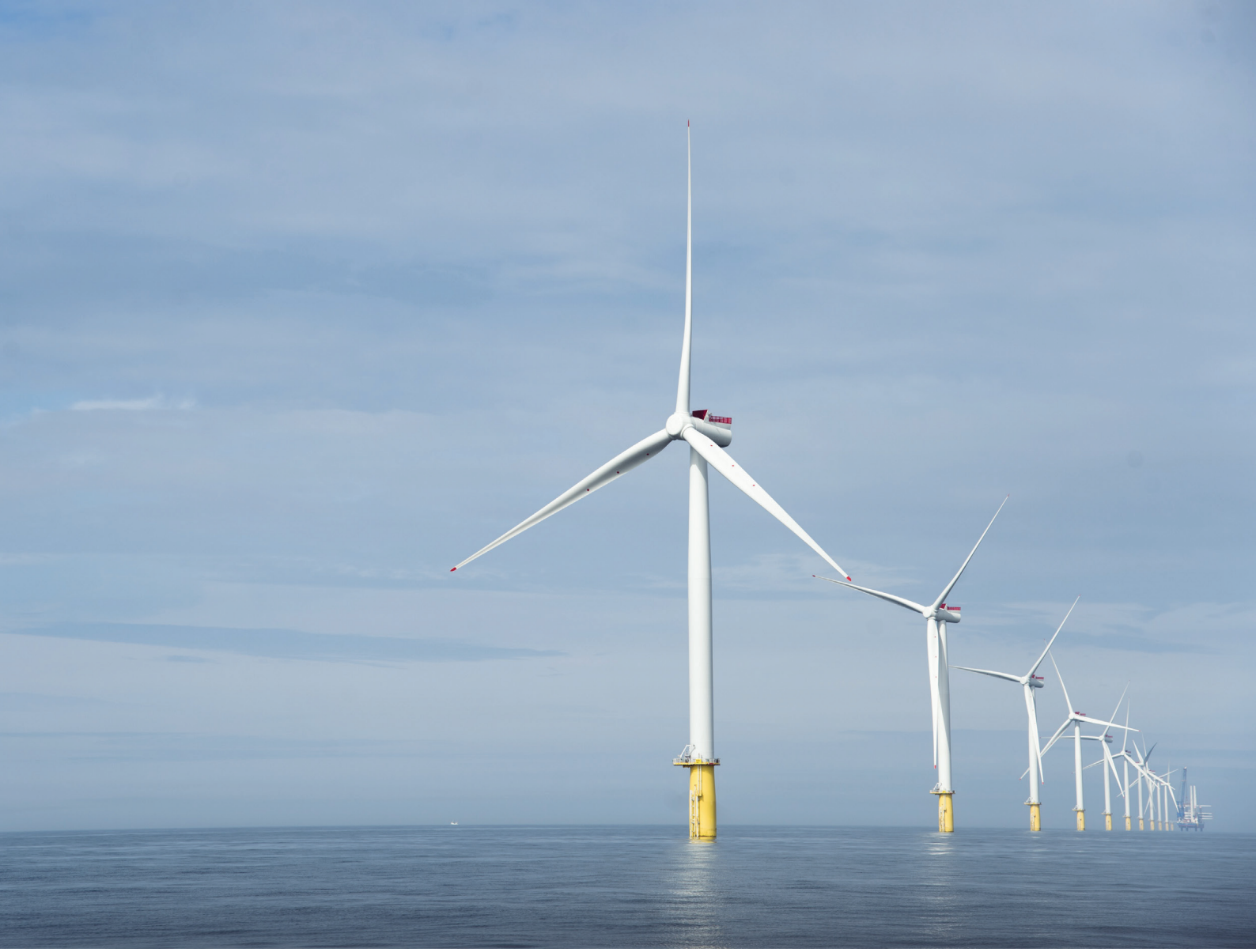

Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects

Environmental Statement

Volume 1

Chapter 24 - Traffic and Transport

August 2022
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Title: **Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects** **Environmental Statement** **Chapter 24: Traffic and Transport**	
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Glossary of Acronyms

AADT	Annual Average Daily Traffic
ATC	Automatic Traffic Count
BDC	Broadland District Council
CIA	Cumulative Impact Assessment
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DECC	Department for Energy and Climate Change
DEP	Dudgeon Offshore Wind Farm Extension Project
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
ESDAL	Electronic Service Delivery for Abnormal Loads
TG	Expert Topic Group
GEART	Guidelines for the Environmental Assessment of Road Traffic
GHG	Greenhouse Gas
HDD	Horizontal Directional Drill
HE	Highways England (now known as National Highways)
HGV	Heavy Goods Vehicle
HP3	Hornsea Project Three
LV	Light Vehicle
NB	Norfolk Boreas
NCC	Norfolk County Council
NNDC	North Norfolk District Council
NH	National Highways (formerly known as Highways England)
NPS	National Policy Statement
NRSWA	New Roads and Street Works Act
NSIP	Nationally Significant Infrastructure Project
NV	Norfolk Vanguard
OCTMP	Outline Construction Traffic Management Plan
PEIR	Preliminary Environmental Information Report

PPG	Planning Practice Guidance
RIS	Road Investment Strategy
SCC	Suffolk County Council
SEP	Sheringham Shoal Offshore Wind Farm Extension Project
SNC	South Norfolk Council
SRN	Strategic Road Network
TA	Transport Assessment
TMA	Traffic Management Act
TTSA	Traffic and Transport Study Area
UK	United Kingdom

Glossary of Terms

Order Limits	The area subject to the application for development consent, including all permanent and temporary works for SEP and DEP.
Dudgeon Offshore Wind Farm Extension Project (DEP)	The Dudgeon Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.
DEP onshore site	The Dudgeon Offshore Wind Farm Extension onshore area consisting of the DEP onshore substation site, onshore cable corridor, construction compounds, temporary working areas and onshore landfall area.
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the EIA and HRA for certain topics.
Expert Topic Group (ETG)	A forum for targeted engagement with regulators and interested stakeholders through the EPP.
Heavy Goods Vehicle (HGV)	HGV is the term for any vehicle with a Gross Weight over 3.5 tonnes. This is also used as a proxy for HGVs and buses / coaches recognising the similar size and environmental characteristics of the respective vehicle types.
Horizontal directional drilling (HDD) zones	The areas within the onshore cable corridor which would house HDD entry or exit points.
Jointing bays	Underground structures constructed at regular intervals along the onshore cable corridor to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The point at the coastline at which the offshore export cables are brought onshore and connected to the onshore export cables.
Links	A road or group of roads with similar traffic characteristics and composition.
Light Vehicle (LV)	The term ‘light vehicle’ is used to describe the range of vehicles that would be used by construction employees, i.e. cars, vans, pick-ups, minibuses, etc.
Movement	A two-way trip (i.e. the arrival and departure from site) for the transfer of employees or goods.
Onshore cable corridor	The area between the landfall and the onshore substation sites, within which the onshore cable circuits will be installed along with other temporary works for construction.

Onshore export cables	The cables which would bring electricity from the landfall to the onshore substation. 220 – 230kV.
Onshore Substation	Compound containing electrical equipment to enable connection to the National Grid.
Traffic and Transport Study Area (TTSA)	Area where potential impacts from the project could occur, as defined for each individual EIA topic.
Sheringham Shoal Offshore Wind Farm Extension Project (SEP)	The Sheringham Shoal Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.
The Applicant	Equinor New Energy Limited.
Transition joint bay	Connects offshore and onshore export cables at the landfall. The transition joint bay will be located above mean high water.
Vehicle (HGV, Traffic) trips	A two-way trip (i.e. the arrival and departure from site) for the transfer of employees or goods.

24 Traffic and Transport

24.1 Introduction

1. This chapter of the Environmental Statement (ES) describes the potential impacts of the proposed Sheringham Shoal Offshore Wind Farm Extension Project (SEP) and Dudgeon Offshore Wind Farm Extension Project (DEP) on Traffic and Transport. The chapter provides an overview of the existing environment for a defined traffic and transport study area, followed by an assessment of the potential impacts and associated mitigation for the construction, operation, and decommissioning phases of SEP and DEP.
2. This assessment has been undertaken with specific reference to the relevant legislation and guidance, of which the primary sources are the National Policy Statements (NPS). Details of these and the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Impact Assessment (CIA) are presented in **Chapter 5 EIA Methodology** and **Section 24.4**.
3. The assessment has informed and should be read in conjunction with following linked chapters:
   - **Chapter 22 Air Quality**;
   - **Chapter 23 Noise and Vibration**;
   - **Chapter 27 Socio-Economics and Tourism**; and
   - **Chapter 28 Health**.
4. This chapter includes a summary of the information contained within a Transport Assessment (TA), (**Appendix 24.1** of this chapter).
5. An outline Construction Traffic Management Plan (OCTMP) (document reference 9.16) has also been prepared and submitted with the DCO application. The OCTMP contains the control measures and monitoring procedures for managing the potential traffic and transport impacts of constructing SEP and DEP. The OCTMP will be developed further in consultation with Norfolk County Council (NCC) and National Highways (NH) prior to the commencement of the authorised project.
6. Additional information to support the traffic and transport assessment includes:
   - **Appendix 24.2 Abnormal Indivisible Load (AIL) Study**;
   - **Appendix 24.3 Pedestrian Delay Assessment**;
   - **Appendix 24.4 Cumulative Traffic Flows**; and
   - **Appendix 24.5 Interaction between Impacts**.

24.2 Consultation

7. Consultation with regard to traffic and transport has been undertaken in accordance with the general process described in **Chapter 5 EIA Methodology** and the **Consultation Report** (document reference 5.1). The key elements have included scoping, the ongoing Evidence Plan Process (EPP) via the traffic and transport Expert Topic Group (ETG), Public Information Days and the Section 42 consultation on the Preliminary Environmental Information Report (PEIR).

8. The feedback received throughout this process has been considered in preparing the ES. This chapter has been updated following consultation in order to produce the final assessment submitted within the Development Consent Order (DCO) application. **Table 24-1** provides a summary of the scoping and ETG consultation responses received to date relevant to this topic, and details of how the Project team has had regard to the comment and how these have been addressed within this chapter.

9. Section 42 and targeted consultation (in relation to the main compound) are provided within the **Consultation Report** (document reference 5.1), which has been submitted as part of the DCO application.

10. The consultation process is described further in **Chapter 5 EIA Methodology**. Full details of the consultation process are presented in the **Consultation Report**.

