DoS of 69.8%.

Image 7.42 B1113 Bramford Rd / Bramford Rd



- 7.11.100 The assessment indicates that the partially signalised three-arm junction operates within capacity across all scenarios and time periods, with no significant delays. The highest DoS occurs in the AM Future Base plus Committed Development and Project flows on the Ahead/Left Lane of B1113 Bramford Road EB, with a delay of 20 seconds and a DoS of 69.8%.

Table 7.76 Site 27 B1113 Bramford Rd / Bramford Rd AM peak capacity assessment

Lane Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
B1113 Bramford Road EB Left Ahead	68.3: 68.3%	69.8: 69.8%	4.5	5	20.6	20
B1113 Bramford Road SB Left	0.0%	0.0%	0	0	0	0
B1113 Bramford Road WB Ahead	21.5%	25.4%	0.1	0.2	1.3	1.3
B1113 Bramford Road WB Right	62.6%	66.2%	5.6	6	14.3	16

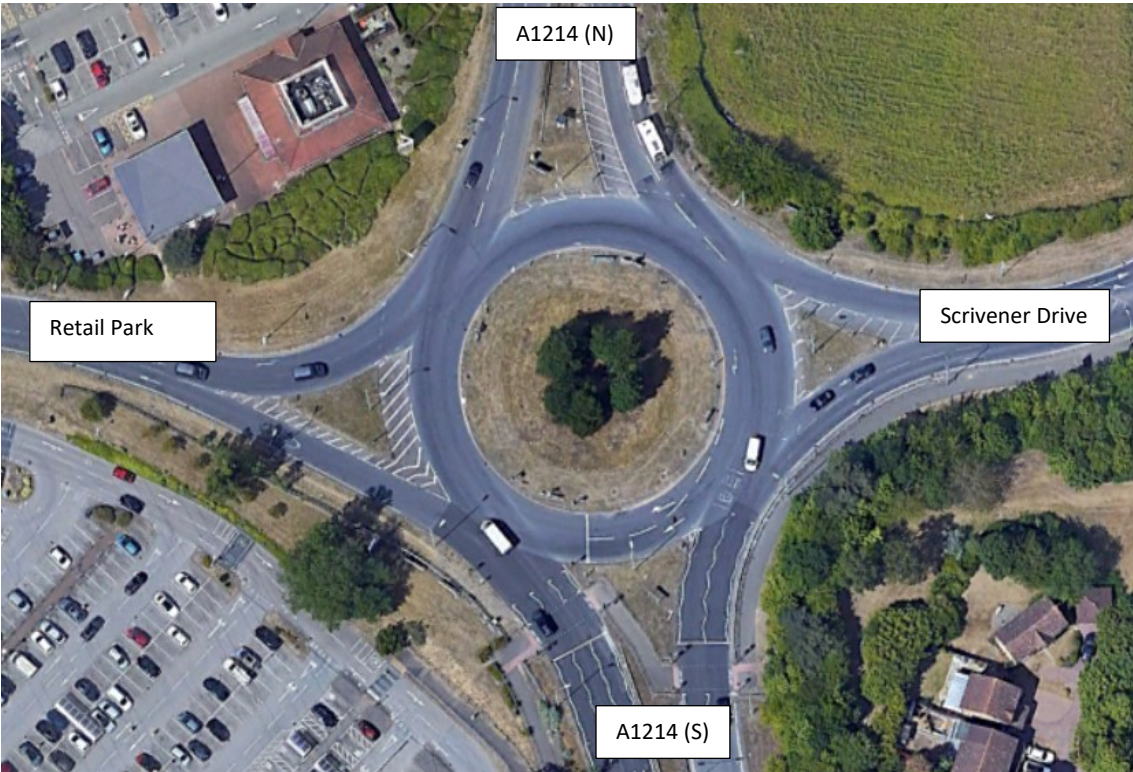
Table 7.77 Site 27 B1113 Bramford Rd / Bramford Rd PM peak capacity assessment

Lane Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
B1113 Bramford Road EB Left Ahead	59.1: 52.9%	64.7: 64.7%	3.1	3.9	19.3	20
B1113 Bramford Road SB Left	0.0%	0.0%	0	0	0	0
B1113 Bramford Road WB Ahead	24.4%	26.7%	0.2	0.2	1.3	1.4
B1113 Bramford Road WB Right	63.6%	67.2%	5.7	6.2	12.5	14.1

Site 30 - A1214 London Rd / Scrivener Dr roundabout

- 7.11.101 The A1214 London Road and Scrivener Drive junction is a four-arm partially signalised roundabout located in Ipswich, Suffolk. The junction connects local residential and commercial areas in southwest Ipswich to the A1214, facilitating access to Junction 55 of the A14.
- 7.11.102 Aerial imagery of the junction is presented in Image 7.43 and has been assessed using LinSig. The capacity assessments are presented in Table 7.78 and Table 7.79.

Image 7.43 A1214 London Rd / Scrivener Dr roundabout



7.11.103 The assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays. The highest DoS occurs in the PM Future Base plus Committed Development and Project flows on the Ahead/Left Lane of Retail Park EB, with a delay of 21.3 seconds and a DoS of 88.4%.

Table 7.78 Site 30 A1214 London Rd / Scrivener Dr roundabout AM peak capacity assessment

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
A1214 (SB) Left Ahead	47.10%	50.00%	0.4	0.5	4.7	5
A1214 (SB) Ahead	70.90%	73.00%	2.8	3.1	8.7	9.3
Scrivener Drive (WB) Ahead Left	67.8 : 67.8%	68.3 : 68.3%	1	1.1	5.1	5.2
A1214 (NB) Ahead Left	73.3 : 73.3%	78.0 : 78.0%	6.5	7.3	18.6	20.7
A1214 (NB) Ahead	66.40%	66.40%	5.5	5.5	16.8	16.8
Retail Park (EB) Ahead Left	51.6 : 51.6%	52.5 : 52.5%	2.3	2.4	6.2	6.6

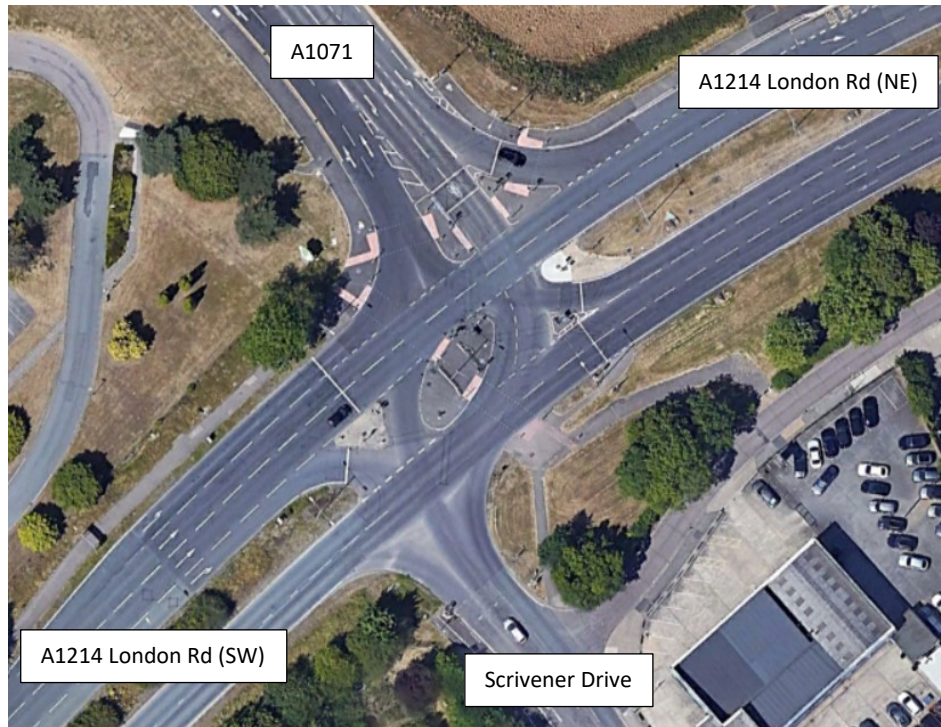
Table 7.79 Site 30 A1214 London Rd / Scrivener Dr roundabout PM peak capacity assessment

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+Project PM	FB+CD PM	FB+CD+Project PM	FB+CD PM	FB+CD+Project PM
A1214 (SB) Left Ahead	78.60%	82.10%	4.2	5	13.8	16.3
A1214 (SB) Ahead	82.20%	84.80%	5	5.8	16.6	19.1
Scrivener Drive (WB) Ahead Left	47.8 : 47.8%	48.2 : 48.2%	0.5	0.5	3	3
A1214 (NB) Ahead Left	81.6 : 81.6%	86.7 : 86.7%	8.7	10.3	24.9	29.5
A1214 (NB) Ahead	86.70%	86.70%	10.1	10.1	30.6	30.6
Retail Park (EB) Ahead Left	87.4 : 87.4%	88.4 : 88.4%	8.9	9.4	19.8	21.3

Site 31 - A1214 London Rd / A1071

- 7.11.104 The junction between the A1214 London Road and the A1071 is a four-arm signalised crossroad junction located in southwest Ipswich, Suffolk. It connects areas to the west of Ipswich to the A1214, a key road which runs through Ipswich town centre.
- 7.11.105 Aerial imagery of the junction is presented in Image 7.44 and has been assessed using LinSig. The capacity assessments are presented in Table 7.80 and Table 7.81.

Image 7.44 A1214 London Rd / A1071



- 7.11.106 The assessment indicates that the partially signalised junction operates within capacity across all scenarios and time periods in the AM peak, but mostly just above capacity in the PM peak, with delays reaching a high of up to 95.5 seconds after incorporating mitigation. The highest DoS occurs in the PM Future Base plus Committed Development and Project flows on the Ahead/Left/Right Lane of Scrivener Drive NB, with a delay of 120 seconds and a DoS of 97.2%. The proposed mitigation at this location involves the introduction of phase delays to the signal controller to further improve the efficiency of the junction alongside signal optimisation.

Table 7.80 Site 31 A1214 London Rd / A1071 AM peak capacity assessment

Approach	AM Peak								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation
A1214 London Road WB Ahead Left	62.80%	60.90%	60.90%	9.7	9.5	9.5	42.1	40.6	40.6
A1214 London Road WB Ahead Right	65.6 : 78.4%	63.6 : 85.6%	63.6 : 78.4%	10.4	10.3	10.3	45.7	45.4	44.5
Scrivener Drive NB Left Ahead Right	80.6 : 80.6%	84.6 : 84.6%	84.6 : 84.6%	10	10.7	10.7	65.9	73.5	73.5
A1214 London Road EB Left Ahead	83.8 : 83.8%	83.8 : 83.8%	83.8 : 83.8%	11.4	12.5	12.5	59.9	59.8	59.8
A1214 London Road EB Ahead Right	68.8 : 68.7%	75.2 : 75.2%	75.2 : 75.2%	8.7	10.5	10.5	53.7	55.3	55.3
A1071 SB Right Left Ahead	80.9 : 80.9%	85.4 : 85.4%	85.4 : 85.4%	9.3	10.7	10.7	59.4	66.3	65
A1071 SB Right	74.60%	81.00%	81.00%	8.5	9.7	9.7	63.5	70.3	70.3

Table 7.81 Site 31 A1214 London Rd / A1071 PM peak capacity assessment

Approach	PM Peak								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM with mitigation	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM with mitigation	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM with mitigation
A1214 London Road WB Ahead Left	52.50%	53.10%	52.30%	8.2	8.3	8.9	36.5	36.6	38.6
A1214 London Road WB Ahead Right	55.3 : 85.6%	54.7 : 92.7%	53.5 : 93.3%	9	8.9	9.5	42.6	43.3	46
Scrivener Drive NB Left Ahead Right	92.5 : 92.5%	97.2 : 97.2%	92.2 : 92.2%	14.2	16.7	14.8	93.2	120	95.5
A1214 London Road EB Left Ahead	92.0 : 92.0%	94.9 : 94.9%	91.2 : 91.2%	16.2	18.8	18	75.6	87.4	75.6
A1214 London Road EB Ahead Right	90.3 : 90.3%	94.2 : 94.2%	89.9 : 89.9%	15.3	18.2	17.2	74.1	85.5	73.7
A1071 SB Right Left Ahead	91.7 : 91.7%	93.2 : 93.2%	89.2 : 89.2%	12	13.4	12.6	86.3	90.9	78.3
A1071 SB Right	88.40%	90.30%	85.40%	10.5	11.6	11.3	92.2	95.2	83.1

Site 32 - A1071 / B1113 Swan Hill roundabout

- 7.11.107 The junction of A1071 and B1113 Swan Hill is a roundabout located on the eastern outskirts of Ipswich, near Sproughton and to the east of the A14 between junctions 54 and 55. The roundabout consists of four arms and connects local villages and towns to Ipswich and Sudbury via the A1071.
- 7.11.108 Aerial imagery of the junction is presented in Image 7.45 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.82.

Image 7.45 A1071 / B1113 Swan Hill roundabout



- 7.11.109 The Junctions assessment indicates that, in the AM peak, Swan Hill experiences long queue lengths (31 PCUs), significant delays (209 seconds), and is over capacity with an RFC of 1.09 in the Base scenario, worsening in subsequent scenarios. In the Future Base with Committed Developments scenario, both the A1071 (E) and A1071 (W) arms are marginally above capacity with RFCs of 0.85 and 0.86 respectively. The trends identified in the assessment are consistent with Google typical traffic data.
- 7.11.110 These existing junction capacity issues are exacerbated by the addition of the Project traffic, however RFC values do not materially increase once this peak hour construction traffic is applied, the highest increase in RFC when compared with the Future Base plus Committed Development scenario is four percentage points. Existing capacity issues on Swan Hill are expected to worsen, however these issues are not caused by Project traffic.

Table 7.82 Site 32 A1071 / B1113 Swan Hill roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
B1113	2.9	20.17	0.76	2.2	14.13	0.69
A1071 (E)	3.9	17.99	0.80	5.3	22.80	0.86
Swan Hill	31.6	209.07	1.09	2.0	19.39	0.68
A1071 (W)	3.8	22.33	0.80	2.4	13.40	0.71
Future Base						
B1113	3.4	22.64	0.79	2.5	15.76	0.73
A1071 (E)	4.7	20.91	0.83	6.8	28.54	0.90
Swan Hill	49.7	311.33	1.16	2.4	22.34	0.72
A1071 (W)	4.4	24.92	0.83	2.7	14.95	0.74
Future Base plus Committed Developments						
B1113	3.7	24.59	0.81	2.8	17.15	0.75
A1071 (E)	5.4	23.15	0.85	7.7	31.91	0.91
Swan Hill	55.4	346.61	1.18	2.5	23.68	0.73
A1071 (W)	5.2	28.84	0.86	3.1	16.44	0.76
Future Base plus Committed Developments and Project						
B1113	4.0	26.58	0.82	3.0	18.49	0.77
A1071 (E)	6.9	28.59	0.89	10.7	42.82	0.95
Swan Hill	70.4	441.34	1.22	2.8	26.29	0.75
A1071 (W)	6.8	35.49	0.89	3.9	19.68	0.80

7.11.111 As part of a neighbouring development, this junction is proposed to be converted into a signalised crossroad. At the time of writing, it is unclear when this junction upgrade would take place. No separate mitigation has been proposed as part of the Project.

7.11.112 The modelling results indicate that capacity issues exist in the base scenario and are expected to worsen before the Project traffic is added. Given the small increase in RFC values due to the addition of construction traffic and the short duration of worst-case peak flows that have been modelled, no mitigation is proposed at this location.

Essex Junctions

Site 42 and Site 43- A1341 Via Urbis Romanae / Olympic Boulevard/Whitmore Drive

7.11.113 The A1341 Via Urbis Romanae, Olympic Boulevard and Whitmore Drive junction is made up of two signalised T-junctions located in the north of Colchester, Essex. It facilitates access between residential areas in the east and north of Colchester to the A134 and Junction 28 of the A12.

Aerial imagery of the junctions is presented in Image 7.46 and have been assessed using LinSig. The assessment of capacity of both junctions are presented in Table 7.83 and Table 7.84.

Image 7.46 A1341 Via Urbis Romanae / Olympic Blv/Whitmore Drive



7.11.114 The assessment indicates that the signalised junction operates within capacity across all scenarios and time periods, with no significant delays. The highest DoS occurs in the AM Future Base plus Committed Development and Project flows on the Ahead Lane of the Via Urbis Romanae SB, with a delay of 25.6 seconds and a DoS of 82.0%.

Table 7.83 Site 42 and 43 A1341 Via Urbis Romanae / Olympic Blv AM peak capacity assessment

Lane Description	AM Peak								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation (85 th)	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation (85 th)	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation (85 th)
Via Urbis Romanae SB Left	0.80%	0.80%	0.70%	0.1	0.1	0.1	11.4	11.4	11.4
Via Urbis Romanae SB Ahead	73.00%	82.00%	80.10%	16.7	21.1	19.9	21.4	25.6	24.5
Olympic Blvd WB Right Left	41.3 : 41.3%	41.3 : 41.3%	34.3 : 34.3%	2	2.2	1.9	51.6	52.5	47
Via Urbis Romanae NB Left	5.50%	5.30%	5.60%	0.7	0.7	0.8	14.1	13.2	14.5
Via Urbis Romanae NB Ahead	1.70%	14.20%	1.60%	0.2	3.9	0.2	6.2	17.9	5.6
Whitmore Drive EB Left Right	56.3 : 56.3%	56.3 : 56.3%	46.5 : 46.5%	4.6	4.7	3.8	38	38.8	29.9

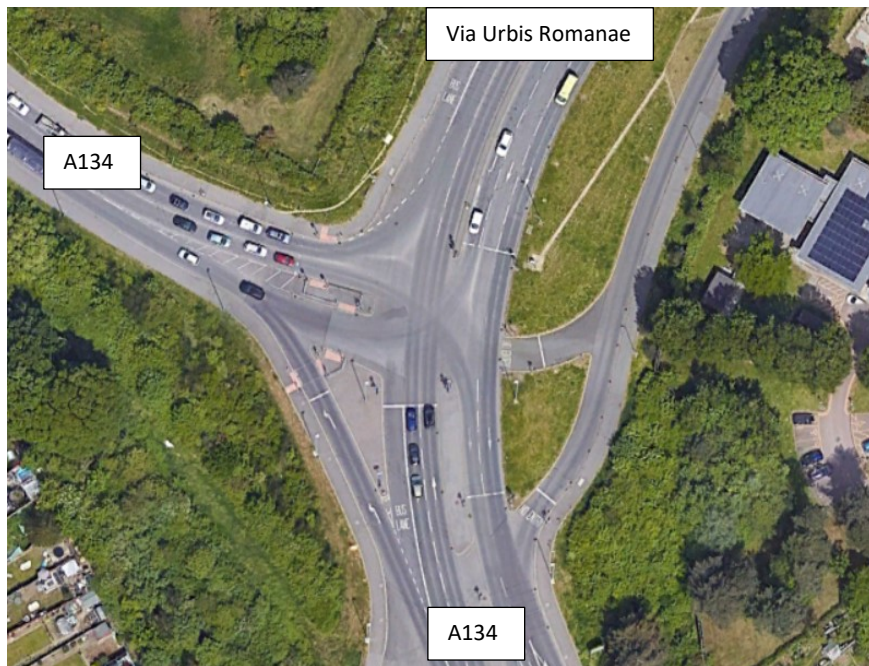
Table 7.84 Site 42 and 43 A1341 Via Urbis Romanae / Olympic Blv PM peak capacity assessment

Lane Description	PM Peak								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation (85 th)	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation (85 th)	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation (85 th)
Via Urbis Romanae SB Left	6.10%	6.30%	6.00%	0.7	0.8	0.7	11.7	11.7	11.6
Via Urbis Romanae SB Ahead	74.30%	80.60%	77.50%	17.1	20.3	18.5	21.9	24.8	23.2
Olympic Blvd WB Right Left	33.1 : 33.1%	32.5 : 32.5%	27.9 : 27.9%	1.5	1.6	1.7	49.6	49.4	47.5
Via Urbis Romanae NB Left	7.10%	6.60%	6.80%	0.9	0.8	0.8	12.3	11.4	11.5
Via Urbis Romanae NB Ahead	1.70%	1.70%	1.60%	0.3	0.3	0.3	8.1	11.8	8.2
Whitmore Drive EB Left Right	42.8 : 42.8%	41.1 : 41.1%	32.5 : 32.5%	2.8	2.7	2.3	39.5	39.2	31.9

Site 44 - A1341 Via Urbis Romanae / A134 Northern Approach Rd

- 7.11.115 The A1341 Via Urbis Romanae and the A134 Northern Approach Road junction is a four-arm signalised located in the north of Colchester, Essex. It is a key junction which facilitates access between areas surrounding Colchester to Junction 28 of the A12 as well as access to the city centre.
- 7.11.116 Aerial imagery of the junction is presented in Image 7.47 and has been assessed using LinSig. The capacity assessments are presented in Table 7.85 and Table 7.86.