Table 24-1: Consultation Responses

Consultee	Date/ Document	Comment	Project Response
Scoping Responses			
Planning Inspectorate	19th November 2019 Scoping Response	The Inspectorate agrees that significant operational effects from traffic and transport are unlikely and that this matter can be scoped out of the assessment.	**Section 24.3.2.3** details the rationale for scoping out the operational assessment.
		The onshore traffic associated with offshore construction is an impact arising from the Proposed Development and the Inspectorate considers that the likely significant effects of the whole scheme should be assessed. Therefore, the transport of elements for the Proposed Development should be assessed where significant effects could occur.	NCC and NH agreed during traffic and transport ETG (23 March 2020) that onshore traffic associated with offshore construction can be scoped out of the assessment.
		The Inspectorate agrees that significant transboundary effects from traffic and transport are unlikely and therefore this matter can be scoped out of the ES.	**Section 24.4.5** details the rationale for scoping out the transboundary effects from the assessment.
		The assumptions made in deriving the traffic demand should be clearly explained within the ES and the maximum parameters should be applied in terms of the Rochdale envelope approach to the assessment.	**Section 24.3.2** provides details of the realistic worst-case scenario following the Rochdale envelope approach to assessment. The TA (**Appendix 24.1**) provides full details of traffic demand.
		The Inspectorate considers that the assessment should assess cumulative impacts with Hornsea Project Three, Norfolk Vanguard and Norfolk Boreas in respect of Oulton airfield and Cawston village.	**Section 24.7** sets out traffic flows from Hornsea Project Three, Norfolk Vanguard and Norfolk Boreas and details the methodology for a cumulative impact assessment provided within the DCO application.
		The Inspectorate expects clear definitions of magnitude of effect to be provided within the ES for all environmental effects.	**Section 24.4.3.3** contains the definitions of magnitude of effect for all identified environmental effects.
NCC	19th November 2019 Scoping Response	The applicants will need to submit a full Transport Assessment (TA). The TA will need to assess the effects of the anticipated traffic upon driver delay; severance; pedestrian delay; pedestrian amenity; accidents; road safety; and impact from abnormal loads.	This chapter and supporting TA (**Appendix 24.1**) contain an assessment of all effects identified by NCC.
		The applicants need to provide details of Vehicles • Define the nature of the traffic likely to be generated. In addition, for the largest vehicles proposed to use each access route(s) this must include: - • Minimum width (including unhindered horizontal space). • Vertical clearance. • Axle weight restriction.	The TA (**Appendix 24.1**) details the types of Heavy Goods Vehicles (HGVs) that will be utilised in the construction of onshore infrastructure.
		The applicants need to provide details of Access and Access Routes • The anticipated volume of construction traffic needs to be identified for each individual route. • Detailed plans of site accesses incorporating sightline provision. • Details of any routes to be stopped up. • Confirmation of any weight restrictions applicable on the route. • Details of any street furniture along each route that may need to be temporarily removed/ relocated. • Any roads to be crossed by open cut trench methods need to be agreed in advance with the Highway Authority.	**Section 24.6.1** provides details of anticipated volume of construction traffic for each link in the Traffic and Transport Study Area (TTSA). The supporting TA (**Appendix 24.1**) contain details of proposed access strategy. An OCTMP (document reference 9.16) is provided with the DCO application which includes details of the routes to be used by HGVs. An Abnormal Indivisible Load Study is included within the DCO application (**Appendix 24.2**) which includes details on potential street furniture removal. Details of roads requiring open cut trenching are provided in **Section 24.6.**
		The applicants need to provide details of impacts during construction and mitigation measures. • Restrictions on the timing of construction works. • Removal of parked vehicles along the route(s) and potential mitigation measures. • Identification of the highway boundary along the construction traffic route (if required). • Any modifications required to the alignment of the carriageway or verges/over-runs.	**Section 24.6** discusses potential mitigation measures required for identified significant environmental impacts. This mitigation is captured in the OCTMP submitted as part of the DCO application (document reference 9.16).

Consultee	Date/ Document	Comment	Project Response
		• Identification of sensitive features along the route together with proposed mitigation measures. • Confirmation of any extraordinary maintenance agreement/s required by the Highway Authority. • A Construction Traffic Management Plan. • Measures proposed to avoid impacts upon traffic during the tourist season • Requirements for a Travel Plan (TP).	
		The cable route passes close to Oulton airfield which is intended to serve as a main compound for Hornsea 3; a mobilisation area for Norfolk Vanguard; and also a mobilisation area for Norfolk Boreas. The applicants need to identify any cumulative impacts arising from their proposals.	**Section 24.7** details the cumulative projects and methodology that inform the CIA assessment provided within the DCO application.
		The cable route passes close Cawston village which accommodates construction traffic for Hornsea 3; Norfolk Vanguard and also Norfolk Boreas. The applicants need to identify any cumulative impacts arising from their proposals.	**Section 24.7** details the cumulative projects and methodology that inform the CIA assessment provided within the DCO application. No HGV construction traffic will route through Cawston Village. This commitment is included as embedded mitigation (**Table 24-3**) and is captured in the OCTMP submitted as part of the DCO application (document reference 9.16).
		The signalised junction at Harford has been identified as already being over capacity. It is anticipated this project will need to utilise this junction for construction works to reach the substation. NH have previously expressed concern with this junction due to potential for traffic to stack back to the A47(T) roundabout.	The proposed onshore substation access is located off the A140, it has therefore been agreed with NCC that this junction would not be adversely impacted by SEP and DEP traffic.
Oulton Parish Council	19th November 2019 Scoping Response	Oulton Parish Council (OPC) commented on the access strategy of HGV movements via the 'A' road network. OPC state the cable route proposed will be accessed mostly by 'B' roads and unclassified roads. OPC requested early consultation with NCC, District Councils and Parish Councils as these bodies have local knowledge and specific concerns.	NCC are included in the Traffic and Transport ETG and have been consulted at all stages of the planning process.
Weybourne Parish Council	19th November 2019 Scoping Response	Weybourne Parish Council raised concerns that the road infrastructure is inadequate to gain access to the Landfall location by HGVs. Also request that Equinor consider the use of barges and pontoons to bring construction machinery and materials to the Landfall site.	The assessment contained in this ES is based on a worst-case scenario where all materials are transported via the road network. The assessment has considered the maximum size of vehicle to be used at the landfall location.
ETG Meetings			
NH and NCC	17th January 2020 Traffic and Transport ETG 1	An initial ETG meeting was held to discuss the proposed approach to: • Data gathering; • Derivation and distribution of employee and HGV construction traffic; • The effects to be assessed; and • DCO documents. Agreement were reached with regards to: • The impact assessment methodology; • The approach to deriving and assigning construction traffic to the TTSA; • That a separate Travel Plan would not be required and measures could be contained within the OCTMP; and • The approach to deriving future year traffic flows.	The approach to data gathering is outlined within **Section 24.4.2** and the supporting TA (**Appendix 24.1**). The approach to derivation and distribution of construction traffic is outlined within the supporting TA (**Appendix 24.1**). The impact assessment methodology and agreed effects to be assessed are outlined within **Section 24.4**. The approach to derivation of future year traffic flows is outlined within the supporting TA (**Appendix 24.1**). An OCTMP (document reference 9.16) is provided with the DCO application which includes travel plan measures.
NH and NCC	18th September 2020 Traffic and Transport ETG 2	A second ETG meeting was held to discuss the outcomes of the Traffic and Transport Method Statement issued on the 21 July 2020. The following agreements were reached: • Reconfirmed no changes to agreements reached at ETG 1;	The approach to deriving baseline and future year traffic flows is outlined within the supporting TA (**Appendix 24.1**).

Consultee	Date/ Document	Comment	Project Response
		• Agreed to the use of 2025 as a base year for assessment; • Agreed to the use of a neutral period for traffic data collection; • The approach to scoping out of the assessment consideration of operational impacts; and • The approach to not undertaking a separate assessment of decommissioning impacts.	
NH and NCC	13 July 2021 Traffic and Transport ETG 3	A third ETG meeting was held to discuss feedback received from NH and NCC through their Section 42 responses. The following agreements were reached: • Reconfirmed no changes to agreements reached at ETG 1 and 2; • The extent of the TTSA; • The baseline data captured for the PEIR was appropriate, but that NCC would require a clause in the OCTMP that permits further assessment of network capacity constraints at identified sensitive junctions if baseline traffic conditions are evidenced to have changed materially from those of the DCO application post consent. • A separate 'abridged' Transport Assessment would be required in support of the DCO application; • The junctions, to be assessed for driver delay impacts, software to be used and the approach to data collection; • NH agreed that there would be no impacts upon severance, amenity, pedestrian delay or driver delay (highway geometry) from SEP and DEP construction traffic on the Strategic Road Network; and • The approach to cumulative impact assessment. Areas where agreements had not yet been reached were also discussed, these included: • Accesses from the local highway network; and • Impact assessment findings on the local highway network.	Details of the approach to defining the extent of the TTSA is outlined within **Section 24.3.1**. The approach to deriving baseline and future year traffic flows is outlined within the supporting TA (**Appendix 24.1**). An OCTMP (document reference 9.16) is provided with the DCO application which includes clauses in relation network capacity constraints. A supporting TA is provided as (**Appendix 24.1**). The supporting TA (**Appendix 24.1**) provides details of the approach to the assessment of capacity at the identified junctions and contains a detailed summary of the assessment findings. The assessment of traffic and transport impacts upon all effects scoped in traffic and transport effects is presented within **Section 24.6**. **Section 24.7** presents the findings of the CIA. The supporting TA (**Appendix 24.1**) presents the proposed access strategy and outline designs for all accesses and crossings.
NCC	31 March 2022 Traffic and Transport ETG 4	A fourth ETG meeting was held to discuss areas of agreement and to provide NCC with an overview of the initial assessment findings. The following agreements were reached: • Reconfirmed no changes to agreements reached at ETG 1, 2 and 3; • Agreement of the proposed access strategy from the local highway network; • Agreement of the roads to be crossed using trenchless techniques; and • The proposed approach to providing an outline of mitigation measures for the effects of amenity, severance and driver delay (highway constraints) within the OCTMP. Areas where no agreements had been reached at this stage were also discussed. NCC reserved their position upon the impact assessment findings until submission of the DCO documentation for the effects of, severance, amenity, pedestrian delay, road safety, road safety, driver delay (capacity), driver delay (highway geometry) and abnormal loads.	The supporting TA (**Appendix 24.1**) presents the proposed access strategy and outline designs for all accesses and crossings. **Section 24.6.1.9** presents details of the roads that would not be crossed using trenchless techniques and an assessment of the associated impacts. An OCTMP (document reference 9.16) is provided with the DCO application which includes an outline of mitigation measures to be adopted. **Section 24.6.1** presents the findings of the impact assessment.
NH	5 April 2022 Traffic and Transport ETG 5	A fifth ETG meeting was held to discuss areas of agreement and to provide NH with an overview of the initial assessment findings. The following agreements were reached: • Reconfirmed no changes to agreements reached at ETG 1, 2 and 3; • Agreement of the proposed access strategy from the A47; • Agreed that there would be no impact upon the strategic road network from the proposed road closures;	The supporting TA (**Appendix 24.1**) presents the proposed access strategy and outline designs for all accesses and crossings. **Section 24.6.1** presents the findings of the impact assessment.

Consultee	Date/ Document	Comment	Project Response
		Areas where no agreements had been reached at this stage were also discussed. NCC reserved their position upon the impact assessment findings until submission of the DCO documentation for the effects of, driver delay (capacity), road safety and abnormal loads.	

24.3 Scope

24.3.1 Study Area

11. The Traffic and Transport Study Area (TTSA) has been established through stakeholder engagement, determining the most probable routes for traffic, for both the transportation of materials and employees.
12. The extent of the TTSA is shown in **Figure 24.1**. The TTSA is divided into 140 separate highway sections known as links, which are sections of road with similar characteristics and traffic flows.
13. The extent of the TTSA was agreed with NCC and NH at an ETG meeting on the 13 July 2021.
14. Following the completion of the PEIR, there have been a number of refinements to the proposed access locations for SEP and DEP. The TTSA area was therefore revised to remove those sections of highway (links) that would no longer be impacted by SEP and/or DEP traffic. A total of 16 links have been removed as a consequence of these access refinements, no additional links have been included.
15. In order to allow cross referencing between the PEIR and the ES, links have not been renumbered to account for the removal of these 16 links.
16. Routes that extend outside of the TTSA are routes where construction traffic has dissipated and/ or include roads with negligible sensitive receptors. These parameters combine and do not represent significant impacts upon users of the existing highway network.

24.3.2 Realistic Worst-case Scenario

24.3.2.1 General Approach

17. The design of SEP and DEP will evolve during the Projects' lifecycle informed by further detailed engineering studies. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst-case scenarios have been defined to determine the maximum levels of effect that may arise. This approach to EIA, referred to as the Rochdale Envelope, is common practice for developments of this nature, as set out in Planning Inspectorate Advice Note Nine: Rochdale Envelope (v3, 2018). The Rochdale Envelope for a project outlines the realistic worst-case scenario for each individual impact, so that it can be safely assumed that all lesser options will have less impact. Further details are provided in **Chapter 5 EIA Methodology**.
18. The realistic worst-case scenarios for the traffic and transport assessment are summarised in **Table 24-2**. These are based on the project parameters described in **Chapter 4 Project Description**, which provides further details regarding specific activities and their durations.

19. In addition to the design parameters set out in **Table 24-2**, consideration is also given to how SEP and DEP will be built out as described in **Sections 24.3.2.2** to **24.3.2.2** below. Recognising SEP and DEP are the subject of one DCO application, the realistic worst-case scenarios make provision for either one or both of the projects to be developed, and if both are developed, that construction may be undertaken either concurrently or sequentially. Further details are provided in **Chapter 4 Project Description**.

24.3.2.2 Construction Scenarios

20. In the event that both SEP and DEP are built, the following principles set out the framework for how SEP and DEP may be constructed:
    - SEP and DEP may be constructed at the same time, or at different times;
    - If built at the same time both SEP and DEP could be constructed in four years;
    - If built at different times, either Project could be built first;
    - If built at different times, each Project would require a four year period of construction;
    - If built at different times, the offset between the start of construction of the first Project, and the start of construction of the second Project may vary from two to four years;
    - Taking the above into account, the total maximum period during which construction could take place is eight years for both Projects; and
    - The earliest construction start date is 2025.
21. In order to determine which construction scenario presents the realistic worst-case for each receptor and impact, the assessment considers both maximum duration effects (by assessing average traffic demand for the duration of each scenario) and maximum peak effects (by assessing peak traffic demand for the period that occurs).
22. The construction parameters summarised in **Table 24-2** have informed a more detailed review of construction activity which has in turn, informed the worst-case traffic scenarios. Full details of the traffic derivation is contained in the TA (**Appendix 24.1**).
23. The impact assessment for traffic and transport considers the following development scenarios in determining the worst-case scenario for each topic:
24. The following influences were key considerations when developing traffic worst-case scenarios:
    - Build SEP or build DEP in isolation.
        - generates less traffic demand overall than a SEP and DEP concurrently scenario (due to the reduction in quantities). However, due to differences in activity scheduling for the respective projects it does not necessarily follow that SEP or DEP in isolation would generate less daily traffic on respective links. Therefore, it is necessary to consider the traffic impacts from both SEP or DEP in isolation and SEP and DEP concurrently as a worst-case scenario.

- Build SEP and DEP sequentially with a gap of up to four years between the start of construction of each Project – reflecting the maximum duration of effects.
    - A SEP and DEP sequential scenario would have the same activity schedule and in turn daily traffic demand, as a SEP or DEP in isolation scenario. The daily traffic demand would be replicated for each project.
- Build SEP and DEP concurrently – reflecting the maximum peak effects.
    - In the event that there is an overlap between SEP and DEP in the sequential built out scenario, the potential maximum impacts are assessed within the worst-case parameters identified for SEP and DEP concurrently built out scenario..

25. The two worst-case construction scenarios considered by the traffic and transport assessment are therefore:
    - Build SEP or build DEP in isolation; and
    - Build SEP and DEP concurrently.

24.3.2.3 Operation Scenarios

26. Operation scenarios are described in detail in **Chapter 4 Project Description**.
27. During the operational phase, traffic would be limited to those generated by the operational and maintenance activity at the onshore substation. There is no ongoing requirement for regular maintenance of the onshore cables following installation, however access to the onshore export cables would be required to conduct emergency repairs, if necessary.
28. The onshore substation would not be manned; however, access would be required periodically for routine maintenance activities, estimated at an average of one visit per week.
29. No significant traffic impacts are anticipated during the operational and maintenance phase and as agreed with the Planning Inspectorate, no operational scenarios will be assessed within this traffic and transport impact assessment.

24.3.2.4 Decommissioning Scenarios

30. Decommissioning scenarios are described in detail in **Chapter 4 Project Description**. Decommissioning arrangements for the onshore elements of SEP and DEP will be agreed through the submission of an onshore decommissioning programme to the relevant planning authority for approval within six months of the permanent cessation of commercial operation (unless otherwise agreed in writing by the relevant planning authority), however for the purpose of this assessment it is assumed that decommissioning of SEP and DEP could be conducted separately, or at the same time.

31. No final decision has yet been made regarding the final decommissioning policy for SEP and DEP onshore infrastructure including landfall, onshore cable corridor and onshore substation. It is also recognised that legislation and industry best practice change over time. However, it is likely that SEP and DEP equipment, including the cable, would be removed, reused, or recycled where possible, with the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works would be determined by the relevant legislation and guidance at the time of decommissioning and would be agreed with the regulator. It is anticipated that, for the purposes of a worst-case scenario, the impacts would be no greater than those identified for the construction phase. Therefore, no separate assessment of decommissioning scenario impacts will be presented within the EIA.

Table 24-2: Realistic Worst-case Scenarios

Impact	SEP or DEP in Isolation	SEP and DEP Concurrently	SEP and DEP Sequentially	Notes and Rationale
Construction				
Impact 1: Severance **Impact 2**: Amenity **Impact 3**: Pedestrian Delay **Impact 4**: Road Safety **Impact 5**: Driver Delay (capacity) **Impact 6**: Driver Delay (highway constraints) **Impact 7**: Driver Delay (road closures)	The onshore parameters described in **Chapter 4 Project Description** have been reviewed by construction contractors J Murphy and Sons Ltd. (JMS) and the Applicant's engineering team. JMS and the Applicant's engineering team have applied their experience gained through the construction of previous wind farm projects in the UK to determine the worst-case scenario for traffic and transport. Traffic demand has been forecasted by applying a 'first principles' approach. The first principles approach generates traffic volumes from an understanding of material quantities and employee numbers required for SEP and DEP and converts these metrics into vehicle trips. The following worst-case assumptions (describe in detail in TA (**Appendix 24.1**) have been applied to all scenarios: • HGV numbers assume all materials are delivered direct to the work area by road, i.e. no use of rail or water transport; • HGV numbers assume no back-hauling, i.e. no reduction has been applied to take account of the potential that vehicles making deliveries could be used to export materials; • A contingency (reflecting the uncertainties in the design) has been applied to all material quantities and associated HGV movements; • Employee movements have been based upon one employee to one vehicle, i.e. no reduction has been applied to account for the potential for that construction employees may car-share, or travel in contractor provided minibuses; • No reduction in traffic movements has been applied to account for the reassignment of traffic. For example, many HGVs would already be on the local network serving existing construction projects and would naturally reassign to serve SEP and DEP when their existing contracts are complete.			The assessment of severance, amenity and road safety is informed through a consideration of the magnitude of change in daily traffic flows. In order to consider a worst-case scenario, the assessment utilises the peak daily traffic flows that could occur during the construction phase. The assessment of pedestrian delay and driver delay is informed through a consideration of changes in hourly traffic flows. In order to consider a worst-case scenario, the assessment utilises the peak daily traffic flows that could occur during the construction phase. Hourly flows are then calculated from peak daily traffic flows. The peak daily traffic flows are a derivation of the peak activities per onshore cable corridor section occurring simultaneously for SEP and/or DEP. They represent the maximum traffic demand that could occur on the highway network and therefore informs the magnitude of effect for the assessed impacts. Should there be a reduction in peak activities occurring simultaneously for any of the build out scenarios the resultant traffic demand would fall within the assessed worst-case traffic demand.
	The worst-case parameters associated with the derivation of the construction vehicle numbers derived by JMS are provided within Annex 9 of the TA (**Appendix 24.1**). The TA also outlines the worst-case parameters adopted for assigning these daily traffic numbers to the TTSA. The resultant peak daily traffic flows upon each link within the TTSA are presented in **Table 24-19**.	The worst-case parameters associated with the derivation of the construction vehicle numbers derived by JMS are provided within Annex 10 of the TA (**Appendix 24.1**). The TA also outlines the worst-case parameters adopted for assigning these daily traffic numbers to the TTSA. The resultant peak daily traffic flows upon each link within the TTSA are presented in **Table 24-20**.	A SEP and DEP sequential scenario would have the same activity schedule and in turn daily traffic demand, as a SEP or DEP in isolation scenario. The daily traffic demand would be replicated for each project. In the event that there is an overlap between SEP and DEP in the sequential built out scenario, the potential impacts are assessed within the worst-case parameters identified for SEP and DEP concurrently built out scenario.	
Operational				
No significant traffic impacts are anticipated during the operational phase and as agreed with stakeholders through the EPP and as set out in the scoping opinion, no operational scenarios will be assessed within this traffic and transport impact assessment.				

24.3.3 Summary of Mitigation Embedded in the Design

32. This section outlines the embedded mitigation relevant to the traffic and transport assessment, which has been incorporated into the design of SEP and DEP (**Table 24-3**). Where other mitigation measures are proposed, these are detailed in the impact assessment (**Section 24.6**).

Table 24-3: Embedded Mitigation Measures

Parameter	Mitigation Measures Embedded into the Project Design
General	
Site Selection	SEP and DEP has undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements. Considerations include (but are not limited to) adhering to the Horlock Rules (for explanation see **Chapter 3 Site Selection and Alternatives**) for the onshore substation and associated infrastructure and developing construction methodologies to minimise potential impacts, including: • Avoiding key constraints e.g. height or weight restrictions on the highway network, where possible; • Avoiding populated areas, where possible; • Avoiding proximity to residential dwellings; and • Minimising impacts to local residents in relation to access to services and road usage, including road and footpath closures.
Duct Installation Method	The onshore cable duct installation method is proposed to be conducted in a sectionalised approach in order to minimise impacts. Construction teams would work on sections of up to 1km at a time and once the cable ducts have been installed, the section would be back filled, and the topsoil replaced before moving onto the next section. This would minimise the amount of land being worked on at any one time and would also minimise the duration of works on any given section of the route. This strategy has informed suitable access points and optimum routes for construction traffic and also serves to minimise daily construction traffic demand.
HDD at Landfall	HDD at landfall to avoid restrictions or closures to the Weybourne Beach during construction[1].
Trenchless Crossings	Commitment to trenchless crossing techniques to minimise disruption and delay to users of the following transport routes; • North Norfolk Railway

[1] Whilst the HDD works should not require any prolonged periods of restrictions or closures to the beach for public access, it is possible that some work activities will be required to be performed on the beach that may require short periods of restricted access. For example, use of a temporary seawater pipe and pump to supply seawater to the onshore HDD temporary works compound for use with the drilling fluid, as well as the use of vehicles to transport the ducting across the beach. Any areas subject to short-term restricted access would be agreed in advance with the Countryside Access Officer at NCC prior to construction.

Parameter	Mitigation Measures Embedded into the Project Design
	• Cambridge to Norwich Railway • All A and B roads and 16 other local roads • The proposed Norwich Western Link Road
Embedded mitigation for traffic and transport	
Temporary Construction Compounds (TCCs)	TCC locations have been located close to main A roads wherever possible minimising impacts upon local communities and utilising the most suitable roads. TCCs are located away from population centres where practical to reduce impact on local communities and population centres.
Onshore Infrastructure access	Access points located to minimise impacts on sensitive receptors, road safety and local routes.
Vehicle Trips	Construction of a typically 5m wide haul road with a length up to 60km to reduce the number of access points and Heavy Goods Vehicle (HGV) trips on the local road network. Carefully selected delivery routes to minimise impacts on the sensitive receptors within the TTSA.
Vehicle Routing	Links 91 (Blind Lane), 48 (Horsford), Cantley Road and as well as Attlebridge Village, Barford Village, Cawston Village, Oulton Village and Weston Longville Village are prohibited for use by SEP/DEP HGV traffic at the request of highway stakeholders and the local community.
Construction Accesses	Repositioning of numerous construction access locations to meet stakeholder and landowner requests, avoid ecological features and to ensure road safety.
Blind Lane / Taverham Road Temporary Scheme	During an ETG meeting with NH (3 July 2021), NH requested that if improvements to the A47 are not completed prior to the commencement of SEP and/or DEP, that road safety improvements to the junction of the A47, Blind Lane and Taverham Road proposed by Hornsea Project Three (HP3) are retained/ re-introduced for the construction of SEP and DEP. These amendments include the closure of Blind Lane and creation of a left in left out only junction at Taverham Road and are detailed further within the OCTMP (document reference 9.16).