Image 7.47 A1341 Via Urbis Romanae / A134 Northern Approach Rd



- 7.11.117 The assessment indicates that the signalised junction operates within capacity across all scenarios and time periods, with no significant delays. The highest DoS occurs in the AM Future Base plus Committed Development and Project flows on the Ahead/Right Lane of the Via Urbis Romanae SB, with a delay of 37.7 seconds and a DoS of 73.2%.

Table 7.85 Site 44 A1341 Via Urbis Romanae / A134 Northern Approach Rd AM peak capacity assessment

Lane Description	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
Via Urbis Romanae SB Ahead	60.2%	67.1%	8.4	10.7	31.6	30.5
Via Urbis Romanae SB Ahead Right	60.6 : 60.6%	73.2 : 73.2%	5.6	8.4	33.4	37.7
Via Urbis Romanae WB Left	10.0%	10.0%	0.4	0.4	50.3	50.3
Via Urbis Romanae WB Ahead	0.0%	0.0%	0	0	0	0
A134 Northern Approach Road Ahead	57.1 : 57.1%	56.8 : 56.8%	4.7	4.7	46.2	46.1
A134 Northern Approach Road Ahead	59.1%	59.4%	5	5.1	47.6	47.7
A134 Northern Approach Road EB Right Left	62.2 : 62.2%	76.6 : 76.6%	9	12.3	23.8	30.8

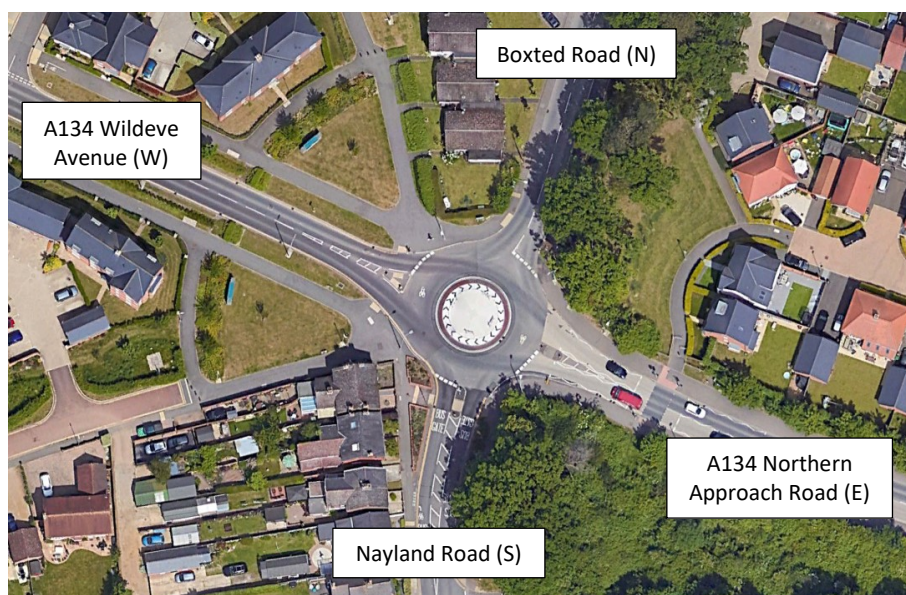
Table 7.86 Site 44 A1341 Via Urbis Romanae / A134 Northern Approach Rd PM peak capacity assessment

Lane Description	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD AM PM	FB+CD+ Project PM
Via Urbis Romanae SB Ahead	51.9%	62.3%	7.9	10.4	22.7	25.1
Via Urbis Romanae SB Ahead Right	63.6 : 63.6%	72.2 : 72.2%	6.9	8.8	35	42.8
Via Urbis Romanae WB Left	15.6%	15.6%	0.7	0.7	51.2	51.2
Via Urbis Romanae WB Ahead	0.00%	0.00%	0	0	0	0
A134 Northern Approach Road Ahead	61.9 : 61.9%	69.1 : 69.1%	6.5	7	41.6	47.3
A134 Northern Approach Road Ahead	63.80%	69.70%	6.9	7.2	42.8	48.2
A134 Northern Approach Road EB Right Left	64.1 : 64.1%	71.3 : 71.3%	8.6	10	31.2	33.1

Site 45- A134 Northern Approach Rd / Boxted Rd roundabout

- 7.11.118 The A134 Northern Approach Rd and Boxted Road junction is a four-arm roundabout located in the north of Colchester, Essex. The southern arm of the roundabout operates as a bus gate and there is a toucan crossing on the Northern Approach Road (A134) to the east of its junction with Boxted Road. The junction provides access to the town centre as well as facilitating access to the A12.
- 7.11.119 Aerial imagery of the junction is presented in Image 7.48 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.87.

Image 7.48 A134 Northern Approach Rd / Boxted Rd roundabout



- 7.11.120 The Junctions assessment indicates that during the PM peak none of the roundabout arms operate above capacity or experience significant delays in any scenario. In the AM peak, there are no issues with delays or capacity across the Base, Future Base and Future Base plus Committed Development scenarios.
- 7.11.121 With the addition of Project flows the A134 Wildeve Avenue capacity (W) in the AM increases marginally above practical capacity with an RFC of 0.87. All other arms in both peaks are predicted to continue operating within capacity.

Table 7.87 Site 45 A134 Northern Approach Rd / Boxted Rd roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Boxted Road (N)	0.3	4.97	0.21	0.2	4.61	0.17
A134 Northern Approach Road (E)	1.6	9.74	0.61	1.8	10.38	0.65
Nayland Road (S)	0.1	9.39	0.07	0.1	9.10	0.09
A134 Wildeve Avenue (W)	3.6	16.09	0.79	1.4	8.35	0.59
Future Base						
Boxted Road (N)	0.3	5.09	0.21	0.2	4.71	0.18
A134 Northern Approach Road (E)	1.7	10.29	0.63	2.0	11.08	0.67
Nayland Road (S)	0.1	9.53	0.07	0.1	9.30	0.09
A134 Wildeve Avenue (W)	4.1	18.01	0.81	1.5	8.79	0.61
Future Base plus Committed Developments						
Boxted Road (N)	0.3	5.09	0.21	0.2	4.71	0.18
A134 Northern Approach Road (E)	1.7	10.29	0.63	2.0	11.08	0.67
Nayland Road (S)	0.1	9.53	0.07	0.1	9.30	0.09
A134 Wildeve Avenue (W)	4.1	18.01	0.81	1.5	8.79	0.61
Future Base plus Committed Developments and Project						
Boxted Road (N)	0.3	5.34	0.22	0.2	4.99	0.18
A134 Northern Approach Road (E)	3.4	16.57	0.77	2.8	14.19	0.74
Nayland Road (S)	0.1	10.23	0.08	0.1	9.90	0.10
A134 Wildeve Avenue (W)	6.2	24.83	0.87	2.5	12.51	0.71

- 7.11.122 Queuing on A134 Wildeve Avenue (W) is not predicted to impact any upstream junctions, nor is the increase in RFC deemed to be a noticeable worsening of junction performance. For this reason, no mitigation is proposed at this junction.

Site 50 - B1389 Hatfield Road / Spinks Lane

- 7.11.123 The B1389 Hatfield Road and Spinks Lane junction is a signalised four-arm crossroad located in Witham, Essex. It connects local roads to the B1389, the main route through Witham and facilitates access to the A12.
- 7.11.124 Aerial imagery of the junction is presented in Image 7.49 and has been assessed using LinSig. The capacity assessments are presented in Table 7.88 and Table 7.89.

Image 7.49 B1389 Hatfield Road / Spinks Lane



- 7.11.125 The assessment indicates that the signalised crossroad operates within capacity across nearly all scenarios and time periods, with no significant delays. The highest DoS being just above practical capacity occurring in the AM Future Base plus Committed Development and Project flows on B1389 Hatfield Road, with a delay of 63.4 seconds and a DoS of 90.2%.

Table 7.88 Site 50 B1389 Hatfield Road / Spinks Lane AM peak capacity assessment

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
B1389 Bridge Street (NE) Left Ahead Right	85.3%	89.0%	16.3	17.4	61.6	69.8
Howbridge Road (SE) Right Left Ahead	73.4%	69.8%	10	9.6	57.1	52.9
B1389 Hatfield Road (SW) Ahead Right Left	86.3 : 86.3%	90.2 : 90.2%	16.9	18.9	56.1	63.4
Spinks Lane (NW) Left Ahead Right	85.1 : 85.1%	88.9 : 88.9%	14.8	18	55.3	61.6

Table 7.89 Site 50 B1389 Hatfield Road / Spinks Lane PM peak capacity assessment

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
B1389 Bridge Street (NE) Left Ahead Right	75.4%	84.7%	17.2	20.5	40.1	55.4
Howbridge Road (SE) Right Left Ahead	82.5%	74.5%	15.4	12.2	86.9	59.9
B1389 Hatfield Road (SW) Ahead Right Left	83.1 : 83.1%	88.2 : 88.2%	18.7	24.1	38.2	45.2
Spinks Lane (NW) Left Ahead Right	83.3 : 83.3%	87.6 : 87.6%	12.5	19.5	55	68

Site 52 - Highfields Rd / Guithavon Rd Priority Junction

- 7.11.126 The Highfields Road and Guithavon Road junction is a small priority T-junction located in Witham, Essex. The junction connects residential areas to routes leading to the town centre.
- 7.11.127 Aerial imagery of the junction is presented in Image 7.50 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.90.

Image 7.50 Highfields Rd / Guithavon Rd Priority Junction



- 7.11.128 The Junctions assessment indicates that the junction operated within capacity across all scenarios and time periods, with no significant delays.
- 7.11.129 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the Future Base plus Committed Development and Project flows during the PM on Guithavon Road (E) Right Turn, with a delay of 21 seconds and an RFC of 0.53.

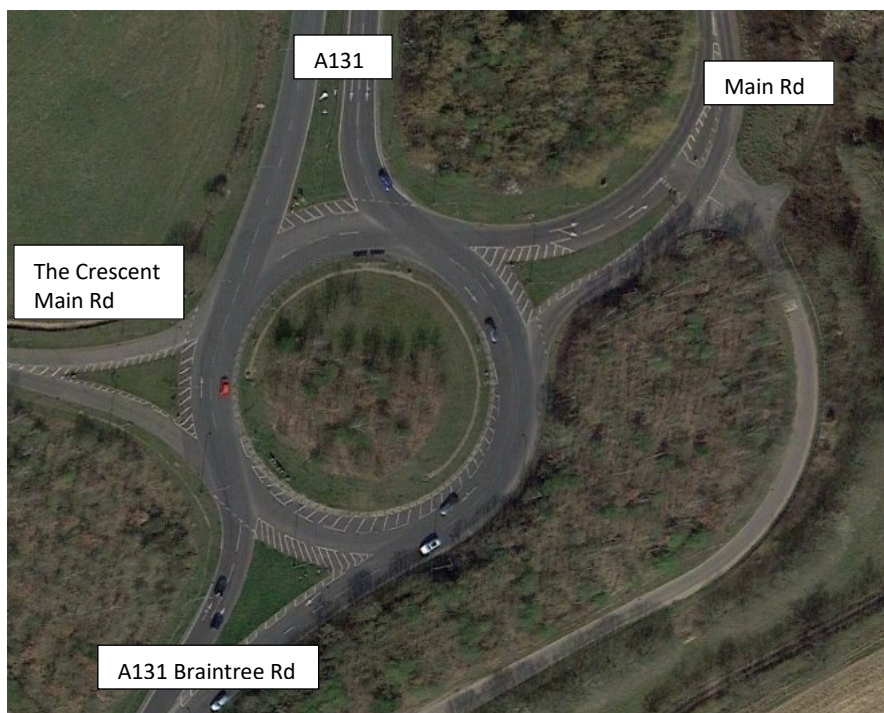
Table 7.90 Site 52 Highfields Rd / Guithavon Rd Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Guithavon Road (E) Left Turn	0.2	8.35	0.18	0.3	8.98	0.23
Guithavon Road (E) Right Turn	0.2	13.18	0.13	0.9	18.96	0.49
Highfield Road (SW) Right and Ahead	0.7	6.99	0.32	0.3	4.76	0.13
Future Base						
Guithavon Road (E) Left Turn	0.2	8.52	0.19	0.3	9.24	0.24
Guithavon Road (E) Right Turn	0.2	13.61	0.14	1.0	20.23	0.52
Highfield Road (SW) Right and Ahead	0.8	7.12	0.34	0.3	4.74	0.13
Future Base plus Committed Developments						
Guithavon Road (E) Left Turn	0.2	8.52	0.19	0.3	9.24	0.24
Guithavon Road (E) Right Turn	0.2	13.61	0.14	1.0	20.23	0.52
Highfield Road (SW) Right and Ahead	0.8	7.12	0.34	0.3	4.74	0.13
Future Base plus Committed Developments and Project						
Guithavon Road (E) Left Turn	0.2	8.66	0.19	0.3	9.43	0.24
Guithavon Road (E) Right Turn	0.2	14.10	0.14	1.1	21.30	0.53
Highfield Road (SW) Right and Ahead	0.9	7.19	0.35	0.4	4.72	0.14

Site 58 - A131 Great Notley Bypass / Main Rd roundabout

- 7.11.130 The A131 Great Notley Bypass and Main Road junction is a four-arm roundabout located south of Notley Green and Braintree. The junction links the A131 Bypass to Main Road, which runs through the village of Great Leighs, and other surrounding villages.
- 7.11.131 Aerial imagery of the junction is presented in Image 7.51 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.91.

Image 7.51 A131 Great Notley Bypass / Main Rd roundabout



- 7.11.132 The Junctions assessment indicates that during the PM peak, the roundabout operates within capacity and with no significant delays in the Base and Future Base scenarios. During the AM peak, the Base scenario shows the A131 arm operating above practical capacity with an RFC of 0.92. In the Future Base with Committed Development scenario, three of the four arms experience issues with queue length, delay, and/or RFC.
- 7.11.133 The introduction of the Project traffic has a marginal impact upon capacity when compared with the Future Base plus Committed Development scenario. In the AM the Project flows worsen any queue lengths, delays and RFC predicted and on the AM arms, and the additional flows push the A131 Braintree Road PM RFC to 0.85, putting it on the edge of practical capacity.

Table 7.91 Site 58 A131 Great Notley Bypass / Main Rd roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A131	8.5	19.29	0.92	0.5	1.75	0.33
Main Road	1.7	26.80	0.64	0.2	3.55	0.13
A131 Braintree Road	1.2	3.97	0.53	2.9	7.01	0.75
The Crescent Main Road	0.0	4.84	0.04	0.1	5.01	0.05
Future Base						
A131	21.0	50.47	1.01	0.5	1.78	0.34
Main Road	4.8	71.93	0.87	0.2	3.63	0.14
A131 Braintree Road	1.3	4.13	0.54	3.3	7.80	0.77
The Crescent Main Road	0.6	52.75	0.42	0.1	5.17	0.05
Future Base plus Committed Developments						
A131	21.0	50.47	1.01	0.5	1.78	0.34
Main Road	4.8	71.93	0.87	0.2	3.63	0.14
A131 Braintree Road	1.3	4.13	0.54	3.3	7.80	0.77
The Crescent Main Road	0.6	52.75	0.42	0.1	5.17	0.05
Future Base plus Committed Developments and Project						
A131	56.9	154.89	1.09	0.6	1.88	0.36
Main Road	15.6	175.08	1.02	0.2	3.74	0.14
A131 Braintree Road	1.5	4.53	0.58	5.6	12.24	0.85
The Crescent Main Road	1.2	122.08	0.60	0.1	5.72	0.06

7.11.134 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.92 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.92 Site 58 A131 Great Notley Bypass / Main Rd roundabout capacity assessment with reduced flows

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
A131	56.9	154.89	1.09	0.6	1.88	0.36
Main Road	15.6	175.08	1.02	0.2	3.74	0.14
A131 Braintree Road	1.5	4.53	0.58	5.6	12.24	0.85
The Crescent Main Road	1.2	122.08	0.60	0.1	5.72	0.06
Future Base plus Committed Developments and Project – Reduced Worst-Case Flows (50%)						
A131	34.6	90.79	1.04	0.6	1.83	0.35
Main Road	7.6	105.31	0.92	0.2	3.68	0.14
A131 Braintree Road	1.3	4.3	0.56	4.2	9.56	0.81
The Crescent Main Road	0.8	79.73	0.49	0.1	5.43	0.05

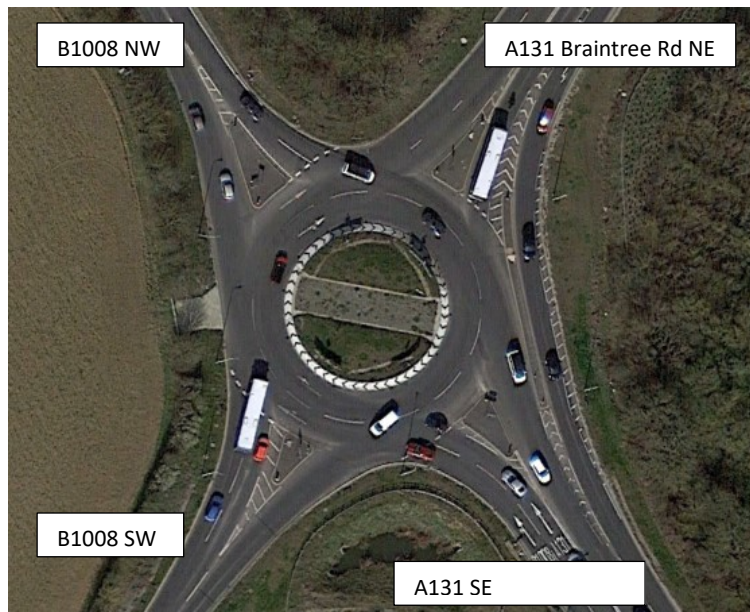
7.11.135 An assessment of this lower, more representative construction traffic volume indicates that the junction is still predicted to operate over capacity.

7.11.136 It is proposed that temporary signage be provided to warn general traffic of peak hour congestion and availability of alternative routes.

Site 59 - A131 Braintree Rd/ B1008 Essex Regiment Way roundabout

- 7.11.137 The A131 Braintree Road and B1008 Essex Regiment Way roundabout is located north of Chelmsford. The four-arm junction is situated between Braintree and Chelmsford and connects local roads to this key route.
- 7.11.138 Aerial imagery of the junction is presented in Image 7.52 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.93.