24.4 Impact Assessment Methodology

24.4.1 Policy, Legislation and Guidance

33. There are a number of legislation applicable to traffic and transport. The following sections provide detail on key pieces of legislation which are relevant to this chapter. Full details on policy, legislation and guidance is provided in **Chapter 2 Policy and Legislative Context**.

24.4.1.1 National Policy Statements

34. The assessment of potential impacts upon traffic and transport has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision-making documents for Nationally Significant Infrastructure Projects (NSIPs). Those relevant to SEP and DEP are:

- Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a);

- NPS for Renewable Energy Infrastructure (EN-3) (DECC 2011b); and
- NPS for Electricity Networks Infrastructure (EN-5) (DECC 2011c).

35. The specific assessment requirements for traffic and transport, as detailed in the NPS, are summarised in **Table 24-4** together with an indication of the section of the ES chapter where each is addressed.

36. It is noted that the NPS for Energy (EN-1), the NPS for Renewable Energy Infrastructure (EN-3) and the NPS for Electricity Networks Infrastructure (EN-5) are in the process of being revised. A draft version of each NPS was published for consultation in September 2021 (Department for Business Energy and Industrial Strategy (BEIS), (2021a), BEIS, (2021b) and BEIS (2021c) respectively). A review of these draft versions has been undertaken in the context of this ES chapter.

37. **Table 24-4** includes a section for the draft version of NPS in which relevant additional NPS requirements not presented within the current NPS (EN-1) have been included. A reference to the particular requirement's location within the draft NPS and to where within this ES chapter or wider ES it has been addressed has also been provided.

38. Minor wording changes within the draft version which do not materially influence the NPS (EN-1) requirements have not been reflected in **Table 24-4**.

Table 24-4: NPS Assessment Requirements

NPS Requirement	NPS Reference	Section Reference
NPS for Energy (EN-1)		
If a project is likely to have significant transport implications, the applicant's ES should include a Transport Assessment, using the New Approach To Appraisal / Transport Analysis Guidance methodology stipulated in Department for Transport (DfT) guidance, or any successor to such methodology.	Section 5.13.3	This chapter and the supporting TA (**Appendix 24.1**) have been produced in accordance with current transport guidance (referenced later within **Section 24.4)** and agreed with NCC and NH at ETG on the 23 March 2020.
Where appropriate, the applicant should prepare a Travel Plan including demand management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for car parking associated with the proposal and to mitigate transport impacts.	Section 5.13.4	**Section 24.6** contains an assessment of the potential impacts on the transport network associated with SEP and DEP and further outlines the mitigation measures for construction, such as demand management measures and heavy goods vehicle (HGV) controls. An OCTMP has been submitted with the DCO application (document reference 9.16). The OCTMP includes outline travel plan measures, which will be developed further in consultation with NCC and NH prior to the commencement of the authorised project.
Draft Overarching NPS for Energy (EN-1) (BEIS, 2021a)		
The draft NPS, includes for an additional sentence at the end of section 5.13.4 of the NPS. This states that:	Section 5.14.4	**Section 24.6** contains an assessment of the potential impacts on the transport network associated with SEP and DEP and further outlines the mitigation

NPS Requirement	NPS Reference	Section Reference
The assessment should also consider any possible disruption to services and infrastructure (such as road, rail and airports).		measures for construction, such as demand management measures and heavy goods vehicle (HGV) controls. No impacts upon other transport services or infrastructure are anticipated.

24.4.1.2 Local Planning Policy

39. EN-1 states that the planning Inspectorate will also consider Development Plan Documents or other documents in the Local Development Framework to be relevant to its decision making.

40. The onshore highway TTSA falls under the jurisdiction of NCC and Suffolk County Council (SCC) as the Local Highway Authorities and would potentially include the following Local Planning Authorities:

- North Norfolk District Council (NNDC);
- South Norfolk Council (SNC);
- Broadlands District Council (BDC);
- Norwich City Council (NCC);
- Breckland Council (BC);
- East Suffolk Council (ESC);
- Borough of Kings Lynn and West Norfolk; and
- Great Yarmouth Borough Council (GYBC).

41. NNDC have produced a Local Plan which includes the Core Strategy and Site Allocation Plans (North Norfolk District Council, 2008) setting out detailed, site specific policies providing the context for development across North Norfolk. NNDC is currently working on an Emerging Local Plan 2016-2036.

42. Breckland Council adopted a new Local Plan in November 2019 (Breckland Council, 2019) The plan aims to set a spatial vision and strategy for the district, with clear economic, social and environmental objectives.

43. East Suffolk Council was created by parliamentary order in April 2019 covering the former districts of Suffolk Coastal and Waveney District Councils. A local plan covering the former Waveney Local Planning Authority was adopted in March 2019 (East Suffolk Council, 2019) which supersedes the previous Development Plan Documents but retains the Supplementary Planning Documents.

44. The Borough of Kings Lynn and West Norfolk have produced a Local Plan which includes the Core Strategy and Site Allocation and Development Management Policies Plan setting out detailed, site specific policies providing the context for development across the Borough. The Borough is currently working on an Emerging Local Plan 2016-2036.

45. Great Yarmouth Borough Council have produced a Local Plan Part 1, which includes the Core Strategy adopted in December 2015 (Great Yarmouth Borough Council, 2015), with the Local Plan Part 2 (Development Management Policies and Site Allocations) currently in examination by the Planning Inspectorate. Once adopted it will supersede the remaining 'saved' policies from the 2001 Local Plan.

46. **Table 24-5** provides details of the local planning policy documents and the policies contained within these which are relevant to traffic and access. These policies have been considered within the development of this ES.

Table 24-5: Relevant Local Planning Policies

Document	Policy	Policy / Guidance purpose	ES consideration
North Norfolk District Council			
Local Development Framework – Core Strategy – Adopted September 2008	CT5: The Transport Impact of New Development	Development will be designed to reduce the need to travel and to maximise the use of sustainable forms of transport appropriate to its particular location.	The OCTMP (document reference 9.16) includes outline travel plan measures, which will be developed further in consultation with NCC, SCC and NH prior to the commencement of the authorised project.
South Norfolk Council			
Development Management Policies Document – Adopted October 2015	Policy DM 3.11 Road Safety and the Free Flow of Traffic	On all sites, development will not be permitted that endangers highway safety or the satisfactory functioning of the highway network.	**Section 24.6** details an assessment of the proposed SEP and DEP project impacts on the transport network.
Broadland District Council			
Development Management Policies Document – Adopted August 2015	Policy GC5: Renewable Energy	Proposals for renewable energy technology, associated infrastructure and integration of renewable energy technology will be encouraged where its impacts are (or can be made) acceptable.	**Section 24.6** details an assessment of the proposed SEP and DEP project impacts on the transport network.
	Policy TS2 – Travel Plans and Transport Assessments	In the case of major development, or where a particular need is identified, a Transport Assessment and/or Travel Plan will be required. Developers will need to include proposals to deal with any consequences of their development in terms of maximising access by foot, cycle and public transport and the means by which this will be secured in perpetuity.	The OCTMP (document reference 9.16) includes outline travel plan measures, which will be developed further in consultation with NCC, SCC and NH prior to the commencement of the authorised project.
	Policy TS3: Highway Safety	Development will not be permitted where it would result in any significant adverse impact upon	**Section 24.6** details an assessment of the proposed SEP and DEP

Document	Policy	Policy / Guidance purpose	ES consideration
		the satisfactory functioning or safety of the highway network.	project impacts on the transport network including a detailed consideration of road safety.
Norwich City Council			
Development Management Policies Document – Adopted December 2014	Policy DM30: Access and Highway Safety	Development must seek opportunities to remove unnecessary access points onto the principal or main distributor routes (as defined in the Norwich Area Transportation Strategy route hierarchy). New vehicular accesses onto these routes will only be permitted where there is no practical alternative from a more minor route and (where adjacent to an existing or proposed bus rapid transit corridor) they would not prevent or restrict the implementation of necessary highway or junction improvement works associated with the transit corridor. Any new access point must allow for access and egress in a forward gear.	The TA (**Appendix 24.1**) and the OCTMP (document reference 9.16) submitted with the DCO application details the SEP and/or DEP access strategy which provides information on the access locations and routes.
Breckland Council			
Breckland Council Local Plan – Adopted November 2019	Policy TR 01: Sustainable Transport Network	Development should: • seek to minimise the need to travel; • promote opportunities for sustainable transport modes; • not adversely impact on the operation or safety of the strategic road network; • improve accessibility to services; and support the transition to a low carbon future.	The OCTMP (document reference 9.16) includes outline travel plan measures, which will be developed further in consultation with NCC, SCC and NH prior to the commencement of the authorised project. **Section 24.6** further details an assessment of the proposed SEP and DEP project impacts on the transport network.
	Policy TR 02: Transport Requirements	Major development proposals should include an assessment of the impacts of new development on the existing transport network; and demonstrate how they will maximise connectivity within and through a development and to the surrounding areas, including the provision of high quality and safe pedestrian and cycle routes.	The TA (**Appendix 24.1**) outlines baseline traffic flows, the methodology behind predicted construction traffic flows, and the resulting combined traffic flows across the TTSA.

Document	Policy	Policy / Guidance purpose	ES consideration
		Where potential transport impacts are identified, developers will be expected to produce Transport Assessments to assess the impacts and identify appropriate mitigation, together with Travel Plans where appropriate.	**Section 24.6** further details an assessment of the proposed SEP and DEP project impacts on the transport network. The OCTMP (document reference 9.16) also includes outline travel plan measures, which will be developed further in consultation with NCC, SCC and NH prior to the commencement of the authorised project.
	Policy ENV 10: Renewable Energy Development	"*The Council supports proposals for new renewable energy and low carbon development, subject to consideration of the impact of the development and whether this can be made acceptable. Proposals will be considered having regard to the extent to which there are:* *… ii. adverse effects on residential amenity by virtue of outlook / overbearing impact, traffic generation, noise, vibration, overshadowing, glare or any other associated detrimental emissions, during construction, operation and decommissioning…* *…Proposals will be permitted where the impact is, or can be made, acceptable. Applications will be expected to demonstrate that any adverse impacts can be mitigated…*"	**Section 24.6** and **24.7** contain an assessment of the proposed SEP and DEP project impacts on the transport network. **Section 24.6** and **24.7** also discuss potential mitigation measures required for identified significant environmental impacts.
East Suffolk Council			
Waveney Local Plan – Adopted March 2019	WLP8.21 – Sustainable Transport	In consultation with the Local Highway Authority, the scale, location and nature of development will be considered in determining how the transport impacts of development should be assessed.	**Section 24.6** details an assessment of the proposed SEP and DEP project impacts on the transport network.
Borough of Kings Lynn and West Norfolk			

Document	Policy	Policy / Guidance purpose	ES consideration
Site Allocations and Development Policies Plan – Adopted September 2016	Policy DM 12 – Strategic Road Network	New development, apart from specific plan allocations, will not be permitted if it would include the provision of vehicle access leading directly onto a road forming part of this Strategic Road Network.	The TA (**Appendix 24.1**) and the OCTMP (document reference 9.16) detail the SEP and DEP access strategy which provides information on the access locations and routes.
		In appropriate cases, a Transport Assessment will be required to demonstrate that development proposals can be accommodated on the local road network, taking into account any infrastructure improvements proposed.	The TA (**Appendix 24.1**) outlines baseline traffic flows, the methodology behind predicted construction traffic flows, and the resulting combined traffic flows across the TTSA. **Section 24.6** details an assessment of the proposed SEP and DEP project impacts on the transport network.
Great Yarmouth Borough Council			
Great Yarmouth Local Plan: Core Strategy 2013 – 2030 adopted December 2015	Policy CS16 – Improving accessibility and transport	The Council will ensure that that new development do not have an adverse impact on the safety and efficiency of the local road network for all users	**Section 24.6** details an assessment of the proposed SEP and DEP project impacts on the transport network.
		The Council would seek to minimise the impact of new developments on the existing transport infrastructure by encouraging applicants to: • Produce and implement Transport Assessments and Travel Plans, as appropriate • Improve accessibility to sustainable transport modes • Ensure that necessary transport improvements are addressed prior to development, where possible	The TA (**Appendix 24.1**) outlines baseline traffic flows, the methodology behind predicted construction traffic flows, and the resulting combined traffic flows across the TTSA. The TA (**Appendix 24.1**) and the OCTMP (document reference 9.16) details the SEP and/or DEP access strategy which provides information on the access locations and routes.