Image 7.52 A131 Braintree Rd/ B1008 Essex Regiment Way roundabout



- 7.11.139 The Junctions assessment indicates that during the AM peak, the roundabout is above capacity on the A131 (SE) arm, with an RFC of 0.92 in the Base scenario, increasing to 0.96 in the Future Base plus Committed Development scenario. During the PM peak, the B1008 (SW) and B1008 (NW) arms are marginally above capacity in the Future Base plus Committed Development scenario.
- 7.11.140 The introduction of the Project traffic results in a marginal impact on capacity when compared to the Future Base plus Committed Development scenario. The most notable change in RFC is observed on the B1008 (SW) during the PM peak, where RFC increases by 0.1, rising from 0.89 to 0.99 just below theoretical capacity. While the Project flows introduce changes in comparison to the Future Base plus Committed Development scenario, it is important to note that the affected arms were already operating over practical capacity.

Table 7.93 Site 59 A131 Braintree Rd/ B1008 Essex Regiment Way roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A131 Braintree Road (NE)	1.7	8.55	0.62	0.4	4.78	0.28
A131 (SE)	9.1	22.02	0.92	2.5	6.51	0.71
B1008 (SW)	0.9	7.87	0.46	4.6	23.10	0.84
B1008 (NW)	2.3	11.51	0.70	4.3	25.31	0.83
Future Base						
A131 Braintree Road (NE)	1.9	9.32	0.65	0.4	4.93	0.29
A131 (SE)	13.8	31.38	0.96	2.9	7.25	0.74
B1008 (SW)	1.0	8.69	0.49	6.9	33.65	0.89
B1008 (NW)	2.7	13.28	0.73	6.6	36.36	0.89
Future Base plus Committed Developments						
A131 Braintree Road (NE)	1.9	9.32	0.65	0.4	4.93	0.29
A131 (SE)	13.8	31.38	0.96	2.9	7.25	0.74
B1008 (SW)	1.0	8.69	0.49	6.9	33.65	0.89
B1008 (NW)	2.7	13.28	0.73	6.6	36.36	0.89
Future Base plus Committed Developments and Project						
A131 Braintree Road (NE)	2.6	11.60	0.72	0.6	5.67	0.35
A131 (SE)	17.9	44.09	0.99	3.2	7.91	0.76
B1008 (SW)	1.4	10.63	0.57	19.1	81.22	0.99
B1008 (NW)	3.0	15.19	0.75	10.1	59.43	0.94

7.11.141 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.94 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.94 Site 59 A131 Braintree Rd/ B1008 Essex Regiment Way roundabout capacity assessment with reduced flows

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
A131 Braintree Road (NE)	2.6	11.60	0.72	0.6	5.67	0.35
A131 (SE)	17.9	44.09	0.99	3.2	7.91	0.76
E1008 (SW)	1.4	10.63	0.57	19.1	81.22	0.99
B1008 (NW)	3.0	15.19	0.75	10.1	59.43	0.94
Future Base plus Committed Developments and Project – Reduced Worst-Case Flows (50%)						
A131 Braintree Road (NE)	2.2	10.23	0.69	0.5	5.29	0.32
A131 (SE)	15.7	37.01	0.97	3.0	7.56	0.75
B1008 (SW)	1.2	9.59	0.53	10.8	49.80	0.94
B1008 (NW)	2.8	14.17	0.74	7.9	46.03	0.92

- 7.11.142 The sensitivity assessment indicates that the junction is still anticipated to operate close to capacity at 50% of the worst-case peak flows.
- 7.11.143 It is proposed to provide temporary signage to warn general traffic of peak hour congestion and availability of alternative routes, no physical mitigation is proposed at this location.

Site 61 - B1008 Blasford Hill/ Chelmsford Road Priority Junction

- 7.11.144 The junction between the B1008 Blasford Hill and Chelmsford Road is a priority T-junction. It is located north of Chelmsford, near the village of Little Waltham, Essex. It connects local roads to nearby residential areas and local amenities.
- 7.11.145 Aerial imagery of the junction is presented in Image 7.53 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.95.

Image 7.53 B1008 Blasford Hill/ Chelmsford Road Priority Junction



- 7.11.146 The Junctions assessment indicates that the junction operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.147 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the Future Base plus Committed Development and Project flows during the AM on Guithavon Road (E) Right Turn, with a delay of 15 seconds and an RFC of 0.47.

Table 7.95 Site 61 B1008 Blasford Hill/ Chelmsford Road Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Chelmsford Road (W) Left Turn	0.3	9.16	0.24	0.4	9.15	0.27
Chelmsford Road (W) Right Turn	0.7	12.18	0.41	0.3	9.07	0.20
B1008 Blasford Hill (N) Right and Ahead	0.2	6.55	0.18	0.3	7.63	0.24
Future Base						
Guithavon Road (E) Left Turn	0.3	9.55	0.25	0.4	9.46	0.29
Guithavon Road (E) Right Turn	0.8	12.94	0.43	0.3	9.36	0.21
Highfield Road (SW) Right and Ahead	0.2	6.65	0.19	0.3	7.82	0.25
Future Base plus Committed Developments						
Guithavon Road (E) Left Turn	0.3	9.55	0.25	0.4	9.46	0.29
Guithavon Road (E) Right Turn	0.8	12.94	0.43	0.3	9.36	0.21
Highfield Road (SW) Right and Ahead	0.2	6.65	0.19	0.3	7.82	0.25
Future Base plus Committed Developments and Project						
Guithavon Road (E) Left Turn	0.6	12.38	0.34	0.8	12.52	0.41
Guithavon Road (E) Right Turn	0.9	15.11	0.47	0.3	10.35	0.23
Highfield Road (SW) Right and Ahead	0.4	8.26	0.29	0.5	9.49	0.32

Site 63 - A414 Three Mile Hill / A1114 London Rd roundabout

- 7.11.148 The A414 Three Mile Hill / A1114 London Road junction is a four-arm roundabout located in Chelmsford, Essex. It is situated on the A414, a major route connecting Chelmsford and Harlow. It facilitates access to Chelmsford from surrounding residential areas.
- 7.11.149 Aerial imagery of the junction is presented in Image 7.54 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.96.

Image 7.54 A414 Three Mile Hill / A1114 London Rd roundabout



- 7.11.150 In the AM Future peaks all but the A1114 north arm are predicted to operate over capacity. In the Future Base plus Committed Development scenario Watford Road is predicted to operate over practical capacity with an RFC of 0.93, whilst A414 London Road and A414 Greenbury Way are predicted to operate above theoretical capacity with RFC values of 1.04 and 1.05 respectively. During the PM peak, the roundabout is marginally above capacity on the A414 Greenbury Way (W) arm with an RFC of 0.86, increasing to 0.91 in the Future Base plus Committed Development scenario.
- 7.11.151 The introduction of the Project traffic has a marginal impact upon capacity when compared with the Future Base plus Committed Development scenario. It is noted that modelling queueing increases exponentially when RFC values exceed 1, the queue results presented below may be over-estimated when the Project traffic is applied.
- 7.11.152 Blocking back queues from A10016 / London Road roundabout to the north impact the capacity at this junction, northbound traffic is prevented from exiting the roundabout due to this queueing observed most notably in the AM peak.

Table 7.96 Site 63 A414 Three Mile Hill / A1114 London Rd roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A1114 London Road (N)	3.6	7.85	0.78	3.2	7.44	0.76
Watford Road (E)	1.8	24.42	0.66	0.2	3.16	0.14
A414 London Road (S)	8.8	25.13	0.92	1.1	3.38	0.52
A414 Greenbury Way (W)	7.2	35.37	0.91	5.4	19.69	0.86
Future Base						
A1114 London Road (N)	4.2	8.95	0.81	3.7	8.50	0.79
Watford Road (E)	7.6	100.39	0.93	0.2	3.31	0.15
A414 London Road (S)	44.2	136.25	1.04	1.2	3.55	0.54
A414 Greenbury Way (W)	28.4	144.76	1.05	7.5	25.53	0.91
Future Base plus Committed Developments						
A1114 London Road (N)	4.2	8.95	0.81	3.7	8.50	0.79
Watford Road (E)	7.6	100.39	0.93	0.2	3.31	0.15
A414 London Road (S)	44.2	136.25	1.04	1.2	3.55	0.54
A414 Greenbury Way (W)	28.4	144.76	1.05	7.5	25.53	0.91
Future Base plus Committed Developments and Project						
A1114 London Road (N)	5.1	10.59	0.84	4.5	10.06	0.82
Watford Road (E)	9.0	118.19	0.97	0.2	3.50	0.16
A414 London Road (S)	70.4	201.79	1.07	1.4	3.92	0.58
A414 Greenbury Way (W)	50.0	273.50	1.10	11.8	36.17	0.96

7.11.153 A sensitivity assessment of 50% of the worst-case peak Project traffic was undertaken. This lower construction traffic flow volume was considered more representative of the level of construction traffic that would use this junction over a longer duration compared with a short-lived, worst-case maximum. Table 7.97 provides a comparison of the Future Base with Committed Developments and Project scenario flows, both with and without the reduced Project flows.

Table 7.97 Site 63 A414 Three Mile Hill / A1114 London Rd roundabout capacity assessment with reduced peak hour flows

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
Future Base plus Committed Developments and Project – Worst-Case Peak (Original) Flows						
A1114 London Road (N)	5.1	10.59	0.84	4.5	10.06	0.82
Watford Road (E)	9.0	118.19	0.97	0.2	3.50	0.16
A414 London Road (S)	70.4	201.79	1.07	1.4	3.92	0.58
A414 Greenbury Way (W)	50.0	273.50	1.10	11.8	36.17	0.96
Future Base plus Committed Developments and Project – Reduced Worst-Case Peak Flows (50%)						
A1114 London Road (N)	4.6	9.71	0.83	4.1	9.22	0.81
Watford Road (E)	9.4	122.43	0.96	0.2	3.40	0.16
A414 London Road (S)	61.2	178.63	1.06	1.3	3.73	0.56
A414 Greenbury Way (W)	37.1	191.48	1.08	9.3	30.26	0.93

7.11.154 The sensitivity assessment indicates that the junction is still predicted to operate over capacity with a lower, more representative peak traffic volume.

7.11.155 It is proposed to provide temporary signage to warn general traffic of peak hour congestion and availability of alternative routes.

Site 64 - A1114 London Rd / A1016 Westway roundabout

- 7.11.156 The A1114 London Rd / A1016 Westway junction is a 3-arm roundabout located in Chelmsford, Essex. It is situated at the start of the A1016, which acts as the western bypass for Chelmsford and connects to the A1114 which runs through the industrial estate in Widford.
- 7.11.157 Aerial imagery of the junction is presented in Image 7.55 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.98.

Image 7.55 A1114 London Rd / A1016 Westway roundabout



- 7.11.158 The Junctions assessment indicates that the roundabout is predicted to operate close to capacity in the AM peak, particular on the A1114 arms, with RFCs above 0.9 in Future Base plus Committed Development scenario. In the PM peak, the roundabout operates above capacity in all scenarios with RFC values above 1 in all PM Future Year scenarios.
- 7.11.159 The introduction of the Project traffic has a negligible impact upon capacity when compared with the Future Base plus Committed Development scenario. In the AM RFC values marginally increase by 0.1 and 0.2 RFC for the A1114 arms, in the PM RFC values remain the same as those reported in the Future Base scenario.
- 7.11.160 Blocking back queuing from neighbouring junctions impacts the capacity of the roundabout with traffic unable to exit, resulting in queuing on the circulatory arm and subsequently back onto entry arms.

Table 7.98 Site 64 A1114 London Rd / A1016 Westway roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A1114 London Road (NE)	7.1	15.45	0.88	13.6	37.76	0.98
A1114 London Road (S)	7.8	16.16	0.90	20.9	39.78	1.01
A1016 Westway (NW)	1.1	4.20	0.51	15.1	37.89	0.99
Future Base						
A1114 London Road (NE)	9.4	19.88	0.91	38.2	116.51	1.04
A1114 London Road (S)	10.6	21.15	0.93	48.2	124.91	1.06
A1016 Westway (NW)	1.1	4.43	0.53	48.7	135.30	1.05
Future Base plus Committed Developments						
A1114 London Road (NE)	9.4	19.88	0.91	38.2	116.51	1.04
A1114 London Road (S)	10.6	21.15	0.93	48.2	124.91	1.06
A1016 Westway (NW)	1.1	4.43	0.53	48.7	135.30	1.05
Future Base plus Committed Developments and Project						
A1114 London Road (NE)	10.4	22.12	0.92	36.9	113.35	1.04
A1114 London Road (S)	13.3	25.46	0.95	49.8	125.35	1.06
A1016 Westway (NW)	1.3	4.73	0.55	50.5	135.77	1.05

- 7.11.161 The introduction of the Project traffic has a negligible impact upon the operation of the junction, it is already predicted to operate over capacity in all PM future year scenarios. A sensitivity test assessing a lower, more representative construction traffic flow has not been undertaken at this junction as it would not produce noticeably improved results compared with the full Project traffic test presented above.
- 7.11.162 It is proposed to provide temporary signage to warn general traffic of peak hour congestion and availability of alternative routes.

Site 65 - A1016 Westway / Writtle Rd

- 7.11.163 The A1016 Westway and Writtle Road junction is a signalised four-arm crossroad located in south-west Chelmsford, Essex. The junction connects local residential roads to the A1016 which provides access to the town centre and the A12.
- 7.11.164 Aerial imagery of the junction is presented in Image 7.56 and has been assessed using LinSig. The capacity assessments are presented in Table 7.99 and Table 7.100.

Image 7.56 A1016 Westway / Writtle Rd



- 7.11.165 The assessment indicates that the signalised crossroad operates within capacity across nearly all scenarios and time periods, with no significant delays. The highest DoS being just above practical capacity occurring in the PM Future Base plus Committed Development and Project flows on A1016 Westway, with a delay of 55.2 seconds and a DoS of 90.1%. The proposed mitigation at this location is cycle and signal time optimisation which is considered sufficient to mitigate the temporary impacts of the Project construction traffic at this location.

Table 7.99 Site 65 A1016 Westway / Writtle Rd AM peak capacity assessments

Lane Description	AM Peak								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation	FB+CD AM	FB+CD+ Project AM	FB+CD+ Project AM with mitigation
A1016 Waterhouse Lane (N) Left Ahead Right	73.5 : 73.5%	75.4 : 75.4%	64.5 : 64.5%	20	22.3	14.4	40.8	41.6	23.2
Writtle Road (E) Right Left Ahead	66.0 : 65.1%	70.3 : 66.2%	71.8 : 71.8%	9.9	10.5	8.8	59.5	63.1	53.8
A1016 Westway (S) Ahead Right Left	88.1 : 88.1%	89.7 : 89.7%	80.0 : 80.0%	29.3	32.8	21.8	49.9	52.3	27.6
Writtle Road (W) Left Ahead Right	83.6 : 83.6%	85.0 : 85.9%	78.1 : 78.1%	13.3	14.3	10.1	74.5	79.8	54.8

Table 7.100 Site 65 A1016 Westway / Writtle Rd PM peak capacity assessments

Lane Description	PM Peak								
	Dos (%)			Av. Queues (PCUs)			Delay (s/PCU)		
	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM with mitigation	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM with mitigation	FB+CD PM	FB+CD+ Project PM	FB+CD+ Project PM with mitigation
A1016 Waterhouse Lane (N) Left Ahead Right	81.4 : 81.4%	80.2 : 80.2%	69.6 : 69.6%	25	28.5	16.7	46.1	46	23.5
Writtle Road (E) Right Left Ahead	74.6 : 74.6%	75.0 : 75.0%	80.7 : 80.7%	11.7	13.2	10.2	68.4	75.4	63.2
A1016 Westway (S) Ahead Right Left	90.9 : 90.9%	90.1 : 90.1%	82.8 : 82.8%	33.8	38.1	23.6	55.4	55.2	27.7
Writtle Road (W) Left Ahead Right	72.1 : 87.3%	73.0 : 86.4%	69.0 : 69.0%	10	11.6	7.4	71.8	78.3	51.5

Site 66 - A1016 Waterhouse Ln / Forest Dr Priority Junction

- 7.11.166 The A1016 Waterhouse Lane and Forest Drive junction is a priority T-junction located in Chelmsford. The junction connects residential areas to the businesses and retail park to the east of Chelmsford city centre.
- 7.11.167 Aerial imagery of the junction is presented in Image 7.57 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.101.

Image 7.57 A1016 Waterhouse Ln / Forest Dr Priority Junction



- 7.11.168 The Junctions assessment indicates that the junction operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.169 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the AM Future Base plus Committed Development and Project flows on Forest Drive (West) left turn, with a delay of 14 seconds and an RFC of 0.39.

Table 7.101 Site 66 A1016 Waterhouse Ln / Forest Dr Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Forest Drive (W) Left Turn	0.5	12.51	0.35	0.3	9.73	0.21
Forest Drive (W) Right Turn	0.4	19.40	0.30	0.3	19.15	0.20
A1016 Waterhouse Lane (N) Right and Ahead	0.3	9.50	0.22	0.3	10.14	0.24
Future Base						
Forest Drive (W) Left Turn	0.6	13.34	0.37	0.3	10.11	0.22
Forest Drive (W) Right Turn	0.5	21.28	0.33	0.3	20.93	0.23
A1016 Waterhouse Lane (N) Right and Ahead	0.3	9.67	0.23	0.4	10.36	0.25
Future Base plus Committed Developments						
Forest Drive (W) Left Turn	0.6	13.34	0.37	0.3	10.11	0.22
Forest Drive (W) Right Turn	0.5	21.28	0.33	0.3	20.93	0.23
A1016 Waterhouse Lane (N) Right and Ahead	0.3	9.67	0.23	0.4	10.36	0.25
Future Base plus Committed Developments and Project						
Forest Drive (W) Left Turn	0.6	14.17	0.39	0.3	10.49	0.22
Forest Drive (W) Right Turn	0.5	23.93	0.36	0.3	23.45	0.25
A1016 Waterhouse Lane (N) Right and Ahead	0.3	9.88	0.23	0.4	10.56	0.26

Site 68 - A1016 Waterhouse Ln / A1060 Rainsford Rd

- 7.11.170 The A1016 Waterhouse Lane and A1060 Rainsford Road junction is a signalised four-arm junction located in central Chelmsford, Essex. The junction provides access towards surrounding towns such as Writtle as well as towards the town centre and access to the A1114 and A12.
- 7.11.171 Aerial imagery of the junction is presented in Image 7.58 and has been assessed using LinSig. The capacity assessments are presented in Table 7.102 and Table 7.103.

Image 7.58 A1016 Waterhouse Ln / A1060 Rainsford Rd



- 7.11.172 The assessment indicates that the junction would operate within capacity across all scenarios and time periods. The highest DoS values are predicted to occur in the AM peak, coinciding with higher queue lengths and delays. During the AM peak, DoS values are estimated to reach a maximum of 88.7% on the A1016 Parkway northbound movement in the Project flow scenario. In the PM peak, DoS values are estimated slightly lower overall; however, the A1016 Parkway ahead (all lanes) movement remains higher than the other movements.