Document	Policy	Policy / Guidance purpose	ES consideration
			Section 24.6 details an assessment of the proposed SEP and DEP project impacts on the transport network.

24.4.1.3 Further Policy and Guidance

24.4.1.3.1 The Strategic Road Network and the Delivery of Sustainable Development

47. The DfT Circular 02/2013 entitled 'The Strategic Road Network and the Delivery of Sustainable Development' sets out the ways in which the Highways Agency (now NH) will engage with communities and developers to deliver sustainable development and, thus economic growth, whilst safeguarding the primary function and purpose of the Strategic Road Network.

48. Under the heading of Environmental Impact 02/2013 notes that:

> *"…developers must ensure all environmental implications associated with their proposals, are adequately assessed and reported so as to ensure that the mitigation of any impact is compliant with prevailing policies and standards. This requirement applies in respect of the environmental impacts arising from the temporary construction works and the permanent transport solution associated with the development, as well as the environmental impact of the existing trunk road upon the development itself".*

49. The Circular 02/2013 details access requirements specifically for wind turbines and states that:

> *"The promoter of a wind farm should prepare a report covering the construction, operation and de-commissioning stages of the development. From this, the acceptability of the proposal should be determined, and any mitigating measures should be identified"*
>
> *Access to the site for construction, maintenance and de-commissioning should be obtained via the local road network and, normally, there should be no direct connection to the strategic road network"*
>
> *Swept path analyses should be provided by the developer for the abnormal load deliveries to the site."*

50. Under the heading of 'Access, The Strategic Road Network' Circular 02/13 notes that:

> *"The creation of new accesses to the strategic road network can impact on its ability to fulfil the function of facilitating the safe and effective movements of goods and people in support of economic growth by compromising traffic movement and flow"*

51. Whilst there is a presumption against new or intensification of access on the motorway network,

"The Highways Agency [now NH] will adopt a graduated and less restrictive approach to the formation or intensification of use of access to the remainder of the strategic road network, However, the preference will always be that new development should make use of existing junctions. Where a new junction or direct means of access is agreed, the promotor will be expected to secure all necessary consents, and to fund all related design and construction works"

52. Circular 02/2013 requirements have been discussed with NH and are addressed within this ES and supporting TA.

24.4.1.3.2 Traffic Management Act 2004

53. The Traffic Management Act (TMA) 2004 was introduced to address congestion and disruption on the road network. The TMA places a duty on Local Traffic Authorities to ensure the expeditious movement of traffic on their road network and those networks of surrounding Local Planning Authorities.
54. The TMA directs effective communication between Local Highway Authorities and parties interested in carrying out street work. The TMA encourages a disciplined approach and advance communication to plan the street works.

24.4.1.3.3 New Roads and Street Works Act 1991

55. The New Roads and Street Works Act (NRSWA) 1991 was introduced to enable new roads to be provided and to make new provision with respect to street works provides a legislative framework for street works by undertakers.
56. The aim of the NRWSA is to balance the statutory rights of highway authorities (street authorities) and undertakers (such as utility companies) to carry out works with the right of road users to expect the minimum disruption from works.

24.4.1.3.4 Road Traffic Regulation Act 1984

57. The Road Traffic Regulation Act (RTRA) 1984 was introduced to regulate or restrict traffic on the road network in the interest of safety.
58. The RRTA enables highway authorities to lawfully restrict and manage traffic. In particular, it sets out (in Part I) how Traffic Regulation Orders (or Traffic Management Orders) can be employed to limit or prevent the use of the road by a particular form of traffic.

24.4.1.3.5 Highways Act 1980

59. The Highways Act (1980) legislates the management and operation of the road network in England and Wales and places statutory duties/powers upon the highway authority. The Act provides for the creation, improvement, and maintenance of roads and for acquisition of land.
60. Section 278 of the Act provides for private developers to either fund or complete works to public highways outside or beyond the development site itself, such as traffic calming and capacity improvements.

24.4.1.3.6 The Guidelines for the Environmental Assessment of Road Traffic

61. The Guidelines for the Environmental Assessment of Road Traffic (GEART) (published in January 1993 by the Institute of Environmental Assessment) are guidelines for the assessment of the environmental impacts of road traffic associated with new developments, irrespective of whether the developments are subject to formal EIAs.

62. The purpose of the guidelines is to provide the basis for systematic, consistent and comprehensive coverage for the appraisal of traffic impacts arising from development projects. Impacts that may arise include pedestrian severance and amenity, driver delay, accidents and safety and noise, vibration and air quality.

63. GEART is the principal guidance that informs this assessment and **Section 24.4.3** of this chapter contains full details of how the guidance has been applied.

24.4.1.3.7 Planning Practice Guidance - Travel Plans, Transport Assessment and Statements

64. DfT Transport Assessment guidance referred to in NPS EN-1, was withdrawn in October 2014 and was replaced with DCLG Planning Practice Guidance (PPG). For the purpose of assessing the impact of SEP and DEP, the relevant PPG is 'Travel Plans, Transport Assessment and Statements' (henceforth referred to as the Transport PPG).

65. The Transport PPG sets out the key principles to be adopted when developing a Transport Assessment as follows:

- Proportionate to the size and scope of the proposed development to which they relate and build on existing information wherever possible;
- Established at the earliest practicable possible stage of a development proposal;
- Be tailored to particular local circumstances (other locally determined factors and information beyond those which are set out in this guidance may need to be considered in these studies provided there is robust evidence for doing so locally); and
- Be bought forward through collaborative ongoing working between the Local Planning Authority / transport authority, transport operators, rail network operators, Highways Agency (now NH) where there may be implications for the strategic road network and other relevant bodies.

66. The Transport PPG key principles have shaped the development of this ES and supporting TA and can be seen throughout this chapter.

24.4.1.3.8 Further Technical Transport Guidance

67. Further supplementary technical transport guidance has been utilised in developing the EIA, these documents are outlined in **Table 24-6**.

Table 24-6: Supplementary Technical Transport Guidance

Document	Purpose/Application
Design Manual for Roads and Bridges (DMRB) CD 123 – Geometric design of at-grade priority and signal-controlled junctions (Highways England, 2021)	The DMRB has been prepared for trunk roads and motorways and has been adopted as best practice within this assessment for the design of all accesses and to augment the GEART assessment of severance and amenity effects.
DMRB CD 116 – Geometric Design of Roundabouts (Highways England, 2020)	
GG 104 – Requirements for Safety Risk Assessments (National Highways, 2018)	Sets out the approach for safety risk assessments to be applied when undertaking activity that can have an impact on safety on the Strategic Road Network (SRN). Provides a framework for identifying hazards, assessing, evaluating and managing safety risks.
GG 119 - Road Safety Audit (Highways England, 2020)	Provides the requirements for road safety audit for highway schemes on the SRN.
GG 142 - Walking, Cycling and Horse Riding Assessment and Review (Highways England, 2019)	Sets out the walking, cycling and horse-riding assessment and review process for highway schemes on the SRN.
LA 112 – Population and Human Health (Highways England, 2020)	Sets out rights of way sensitivity thresholds for walkers, cyclist and horse-riders when crossing roads.
Manual for Streets (Chartered Institution of Highways and Transportation, 2007)	Guidance to inform the visibility requirements for junctions where measured speeds are below 40mph
Manual for Streets 2 (Chartered Institution of Highways And Transportation, 2010)	
Traffic Signs Manual Chapter 8 Traffic Safety Measures and Signs for Road Works and Temporary Situations Part 1: Design (Department for Transport, 2009)	Provides guidance upon temporary traffic management that will be used to inform the assessment of driver delay impacts related to temporary traffic management/ road closures.

24.4.2 Data and Information Sources

24.4.2.1 Desktop Study

68. Data was acquired within the TTSA through a detailed desktop review of existing studies and datasets, as listed in **Table 24-7**.

Table 24-7: Key Sources of TTSA Data

Data	Source	Summary
Traffic flows	DfT	National road traffic statistics provides a summary of traffic flows and vehicle composition (e.g. HGV, car, motorcycle) for a range of motorways, 'A' roads and minor roads across the UK. (DfT, n.d.). Full details of the data and application in the TTSA is presented fully in the TA (**Appendix 24.1**).

Data	Source	Summary
	Classified Automatic Traffic Counts (ATC)	Classified automatic traffic counts. Full details of the data and application in the TTSA is presented in the TA (**Appendix 24.1**).
Collision Data	NCC and SCC Personal Injury Collision data	Collisions on the public highway that are reported to the police, and which involve injury or death are recorded by the police on a STATS19 form and collated by the local highway authority. The personal injury collision data includes a wide variety of information about the collision (such as time, date, location, road conditions). Full details of the data and application in the TTSA is presented fully in the TA (**Appendix 24.1).**
Public Rights of Way (PRoWs)	NCC	Geographic Information System layer from NCC.
National Cycle Routes	Sustrans	Map of the national cycle networks from Sustrans.

24.4.2.2 Site Specific Surveys

69. To inform the traffic data gaps in the TTSA, site-specific traffic surveys were undertaken. A summary of the surveys is outlined in **Table 24-8**, full details are presented within the TA (**Appendix 24.1**).

Table 24-8: Summary of Site-Specific Survey Data

Data set	Date	Coverage	Confidence	Notes
ATCs	October 2020	54 locations within the TTSA	Medium	Traffic counts commissioned by the Applicant which provide classified hourly and daily count and speed data. Counts were undertaken during the Covid19 pandemic and therefore factors have been applied to account for typical conditions. Full details are provided within the TA (**Appendix 24.1**).

Data set	Date	Coverage	Confidence	Notes
Manual Classified Turning Counts	November 2021	11 locations within the TTSA	High	Traffic counts commissioned by the Applicant which provide classified hourly turning count data at 15-minute intervals.

24.4.2.3 Baseline Highway Environment

70. A desk-based assessment supported by site visits was undertaken to provide information with regard to the existing baseline highway environment, clarifying characteristics and sensitive receptors. Further details are provided in **Section 24.5.**

24.4.3 Impact Assessment Methodology

71. **Chapter 5 EIA Methodology** provides a summary of the general EIA methodology applied to SEP and DEP and significance evaluation. These principles have been augmented by traffic and access specific methodologies (as prescribed in GEART) to inform a significance evaluation.

72. The methodology was presented in a Traffic and Transport 'Method Statement' presented as part of the Evidence Plan Process and agreed with both NH and NCC at the ETG meeting 13 July 2021.

73. The following sections confirm the methodology adopted to assess the potential impacts on traffic and transport.

24.4.3.1 Scale of Assessment

74. Having identified the TTSA, GEART suggests application of the following rules to define the extent and scale of the assessment required:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2: Include any specifically sensitive areas where traffic flows are predicted to increase by 10% or more (or where the number of HGVs is predicted to increase by 10% or more).

75. In justifying these rules GEART examines the science of traffic forecasting and states:

> *"It is generally accepted that accuracies greater than 10% are not achievable. It should also be noted that the day to day variation of traffic on a road is frequently at least some + or -10%. At a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact.*
>
> *…a 30% change in traffic flow represents a reasonable threshold for including a highway link within the assessment."*

76. Therefore, changes in traffic flows below the GEART Rules (thresholds) are assumed to result in no discernible or negligible environmental effects and have therefore not been assessed further as part of the assessment.