Table 7.102 Site 68 A1016 Waterhouse Ln / A1060 Rainsford Rd AM peak capacity assessment

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
A1016 Parkway SB Left Ahead	67.00%	68.40%	13.2	13.4	23.4	24.5
A1016 Parkway SB Ahead	67.00%	68.40%	13.2	13.4	23.4	24.5
A1016 Parkway SB Ahead Right	0.0 : 77.7%	0.0 : 77.7%	6.9	6.9	68.6	68.6
Rainsford Road WB (Exit Only)	0.0%	0.0%	0	0	0	0
A1016 Parkway NB Ahead	87.1 : 87.1%	88.7 : 88.7%	14	14.7	41.3	44
A1016 Parkway NB Ahead	76.3%	78.8%	12.4	12.9	41	43.7
A1016 Rainsford Road EB Ahead Left	47.3 : 47.3%	46.0 : 46.0%	4	3.8	27.3	26.4
A1016 Rainsford Road EB Right	84.8 : 84.2%	85.3 : 85.6%	10.3	11	52.6	52.3
A1016 Parkway NB Left	38.3 : 38.3%	41.0 : 41.0%	3.5	3.7	9.6	9.8
A1016 Parkway NB Right	53.3 : 53.3%	53.3 : 53.3%	2.6	2.6	55	55

Table 7.103 Site 68 A1016 Waterhouse Ln / A1060 Rainsford Rd PM peak capacity assessment

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
A1016 Parkway SB Left Ahead	53.50%	54.60%	8.7	8.8	18	18.9
A1016 Parkway SB Ahead	53.20%	54.40%	8.6	8.8	18	18.8
A1016 Parkway SB Ahead Right	0.0 : 79.6%	0.0 : 79.6%	7.2	7.2	64.6	64.6
Rainsford Road WB (Exit Only)	0.0%	0.0%	0	0	0	0
A1016 Parkway NB Ahead	84.1 : 84.1%	85.7 : 85.7%	12.6	13	36.6	38.8
A1016 Parkway NB Ahead	76.9%	79.6%	11.6	12	39.3	42.3
A1016 Rainsford Road EB Ahead Left	44.6 : 44.6%	43.5 : 43.5%	5.2	5.1	24.2	23.4
A1016 Rainsford Road EB Right	78.9 : 79.6%	80.5 : 80.2%	7.2	7.7	50.3	49.5
A1016 Parkway NB Left	41.6 : 41.6%	44.4 : 44.4%	3.7	4.1	10.5	10.7
A1016 Parkway NB Right	44.6 : 44.0%	44.6 : 44.0%	2.1	2.1	47.8	47.8

7.11.173 The predicted traffic forecast for the Project multi-modal 2 scenarios are the same as the Project worst case flows. The results have been included in Table 7.104 and Table 7.105 for completeness.

Table 7.104 Site 68 A1016 Waterhouse Ln / A1060 Rainsford Rd AM peak multi-modal capacity assessment

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
A1016 Parkway SB Left Ahead	67.00%	68.40%	13.2	13.4	23.4	24.5
A1016 Parkway SB Ahead	67.00%	68.20%	13.2	13.3	23.4	24.5
A1016 Parkway SB Ahead Right	0.0 : 77.7%	77.7 : 77.7%	6.9	6.9	68.6	68.1
Rainsford Road WB (Exit Only)	0.0%	0	0	0	0	0
A1016 Parkway NB Ahead	87.1 : 87.1%	88.7 : 88.7%	14	14.7	41.3	44
A1016 Parkway NB Ahead	76.3%	78.8%	12.4	12.9	41	43.7
A1016 Rainsford Road EB Ahead Left	47.3 : 47.3%	46.0 : 46.0%	4	3.8	27.3	26.4
A1016 Rainsford Road EB Right	84.8 : 84.2%	85.3 : 85.6%	10.3	11	52.6	52.3
A1016 Parkway NB Left	38.3 : 38.3%	41.0 : 41.0%	3.5	3.7	9.6	9.8
A1016 Parkway NB Right	53.3 : 53.3%	53.3 : 53.3%	2.6	2.6	55	55

Table 7.105 Site 68 A1016 Waterhouse Ln / A1060 Rainsford Rd PM peak multi-modal capacity assessment

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
A1016 Parkway SB Left Ahead	53.50%	53.40%	8.7	8.7	18	18
A1016 Parkway SB Ahead	53.20%	53.40%	8.6	8.7	18	18
A1016 Parkway SB Ahead Right	0.0 : 79.6%	0.0 : 79.6%	7.2	7.2	64.6	64.6
Rainsford Road WB (Exit Only)	0.0%	0.00%	0	0	0	0
A1016 Parkway NB Ahead	84.1 : 84.1%	85.6 : 85.6%	12.6	13.1	36.6	37.7
A1016 Parkway NB Ahead	76.9%	74.20%	11.6	10.9	39.3	37.7
A1016 Rainsford Road EB Ahead Left	44.6 : 44.6%	44.6 : 44.6%	5.2	5.2	24.2	24.2
A1016 Rainsford Road EB Right	78.9 : 79.6%	86.3 : 85.9%	7.2	8.7	50.3	57.1
A1016 Parkway NB Left	41.6 : 41.6%	44.4 : 44.4%	3.7	4.1	10.5	10.7
A1016 Parkway NB Right	44.6 : 44.0%	44.6 : 44.0%	2.1	2.1	47.8	47.8

Site 69 - A1060 Roxwell Rd / Lordship Rd roundabout

- 7.11.174 The junction between the A1060 Roxwell Road and Lordship Road is a small 3-arm roundabout located north of Writtle, Essex. The A1060 is a route that connects Chelmsford to surrounding villages. Lordship Road provides direct access to Writtle village.
- 7.11.175 Aerial imagery of the junction is presented in Image 7.59 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.106.

Image 7.59 A1060 Roxwell Rd / Lordship Rd roundabout



- 7.11.176 The Junctions assessment indicates that during the AM peak, the A1060 Roxwell Road (East) operates over practical capacity with an RFC of 0.87, increasing to 0.90 in the Future Base plus Committed Development scenario. Lordship Road (South) is predicted to operate over capacity with an RFC of 0.86 in the Future Base with Committed Development scenario. During the PM peak, Lordship Road operates near theoretical capacity in the Base scenario with an RFC of 0.99 and 54 seconds of delay, worsening in subsequent scenarios to an RFC of 1.03, 76 seconds of delay and a queue length of 20 PCU in the Future Base plus Committed Development scenario.
- 7.11.177 The introduction of the Project traffic has a negligible impact upon capacity and delay when compared with the Future Base plus Committed Development scenario. In the AM the A1060 Roxwell Road (East) capacity increases to 0.93 RFC, and Lordship Road (South) capacity increases to 0.88 RFC. In the PM Lordship Road (South) increases to an RFC of 1.05, 103 seconds of delay, and a queue length of 26 PCU. All of these arms were already predicted to operate over capacity in the Future Base plus Committed Development scenario.

Table 7.106 Site 69 A1060 Roxwell Rd / Lordship Rd roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Farm Access/Unnamed Road (N)	0.0	0.00	0.00	0.0	14.99	0.02
A1060 Roxwell Road (E)	5.7	18.90	0.87	1.4	6.87	0.57
Lordship Road (S)	4.5	22.97	0.83	14.0	54.45	0.99
A1060 Roxwell Road (W)	1.6	10.22	0.61	2.4	14.14	0.71
Future Base						
Farm Access/Unnamed Road (N)	0.0	0.00	0.00	0.0	16.35	0.02
A1060 Roxwell Road (E)	7.2	22.89	0.90	1.5	7.28	0.60
Lordship Road (S)	5.6	27.65	0.86	20.2	76.39	1.03
A1060 Roxwell Road (W)	1.8	11.08	0.64	2.8	16.36	0.75
Future Base plus Committed Developments						
Farm Access/Unnamed Road (N)	0.0	0.00	0.00	0.0	16.35	0.02
A1060 Roxwell Road (E)	7.2	22.89	0.90	1.5	7.28	0.60
Lordship Road (S)	5.6	27.65	0.86	20.2	76.39	1.03
A1060 Roxwell Road (W)	1.8	11.08	0.64	2.8	16.36	0.75
Future Base plus Committed Developments and Project						
Farm Access/Unnamed Road (N)	0.0	0.00	0.00	0.0	17.63	0.02
A1060 Roxwell Road (E)	9.4	28.28	0.93	1.7	8.02	0.63
Lordship Road (S)	6.4	31.94	0.88	26.4	102.71	1.05
A1060 Roxwell Road (W)	2.2	12.80	0.68	3.6	20.01	0.80

- 7.11.178 The introduction of the Project traffic has a negligible impact upon the operation of the junction, it is already predicted to operate over capacity in all AM and PM future year scenarios. A sensitivity test assessing a lower, more representative traffic flow volume has not been undertaken at this junction as it would not provide an improved outcome compared with the scenarios tested above.
- 7.11.179 Given the negligible increase in capacity issues due to the addition of the Project traffic and modelling indicating that capacity issues are already present on site, no physical mitigation is proposed at this junction. The operation of the junction would be monitored during the construction phase.

Site 70- A1060 Rainsford Rd / Park Avenue

- 7.11.180 The A1060 Rainsford Road and Park Avenue junction is a 3-arm signalised T-junction in Chelmsford. It links local residential areas to Rainsford Road, providing access to Chelmsford and surrounding areas.
- 7.11.181 Aerial imagery of the junction is presented in Image 7.60 and has been assessed using LinSig. The capacity assessments are presented in Table 7.107 and Table 7.108.

Image 7.60 A1060 Rainsford Rd / Park Avenue



- 7.11.182 The assessment indicates that the junction will operate within capacity in all scenarios. The Project construction flows are not predicted to have a significant impact at the junction. It was noted that eastbound traffic on the A1060 Rainsford Road exit was occasionally blocked due to parked vehicles in close proximity to the junction. This only occurred when there were right turners waiting to manoeuvre into Park Avenue and a vehicle was parked immediately on the A1060 Rainsford Road eastbound exit.

Table 7.107 Site 70 A1060 Rainsford Rd / Park Avenue AM peak capacity assessment

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
A1060 Rainsford Road (E) Right Ahead	61.1 : 61.1%	63.5 : 63.5%	13.1	14.9	20.2	20.7
Park Avenue (N) Left Right	76.7%	81.0%	9	9.6	51.8	57.7
A1060 Rainsford Road (W) Left Ahead	79.1%	81.6%	18.5	20.8	30.6	31.8

Table 7.108 Site 70 A1060 Rainsford Rd / Park Avenue PM peak capacity assessment

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
A1060 Rainsford Road (E) Right Ahead	63.2 : 63.2%	65.8 : 65.8%	15.4	17	15.8	16.3
Park Avenue (N) Left Right	77.1%	80.5%	6.4	6.8	66.7	72.9
A1060 Rainsford Road (W) Left Ahead	68.6%	71.7%	16.6	18.3	21.4	22.3

Site 71 - A414 Greenbury Way / Highwood Road roundabout

- 7.11.183 The A414 Greenbury Way / Highwood Road junction is four-arm roundabout located west of Chelmsford, near to Writtle. The junction connects local towns and villages via Highwood road and Bulmer's Way to the key A414 route which runs between Chelmsford and Harlow.
- 7.11.184 Aerial imagery of the junction is presented in Image 7.61 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.109.

Image 7.61 A414 Greenbury Way / Highwood Road roundabout



- 7.11.185 The Junctions assessment indicates that the roundabout operates within capacity with no significant delays during the PM peak across all scenarios. However, during the AM peak Base scenario, the A414 Greenbury Way (South-East) arm is above practical capacity with an RFC of 0.91. This increases to 0.94 in the Future Base plus Committed Development scenario.
- 7.11.186 With the Project flows included the capacity on A414 Greenbury Way (SE) increases by 0.04 to 0.98 RFC and delay increases by approximately 9 seconds from 33 seconds to 42 seconds. It is noted that, whilst the capacity nears a value of 1 on this approach, the increase in queuing is not severe and would not impact the operation of any upstream junctions.

Table 7.109 Site 71 A414 Greenbury Way / Highwood Road roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Bulmers Way (NE)	0.5	4.13	0.33	0.5	4.41	0.34
A414 Greenbury Way (SE)	7.8	26.27	0.91	1.1	6.74	0.53
Highwood Road (SW)	0.5	9.82	0.32	0.3	6.69	0.26
A414 (NW)	1.7	11.36	0.63	2.3	10.58	0.70
Future Base						
Bulmers Way (NE)	0.5	4.25	0.34	0.5	4.56	0.35
A414 Greenbury Way (SE)	10.4	32.86	0.94	1.2	7.08	0.55
Highwood Road (SW)	0.5	10.49	0.34	0.4	6.96	0.27
A414 (NW)	2.0	12.45	0.66	2.6	11.64	0.73
Future Base plus Committed Developments						
Bulmers Way (NE)	0.5	4.25	0.34	0.5	4.56	0.35
A414 Greenbury Way (SE)	10.4	32.86	0.94	1.2	7.08	0.55
Highwood Road (SW)	0.5	10.49	0.34	0.4	6.96	0.27
A414 (NW)	2.0	12.45	0.66	2.6	11.64	0.73
Future Base plus Committed Developments and Project						
Bulmers Way (NE)	0.5	4.38	0.35	0.6	4.71	0.36
A414 Greenbury Way (SE)	14.4	42.17	0.98	1.5	7.83	0.59
Highwood Road (SW)	0.6	11.31	0.36	0.4	7.25	0.28
A414 (NW)	2.4	14.45	0.70	3.1	13.48	0.76

7.11.187 Given the negligible increase in capacity issues due to the addition of the Project traffic and modelling indicating that capacity issues are already present on site, no physical mitigation is proposed at this junction. The operation of the junction would be monitored during the construction phase by the Main Works Contractor(s).

Site 74 - A176 Noak Hill Rd / Wash Rd Priority Junction

- 7.11.188 A176 Noak Hill Rd / Wash Rd is a small priority T-junction located in the north-west of Basildon. The junction is within a residential area and connects Wash Road to the A176 which facilitates access to the A127.
- 7.11.189 Aerial imagery of the junction is presented in Image 7.62 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.110.

Image 7.62 A176 Noak Hill Rd / Wash Rd Priority Junction



- 7.11.190 The Junctions assessment indicates that the junction operates within capacity with no significant delays during the PM peak across all scenarios. During the AM peak Base scenario, the Wash Road (South-West) left turn and ahead movement experiences a delay of 41 seconds and is marginally above capacity with an RFC of 0.87. These values increase to 49 seconds and 0.91 RFC in the Future Base plus Committed Development scenario.
- 7.11.191 With the Project flows delay and capacity marginally increases at the Wash Road (South-West) left turn to 51 seconds and 0.92 RFC in the AM. Furthermore, the A176 Noak Hill Road (North) right turn which is marginally over practical capacity from the AM Future Base onwards experiences a negligible increase of 0.01 RFC from 0.86 to 0.87 RFC.

Table 7.110 Site 74 A176 Noak Hill Rd / Wash Rd Priority Junction capacity assessment

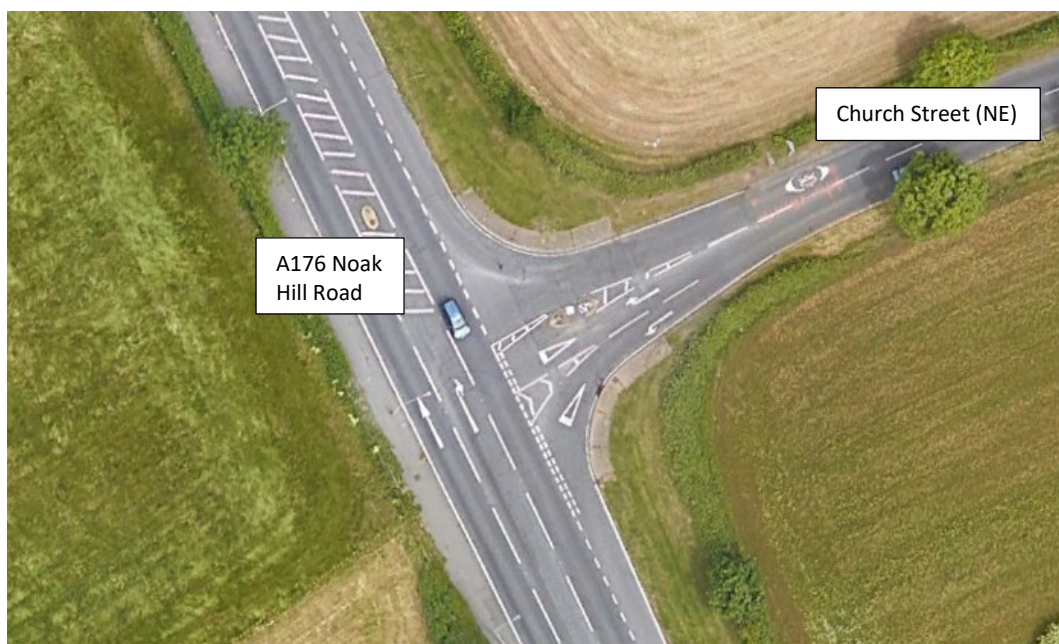
Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A176 Noak Hill Road (N) Right turn	4.8	25.76	0.82	4.1	20.58	0.78
Wash Road (SW) Left and Ahead	5.1	40.88	0.87	1.5	17.33	0.61
Wash Road (SW) Right and Ahead	0.0	0.00	0.00	0.0	29.36	0.02
A176 Noak Hill Road (SE) All Directions	0.0	0.00	0.00	0.0	0.00	0.00
Future Base						
A176 Noak Hill Road (N) Right turn	6.4	28.82	0.86	5.1	22.15	0.81
Wash Road (SW) Left and Ahead	6.4	48.69	0.91	1.7	18.85	0.64
Wash Road (SW) Right and Ahead	0.0	0.00	0.00	0.0	33.21	0.02
A176 Noak Hill Road (SE) All Directions	0.0	0.00	0.00	0.0	0.00	0.00
Future Base plus Committed Developments						
A176 Noak Hill Road (N) Right turn	6.4	28.82	0.86	5.1	22.15	0.81
Wash Road (SW) Left and Ahead	6.4	48.69	0.91	1.7	18.85	0.64
Wash Road (SW) Right and Ahead	0.0	0.00	0.00	0.0	33.21	0.02
A176 Noak Hill Road (SE) All Directions	0.0	0.00	0.00	0.0	0.00	0.00
Future Base plus Committed Developments and Project						
A176 Noak Hill Road (N) Right turn	7.0	29.72	0.87	5.5	22.63	0.82
Wash Road (SW) Left and Ahead	6.8	51.27	0.92	1.8	19.44	0.65
Wash Road (SW) Right and Ahead	0.0	0.00	0.00	0.0	35.50	0.02
A176 Noak Hill Road (SE) All Directions	0.0	0.00	0.00	0.0	0.00	0.00

- 7.11.192 The results indicate that the addition of the Project traffic is predicted to have a negligible impact on the junction capacity. As such no sensitivity tests have been conducted. It is proposed to monitor the operation of the junction during the construction phase.

Site 75 - A176 Noak Hill Rd / Church St Priority Junction

- 7.11.193 The A176 Noak Hill Road and Church Street junction is a small priority T-junction located north of Basildon and south of Billericay. The junction is within a rural area and connects Church Street to the A176 which facilitates access to the A127 and Billericay.
- 7.11.194 Aerial imagery of the junction is presented in Image 7.63 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.111.

Image 7.63 A176 Noak Hill Rd / Church St Priority Junction



- 7.11.195 The Junction assessment demonstrates that the junction operates within capacity with no significant delays during the PM peak across all scenarios. During the AM peak, the junction also operates within capacity; however, there is an estimated delay of 39 seconds for the Church Street (North-East) right turn movement in the Base scenario. In the Future Base plus Committed Development scenario this increases to 47 seconds.
- 7.11.196 The introduction of the Project traffic has a marginal impact on the junction. The junction continues to operate within capacity in the AM and PM. The additional traffic has a negligible impact on delay in the AM along the Church Street (North-East) right turn movement, resulting in an increase of approximately 4 seconds.