77. The exception to the GEART Rule 1 and 2 is the consideration of the effects of road safety and driver delay. These effects can be potentially significant for lower changes in traffic flow when high baseline traffic flows are evident. Full details of the methodology adopted for these effects are set out later in **Sections 24.4.3.1.4** and **24.4.3.1.5**)

78. Following initial screening, GEART, sets out considerations and, in some cases, thresholds in respect of changes in the volume and composition of traffic to facilitate a subjective judgement of traffic impact and significance.

79. It was agreed during traffic and transport ETG (23/03/2020) with NCC and NH, that the potential traffic and transport effects to be assessed are:

- Severance;
- Pedestrian and Cyclist Amenity (Amenity);
- Pedestrian and Cycle Delay (Pedestrian Delay);
- Road Safety;
- Driver Delay (capacity, highway constraints and road closures); and
- Abnormal Load effects.

80. The following sub-sections provide detail of the adopted methodology for assessing each of these effects.

24.4.3.1.1 Severance

81. Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. It can also relate to relatively minor traffic flows if they impede pedestrian access to essential facilities. Severance effects could equally be applied to residents, motorists, cyclists, or pedestrians.

82. GEART suggests that changes in total traffic flow of 30%, 60% and 90% are considered to be slight, moderate, and substantial respectively. However, GEART notes that these figures should be used cautiously, and the assessment should pay full regard to specific local conditions.

83. It is identified that the addition of traffic flow to low baseline traffic could present an exaggerated magnitude of change and overestimate the severance impacts likely to occur on such links.

24.4.3.1.2 Pedestrian Amenity

84. Amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition, and separation from traffic. It can impact a range of non-motorised users such as pedestrians, cyclists, and equestrians. This effect is therefore referred to here after simply as ‘Amenity’.

85. This definition also includes pedestrian fear and intimidation and can be considered to be a much broader category considering the overall relationship between pedestrians and traffic.

86. GEART suggests that a tentative threshold of a doubling of total traffic flow or the HGV component may lead to a negative impact upon amenity.

24.4.3.1.3 Pedestrian Delay

87. Pedestrians can experience delays and difficulties crossing roads related to changes in traffic, volume, compositions, and speed. GEART advises that, in general, increases in traffic will lead to increases in delay. However, GEART also notes that delays will be dependent upon the level of pedestrian activity, visibility, and site conditions.

88. An assessment of changes in delay has been undertaken using research carried out by the Transport and Roads Research Laboratory in supplementary report 356 (TRRL 356) (Goldschmidt, 1977)

89. The TRRL report identifies that levels of delay experienced by pedestrians trying to cross a road depends upon volumes of traffic and the types of crossing facility available. Where signal-controlled crossing points are provided, pedestrian delay is considered to be less susceptible to increases in traffic. This is because signal-controlled crossings have predefined times a pedestrian would be expected to wait, i.e. irrespective of changes in volumes of traffic, pedestrians would only be expected to wait for a predefined time.

90. In order to consider a worst-case, the assessment initially applies the following formula (taken from the TRRL report) to calculate changes in delays that may be experienced by pedestrians waiting to cross a road where no facilities are provided:

> *"Pedestrian delay (seconds) = 1.26 + 4.56 x10^{-6} x traffic flow per hour past the crossing point"*

91. Similar to amenity effects, pedestrian delay also serves as a useful proxy for other categories of non-motorised user, such as, cyclists and equestrians.

24.4.3.1.4 Road Safety

92. The salient GEART guidance on road safety is as follows:

> *"Where a development is expected to produce a change in the character of traffic (e.g. HGV movements on rural roads), then data on existing accidents levels may not be sufficient. Professional judgement will be needed to assess the implications of local circumstances, or factors which may elevate or lessen the risk of accidents, e.g. junction conflicts."*

93. In this context, a review of the existing collisions occurring within the highway TTSA was undertaken to identify any areas of the highway with concentrations of collisions (clusters) with similar patterns. These sites are considered to be sensitive to changes in traffic flows (sensitive receptors) and therefore a more detailed analysis of significance has been undertaken in the context of the proposals.

94. In addition to considering existing patterns of collisions the OCTMP (document reference 9.16) outlines how any new risks associated with the formation of new points of access to SEP and DEP associated onshore infrastructure would be managed and mitigated.

24.4.3.1.5 Driver Delay

95. GEART recommends the use of proprietary software packages to model junction delay and hence vehicle delays. However, it is noted that vehicle delays are only likely to be significant when the surrounding highway network is at, or close to capacity.

96. During the traffic and transport ETG on the 23 March 2020 it was agreed that the assessment of driver delay should consider not only the impact of increases in traffic upon junction capacity but also delays related to highway constraints (e.g. routes where highway width is constrained) and roadworks.

97. The Driver Delay impact assessment applies to all vehicle users of the highway network including:

- Cars and light commercial vehicles (LCVs);
- Motorcyclists;
- Public Transport;
- Private Transport (e.g. taxis)
- HGVs; and
- Emergency services.

24.4.3.1.6 Capacity

98. During traffic and transport ETG on the 13 July 2021, NH identified those junctions that they considered to be operating close to or above capacity and would therefore potentially be sensitive to changes in traffic.

99. These junctions are detailed within **Table 24-9** (and depicted graphically on **Figure 24.2**). Detailed junction capacity modelling has been undertaken for each of these junctions to understand the potential impacts of SEP and DEP construction traffic upon driver delay.

Table 24-9: Sensitive Junctions

Junction-ID	Location	Description
Junction 1	Junction of the A47, B1535 and Berrys Lane to the East of Hockering/West of Honingham.	Staggered priority junction
Junction 2	Junction of the A47, Blind Lane and Taverham Road to the East of Honingham.	Staggered priority junction
Junction 3	Junction of the A47, Church Lane and Dereham Road to the West of Easton.	Four arm roundabout junction
Junction 4	Junction of the A11 and Station Lane to the North of NCC Highway Depot (South)/North of East Carleton.	Priority/On-slip junction

Junction-ID	Location	Description
Junction 5	Junction of the A11, A47 (Northbound, Southbound - Off ramp), B1172 and Newmarket Road to the Northwest of Cringleford.	Six arm roundabout - Four arms signalised and two arms non-signalised junction.
Junction 6	Junction of the A47 (Westbound, East bound - Off ramp), A140, Markshall Farm Road and Harford Park and Ride Road to the North of Dunston.	Six arm roundabout junction
Junction 7	Junction of the A47 and Norwich Road to the East of Honingham.	Three arm roundabout junction
Junction 8	Junction of the A47, A1074 and William Frost Way at Longwater.	Five arm roundabout junction.
Junction 9	Junction of the A47, Long Lane and Derenham Road to the South of Longwater.	Five arm roundabout junction.
Junction 10	Junction of the A47, B1108 and Green Access to the South-West of Three Score.	Six arm roundabout junction.
Junction 11	Junction of the A47 and B1108 to the South-Eats of Bawburgh.	Four arm roundabout junction

100. With regards to capacity on the local highway network, consultation has been undertaken with NCC to identify those locations where they consider the network to be operating over capacity. NCC have noted that *"Excessive deliveries should be avoided at traffic sensitive times on some key routes"*.

101. During a traffic and transport ETG (dated 31 March 2021), details of forecast construction peak hour and daily traffic flows were shared with NCC. NCC subsequently advised of those locations they consider particularly sensitive to driver delay effects. These links and the identified sensitive periods are detailed within **Table 24-10**.

102. A review of increases in traffic via these links during peak hours has therefore been undertaken to understand the potential impacts of SEP and DEP construction traffic upon driver delay.

Table 24-10: Sensitive Links

Link ID	Link Description	Traffic sensitive period		
		Morning peak	Evening peak	Summer peak
1	A1078 Low Road / A148 Grimston Road	Yes	Yes	No
2	A148 from A149 to A1065	Yes	Yes	No
3	A148 from A1065 to A1067	Yes	Yes	No
4	A148 from A1067 to B1149	Yes	Yes	Yes
5	A148 from B1149 to Hempstead Road	Yes	Yes	Yes

Link ID	Link Description	Traffic sensitive period		
		Morning peak	Evening peak	Summer peak
6	A148 from Hempstead Road to Bridge Road	Yes	Yes	Yes
9	A149 - The Street	Yes	Yes	Yes
11	A149 from Weybourne to Weybourne Road	Yes	Yes	Yes
13	A148 from Gypsie's Lane to B1436	Yes	Yes	Yes
14	B1436 - Felbrigg	Yes	Yes	Yes
15	A140 - Roughton	Yes	Yes	Yes
16	A149 - North Walsham	Yes	Yes	No
17	A149 from B1145 to B1150	Yes	Yes	No
18	A149 from B1150 to Kidas Way	Yes	Yes	No
19	A149 from Kidas Way to Honning Road	Yes	Yes	No
20	A149 from B1159 to Station Road	Yes	Yes	Yes
21	A149 from Station Road to A1064	Yes	Yes	Yes
22	A149 from A1064 to Yarmouth Road	Yes	Yes	Yes
23	A149 from Yarmouth Road to B1141	Yes	Yes	Yes
35	A1270 from A1151 to A47	Yes	Yes	No
37	A149 from A1151 to B1159	Yes	Yes	Yes
38	A149 from The Street to A1151	Yes	Yes	Yes
39	A149 from Honing Road to The Street	Yes	Yes	Yes
40	A1270 from B1150 to A1151	Yes	Yes	No
41	A1270 from A140 to B1150	Yes	Yes	No
42	A140 from B1149 to A1042	Yes	Yes	No
43	A140 from Cawston Road to A1270	Yes	Yes	No
44	A140 from B1145 to Cawston Road	Yes	Yes	No
45	A140 from B1145 to Aylsham Road	Yes	Yes	No
46	A140 from Thorpe Market Road to Aylsham Road	Yes	Yes	No
49	B1149 from Buxton Road to Shorthorn Road	Yes	No	No

Link ID	Link Description	Traffic sensitive period		
		Morning peak	Evening peak	Summer peak
51	B1149 from B1145 to Buxton Road	Yes	No	No
52	B1145 from B1149 to A140	Yes	No	No
53	B1145 from Old Friendship Lane to B1149	Yes	No	No
54	B1149 from Spink's Lane to B1145	Yes	No	No
56	B1149 from B1354 to Spink's Lane	Yes	No	No
57	B1354 east of B1149	Yes	No	No
59	B1149 from A148 to B1354	Yes	Yes	Yes
72	A1270 from Reepham Road to Brewrey Lane	Yes	Yes	No
73	A1270 from Fir Covert Road to Reepham Road	Yes	Yes	No
76	A1067 from Beech Avenue to A140	Yes	Yes	No
77	A1067 from A1270 to Fir Covert Road	Yes	Yes	No
78	A1270 from A1067 to Fir Covert Road	Yes	Yes	No
79	A1067 from Marl Hill Road to A1270	Yes	Yes	No
80	A1067 from A148 to Marl Hill Road	Yes	Yes	No
88	A149 from A148 to A47	Yes	Yes	Yes
96	A1074 from A47 to A140	Yes	Yes	No
98	B1108 from Landlow Lane to B1108	Yes	Yes	No
104	B1108 west of Bow Hill	Yes	Yes	No
106	B1172 from Ketteringham Lane to A47	Yes	Yes	No
107	B1172 from New Road to Ketteringham Lane	Yes	Yes	No
111	B1135 from Melton Road to Norwich Common	Yes	Yes	No
112	B1172 from B1135 to New Road	Yes	Yes	No
113	B1135 from B1172 to A11	Yes	Yes	No
123	B1113 south of the A47	Yes	Yes	No
124	B1113 from A47 to A140	Yes	Yes	No
125	A140 from A146 to A47	Yes	Yes	No

Link ID	Link Description	Traffic sensitive period		
		Morning peak	Evening peak	Summer peak
127	A140 south of the A47	Yes	Yes	No
141	A1082 Holway Road	Yes	Yes	Yes

24.4.3.1.7 Highway Constraints

103. Road users can also experience delays where the existing width of the highway prevents two vehicles from passing and drivers are required to give-way to each other.

104. A review of the TTSA has been undertaken to identify all links where two vehicles would not be able to pass each other (**Section 24.4.3.2.5**). An assessment of the potential changes in traffic flows and opportunities for vehicles to pass along these links (e.g. frequency of passing places) has been undertaken to inform a judgement regarding impact magnitude.

24.4.3.1.8 Road Closures

105. Road users are likely to experience delays where road or lane closures may be required. It is anticipated that temporary road or lane closures may be required during construction where open cut techniques are used to install SEP and DEP cables across the public highway. These locations are identified in **Section 24.4.3.2.6**.

106. To assess the potential impacts of temporary road closures, the assessment considers whether access can be maintained (via a single lane closure) or if a full road closure would be required. Where a full road closure is required the length and duration of the detour has been used to inform a judgement regarding the magnitude of effect.

107. If a single lane can be maintained (i.e. through the use of shuttle working controlled by traffic signals or stop-go boards) a judgement has been made upon the significance of delays. Chapter 8 of the Traffic Signs Manual (Department for Transport, 2009) provides guidance upon when various forms of road works are likely to introduce significant delays.

24.4.3.1.9 Abnormal Loads (Including Indivisible Loads)

108. Abnormal load is a generic term applied when a vehicle or load exceeds the maximum standard parameters set out in The Road Vehicles Construction and Use Regulations 1986 (C&UR) for height, width and weight. This term covers a broad range of vehicles, ranging from limited load projections permitted for standard vehicles to Special Order Vehicles designed specifically for the purpose of moving loads well in excess of standard vehicle parameters.

109. Legislation requires hauliers to notify the movement of most abnormal loads and abnormal vehicles to the police before moving them by road.

110. Loads that require Special Type Vehicles are defined as Abnormal Indivisible Loads (AILs) in The Road Vehicles (Authorisation of Special Types) (General) Order 2003 (SI 1998)[2].

111. The Road Vehicles (Authorisation of Special Types) (General) Order 2003 (SI 1998) limits gross weight of an AIL to 150 tonnes, axle weight to 16,500kg, length to 30m and/or width to 6.1m, above which a Special Order is required from NH (who manage approval on behalf of the Secretary of State for Transport).

112. The transformers for SEP and DEP substation will require Special Order AILs. In addition, there may also be a requirement for non-Special Order AILs associated with large items of plant, cable drums, etc.

113. An AIL study (**Appendix 24.2**) considering the impacts of transporting the transformers has been undertaken by Wynns Ltd (consulting engineers specialising in the transportation of AILs) to inform the management measures required for the transportation of AILs for SEP and DEP.

114. The AIL study has identified that the load could come from King's Lynn Port and travel to the Onshore Substation via the A47 before turning on to the A140 towards the Onshore Substation.

115. The AIL study highlights that the route is negotiable with local accommodation works along the route, including, overrunning of kerbs, removal of signs, traffic signals and bollards and pruning of tress, etc.

116. NH (responsible for the A47) have however not been able to structurally confirm the route as there are two structures of concern. At the time of drafting, NH are still reviewing these structures further to establish if the route can be cleared.

117. The first structure of concern is Scarning Bridge, located to the west of Dereham and is a 26m span structure over Dereham Road. Until such time that NH have completed their further investigations it is necessary to establish a potential diversion route as an alternative.

118. The alternative option (detailed in **Appendix 24.2**) would require the AIL to exit the A47 and use the local road network to pass under Scarning Bridge before re-joining the A47. This alternative route has been cleared as negotiable.

119. The second structure of concern is a culvert located between Kings Lynn and Swaffham. Until such time that NH have completed their further investigations it is necessary to establish a potential diversion route as an alternative. Discussions with Wynns have identified that the structure is only 1.5m in span and as such temporary bridging could be employed to span over the structure.

[2] The Road Vehicles (Authorisation of Special Types) (General) Order 2003 (SI 1998) STGO 2003 limits gross weight to 150 tonnes, axle weight to 16500kg, length to 30m and/or width to 6.1m, above which a Special Order is required from the National Highways.

120. To ensure that delays are managed and minimised, prior to the movement of any AIL the contractor would be required to submit notifications to the relevant authorities (police, highway authorities and bridge / structure owners) through ESDAL (Electronic Service Delivery for Abnormal Loads). The ESDAL process would detail which of the proposed routes would be used and ensure the timing of AIL movements would be co-ordinated and potential impacts would not be significant.

121. The total forecast HGV trips (assessed within this chapter) include for the transportation of cable drums and a percentage allowance has also been applied to account for transportation of plant. Further details regarding the derivation of traffic movements are contained within the TA (**Appendix 24.1**). These numbers of non-Special Order AILs are therefore included within the assessment of all effects presented in **Section 24.6**.

122. It has been agreed at an ETG meeting with NCC (31st March 2022) and NH (5th April 2022) that it would be necessary to ensure that the final selected size non-Special Order AILs (associated with the transportation of plant and cable drums) can be accommodated by the highway network and would not lead to significant delays.

123. To ensure that potential impacts associated with the transportation of all AILs are managed and coordinated, the OCTMP (document refence 9.16) contains commitments that prior to the movement of any AILs, the contractor would be required to submit notifications to the relevant authorities (police, highway authorities and bridge/ structure owners) through EDSAL (Electronic Service Delivery for Abnormal Loads). The EDSAL process would detail which proposed routes would be used and ensure the timing would be co-ordinated and potential impacts would not be significant.

24.4.3.1.10 Other Impacts

124. Traffic borne air quality effects, noise and vibration and health effects have been informed by the traffic data outlined in this chapter. These impacts are assessed in **Chapter 22 Air Quality**, **Chapter 23 Noise and Vibration**, and **Chapter 28 Health** respectively.

24.4.3.2 Sensitivity

24.4.3.2.1 Identification of Sensitive Locations

125. It is necessary to identify particular user groups ('receptors') and associated locations, which may be sensitive to changes in the traffic and transport network conditions.

126. **Table 24-11** provides a summary of the potential effects an indication of the receptors affected and potential locations that will be considered within the assessment.

Table 24-11: Potential Effects and Receptors

Potential Effects	Receptors	Location
Severance	Pedestrians, cyclists and equestrians	Local communities adjoining the highway network, designated
Amenity		

Potential Effects	Receptors	Location
Pedestrian Delay		routes (e.g. Public Rights of Ways, National Cycle Network) excluding motorways.
Road Safety	All road users	The entire highway network
Driver Delay (Capacity)	Drivers and passengers in vehicles	Highway links and junctions
Driver Delay (Highway Constraints)	Drivers and passengers in vehicles	Highway links and junctions
Driver Delay (Road Closures)	Drivers and passengers in vehicles	Highway links
Abnormal Loads	All road users	Highway links and junctions

24.4.3.2.2 Severance, amenity, and pedestrian delay

127. For the effects of severance, amenity and pedestrian delay, an evaluation of the TTSA has been undertaken to identify potential locations with a concentration of receptors which may be sensitive to changes in traffic conditions.

128. Definitions of the different sensitivity levels for highway traffic receptors are given in **Table 24-12**. Sensitivity levels and definitions are derived from GEART.

Table 24-12: Definitions of Sensitivity Levels for Severance, Amenity and Pedestrian Delay

Sensitivity	Definition
High	Concentrations of sensitive receptors (e.g. hospitals, schools, residential dwellings, areas with high footfall) and limited separation from traffic provided by the highway environment; or a low concentration of sensitive receptors and no separation from traffic provided by the highway environment.
Medium	A low concentration of sensitive receptors (e.g. residential dwellings, pedestrian desire lines) and some separation from traffic provided by the highway environment.
Low	Few sensitive receptors and / or highway environment that can accommodate changes in volumes of traffic.
Negligible	Links that fall below GEART Rule 1 and 2 screening thresholds and major 'A' roads with no pedestrian, cycle or equestrian environment.

129. The definitions of the sensitivity levels based on the highway traffic receptors defined in **Table 24-12** have been applied to all links in TTSA and is detailed in **Section 24.1**.

24.4.3.2.3 Road Safety

130. To consider the impacts on road safety, those areas with evidenced road safety patterns, termed 'collision clusters' (shown in **Figure 24.3**) have been assigned an appropriate level of sensitivity informed by a detailed review of the baseline characteristics.

131. The collision cluster criterion has been based on a definition of five personal injury collisions occurring within a three year period in a 50m radius for built up areas and a 100m radius in non-built up areas.

132. The TA (**Appendix 24.1**) details the access strategy for SEP and DEP which considers the impact of new road safety risks associated with the formation of new points of access.

24.4.3.2.4 Driver Delay (Capacity)

133. The potential increases in SEP and DEP construction traffic movements via each link within the TTSA have been calculated. The TA (**Appendix 24.1**) provides further details on the calculations.

134. Junctions that are operating at or above their theoretical capacity could be considered to be of high sensitivity, whilst junctions operating with spare capacity would be of low to medium sensitivity. A review of the junctions within the TTSA is detailed in the TA (**Appendix 24.1**).

135. The capacity of the junctions to be assessed have been informed through either detailed modelling or observations from the relevant highway authority. Further details can be found in the TA (**Appendix 24.1**).

136. NCC have also advised of those links where they consider mitigation should be considered to reduce peak hour and seasonal (summer school holiday) SEP and DEP construction traffic flows. These links are therefore considered to be of high sensitivity to changes in traffic.

24.4.3.2.5 Driver Delay (Highway Constraints)

137. A review of all the links within the TTSA has been undertaken to identify those links of constrained width to prevent two HGVs from passing (therefore leading to delays associated within waiting and manoeuvring). A review of all links has been undertaken to identify these links, defined as roads less than 5.5m wide.

138. **Figure 24.4** highlights that within the TTSA there are 43 links (out of a total of 140 links) that are of constrained width. These links are considered to be sensitive to increases in traffic and will be assessed further for driver delay due to highway constraints. The remaining 97 links are not considered further.

24.4.3.2.6 Driver Delay (Road Closures)

139. A review of all the links within the TTSA has been undertaken to identify links where open trenching may be used to install SEP and DEP cables across the public highway.

140. The onshore cable corridor would cross approximately 48 roads, of these, it is proposed that cables for SEP and/or DEP would be installed under 26 roads using trenchless technologies. **Figure 24.5** highlights the remaining 22 roads where it is proposed that the cables are installed using open cut techniques.

141. The 22 roads proposed to be crossed by open cut techniques are considered to be potentially sensitive to driver delay impacts and are assessed further within this chapter. It is proposed that access for pedestrians and cyclists at these locations would be maintained at all times. Hence, only drivers may be subject to impacts.

24.4.3.3 Magnitude

142. **Table 24-13** details the assessment framework for magnitude thresholds adapted from GEART. These thresholds are guidance only and provide a starting point by which transport data will inform a local analysis augmented by professional judgement of the impact magnitude.

Table 24-13: Traffic and Transport Assessment Framework

Effects	Magnitude of Effect			
	Negligible	**Low**	**Medium**	**High**
Severance	Changes in total traffic flows of less than 30%.	Changes in total traffic flows of 30 to 60%.	Changes in total traffic flows of 60 to 90%.	Changes in total traffic flows of over 90%.
Amenity	Change in traffic flows (or HGV component) less than 100%	Greater than 100% increase in traffic (or HGV component) and a review based upon the quantum of vehicles, vehicle speed and pedestrian footfall.		
Pedestrian Delay	Informed by a review of the existing pedestrian and cycle environment and forecast change in delay.			
Road Safety	Informed by a review of collision patterns and trends based upon the existing personal injury collision records and the forecast increase in traffic.			
Driver Delay (Capacity)	Links and junctions not identified by NH or NCC as sensitive to increases in SEP and DEP traffic.	Informed by projected traffic increases through identified sensitive links junctions within the TTSA.		
Driver Delay (Highway constraints)	Highway geometry typically allows two HGVs to pass	Informed by projected traffic increases along links and existing opportunities to pass and give-way.		
Driver Delay (Road Closures)	No single lane or full road closure required	Informed by an examination of likely length and suitability of diversion routes.		