Table 7.111 Site 75 A176 Noak Hill Rd / Church St Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Church Street (NE) Left Turn	1.7	16.94	0.64	0.6	10.20	0.36
Church Street (NE) Right Turn	0.2	39.48	0.15	0.1	25.99	0.07
A176 Noak Hill Road (S) Right and Ahead	1.9	22.41	0.67	1.7	19.47	0.64
Future Base						
Church Street (NE) Left Turn	1.9	18.66	0.67	0.6	10.68	0.38
Church Street (NE) Right Turn	0.2	46.48	0.17	0.1	28.58	0.07
A176 Noak Hill Road (S) Right and Ahead	2.3	24.92	0.70	2.0	21.60	0.68
Future Base plus Committed Developments						
Church Street (NE) Left Turn	1.9	18.66	0.67	0.6	10.68	0.38
Church Street (NE) Right Turn	0.2	46.48	0.17	0.1	28.58	0.07
A176 Noak Hill Road (S) Right and Ahead	2.3	24.92	0.70	2.0	21.60	0.68
Future Base plus Committed Developments and Project						
Church Street (NE) Left Turn	2.0	19.25	0.68	0.6	10.88	0.39
Church Street (NE) Right Turn	0.2	51.22	0.18	0.1	30.28	0.08
A176 Noak Hill Road (S) Right and Ahead	2.4	25.72	0.71	2.0	22.29	0.68

Site 76 - A176 Noak Hill Rd / Laindon Common Rd Priority Junction

- 7.11.197 The A176 Noak Hill Road and Laindon Common Road junction is a small priority T-junction south of Billericay, Essex. The junction is within a rural area and connects Laindon Common Road to the A176 which facilitates access to the A127, Billericay and Chelmsford.
- 7.11.198 Aerial imagery of the junction is presented in Image 7.64 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.112.

Image 7.64 A176 Noak Hill Rd / Laindon Common Rd Priority Junction



- 7.11.199 The Junctions assessment indicates that the junction operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.200 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the Future Base plus Committed Development and Project flows during the AM on the A176 Noak Hill Road (North) Right and Ahead turn, with a delay of 16 seconds and an RFC of 0.56.

Table 7.112 Site 76 A176 Noak Hill Rd / Laindon Common Rd Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Laindon Common Road (SW) Left Turn	0.2	7.27	0.16	0.3	7.98	0.24
Laindon Common Road (SW) Right Turn	0.2	24.65	0.18	0.3	17.87	0.22
A176 Noak Hill Road (N) Right and Ahead	1.1	15.04	0.53	0.3	9.04	0.23
Future Base						
Laindon Common Road (SW) Left Turn	0.2	7.43	0.17	0.3	8.20	0.25
Laindon Common Road (SW) Right Turn	0.2	27.10	0.19	0.3	19.06	0.23
A176 Noak Hill Road (N) Right and Ahead	1.2	15.74	0.55	0.3	9.24	0.24
Future Base plus Committed Developments						
Laindon Common Road (SW) Left Turn	0.2	7.43	0.17	0.3	8.20	0.25
Laindon Common Road (SW) Right Turn	0.2	27.10	0.19	0.3	19.06	0.23
A176 Noak Hill Road (N) Right and Ahead	1.2	15.74	0.55	0.3	9.24	0.24
Future Base plus Committed Developments and Project						
Laindon Common Road (SW) Left Turn	0.2	7.54	0.17	0.3	8.34	0.26
Laindon Common Road (SW) Right Turn	0.2	28.77	0.19	0.3	19.91	0.24
A176 Noak Hill Road (N) Right and Ahead	1.3	16.01	0.56	0.3	9.35	0.24

Site 77 - A176 Noak Hill Rd / A176 Laindon Rd roundabout

- 7.11.201 The A176 Noak Hill Road and A176 Laindon Road junction is a four-arm roundabout located south of Billericay. The junction is within a semi-rural area and connects residential areas around Laindon Road to the A176 which facilitates access to the A127, Billericay and Chelmsford.
- 7.11.202 Aerial imagery of the junction is presented in Image 7.65 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.113.

Image 7.65 A176 Noak Hill Rd / A176 Laindon Rd roundabout



- 7.11.203 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.204 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the Future Base plus Committed Development and Project flows during the AM on the A176 (North-East) arm, with a delay of 5 seconds and an RFC of 0.53.

Table 7.113 Site 77 A176 Noak Hill Rd / A176 Laindon Rd roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
A176 (NE)	1.0	4.89	0.50	0.3	3.38	0.24
Kennel Lane (E)	0.1	6.81	0.07	0.0	5.83	0.03
A176 Noak Hill Road (S)	0.7	2.95	0.41	0.6	2.65	0.36
A176 Laindon Road (NW)	0.6	3.87	0.35	0.9	4.51	0.48
Future Base						
A176 (NE)	1.1	5.14	0.52	0.3	3.46	0.25
Kennel Lane (E)	0.1	7.05	0.07	0.0	5.98	0.03
A176 Noak Hill Road (S)	0.7	3.02	0.42	0.6	2.71	0.37
A176 Laindon Road (NW)	0.6	4.01	0.37	1.0	4.73	0.50
Future Base plus Committed Developments						
A176 (NE)	1.1	5.14	0.52	0.3	3.46	0.25
Kennel Lane (E)	0.1	7.05	0.07	0.0	5.98	0.03
A176 Noak Hill Road (S)	0.7	3.02	0.42	0.6	2.71	0.37
A176 Laindon Road (NW)	0.6	4.01	0.37	1.0	4.73	0.50
Future Base plus Committed Developments and Project						
A176 (NE)	1.1	5.23	0.53	0.3	3.50	0.26
Kennel Lane (E)	0.1	7.18	0.07	0.0	6.08	0.03
A176 Noak Hill Road (S)	0.8	3.09	0.43	0.6	2.78	0.38
A176 Laindon Road (NW)	0.6	4.22	0.39	1.1	4.99	0.52

Site 79 - A129 Southend Rd / A129 Sun St roundabout

- 7.11.205 The A129 Southend Road and A129 Sun Street junction is a 3-arm roundabout located in Billericay, Essex. The junction is within a residential area and connects local roads to the centre of Billericay as well as facilitating access to routes towards the A127 and Chelmsford.
- 7.11.206 Aerial imagery of the junction is presented in Image 7.66 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.114.

Image 7.66 A129 Southend Rd / A129 Sun St roundabout



- 7.11.207 The Junctions assessment indicates that the roundabout operates within capacity across all scenarios and time periods, with no significant delays.
- 7.11.208 The inclusion of the Project traffic does not cause capacity to be exceeded. The highest RFC occurs in the AM on the A129 Southend Road arm, with a delay of 10 seconds and an RFC of 0.75.
- 7.11.209 Some exit blocking was observed on the Sun Street exit arm that impacted the operation of the junction, however these impacts were temporary and the junction capacity was able to recover.

Table 7.114 Site 79 A129 Southend Rd / A129 Sun St roundabout capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Chapel Street	2.2	10.56	0.68	2.1	10.55	0.68
A129 Southend Road	2.6	8.79	0.72	1.5	6.01	0.61
Future Base						
Chapel Street	2.4	11.35	0.70	2.4	11.38	0.71
A129 Southend Road	3.0	9.70	0.75	1.7	6.39	0.63
Future Base plus Committed Developments						
Chapel Street	2.4	11.35	0.70	2.4	11.38	0.71
A129 Southend Road	3.0	9.70	0.75	1.7	6.39	0.63
Future Base plus Committed Developments and Project						
Chapel Street	2.4	11.35	0.70	2.4	11.38	0.71
A129 Southend Road	3.1	10.00	0.75	1.8	6.53	0.64

Site 81 - A129 London Rd / Western Rd

- 7.11.210 The junction between the A129 London Road and Western Road is a signalised four-arm crossroad located in Billericay, Essex. The junction links local residential roads to the main A127 route.
- 7.11.211 Aerial imagery of the junction is presented in Image 7.67 and has been assessed using LinSig. The capacity assessments are presented in Table 7.115 and Table 7.116.

Image 7.67 A129 London Rd / Western Rd



- 7.11.212 The assessment indicates that the junction operates within capacity across all scenarios during the AM peak. During the PM peak, the Tye Common Road ahead and right movement and the A129 London Road all directions movement are marginally over practical capacity, with DoS values of 91.9% and 93.1%, respectively, with Project flows. Delays for these movements are higher compared to the other two movements, with 64 seconds and 45 seconds recorded in the AM, and 64 seconds and 51 seconds recorded in the PM. The current lane widths on the A129 (W) approach are narrow for the ahead and right movements, whereas the exit lane is larger than required as it is only fed by single lanes and is marked with merge arrows. By reallocating space from the exit lane to the approach lanes it is possible to provide wider lane widths and also an extension on the flare length. This alongside signal optimisation would mitigate the impacts of the Project construction traffic at this location.

Table 7.115 Site 81 A129 London Rd / Western Rd AM peak capacity assessments

Approach	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
A129 London Road (E) Right Left Ahead	71.9 : 71.9%	71.9 : 71.9%	13.3	13.6	31.2	31.2
Tye Common Road (S) Ahead Right Left	84.8%	88.2%	16.6	16.6	45.9	50.3
A129 London Road (W) Left Ahead Right	86.0 : 86.0%	83.7 : 86.9%	19.5	17.3	49.8	41.3
Western Road (N) Left Ahead Right	51.6%	50.9%	4.8	4.9	38.3	36.5

Table 7.116 Site 81 A129 London Rd / Western Rd PM peak capacity assessments

Approach	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
A129 London Road (E) Right Left Ahead	59.7 : 59.7%	61.1 : 61.1%	11.2	11.5	24.9	26
Tye Common Road (S) Ahead Right Left	91.5%	91.9%	16.2	16.9	64.1	63.6
A129 London Road (W) Left Ahead Right	91.0 : 91.0%	93.1 : 93.1%	24.4	26	44.8	50.8
Western Road (N) Left Ahead Right	46.3%	48.1%	5.1	5.6	36.6	35.8

Site 82 - A129 London Rd / Mountnessing Rd Priority Junction

- 7.11.213 The A129 London Road and Mountnessing Road junction is a priority T-junction located on the eastern edge of Billericay, Essex. It connects the local residential road to the A129 which provides a route between Billericay and Brentwood.
- 7.11.214 Aerial imagery of the junction is presented in Image 7.68 and has been assessed in Junctions V9 software. The capacity assessments are presented in Table 7.117.

Image 7.68 A129 London Rd / Mountnessing Rd Priority Junction



- 7.11.215 The Junctions assessment indicates that the junction operates within capacity during the Base scenario. However, there is a notable delay for the Mountnessing Road (North) right-turn movement, with delays of 69 seconds in the AM peak and 43 seconds in the PM peak. These delays increase in both Future Base plus Committed Development peaks and RFC values exceed practical capacity along the A129 London Road right turn movement in the PM.
- 7.11.216 The introduction of the Project traffic has an impact on capacity and delay when compared with the Future Base plus Committed development scenario. The greatest capacity increase occurs along Mountnessing Road (left turn) in the AM from 0.83 to 0.91 RFC. Similarly on this movement delay increases by approximately 24 seconds.

Table 7.117 Site 82 A129 London Rd / Mountnessing Rd Priority Junction capacity assessment

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	RFC	Queue Length (PCU)	Delay (s)	RFC
2024 Base						
Mountnessing Road (N) Left Turn	2.4	24.47	0.72	1.7	18.34	0.64
Mountnessing Road (N) Right Turn	2.7	69.18	0.75	1.4	42.92	0.60
A129 London Road (E) Right and Ahead	4.3	30.69	0.80	4.7	29.54	0.83
Future Base						
Mountnessing Road (N) Left Turn	4.0	40.56	0.83	2.1	21.86	0.69
Mountnessing Road (N) Right Turn	4.0	100.47	0.84	1.7	52.78	0.66
A129 London Road (E) Right and Ahead	5.5	36.00	0.84	6.0	33.39	0.87
Future Base plus Committed Developments						
Mountnessing Road (N) Left Turn	4.0	40.56	0.83	2.1	21.86	0.69
Mountnessing Road (N) Right Turn	4.0	100.47	0.84	1.7	52.78	0.66
A129 London Road (E) Right and Ahead	5.5	36.00	0.84	6.0	33.39	0.87
Future Base plus Committed Developments and Project						
Mountnessing Road (N) Left Turn	6.3	64.75	0.91	2.3	23.96	0.71
Mountnessing Road (N) Right Turn	5.1	125.78	0.89	2.0	59.87	0.70
A129 London Road (E) Right and Ahead	5.9	37.64	0.85	6.5	34.39	0.88

7.11.217 A test to understand the impacts of potential signalisation of this junction was undertaken seeking to determine the impact this would have on junction capacity. Table 7. Table 7.118 provides a summary of the modelling results.

Table 7.118 Site 82 A129 London Rd / Mountnessing Rd Priority Junction capacity assessment
- signalised T-junction potential mitigation

Approach	AM Peak			PM Peak		
	Queue Length (PCU)	Delay (s)	DoS (%)	Queue Length (PCU)	Delay (s)	DoS (%)
Future Base plus Committed Developments and Project						
Mountnessing Road (N)	10.2	45.8	86.8	11.5	51.4	86.1
A129 London Road Westbound	13.2	31.0	87.8	12.7	38.4	88.6
A129 London Road Eastbound	14.4	34.4	85.3	16.8	32.1	81.7

- 7.11.218 The results indicate that signalising this junction would provide limited benefit, with degree of saturation values close to 90% being of similar magnitude to RFC values of 0.9 when assessing the existing layout. Signalisation would also introduce delays onto the southeast-bound A129 London Road movement that would otherwise navigate the junction unopposed. Given the cost of signalisation and disruption likely to be caused during the installation of traffic signal infrastructure, this option is not recommended given the limited predicted benefits.
- 7.11.219 The Project is predicted to introduce additional traffic to the A129 London Road mainline only. The predicted increase in RFC on Mountnessing Road is due to fewer gaps being available for turning traffic to enter the mainline. It is proposed to monitor the operation of the junction, particularly in relation to the stacking capacity for right turning traffic from A129 London Road into Mountnessing Road.

Thurrock Junctions

Site 85 - A1013 Stanford Road / Buckingham Hill Road

- 7.11.220 The A1013 Stanford Road and Buckingham Hill Road junction is a signalised T-junction, located east of Stanford-le-Hope, Thurrock. The junction provides access to local areas such as Chadwell St Mary, Linford and East Tilbury.
- 7.11.221 Aerial imagery of the junction is presented in Image 7.69 and has been assessed using LinSig. The capacity assessments are presented in Table 7.119 and Table 7.120.

Image 7.69 A1013 Stanford Road / Buckingham Hill Road



- 7.11.222 The assessment indicates that the junction operates within capacity across all scenarios and time periods. The highest DoS values generally occur in the PM peak, coinciding with higher queue lengths and delays. During the PM peak, DoS values are predicted to reach a maximum of 66.3% on the A1013 Stanford Road eastbound ahead and right movement in the Project flow scenario. In comparison, during the AM peak, DoS values are predicted to reach 68.9% on the A1013 Stanford Road westbound ahead and left movement in the Project flow scenario.

Table 7.119 Site 85 A1013 Stanford Road / Buckingham Hill Road AM peak capacity assessment

Lane Description	AM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM	FB+CD AM	FB+CD+ Project AM
A1013 Stanford Road EB Ahead Right	63.8 : 63.8%	68.9 : 68.9%	3.2	4.3	22.4	23.1
A1013 Stanford Road WB Ahead Left	59.1 : 39.9%	64.4 : 43.5%	3.9	4.1	21.1	22.7
Buckingham Hill Road Right Left	35.6 : 61.2%	37.4 : 65.6%	4.3	4.5	13.3	13.3

Table 7.120 Site 85 A1013 Stanford Road / Buckingham Hill Road PM peak capacity assessment

Lane Description	PM Peak					
	Dos (%)		Av. Queues (PCUs)		Delay (s/PCU)	
	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM	FB+CD PM	FB+CD+ Project PM
A1013 Stanford Road EB Ahead Right	62.4 : 62.4%	65.8 : 65.8%	5.5	6.1	17.5	17.5
A1013 Stanford Road WB Ahead Left	61.1 : 61.1%	64.8 : 64.8%	5.5	5.8	25.6	27.4
Buckingham Hill Road Right Left	61.9 : 61.9%	66.3 : 66.3%	5.2	5.5	23.7	24.5

7.12 Junction Mitigation

7.12.1 The results of the junction capacity assessments during the AM and PM peak are presented for the SRN / MRN and LRN within Section 7.5 and Section 7.7 respectively. The assessment identifies where mitigation is required during the construction period and a summary is provided in Table 7.121 for SRN / MRN junctions, and Table 7.122 for LRN junctions. It is anticipated that the Main Works Contractor(s) will be responsible for ensuring these measures are enforced. The junction mitigation measures are shown on Figure 2: Additional Measures in Appendix I.

Table 7.121 SRN / MRN Junction mitigation summary

Project Section	Region	Site No.	Junction	Junction Type	Mitigation Measures
Section A	Norfolk	Site 1	A47 Norwich Southern Bypass/ A140 Ipswich Rd	Priority Roundabout	Temporary signage to warn general traffic of peak hour congestion
	Norfolk	Site 12	A11 Thetford Bypass / A1066 Mundford Road	Priority Roundabout	No mitigation proposed
Section B	Suffolk	Site 16	A140 Ipswich Road / A143 Old Bury Road	Priority Roundabout	No mitigation proposed
	Suffolk	Site 21	A14 J50 Cedars Interchange	Priority Roundabout	No mitigation proposed
	Suffolk	Site 26	A14 J52 Claydon Roundabout	Roundabout	No mitigation proposed
	Suffolk	Site 35	A140 Stoke Ash	Priority crossroad	No mitigation proposed
Section C	Suffolk	Site 29	A14 J55 Copdock Interchange	Signalised roundabout	Change to lane and destination arrow markings on the A1214 and A12 approaches to the roundabout, and on the circulatory carriageway
	Essex	Site 36	A12 / Birchwood Road	Roundabout	No mitigation proposed
	Essex	Site 39	A120 Harwich Road / Bentley Road	Priority junction	Widening of junction bellmouth and lengthening of merge taper onto A120 NB mainline
Section D	Essex	Site 38	A120 Ardleigh Crown Interchange	Partially Signalised Roundabout	Further discussions to be undertaken with Local Highway Authorities /National Highways

Project Section	Region	Site No.	Junction	Junction Type	Mitigation Measures
	Essex	Site 40	A12 Severalls Interchange	Priority Double Roundabout	No mitigation proposed
	Essex	Site 46	A12 Eight Ash Green Interchange	Signalised Roundabout	Signal Optimisation
	Essex	Site 47	A120 Coggeshall Road / Great Tey Road	Priority T-junction	Further discussions to be undertaken with Local Highway Authorities /National Highways
Section E	Essex	Site 48	A120 Braintree Bypass / B1018 Braintree Rd	Priority Roundabout	Monitor operation of junction Temporary signage to warn general traffic of peak hour congestion
	Essex	Site 56	A120 Braintree Bypass / A131 Great Notley Bypass	Priority Roundabout	No mitigation proposed
Section F	Essex	Site 62	A12 J15 Webbs Farm Interchange	Priority Roundabout	No mitigation proposed
Section G	Essex	Site 73	A127 Southend Arterial Rd / A176 Noak Hill Rd	Priority Roundabout	Monitor operation of junction
	Essex	Site 83	A127 Southend Arterial Rd / B148 West Mayne	Priority Roundabout	No mitigation proposed
	Essex	Site 84	A127 Southend Arterial Rd /A128 Tilbury Road	Priority Roundabout	No mitigation proposed
Section H	Thurrock	Site 88	A13 Stanford le Hope Bypass / A1013 Stanford Rd (Orsett Cock roundabout)	Roundabout	No mitigation proposed
	Thurrock	Site 89	A1089 Dock Approach Road / Thurrock Parkway (Asda Roundabout)	Roundabout	No mitigation proposed
	Thurrock	Site 90	M25 J30	Signalised Roundabout	Signal Optimisation

Table 7.122 LRN Junction mitigation summary

Project Section	Region	Site No.	Junction	Junction Type	Mitigation Measure
Section A	Norfolk	Site 2	A140 Ipswich Road / Mangreen Lane	Priority T-junction	Construction vehicles to avoid AM Peak hour
	Norfolk	Site 3	B1113/ Wymondham Road	Priority T-junction	No mitigation proposed 40 mph proposed as part of highway mitigation works to reduce speed on approach to junction
	Norfolk	Site 6	A1066 Victoria Road / B1077 Stunston Road	Priority T-junction	Construction traffic through Diss only to occur outside of off peak times. During this time construction traffic is to be split 50/50 through Diss and Thetford
	Norfolk	Site 7	A1066 Victoria Rd / Tesco access	Priority Roundabout	Construction traffic through Diss only to occur outside of off peak times. During this time construction traffic is to be split 50/50 through Diss and Thetford
	Norfolk	Site 8	A1066 Victoria Rd / Morrisons access	Priority Roundabout	Construction traffic through Diss only to occur outside of off peak times. During this time construction traffic is to be split 50/50 through Diss and Thetford
	Norfolk	Site 9	A1066 Park Rd / Denmark St	Roundabout	Construction traffic through Diss only to occur outside of off peak times. During this time construction traffic is to be split 50/50 through Diss and Thetford
	Norfolk	Site 10	A1066 Park Rd / Denmark St	Priority Crossroad	Construction traffic through Diss only to occur outside of off peak times. During this time construction traffic is to be split 50/50 through Diss and Thetford
	Norfolk	Site 13	A1066 Mundford Road / Wyatt Way	Priority Roundabout	100% of construction traffic to use the junction during peak hours.

Project Section	Region	Site No.	Junction	Junction Type	Mitigation Measure
					Outside of peak times construction traffic is to be split 50/50 through Diss and Thetford
	Norfolk	Site 14	A1066 Mundford Road / A1075 Norwich Road	Priority Roundabout	100% of construction traffic to use the junction during peak hours.
	Norfolk	Site 15	A1066 Hurth Way / A1066 Thetford Road	Priority Roundabout	Outside of peak times construction traffic is to be split 50/50 through Diss and Thetford
Section B	Suffolk	Site 17	A143 Old Bury Road / B1077 Stunston Road	Priority Roundabout	No mitigation proposed
	Suffolk	Site 18	A143 Old Bury Road / Lion Road	Priority T-junction	No mitigation proposed
	Suffolk	Site 22	A1120 Church Rd / B1115 Stowmarket Rd	Priority T-junction	Construction traffic to avoid peak hours and avoid school pick-up and drop off periods
	Suffolk	Site 23	A1120 Church Road / Thorney Green	Priority T-junction	No mitigation proposed
	Suffolk	Site 24	A1120 / Gun Cotton Way	Priority Roundabout	No mitigation proposed
	Suffolk	Site 25	A1120 / B1113 Needham Rd	Signalised roundabout	Signal optimisation
	Suffolk	Site 27	B1113 Bramford Rd / Bramford Rd	Partially signalised Junction	Signal optimisation
Section C	Suffolk	Site 30	A1214 London Rd / Scrivener Dr	Partially Signalised Roundabout	Signal optimisation
	Suffolk	Site 31	A1214 London Rd / A1071	Signalised T-Junction	Rationalise Intergreens, add phase delays and signal optimisation
	Suffolk	Site 32	A1071 / B1113 Swan Hill	Priority Roundabout	Rationalise Intergreens and add phase delays and signal optimisation
Section D	Essex	Site 41	A1341 Via Urbis Romanae / United Way	Priority Roundabout	No mitigation proposed

Project Section	Region	Site No.	Junction	Junction Type	Mitigation Measure
	Essex	Site 42	A1341 Via Urbis Romanae / Olympic Blv	Signalised Junction	Update to intergreens and phase delays and optimise signal timings
	Essex	Site 43	A1341 Via Urbis Romanae / Whitmore Dr	Signalised Junction	Update to intergreens and phase delays and optimise signal timings
	Essex	Site 44	A1341 Via Urbis Romanae / A134 Northern Approach Rd	Signalised Junction	Update to intergreens and phase delays and optimise signal timings
	Essex	Site 45	A134 Northern Approach Rd / Boxted Rd	Priority Roundabout	No mitigation proposed
Section E	Essex	Site 50	B1389 Hatfield Road / Spinks Lane	Signalised Crossroads	Signal optimisation
	Essex	Site 52	Highfields Road / Guithavon Road	Priority T-junction	No mitigation proposed
Section F	Essex	Site 58	A131 Great Notley Bypass / Main Road	Priority Roundabout	Temporary signage be provided to warn general traffic of peak hour congestion and availability of alternative routes
	Essex	Site 59	A131 Braintree Rd/ B1008 Essex Regiment Way	Priority Roundabout	Temporary signage be provided to warn general traffic of peak hour congestion and availability of alternative routes
	Essex	Site 61	B1008 Main Road/ The Street / Chelmsford	Priority T-junction	No mitigation proposed
	Essex	Site 63	A414 Three Mile Hill / A1114 London Rd	Priority Roundabout	Temporary signage be provided to warn general traffic of peak hour congestion and availability of alternative routes
	Essex	Site 64	A1114 London Rd / A1016 Westway	Roundabout	Temporary signage be provided to warn general traffic of peak hour congestion and availability of alternative routes
	Essex	Site 65	A1016 Westway / Writtle Rd	Signalised Crossroads	Signal and cycle time optimisation
	Essex	Site 66	A1016 Waterhouse Ln / Forest Dr	Priority T-junction	No mitigation proposed
	Essex	Site 68	A1016 Waterhouse Ln / A1060 Rainsford Rd	Signalised	Signal Optimisation

Project Section	Region	Site No.	Junction	Junction Type	Mitigation Measure
Section G	Essex	Site 69	A1060 Roxwell Rd / Lordship Rd	Priority Roundabout	Monitor operation of the junction
	Essex	Site 70	A1060 Rainsford Rd / Park Avenue	Signalised	Signal optimisation
	Essex	Site 71	A414 Greenbury Way / Highwood Road	Roundabout	Monitor operation of the junction
	Essex	Site 74	A176 Noak Hill Road / Wash Road	Priority T-junction	Monitor operation of the junction
	Essex	Site 75	A176 Noak Hill Road / Church St	Priority T-junction	No mitigation proposed
	Essex	Site 76	A176 Noak Hill Road / Laindon Common Road	Priority T-junction	No mitigation proposed
	Essex	Site 77	A176 Noak Hill Road / A176 Laindon Road	Priority Roundabout	No mitigation proposed
Section G	Essex	Site 79	A129 Southend Road / A129 Sun St	Priority Roundabout	No mitigation proposed
	Essex	Site 81	A129 London Rd / Western Rd	Signalised Crossroads	Signal optimisation
	Essex	Site 82	A129 London Rd / Mountnessing Rd	Priority T-junction	Monitor operation of the junction
Section H	Thurrock	Site 85	A1013 Stanford Road / Buckingham Hill Road	Signalised T-junction	Signal optimisation

7.13 Road Safety

- 7.13.1 As stated in Chapter 4, collision data has been reviewed in relation to several aspects including identifying clusters along PARS and connecting LRN junctions as well as links forming the PARs.
- 7.13.2 From the collision data analysis, four collision clusters were identified along the PARs and connecting LRN junctions:
- PAR 9: A1066
 - PAR 36: A134
 - PAR 41: B1018
 - A1016 Rainsford Lane / A1016 Parkway junction.
- 7.13.3 In addition, the collision data has been analysed along the full length of the links to identify patterns in collision locations in order to establish any areas of safety concerns. The light conditions, weather conditions and road surface conditions for the personal injury collision data over the three-year period 2021–2023 is presented in

Table A16.2.76 within ES Appendix 16.2: Traffic and Transport Baseline Conditions (document reference 6.16.A2).

- 7.13.4 The analysis on the road links forming the PARs shows that in general the collisions happened during daylight hours, with fine weather conditions and with a dry road surface. No specific collision patterns were identified based on conditions.
- 7.13.5 The comparison of the road links forming the PARs with the collision rate of PIC per annum (p.a.) per billion vehicle km for the period 2021-2023 show that there are 14 links with an annual collision rate higher than the national average – therefore most of the road links forming part of the PARs have an collision rate below or similar to the national collision rate per billion vehicle kilometres.
- 7.13.6 Locations where the collision rate exceeds the national average, these can be influenced by various factors and should be interpreted with caution. In general, these collisions do not suggest a significant pattern or a presence of a hotspot on these links therefore it is reasonable to conclude that the Project would not have any substantial adverse impact on road safety along the PARs.
- 7.13.7 For road safety during construction, construction drivers would receive a driver information pack to include identified hazard locations, such as areas with road safety concerns i.e. where pedestrians may be crossing the carriageway away from designated crossing point or within the carriageway or adjacent verge. This measure will be secured through the Outline CTMP (document reference 7.3).
- 7.13.8 Regarding road safety at temporary and permanent Project SAPs, each of these would require a new or upgraded access onto the LRN. These have been designed in accordance with relevant highways standards and a Stage 1 Road Safety Audit undertaken and mitigation for temporary SAPs provided where necessary. Stage 1 Road Safety Audits have also been undertaken on the preliminary designs of the temporary haul road crossover points, and highway mitigation proposals required for the Project. A summary of all Road Safety Audits undertaken for the Project are provided within Appendix A.
- 7.13.9 Safety of road users along PARs have been considered for WCH in Section 7.16.
- 7.13.10 Additional highway mitigation measures for safe use of PARs include carriageway widening and passing places, vegetation removal/cutting back, temporary removal of street furniture and speed restrictions.

7.14 Parking and Loading

- 7.14.1 Temporary changes to on-street parking as a result of the construction activities are minimal with temporary suspensions proposed where there are width restrictions to provide safe two-way movement. Construction workers and vehicles would have sufficient parking provision within the designated temporary construction compounds. As a result, there would be no additional demand of parking spaces along the LRN.
- 7.14.2 Effects on parking and loading have been analysed on those road links forming the PARs where the suspension of any formal or informal parking has been identified. The PARs affected by temporary loss of parking provision as a result of the Project are as follows:
 - Section of B1113 Lorraine Way (PAR20), Suffolk – Temporary suspension of street parking on Section of B1113 Lorraine Way to accommodate design vehicle movements for the duration of construction access use. The suspension is

expected only during arrival/departure of AIL vehicles. The duration of the impact would therefore be limited to periods of less than four weeks. Alternative parking nearby is available, albeit with a charge at the Dragonfly Hotel. therefore, the magnitude of impact has been classified as minor, and the significance of effect is slight or moderate given the sensitivity of receptors

- Old Ipswich Road (Link PAR33), Essex - Temporary suspension of the parking bay on the eastern side of Old Ipswich Road opposite the Dragonfly Hotel and informal kerbside parking spaces along the section of Old Ipswich Road located under the A12. The suspension is expected only during arrival/departure of AIL vehicles. The duration of the impact would therefore be limited to periods of less than four weeks. Alternative parking nearby is available, albeit with a charge at the Dragonfly Hotel. Therefore, the magnitude of impact has been classified as minor, and the significance of effect is slight given the low sensitivity of receptors
- Spinks Lane (Link PAR43), Essex - Temporary suspension of informal kerbside parking during arrival/departure of AIL vehicles. The duration of the impact would therefore be limited to periods of less than four weeks. School keep clear carriageway entrance markings are already provided with no stopping Mon-Fri 8-9.30 and 2.30-4pm restrictions in place outside the school. Alternative parking locations are available on nearby roads. Therefore, the magnitude of impact has been classified as minor, and the significance of effect is slight or moderate given high sensitivity of receptors
- Highfields Road (Link PAR43), Essex - Temporary suspension of informal kerbside parking during arrival/departure of AIL vehicles. The duration of the impact would therefore be limited to periods of less than four weeks. Alternative parking locations are available on nearby roads. Therefore, the magnitude of impact has been classified as minor, and the significance of effect is slight or moderate given high sensitivity of receptors.

1.1.1 The parking and loading analysis is presented in Table A16.4.7: Significance of Effect Parking and Loading within ES Appendix 16.4: Traffic and Transport Construction Effects (document reference 6.16.A4). Short-term effects may occur; however, these are not considered significant.

7.15 Bus Network

- 7.15.1 There are no expected changes to bus services, bus stops or taxi facilities for over four weeks in any 12-month period during the construction period 2027–2031 as a result of the construction activities. There would be short-term impact (less than four week duration) on some bus networks as a result of the Project. These would be mitigated on a case-by-case basis in liaison with bus operators and the relevant Local Highway Authority. Table 7.123 and Table 7.124 provide a summary of the increase in traffic along the PARs where bus services are located for the AM and PM peak hour respectively.
- 7.15.2 The existing bus services that coincide with PARs are set out in Appendix C. The A1341 Via Urbis Romanae (Link PAR 35) and A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway (Link PAR 36) in Colchester would experience the largest increase with 118 additional vehicles in both peak hours.

- 7.15.3 The bus services with highest frequencies operating on these links are:
- A1341 Via Urbis Romanae: P&R Colchester (Colchester City Centre High Street - Mile End Colchester North Park-and-Ride) with services running every 12-20' in each direction
 - A134 Wildeve Avenue: 2 (Horkesley Heath – Highwoods) with services running every 12-20' in each direction and 87 (Horkesley Heath – Brightlingsea) with services running every 20-30' in each direction.
- 7.15.4 The additional 118 vehicles would generally equate to two additional vehicles every minute, with one additional vehicle in each direction for a duration of one week. This is not expected to impact upon the operation of the bus services nor the pedestrian severance when crossing the road links to access the bus stops. Given these are the links with the largest increase in construction traffic during the AM and PM peak hours on the LRN, it is therefore not expected that the Project would substantially impact upon the future operation of the bus network at this location or other PARs with less additional vehicles.
- 7.15.5 Short-term road closures associated with overhead line stringing, construction of highway mitigation works, construction of bellmouth junctions and the open-cut cable swathe are expected on some of the roads. Full road closures are expected to be for no more than four weeks and will require a diversion. Other roads are expected to be managed through: Managed/ Road Open/Single Lane Running/Single Lane Running with widening avoiding the need to close the road. The duration of these would be between six to eight weeks and would mainly access for vehicles on the affected roads.
- 7.15.6 Any impacts from these short-term road closures will be managed to keep any impacts, such as delay, to a minimum. If a bus stop is located on those roads, a temporary stop would be provided in a suitable location, following agreement with the relevant Local Highway Authorities and the bus operators.

Table 7.123 Traffic flow changes on bus routes (AM peak)

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Norfolk	Link PAR 1	A140 Ipswich Road	2028	2,262	2,929	3,038	110	95	15	4%	1
	Link PAR 8	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road	2028	822	822	853	31	0	31	4%	3
	Link PAR 9	A1066 High Road / A1066 Low Road / A1066 Diss Road / A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road (alternative PAR)	2028	635	635	666	31	0	31	5%	3
Suffolk	Link PAR 19	B1113 Needham Road / B1113 Stowmarket Road	2028	992	997	1,013	16	0	16	2%	9
	Link PAR 22	A1214 London Road	2028	1,249	1,375	1,400	25	0	25	2%	11
	Link PAR 23	A1071	2028	1,059	1,168	1,193	25	0	25	2%	11
Essex	Link PAR 35	A1341 Via Urbis Romanae	2028	1,411	1,411	1,529	118	74	44	8%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 36	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway	2028	1,231	1,231	1,349	118	74	44	10%	1
	Link PAR 37	A1124 Halsted Road	2027	2,060	2,060	2,102	42	0	42	2%	1
	Link PAR 41	B1018 Braintree Road / B1018 Witham Road	2028	1,098	1,187	1,203	16	0	16	1%	4
	Link PAR 42	B1389 Hatfield Road	2028	1,267	1,267	1,284	17	0	17	1%	2
	Link PAR 43	Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill	2028	741	741	758	17	0	17	2%	2
	Link PAR 44	A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road	2028	1,621	1,871	2,021	150	104	46	8%	1
	Link PAR 45	B1008 Essex Regiment Way	2027	1,249	1,249	1,262	13	0	13	1%	10

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 46	B1008 Braintree Road / B1008 Main Road	2028	1,205	1,226	1,252	26	0	26	2%	1
	Link PAR 49	A414 Three Mile Hill / A1114 London Road	2028	2,093	2,093	2,147	53	0	53	3%	1
	Link PAR 50	A1016 Waterhouse Lane / A1016 Rainsford Lane	2028	1,416	1,416	1,443	27	0	27	2%	1
	Link PAR 51	A1060 Rainsford Road / A1060 Roxwell Road	2028	1,052	1,052	1,079	27	0	27	3%	1
	Link PAR 60	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road	2028	1,397	1,397	1,411	15	0	15	1%	7
	Link PAR 60	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (one-way system)	2028	525	525	532	7	0	7	1%	7
	Link PAR 61	A129 Sun Street / A129 London Road / A129 Rayleigh Road (one-way system)	2028	1,005	1,005	1,012	7	0	7	1%	7

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Thurrock	Link PAR 61	A129 Sun Street / A129 London Road / A129 Rayleigh Road	2028	1,069	1,069	1,083	15	0	15	1%	7
	Link PAR 64	A1013 Stanford Road (east of Orsett Cock Roundabout)	2028	735	809	896	88	74	14	11%	1
	Link PAR 66	Brentwood Road	2028	1,126	1,184	1,270	86	74	12	7%	1
	Link PAR 67	A1013 Stanford Road (west of Orsett Cock Roundabout)	2028	1,421	1,438	1,515	78	36	42	5%	2
	Link PAR 68	Heath Road	2028	288	288	356	67	30	37	23%	2
	Link PAR 69	Chadwell Hill	2028	569	575	604	29	29	0	5%	1
	Link PAR 70	Linford Road	2028	712	775	804	29	29	0	4%	1

Table 7.124 Traffic Flow Changes on Bus Routes (PM Peak)

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Norfolk	Link PAR 1	A140 Ipswich Road	2028	2,289	3,002	3,112	110	95	15	4%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Suffolk	Link PAR 8	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road	2028	889	889	920	31	0	31	4%	3
	Link PAR 9	A1066 High Road / A1066 Low Road / A1066 Diss Road / A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road (alternative PAR)	2028	694	694	725	31	0	31	5%	3
	Link PAR 19	B1113 Needham Road / B1113 Stowmarket Road	2028	1,130	1,135	1,151	16	0	16	1%	9
	Link PAR 22	A1214 London Road	2028	1,519	1,639	1,664	25	0	25	2%	11
	Link PAR 23	A1071	2028	1,223	1,330	1,355	25	0	25	2%	11
Essex	Link PAR 35	A1341 Via Urbis Romanae	2028	1,514	1,514	1,632	118	74	44	8%	1
	Link PAR 36	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway	2028	1,206	1,206	1,324	118	74	44	10%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 37	A1124 Halsted Road	2027	2,037	2,037	2,079	42	0	42	2%	1
	Link PAR 41	B1018 Braintree Road / B1018 Witham Road	2028	1,352	1,423	1,439	16	0	16	1%	4
	Link PAR 42	B1389 Hatfield Road	2028	1,491	1,491	1,508	17	0	17	1%	2
	Link PAR 43	Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill	2028	938	938	955	17	0	17	2%	2
	Link PAR 44	A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road	2028	1,904	2,172	2,322	150	104	46	7%	1
	Link PAR 45	B1008 Essex Regiment Way	2027	833	833	846	13	0	13	2%	10
	Link PAR 46	B1008 Braintree Road / B1008 Main Road	2028	1,163	1,184	1,210	26	0	26	2%	1
	Link PAR 49	A414 Three Mile Hill / A1114 London Road	2028	2,424	2,424	2,477	53	0	53	2%	1
	Link PAR 50	A1016 Waterhouse Lane / A1016 Rainsford Lane	2028	1,536	1,536	1,563	27	0	27	2%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 51	A1060 Rainsford Road / A1060 Roxwell Road	2028	963	963	990	27	0	27	3%	1
	Link PAR 60	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road	2028	1,380	1,380	1,394	15	0	15	1%	7
	Link PAR 60	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (one-way system)	2028	678	678	685	7	0	7	1%	7
	Link PAR 61	A129 Sun Street / A129 London Road / A129 Rayleigh Road (one-way system)	2028	822	822	829	7	0	7	1%	7
	Link PAR 61	A129 Sun Street / A129 London Road / A129 Rayleigh Road	2028	1,164	1,164	1,178	15	0	15	1%	7
Thurrock	Link PAR 64	A1013 Stanford Road (east of Orsett Cock Roundabout)	2028	923	997	1,084	88	74	14	9%	1
	Link PAR 66	Brentwood Road	2028	1,141	1,199	1,285	86	74	12	7%	1
	Link PAR 67	A1013 Stanford Road (west of Orsett Cock Roundabout)	2028	1,204	1,220	1,297	78	36	42	6%	2

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 68	Heath Road	2028	356	356	424	67	30	37	19%	2
	Link PAR 69	Chadwell Hill	2028	766	772	801	29	29	0	4%	1
	Link PAR 70	Linford Road	2028	851	914	943	29	29	0	3%	1

7.16 Walkers, Cyclists and Horse Riders Network

Severance

- 7.16.1 The analysis of the WCH severance is presented in Table A16.4.4: Significance of Effect WCH Severance within ES Appendix 16.4: Traffic and Transport Construction Effects (document reference 6.16.A4).
- 7.16.2 The assessment is based on the changes in total traffic flows of 30%, 60% and 90% which are considered minor, moderate and major changes in magnitude. The significance of effect for the road links is classified as slight or neutral when assessing all traffic for all the road links, except for Bentley Road (Link PAR 30) that is classified as large or moderate.
- 7.16.3 In Bentley Road (Link PAR 30) a shared pedestrian/cycle route has been proposed as part of the embedded mitigation measures. A suitable crossing point has been provided as part of the design of the shared pedestrian/cycle route therefore no further mitigation is proposed at this road link.
- 7.16.4 Although severance was not identified within the assessment as an identified issue along road links within Thurrock, safety concerns were raised by the relevant Local Highway Authority. The need to consider informal pedestrian crossing locations along PARs was identified and a review of these locations was undertaken, and measures have been proposed as summarised in Table 7.125.

Table 7.125 WCH severance – mitigation proposals

Project Section	Region	Location	Issue detected	Proposal
Section H	Thurrock	Link PAR 64 - A1013 Stanford Road (east of Orsett Cock Roundabout)	The McDonald's located on the A13 is currently accessed from the north side of A1013 Stanford Road through private land. People cross informally the A1013 Stanford Road away from designated crossings	Within CTMP - Driver information pack will identify potential hazard locations where pedestrians may be crossing the carriageway away from designated crossing point
Section H	Thurrock	Link PAR 65 - Buckingham Hill Road	Users of footpaths 41 and 42 are required to cross Buckingham Hill Road. Safety concerns have been raised at this location as currently the road is already heavily used by HGVs.	Within CTMP – Driver information pack will identify locations where pedestrians may be walking on verge and crossing the carriageway Ensure adjacent vegetation is maintained to allow visibility

Project Section	Region	Location	Issue detected	Proposal
Section H	Thurrock	Link PAR 66 - Brentwood Road	Safety concerns have been raised at the crossing of pedestrians and cyclists on the approach to Orsett Cock Roundabout	Within CTMP - Driver information pack will identify potential hazard locations where pedestrians/cyclists are crossing the carriageway
Section H	Thurrock	Hoford Road	Popular route for walkers and cyclists connecting to footpaths 45 and 43. Safety concerns at this location as currently a no-through road at Clearserve access. Road would be heavily used by construction traffic accessing Tilbury North Substation construction site via Buckingham Hill Road.	Designated facilities for pedestrians and cyclists along Hoford Road between Tilbury North SAP and Buckingham Hill Road to provide segregation from construction traffic and improve safety.

Amenity

- 7.16.5 The assessment for the WCH Amenity is presented in Table A16.4.5: Significance of Effect WCH Amenity within ES Appendix 16.4: Traffic and Transport Construction Effects (document reference 6.16.A4).
- 7.16.6 ES Chapter 16: Traffic and Transport (document reference 6.16) identified several road links where the significance of effect is moderate or large when assessing total and HGV flow increase. For some road links, further mitigation measures have been investigated. Further details are shown in Table 7.126.

Table 7.126 WCH amenity – mitigation proposals

Project Section	Region	Location	Issue detected	Proposal
Section A	Norfolk	Link PAR 1 - A140 Ipswich Road	There is not a cycling route in this road link and Norfolk County Council has not raised concerns. Traffic surveys show a low number of cyclists	Within CTMP – Driver information pack will identify locations where pedestrians/cyclists cross the carriageway. If necessary, speed reduction on approach and through junction to allow for potential gaps in traffic. Warning signs on approach to crossings

Project Section	Region	Location	Issue detected	Proposal
Section A	Norfolk	Link PAR 9 - A1066 High Road / A1066 Low Road / A1066 Diss Road / A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road	The WCH provision is adequate, but there is an uncontrolled crossing for pedestrians and cyclists at Old Croxton Rd	Within CTMP – Driver information pack will identify locations where pedestrians/cyclists cross the carriageway. Warning signs on approach to crossings
Section B	Suffolk	Link PAR 12 - B1113 Finningham Rd / B1113 Walsham Road	The stretch of B1113 between Gislingham Road and Wickham Road has no footway available, where the footpath W-246/013 access from the playground. Speed limit of 30 mph but the signage is hidden behind vegetation	Within CTMP – Driver information pack will identify locations where pedestrians cross the carriageway or could be walking on carriageway from playground Cut back vegetation to improve visibility to PRow access and advanced warning signage and maintain verge Improve existing signage (height of post/backing boards and/or VMS sign) Notices on PRow access indicating construction route Surface colouring across under SLOW markings
Section B	Suffolk	Link PAR 16 - A1120 Church Road / A1120 Bell's Lane	School route at Stowupland	Avoid construction traffic during school pickup/drop off times
Section C	Suffolk	Link PAR 25 - B1070 Hadleigh Road	Bellmouth access to haul road proposed on the same side of the footway, that is a school route to East Bergholt. Cycle route at B1070 with no dedicated cycling infrastructure for the cycle users	Crossing facilities for pedestrians at the bellmouth access provided Within CTMP – Driver information pack will identify locations where pedestrians/cyclists cross the carriageway

Project Section	Region	Location	Issue detected	Proposal
				or could be cycling on carriageway. Maintenance of footway to ensure width is fully accessible
Section C	Essex	Link PAR 27 - Birchwood Road	Users of Birchwood Corner bus stops are not provided with footway or crossing facilities. The number of construction vehicles expected in this section of Birchwood Road towards Wick Lane is expected to be low	Within CTMP – Driver information pack will identify locations where pedestrians may be walking to bus stops either on verge or carriageway. Ensure adjacent vegetation is maintained to keep verge clear. Place signs to warn drivers of upcoming pedestrians in road ahead crossing the carriageway
Section C	Essex	Link PAR 28 - Wick Road / Grove Hill	Adequate width for the footway serving mainly residential properties but no dedicated cycling infrastructure for the cycle path users	Within CTMP – Driver information pack will identify NCN locations where higher number of cyclists may be on the carriageway.
Section D	Essex	Link PAR 36 - A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway	Potential presence on the verge of WCH at locations where there are PRoW access points	Within CTMP – Driver information pack will identify locations where pedestrians may be walking either on verge or carriageway. Ensure adjacent vegetation is maintained to keep verge clear. Place signs to warn drivers of upcoming pedestrians in road ahead crossing the carriageway
Section D	Essex	Link PAR 37 - A1124 Halsted Rd	Potential presence on the verge of WCH at locations where there are PRoW access points	Within CTMP – Driver information pack will identify locations where pedestrians may be

Project Section	Region	Location	Issue detected	Proposal
				walking either on verge or carriageway. Ensure adjacent vegetation is maintained to keep verge clear. Place signs to warn drivers of upcoming pedestrians in road ahead crossing the carriageway
Section D	Essex	Link PAR 38 - Mill Rd	NCN Route 13 on this road link with no dedicated cycling infrastructure for the cycle path users	Within CTMP – Driver information pack will identify NCN locations where higher number of cyclists may be on the carriageway. Potential speed limit reduction through this section (from national speed limit 60 mph)
Section E	Essex	Link PAR 43 - Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill	Potential presence on the verge of WCH at locations where there are PRow access points	Within CTMP – Driver information pack will identify locations where pedestrians may be walking either on verge or carriageway. Ensure adjacent vegetation is maintained to keep verge clear. Place signs to warn drivers of upcoming pedestrians in road ahead crossing the carriageway
Section F	Essex	Link PAR 49 - A414 Three Mile Hill / A1114 London Rd	Good WCH provision for pedestrians, accessing from PRow and to the bus stops but no crossing points present (dual carriageway)	Within CTMP – Driver information pack will identify locations where pedestrians may be crossing Ensure adjacent vegetation is maintained to allow visibility

Project Section	Region	Location	Issue detected	Proposal
Section F	Essex	Link PAR 51 - A1060 Rainsford Rd / A1060 Roxwell Rd	There is no footway or path to access the bus stop Reeds Farm	Within CTMP – Driver information pack will identify locations where pedestrians may be walking on verge Ensure adjacent vegetation is maintained to allow visibility
Section G	Essex	Link PAR 54 - B1002 Main Road	Potential presence of horse-riders on the carriageway. School route in Margaretting	Within CTMP – Driver information pack will identify locations where horse-riders may be on the carriageway. Avoid construction traffic during school dropoff/pick up times
Section H	Thurrock	Link PAR 67 - A1013 Stanford Road (west of Orsett Cock Roundabout)	Cyclists are required to join carriageway at the A1013 Stanford Rd overbridge over A1089	Within CTMP – Driver information pack will identify NCN locations and warning of off carriageway section over bridge where higher number of cyclists may be on the carriageway. Allow cyclists on the footway during construction period
Section H	Thurrock	Link PAR 68 - Heath Road	This road link is a school route between the bus stops at A1013 Stanford Road and schools located in Chadwell St. Mary, with an adequate WCH provision. The PAR at this location is for a short section and the bellmouth access is located on the opposite side of the footway, on the east side	Within CTMP – Driver information pack will identify school routes

Fear and Intimidation

- 7.16.7 The assessment for the road links forming part of the PARs of the fear and intimidation is presented in Table A16.4.6: Significance of Effect WCH Fear and Intimidation within ES Appendix 16.4: Traffic and Transport Construction Effects (document reference 6.16.A4).
- Link PAR 9 - A1066 High Road / A1066 Low Road / A1066 Diss Road / A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road
 - Link PAR 36 - A134 Northern Approach Rd / A134 Wildeve Avenue / A134 Nayland Rd / A134 The Causeway
 - Link PAR 65 - Buckingham Hill Road
 - Link PAR 67 - A1013 Stanford Road (west of Orsett Cock Roundabout).
- 7.16.8 Mitigation measures have been investigated in the links listed above as part of the WCH Amenity assessment. Therefore, no further mitigation measures are to be investigated on these locations.

Delay

- 7.16.9 An Outline PRow Management Plan (document reference 7.6) has been prepared with the aim of reducing disruption to users (as far as practicable). The PRow management plan summarises the proposed management strategy, describes the proposed mitigation, and outlines the expected duration for each affected PRow as a result of proposed construction activities of the Project.
- 7.16.10 The types of PRowS that have been assessed are:
- Formally designated PRow: Footpaths, bridleways restricted byways, byway open to all traffic (BOAT)
 - Permissive paths as allowed by landowners with no legal right of access (where information is available)
 - Open Access Land (land mapped as 'open country')
 - Cycle tracks including the NCN.
- 7.16.11 Works associated with construction of the Project would require the management of PRowS to allow continued access and safeguard PRow users. Table 7.127 provides a summary of the management regimes.

Table 7.127 Management regimes

Measure	Application
Signage	Signage will be provided for all affected PRowS, and will include a range of signage measures such as advanced warnings of temporary closures and/or diversions and waymarking of diversion routes.
Active management	Active management involves the Main Works Contractor(s) using measures to manage the interaction between construction activities and PRow users, for example on routes shared by construction traffic

Measure	Application
	and PRow users. Appropriate signage would be erected to alert drivers of the potential interface and measures such as speed limit signage will be used to ensure that all construction vehicles travel at low speeds.
Temporary closure (managed)	Managed use to allow ongoing use of the PRow by the public through the use of appropriate signage and access controls agreed with the relevant Local Highway Authority to ensure temporary cessation of works and safe passage of PRow users. Short periods of PRow closure may be required for certain construction activities, for example overhead line pulling.
Temporary closure with diversion	Provision of an alternative temporary route. These may be via alternative existing PRowS or via temporary alternative alignments. These are intended to reduce inconvenience to PRow users as much as practicable, for example with regard to diversion length, and all diverted PRowS will be provided to a comparable standard to that which they replace. Signage will provide users with an early indication that the PRow has been diverted. Once temporary diversion is no longer required, this will be removed and the land returned to original status.
Temporary closure with no diversion	In some instances, there may be no suitable or safe available diversion for PRow that require temporary closures. These will be kept to a minimum where practicable.
Permanent stopped up with diversion	Permanent diversions will be required where permanent proposed infrastructure, such as substations, impact a PRow. The number of PRow requiring permanent diversion is limited.
Permanent stopped up with no diversion	Permanent closure of PRow will only be required where no safe permanent diversion is practicable. It is considered unlikely that any permanent closures will be required for the Project.

- 7.16.12 For each PRow the default expectation is that the diversion would be provided on a like for like basis. This means that where a PRow is currently unsurfaced, the replacement diversion route would similarly be unsurfaced. Alternatively, where a PRow is surfaced, we would provide some form of surfacing. However, consideration has been given to the duration of each temporary PRow diversion to be proportionate on the need for surfacing.
- 7.16.13 As defined in the Outline PRow Management Plan (document reference 7.6) the Main Works Contractor(s) will, subject to discussion with the relevant Local Highway Authorities PRow Officers, maintain the existing widths of the relevant PRow that are diverted. Actual widths of the PRow would be determined based on the type of PRow in accordance with minimum widths set out in the Highways Act 1980. This includes:
- As respects a footpath which is not a field-edge path, 1 metre
 - As respects a footpath which is a field-edge path, 1.5 metres
 - As respects a bridleway which is not a field-edge path, 2 metres

- As respects any other highway, 3 metres.

- 7.16.14 Discussion with Local Highway Authorities PRow Officers to-date has indicated that all footpaths should be a minimum of 1.5 m wide, whether located at a field edge or not, and bridleways that are fenced off to maintain separation of the PRow from the working area, or are constrained on both sides, should be a minimum of 4 m wide between fencing or other such constraint, to allow sufficient width for horses to turn around.
- 7.16.15 Details on proposed mitigation and management of PRowS during construction can be found within the Draft DCO (document reference 3.1) Schedule 7 streets or public rights of way to be temporarily stopped up, and the Access, Rights of Way and Public Rights of Navigation Plans (document reference 2.5).
- 7.16.16 Delay to WCH has also been assessed where there would be a temporary maximum increase in journey length along a road or PRow for more than four weeks in any 12-month period. The assessment of these impacts is presented in Table A16.4.3: Significance of Effect WCH Delay within ES Appendix 16.4: Traffic and Transport Construction Effects (document reference 6.16.A4) and reported in ES Chapter 16: Traffic and Transport (document reference 6.16). It was demonstrated that there are no substantial adverse impacts on any PRowS as a result of temporary closures proposed.
- 7.16.17 Disruption and delay to PRow users has been minimised as much as reasonably practicable, with options to keep PRowS open, or to manage the access (as far as practicable). Where this is not practicable, the existing PRow would be a temporary closure and a temporary diversion provided via the shortest, or most feasible alternative route. Temporary diversions would be clearly marked at both ends with signage explaining the diversion, the duration of the diversion and a contact number for any concerns. Details of the strategy for PRowS and the management regimes can be found within the Outline PRow Management Plan (document reference 7.6).
- 7.16.18 Table 7.128 provides a summary of the temporary closures and diversions of PRowS and the net change in distance travelled as a result of the proposed alternative routeing where an increase of the diversion length exceeds 500 m, which is equivalent to approximately six minutes of increase in journey time, considering a walking speed of 5 km/h. All the temporary diversions are illustrated within the Access, Rights of Way and Public Rights of Navigation Plans (document reference 2.5) and the extent of the diversion outlined Schedule 8 of the Draft DCO (document reference 3.1). All temporary closures and diversions of PRowS can be found in Table 6.1 of the Outline PRow Management Plan (document reference 7.6).

Table 7.128 PRow Temporary Closure and Diversions (exceeding 500 m)

Project Section	Type of PRow	Region	Parish	Local Authority Designation	Net Change in Distance (m)	Duration
B	Footpath	Suffolk	Barking and Battisford	W-121/006/0 and W-129/025/0	1,300	2 months

Project Section	Type of PRow	Region	Parish	Local Authority Designation	Net Change in Distance (m)	Duration
D	Footpath	Essex	Great Horkesley	Great Horkesley 30	784	2 months
D	Footpath	Essex	Great Tey	Great Tey 38	768	2 months
D	Footpath	Essex	Great Tey	Great Tey 50	1,400	1 day
F	Footpath	Essex	Margaretting	Margaretting 13	556	2 months
G	Footpath	Essex	West Horndon	West Horndon 69	636	15 weeks

- 7.16.19 The OAL management proposals are detailed within the Outline PRow Management Plan (document reference 7.6) with indicative durations provided for affected OALs which will be subject to temporary closure (managed).
- 7.16.20 In general, the duration of closures are less than four weeks and the right to roam across the affected OAL will be maintained.
- 7.16.21 Where temporary construction works are proposed to be undertaken within an area of open access land during the construction phase, Main Works Contractor(s) staff will be on site and will assist users of the open access land to move around the temporary construction areas. Where a temporary construction haul road crosses open access land it will not be fenced off and the right to roam across will be retained but on entrances to the land appropriate signage will be installed. Where open cable trenches are required across open access land, these will be fenced off with a localised diversion provided. Therefore, **no significant impact** on OAL is expected as a result of the Project.
- 7.16.22 A long-term road closure of Wymondham Road (Link PAR5) is required, which would require a 2.4 km diversion route between via Flordon Road and B1113 Norwich Road. This diversion route has been agreed with the relevant Local Highway Authority who advised this would have no significant effects on the local highway network or road users given an increase of journey time of just two minutes is anticipated for drivers and no dedicated facilities for WCH are provided.
- 7.16.23 Short-term road closures associated with overhead line stringing, construction of highway mitigation works, construction of bellmouth junctions and the open-cut cable swathe are expected on some of the roads. Full road closures are expected to be for no more than four weeks and will require a diversion. Other roads are expected to be managed through: Managed/ Road Open/Single Lane Running/Single Lane Running with widening avoiding the need to close the road. The duration of these would be between six to eight weeks and would mainly access for vehicles on the affected road. Therefore, no significant impact on WCH delay is expected in relation to footway/cycleway provision as a result of the Project.

Cycling Network

- 7.16.24 There are no expected closures or diversions on the cycle network as a result of the construction activities of the Project. However, several cycle routes that are located in the PARs would experience an increase in traffic during construction.
- 7.16.25 The off-road cycle routes would have limited interaction with traffic and therefore it is considered that the impact would be negligible.
- 7.16.26 The temporary impact of the construction flows during the AM and PM peak hours on the on-road cycle routes, where cyclists would travel alongside vehicular traffic, is summarised in Table 7.129 and Table 7.130.
- 7.16.27 The analysis of construction traffic impacts on the identified cycling routes indicates that, for most routes, the increase in total traffic is below 10%. On Grove Hill, the percentage increase exceeds 90%; however, this is due to the low baseline traffic flow. In absolute terms, the net increase on this route is 26 construction vehicles in the AM and PM Peak hours that would be approximately equivalent to one vehicle every two and a half minutes. Given the minimal impact on these routes, no significant adverse effects are anticipated.
- 7.16.28 The highest net increase in total traffic flow from the future baseline is located on the Spa Road, along the NCN Route 16 with an additional 97 construction vehicles in both the AM and PM peak hours. This peak traffic flow is expected to last for a maximum of one week. Consequently, considering the temporary duration on this road link it is considered that no mitigation measures are necessary for this road link.

Table 7.129 Traffic flow changes on cycling routes (AM peak)

Region	Route	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Essex	NCN Route 1	Grove Hill	2030	28	28	46	18	6	12	64%	1
Essex	NCN Route 16	Spa Road	2028	741	741	758	17	0	17	2%	2
Essex	NCN Route 13	A176 Noak Hill Road	2028	1,397	1,397	1,411	15	0	15	1%	7
Essex		A176 Laindon Road	2028	525	525	532	7	0	7	1%	7
Suffolk	RCN South Suffolk Route B	B1070	2028	704	718	792	74	48	26	10%	1

Table 7.130 Traffic flow changes on cycling routes (PM peak)

Region	Route	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Essex	NCN Route 1	Grove Hill	2030	28	28	46	18	6	12	64%	1
Essex	NCN Route 16	Spa Road	2028	938	938	955	17	0	17	2%	2
Essex	NCN Route 13	A176 Noak Hill Road	2028	1,380	1,380	1,394	15	0	15	1%	7
Essex		A176 Laindon Road	2028	678	678	685	7	0	7	1%	7
Suffolk	RCN South Suffolk Route B	B1070	2028	705	720	794	74	48	26	10%	1

8. Conclusion

- 8.1.1 The TA has set out the following related to the scope of the assessment (as defined above), focused on temporary impacts during the peak period of construction activity for each location assessed:
- Relevant national, regional and local policy and guidance, which provided a framework for the assessment
 - Existing baseline and future baseline transport conditions
 - The level of construction traffic expected on the road network
 - Requirements for temporary amendments to the road network and PRowS
 - The resultant impact of the Project on the road network, bus services, and WCH.
- 8.1.2 This TA has been developed in accordance with relevant national, regional, and local transport and planning policy, including the Overarching NPS for Energy (EN-1) (DESNZ, 2024a) and National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (DESNZ, 2024b).
- 8.1.3 The assessment indicates that the total traffic on the SRN/MRN would increase by less than 15% in the AM and PM peak hours during peak periods of Project construction activity. On the LRN, some percentage increases of traffic owing to the Project are deemed significant, primarily due to the low future baseline traffic levels. However, the total future flows in these road links are not expected to have a material impact on the operation or performance of the network, and generally occur over a short duration (e.g. one week). There are links where the duration is expected to be for a longer period of time, though the associated construction traffic flows are notably lower.
- 8.1.4 Based on the junction capacity assessment, the majority of the junctions would operate within capacity during the worst-case peak where construction traffic would be at its greatest. The 85th percentile or 50% reduction of the worst-case peak has also been tested and the majority of junctions would also operate within capacity. Where this is not the case, temporary mitigation has been proposed to improve the operation of the junction and reduce the likely impact on road users. Furthermore, given the likely impact of the Project construction traffic would be temporary and short term, it is considered that the Project would not have a substantial impact upon the operation of the road network. This includes bus services and where only short-term road closures are required.
- 8.1.5 A review of personal injury collision data has been analysed along the full length of the links along PARs and connecting to LRN junctions to identify patterns in collision locations in order to establish any areas of safety concern. Where collision clusters have been identified these have been reviewed on a case-by-case basis and mitigation provided within the Outline CTMP (document reference 7.3) and through additional mitigation summarised within Section 7.11. Therefore, it is reasonable to conclude that the Project would have no substantial adverse impact on road safety along the PARs.

- 8.1.6 Parking provision for construction workers and construction vehicles would be provided within temporary construction compounds. Therefore, there would be no substantial direct impacts on existing on-street parking on the LRN. Although there are locations where temporary suspensions of kerbside parking is proposed, these are temporary and associated with the movement of AILs.
- 8.1.7 For the WCH network, mitigation measures have been proposed for severance, amenity, and fear and intimidation, identified within ES Chapter 16: Traffic and Transport (document reference 6.16) and through discussion with the relevant Local Highway Authority. There are no expected closures or diversions on the cycle network as a result of the construction activities of the Project. However, several cycle routes that are located in the PARs would experience an increase in traffic during construction. As part of standard mitigation, the Outline CTMP (document reference 7.3) would provide measures to ensure all locations where WCH may be more likely to be within or crossing the carriageway are identified as hazard locations. This would include details within the construction vehicles Driver information pack and associated temporary signage.
- 8.1.8 A number of PRoWs would be temporarily impacted by the Project during construction. These would be managed to allow continued access and safeguard PRoW users through a management regime. Notably, there are five PRoWs that would have a temporary closure with diversion resulting in a net change in distance of over 500 m. Overall, the assessment indicates that there would be no substantial impacts on the WCH network.
- 8.1.9 Where temporary construction works are proposed to be undertaken within an area of OAL during the construction phase, Main Works Contractor(s) staff will be on site and will assist users of the OAL to move around the temporary construction areas. The right to roam across affected OAL will be maintained with temporary closures (managed), and will in general be closed for less than four weeks. Therefore, no significant impact on WCHs are expected as a result of the Project.
- 8.1.10 Wymondham Road (Link PAR5) requires a long-term road closure, however no dedicated facilities for WCH are currently provided. The diversion route has been agreed with the relevant Local Highway Authority who advised this would have no significant effects on the local highway network or road users given an increase of journey time of just two minutes is anticipated for drivers.
- 8.1.11 In conclusion, the Project is not anticipated to have a substantial impact on the transport network during construction.
- 8.1.12 Multiple sustainable transport modal options have been assessed for their appropriateness in delivering the materials required for the Project. This assessment has been undertaken in accordance with the Overarching National Policy Statement (NPS) for Energy (EN-1, 2023), which emphasises the importance of minimising environmental impacts and promoting sustainable logistics solutions.
- 8.1.13 However, several key elements of the Project remain to be finalised, including the detailed design, construction programme, and commercial agreements for the procurement of material quantities. As a result, further progress is required to confirm the approach to material supply and associated transport logistics.
- 8.1.14 These matters will be developed in collaboration with the appointed Main Works Contractor(s), who will play a central role in refining the strategy for material sourcing and delivery.

Abbreviations

Abbreviation	Full Reference
ABP	Associated British Ports
AIL	Abnormal indivisible load
AIS	Air Insulated Switchgear
AONB	Area of Outstanding Natural Beauty
ATC	Automatic Traffic Count
BNG	Biodiversity Net Gain
BOAT	Byway Open to All Traffic
CoCP	Code of Construction Practice
CNEB	Chelmsford Northeast Bypass
CRoW	Countryside and Rights of Way
CSE	Cable Sealing End
CTMP	Construction Traffic Management Plan
CWTP	Construction Workers Travel Plan
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
DM	DO-Minimum
DMRB	Design Manual for Roads and Bridges
DS	Do-Something
E	East
EACN	East Anglia Connection Node
EATM	Environmental Assessment of Traffic Movements
EB	Eastbound
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESDAL	Electronic Service Delivery for Abnormal Loads
GIS	Gas Insulated Switchgear
HGV	Heavy Goods Vehicle

Abbreviation	Full Reference
IEMA	Institute of Environmental Management and Assessment
km	Kilometre
kV	Kilovolt
LGV	Light Goods Vehicle
LRN	Local Road Network
LTC	Lower Thames Crossing
m	Metre
MCC	Manual Classified Counts
mph	Miles per hour
MRN	Major Road Network
MSOA	Middle Super Output Areas
N	North
NB	Northbound
NCN	National Cycle Network
NE	North-east
NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
NTEM	National Trip End Model
NW	North-west
OAL	Open Access Land
OGV	Ordinary Goods Vehicle
PAR	Primary Access Routes
PCU	Passenger Car Units
PIC	Personal Injury Collisions
PIL	Persons with Interest in Land
PRoW	Public Rights of Way
RCN	Regional Cycle Network
RFC	Ratio of Flow to Capacity

Abbreviation	Full Reference
RoSPA	Royal Society for the Prevention of Accidents
S	South
SAP	Site access point
SAR	Secondary Access Routes
SB	Southbound
SE	South-east
SRN	Strategic Road Network
STGO	Special Types General Orders
SW	South-west
TA	Transport Assessment
TAG	Transport Analysis Guidance
TPC	Travel Plan Coordinator
TRO	Traffic Regulation Orders
TSM	Traffic Signs Manual
TTRO	Temporary Traffic Regulation Orders
UKPN	UK Power Networks
V/C	Volume to capacity
W	West
WB	Westbound
WCH	Walkers, cyclists and horse riders

Glossary

Term	Definition
Access Land	This is land where the public has a right to walk for recreational purposes, even if the land is privately owned.
Abnormal load	A large load which exceeds limits set out in terms of weight (>44 tonnes), length (>18.65 m), and width (>2.9 m).
Abnormal indivisible load	A large load which cannot 'without undue expense or risk of damage' be divided into two or more smaller loads for the purposes of being transported by road, and which exceeds limits set out in terms of weight (>44 tonnes), length (>18.65 m), and width (>2.9 m).
Access Tracks	Temporary access to a smaller scale, isolated works area, typically provided for erection of scaffold and netting at locations the overhead line crosses features such as roads and railways.
Additional mitigation measures	Comprises measures over and above embedded and standard mitigation measures to reduce environmental effects. This would include, but not be limited to, mitigation required for protected species.
Aggregate	Granular material (e.g. sand and gravel or crushed rock) that can be used for building and/or civil engineering purposes (e.g. for concrete production).
Alignment	The proposed overhead line and underground cable route.
Amenity	A term used to describe the character or attractiveness of an area. The assessment of amenity considers landscape and visual, noise and vibration, and traffic and transport effects.
Annual Average Daily Traffic flow	24-hour traffic count data averaged for all the days in the year, i.e. the total traffic flow on a road for a year divided 365.
Annual Average Weekday Traffic flow	24-hour traffic count data averaged for just the weekdays (Monday to Friday).
Automatic traffic counter	An automatic counter which records the total number of vehicles passing along a designated road or highway, calculating a vehicle's speed and category.
Bellmouth	A flared vehicular access point connecting a construction site to the public highway, designed to accommodate turning movements by large vehicles.
Cable	An insulated conductor designed for underground installation.

Term	Definition
Cable circuit	A set of wires along which current flows and returns. It is necessary to have a complete circuit for current to flow. The National Grid standard for overhead lines operating at 400 kV is for pylons to carry two circuits, each consisting of three phases, i.e. a double circuit configuration.
Cable drum	Cylindrical object used to transport cables.
Cable Sealing End	A termination point where high-voltage underground cables are connected to overhead lines or substations. It provides the necessary insulation and mechanical support to safely transition between different types of electrical infrastructure. These are typically housed within a Cable Sealing End (CSE) compound.
Cable Sealing End compound	Electrical infrastructure used as the transition point between overhead lines and underground cables. A compound on the ground acts as the principal transition point.
Code of Construction Practice	A code of construction practice sets out the standards and procedures to which a developer (and its contractors) must adhere in order to manage the potential impacts of construction works.
Committed development	A development that has full or outline planning permission, or is allocated in an adopted development plan.
Conservation Area	An area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance as defined in s69(1)(a) in the Planning (Listed Building and Conservation Areas) Act 1990.
Construction Traffic Management Plan	Plan detailing the procedures, requirements and standards necessary for managing the traffic effects during construction of the Project so that safe, adequate and convenient facilities for local movements by all transport modes are maintained throughout the construction process.
Construction Worker Travel Plan	Plan that sets out the framework and principles proposed for the management of construction worker travel to mitigate potential impacts and encourage more sustainable modes of transport.
Crossover points	Locations where haul roads cross the local road network, but are not generally proposed for construction HGVs to transition to or from the local road network
Countryside and Rights of Way (CRoW) open access land/registered common land	The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land mapped as 'open country' (mountain, moor, heath and down) or registered common land. These areas are known as 'open access land'.
Development Consent Order	A statutory instrument which grants consents and other rights to build a Nationally Significant Infrastructure Project, as defined by the Planning Act 2008.

Term	Definition
Electronic Service Delivery for Abnormal Loads	National service for managing abnormal loads; used to notify Police, highway and structures authorities of abnormal load movements.
Embedded design measures	Mitigation measures are those that are intrinsic to and built into the design of the Project.
Environmental Areas	These are locations identified for environmental embedded measures, mitigation and/or Biodiversity Net Gain/environmental enhancement.
Environmental Impact Assessment (EIA)	An assessment of the likely effects of a development project on the environment, which is reported in an Environmental Statement that is publicised and consulted on and taken into account in the decision on whether a project should proceed.
Environmental Statement (ES)	The main output from the EIA process, an ES is the report required to accompany an application for development consent (under the Infrastructure Planning (EIA) Regulations 2017) to inform public and stakeholder consultation and the decision on whether a project should be allowed to proceed. The EIA Regulations set out specific requirements for the contents of an ES for Nationally Significant Infrastructure Projects.
GEH	The GEH statistic is a standard measure of the 'goodness of fit' between observed and modelled flows. The closer the value is to zero the better the fit between observed and modelled data.
Heavy Goods Vehicle	Goods vehicles weighing more than 3,500 kg.
Kilometre	1,000 metres
Light Goods Vehicles	Goods vehicle weighing 3,500 kg or less.
Listed building	A measure of a building's special architectural and historic interest. There are three categories of listed buildings, Grades I, II* and II, depending on the level of interest.
Local Highway Authority	The public authority whose duty it is to maintain and protect the safety and usability of public roads.
Local Planning Authority	The public authority whose duty it is to carry out specific planning functions for a particular area.
Magnitude of change	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.
Major Road Network	Routes in the middle tier of the road network (between the SRN and LRN), as defined by the Department for Transport. MRNs are managed by the Local Highway Authorities. For the Project, the Local Highway Authorities are Thurrock Council and Essex, Suffolk and Norfolk County Councils

Term	Definition
Main Works Contractor(s)	The contractor appointed by the client to plan, manage, monitor, and coordinate the construction phase of a project involving multiple contractors. They are responsible for ensuring that construction work is carried out safely, efficiently, and in compliance with legal and regulatory requirements. This includes preparing the Construction Phase Plan, coordinating health and safety measures, and liaising with the Principal Designer and other stakeholders throughout the project
Mitigation	The action of reducing the severity and magnitude of change (impact) to the environment. Measures to avoid, reduce, remedy or compensate for significant adverse effects.
National Cycle Network	A series of traffic-free paths and quiet, on-road cycling and walking routes that connect to every major town and city. These routes are promoted for both recreational and active travel purposes.
National Landscape (an Area of Outstanding Natural Beauty)	Formally designated under the National Parks and Access to the Countryside Act of 1949 to protect areas of the countryside of high scenic quality that cannot be selected for National Park status due to their lack of opportunities for outdoor recreation (an essential objective of National Parks). As of November 2023, all AONBs became 'National Landscapes'. This reflects ambitions for the areas to play a key part in the international '30 by 30' commitment (to protect and conserve a minimum of 30% of land and sea for biodiversity by 2030).
Nationally Significant Infrastructure Project	Typically a large scale development of national importance that requires development consent from the Secretary of State, under the Planning Act 2008.
Order Limits	The maximum extent of land within which the authorised development may take place.
Overhead line	Conductor (wire) carrying electric current, strung from pylon to pylon.
Passenger Car Unit (PCU)	A unit used to represent general traffic where vehicle types are assigned a conversion factor to the equivalent number of cars based on the amount of road space they take up.
Permanent access	Access required to infrastructure during the operational phase of the Project, for operational and maintenance purposes.
Practical Capacity	The maximum flow a junction can handle under typical condition
Primary Access Routes	Access routes on the public highway designated for use by construction vehicles (typically for HGVs) to travel from the strategic road network / major road network to the site access point.
Project Section	Geographical 'sections' have been identified that break the Project down into smaller units for ease of description within the documentation. These Project Sections are broken down into eight sections based largely on Local Planning Authority boundaries.
Public Right of Way	A footpath, bridleway or byway accessible to all members of the public.

Term	Definition
Pylon	Structures that support the overhead line (conductors).
Ratio of Flow to Capacity (RFC)	A measurement used to determine how busy an approach is at an unsignalised junction.
Site access points	The location on a PAR where construction vehicles will transition between the public highway and haul roads/working areas
Special Order	A category of abnormal load for those which are above 150,000 kg in total weight, 6.1 m in total width or 30 m in rigid length.
Special Types General Orders (STGO)	A movement order under which abnormal loads can be transported subject to conditions which are split into 3 categories (STGO Cat 1/2/3) and are governed by vehicle and/or axle weight.
Swept path analysis	A digital simulation process used to assess whether a proposed or existing road layout can accommodate the movement of modelled vehicles.
Standard mitigation measures	Comprise management activities and techniques, which would be implemented throughout construction of the Project to limit effects through adherence to good site practices.
Strategic Road Network	Comprises the motorway and trunk road network, managed by National Highways, as defined by the Department for Transport
Substation	Substations are used to control the flow of power through the electricity system. They are also used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses.
Temporary construction compounds	Temporary compounds installed during the construction phase of the Project. Each compound may contain storage areas including laydown areas, soils storage and areas for equipment and fuel, drainage, generators, car parking and offices and welfare areas (portacabins).
Theoretical Capacity	The absolute maximum flow a junction can handle under ideal conditions
Transformer	An electrical component used to transfer energy from one circuit to another, often used to step the voltage value up or down.
Transport Assessment	Transport Assessment is a comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures will be taken to deal with the anticipated transport effects of the Project. It is separate to Chapter 16: Traffic and Transport (document reference 6.16).
Transport Coordinators	The Transport Coordinators will be responsible for the monitoring and management of measures recorded within the CTMP. The Transport Coordinators would liaise with the Travel Plan Coordinator (TPC) to help identify initiatives to limit vehicle movements. They would also liaise with the Local Highway Authorities to provide monitoring reports for the CTMP.

Term	Definition
Travel Plan Coordinator	A person or role appointed to develop, implement, monitor, and promote a Travel Plan for a development. The Travel Plan Coordinator acts as the main point of contact between the developer, Local Planning Authority, and transport stakeholders. Their responsibilities include encouraging sustainable travel choices (e.g. walking, cycling, public transport), collecting travel data, and ensuring compliance with planning obligations related to transport.
Underground cable	An insulated conductor carrying electric current designed for underground installation. Underground cables link together two Cable Sealing End compounds.
Visibility splay	Areas of tree/vegetation removal, typically where access points are, to enable a driver to see down the road and know when the road is clear.
Working area	Working area required to construct elements of the Project, such as pylons, underground cables, CSE compounds.

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