24.4.3.4 Impact Significance

143. In basic terms, the potential significance of an impact is a function of the sensitivity of the receptor and the magnitude of the effect (see **Chapter 5 EIA Methodology** for further details). The determination of significance is guided by the use of an impact significance matrix, as shown in **Table 24-14**. Definitions of each level of significance are provided in **Table 24-15**.

144. In defining the impact significance, the duration and reversibility of the impacts are taken into consideration.

145. Potential impacts identified within the assessment as major or moderate are regarded as significant in terms of the EIA regulations. Appropriate mitigation has been identified, where possible, in consultation with the regulatory authorities and relevant stakeholders. The aim of mitigation measures is to avoid or reduce the overall impact in order to determine a residual impact upon a given receptor.

Table 24-14: Impact Significance Matrix

		Negative Magnitude				Beneficial Magnitude			
		High	**Medium**	**Low**	**Negligible**	**Negligible**	**Low**	**Medium**	**High**
Sensitivity	**High**	*Major*	*Major*	*Moderate*	*Minor*	*Minor*	*Moderate*	*Major*	*Major*
	Medium	*Major*	*Moderate*	*Minor*	*Minor*	*Minor*	*Minor*	*Moderate*	*Major*
	Low	*Moderate*	*Minor*	*Minor*	*Negligible*	*Negligible*	*Minor*	*Minor*	*Moderate*
	Negligible	*Minor*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Minor*

Table 24-15: Definition of Impact Significance

Significance	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision making process.
Negligible	No discernible change in receptor condition.
No change	No impact, therefore, no change in receptor condition.

24.4.4 Cumulative Impact Assessment Methodology

146. The cumulative impact assessment (CIA) considers other plans, projects and activities that may impact cumulatively with SEP and DEP. As part of this process, the assessment considers which of the residual impacts assessed for SEP and/or DEP on their own have the potential to contribute to a cumulative impact, the data and information available to inform the cumulative assessment and the resulting confidence in any assessment that is undertaken. **Chapter 5 EIA Methodology** provides further details of the general framework and approach to the CIA.

147. For traffic and transport, the onshore project area has the potential for temporal and geographical overlap with similar impacts arising from:

- Recent development, either built or under construction (which is not constructed as part of the baseline);
- Approved development, awaiting implementation; and

- Proposals awaiting determination within the planning process with design information in the public domain.

148. It was agreed during the traffic and transport ETG 3 (13/07/2021) that a CIA should be undertaken for the following projects:

- Offshore Wind Farm Schemes:
  - Norfolk Vanguard (NV);
  - Hornsea Project Three (HP3); and
  - Norfolk Boreas (NB);
- Highway Schemes:
  - Norwich Western Link (a highway improvement scheme);
  - A47 North Tuddenham to Easton (a highway improvement scheme);
  - A47 Blofield to North Burlingham (a highway improvement scheme);
  - A47/A11 Thickthorn junction improvement (a highway improvement scheme);
  - A47 Great Yarmouth junction improvements including reconstruction of the Vauxhall Roundabout (a highway improvement scheme); and
  - Great Yarmouth Third River Crossing.

149. The earliest date that construction of SEP and DEP could commence would be 2025. In order to quantify the potential impact from these cumulative projects, the respective application documents have been reviewed to understand traffic demand and associated implementation dates. This traffic demand has been assigned to the highway network as appropriate to facilitate a CIA. Only data publicly available at the time of the DCO submission has been assessed within this CIA.

150. **Table 24-16** presents details of the anticipated construction programme for each of these projects, and when the peak period for deliveries is expected to occur and how this could overlap with SEP and DEP.

Table 24-16: Cumulative Projects Construction Timelines

Projects	Years								Notes
	2022	2023	2024	2025	2026	2027	2028	2029	
SEP and DEP									-
NV									The ES (RHDHV, 2018) states that construction would commence in 2022 and end in 2025, however due to a Judicial Review, it is understood that the start of construction has been delayed by up to a year.
HP3									Discussions have been held with HP3 and who have suggested that construction would commence between the end of 2022 and early 2023.
NB									The ES (RHDHV, 2019) states that construction would commence in 2026 and end in 2027, however due to the Judicial Review (associated with the sister NV project), it is understood that the start of construction has been delayed by up to a year.
A47 North Tuddenham to Easton									NH indicates that construction would commence 2022-2023 and end between 2024 and 2025.
Great Yarmouth Third River Crossing									NCC indicates that construction would end in early 2023.
A47 Blofield to North Burlingham									NH indicates that construction would commence 2022-2023 and end between 2024 and 2025.
A47/A11 Thickthorn									NH indicates that construction would commence 2022-2023 and end between 2024 and 2025.
A47 Great Yarmouth									NH indicates that construction would commence 2022-2023 and end between 2024 and 2025.
Norwich Western Link	Limited information publicly available.								Limited information is available publicly from NCC regarding timescales. At the time of drafting, no planning permission for the scheme is in place and full funding has not been secured from the Department for Transport.

Key	
	Forecast construction duration
	Forecast commencement of operation

151. As outlined in **Table 24-16**, a potential degree of overlap is forecast between the construction of SEP and DEP and the cumulative projects with the exception of the Great Yarmouth Third River Crossing.

152. NB is a sister project to NV and it is understood that NV are proposing to proceed to construction prior to NB and would therefore installs ducts and other shared enabling works for NB which represent the maximum construction intensity for NB. On this basis it is considered that the NV assessment also includes the worst-case scenario of NB and thus NB is not considered as a separate project further in this cumulative assessment.

153. For further details of the methods used for the CIA for traffic and transport, see **Section 24.7.**

24.4.5 Transboundary Impact Assessment Methodology

154. There are no transboundary impacts with regard to traffic and transport as the onshore DCO order limits is entirely within the UK and would not be sited in proximity to any international boundaries. Transboundary impacts are therefore scoped out of the assessment and are not considered further.

24.4.6 Assumptions and Limitations

155. Traffic data collection via onsite ATCs was undertaken during the Covid19 Pandemic (in agreement with NCC/HE). Factors have been applied to reflect neutral conditions. The TA (**Appendix 24.1**) provides further details on the methodology.

156. Where further discrete assumptions have been made in the course of undertaking the assessment, these are noted in **Sections 24.1** to **24.7**.

24.5 Existing Environment

157. Characterisation of the existing environment in relation to traffic and transport has been informed through a number of sources, including:

- Desktop studies and site visits;
- Personal injury collision data sourced using open source data;
- Personal injury collision data sourced from NCC/SCC;
- Traffic count information sourced from the DfT;
- Traffic count information sourced from NV and HP3 Offshore Wind Farm DCO Application documents; and
- Traffic surveys commissioned for SEP and DEP.

24.5.1 Existing Highway Network

158. This section provides a broad overview of the baseline characteristics of the 140 links forming the TTSA. These links are illustrated in **Figure 24.1**.

159. The Principal (A) road network in the TTSA includes the A140, A148, A149 and the A1067 managed by NCC and the A146 and the A1117 managed by SCC. The A47 and A11 (within the TTSA) form part of the Strategic Road (Trunk Road) Network managed by NH.

160. The A47 provides the main east-west road connection and routes from Great Yarmouth to the Midlands and the north of England. Local to the TTSA, the A47 provides a key link between King's Lynn, Norwich and Lowestoft. The A47 is predominately a single carriageway road, widening to dual carriageway around the major urban areas (Norwich, Dereham, Swaffham and King's Lynn).

161. The A146 is a principal rural single carriageway road that connects the A47 south of Norwich, with the A1145 at Lowestoft. This link joins to Lowestoft and onwards to Great Yarmouth, with both towns containing an operational port.

162. Heading north out of Norwich is the A140, a single carriageway A class road that by-passes Aylsham and connects to Roughton. Links to the A148 and A149 are present along this route allowing connection to the wider transport network.

163. From the main A road network, in order to access the majority of the proposed construction access points for SEP and/or DEP, construction vehicles would need to utilise the local road network (B roads and unclassified roads). **Figure 24.6** depicts the proposed access locations.

164. A number of strategically important B class roads are located within the TTSA and offer access to the Principal Road network. These include the B1135, B1145, B1147, B1149, B1159, and the B1436. These main roads offer connectivity to minor roads and lanes located along the onshore cable corridor.

165. There are a total of 72 unclassified links which serve the final part of the journey to the onshore cable corridor (Local Access routes). These links typically have narrow carriageways and are subject to very low baseline traffic flows.

166. Further details of link characteristics for all 140 links within the TTSA considered as detailed:

- The existing background traffic flows and estimated future traffic flows (**Section 24.5.2** and **Section 24.5.5** respectively);
- An audit of the sensitive receptors in the TTSA (**Section 24.5.3**);
- A detailed review of the baseline road safety condition (**Section 24.5.4**);
- An audit of the TTSA based on junction capacity (**Section 24.4.3.2.4**); and
- An audit of the TTSA based on the highway geometry (**Section 24.4.3.2.5**).

24.5.2 Traffic Flow Data

167. Traffic flow data for all links within the TTSA have been informed by traffic counts. The TA (**Appendix 24.1**) contains full details of these counts and a summary of the baseline traffic flows for all links within the TTSA.

24.5.3 Link Based Sensitive Receptors

168. The sensitivity of a road (link) can be defined by the type of user groups who may use it. A sensitive area may for example be a village environment or where pedestrian or cyclist activity may be high, for example near a school.

169. A desktop exercise augmented by site visits has been undertaken to identify the sensitive receptors in the TTSA. **Table 24-17** provides broad definitions of the different sensitivity levels (derived from GEART) which have been applied to the assessment. All 140 links within the TTSA have been assessed and assigned a sensitivity. **Figure 24.7** illustrates these routes graphically.

Table 24-17: Link Based Sensitive Receptors

Link Sensitivity	Link ID	Rationale
Low	1, 3, 15, 17-20, 22, 25, 27, 31-37, 39-41, 44-47, 50, 51, 54-58, 62, 63, 65, 67, 69-75, 77-82, 85-95, 97-99, 101, 103-107, 109-111, 113-116, 118, 119, 122, 124-131, 137, 139, 143-46, 148, 150 and 152.	Links that can accommodate a high volume of traffic and/or have limited sensitive receptors. The links have minimal/sporadic frontage development and/or footways are wide and/or buffered from traffic.
Medium	2, 4-6, 12, 14, 16, 21, 24, 26, 28- 30, 38, 42, 43, 49, 52, 53, 59, 61, 66, 96, 112, 133, 136 and 147.	Links that can accommodate high volumes of traffic. Direct frontage development will be present along these links with increases in sensitive receptors including schools, hospitals, churches, public houses, and local shops.
High	7-11, 13, 23, 48, 60, 64, 68, 76, 83, 84, 100, 102, 117, 123, 132, 138, 141, 149 and 153.	Links that will pass through built up areas. These areas will have significant frontage development and multiple sensitive receptors throughout, and/or areas with high pedestrian footfall.

24.5.4 Road Safety

170. To assess whether the project will have an adverse road safety impact it is necessary to establish a baseline and identify any inherent road safety issues within the TTSA.

171. The TA (**Appendix 24.1**) details an audit of the TTSA and provides a road safety baseline including cluster locations.

172. A summary of the 37 identified collision clusters within the TTSA is provided in **Table 24-18** and shown graphically in **Figure 24.3**. Full details of the road safety baseline is provided in the TA (**Appendix 24.1**).

Table 24-18: Identified Collision Clusters in the TTSA

Link	Collision Cluster Ref.	Description	No. of collisions	Collision severity		
				Fatal	Serious[3]	Slight[4]
23 / 24	1	A140 /Fuller's Hill Roundabout	13	0	1	12
25	2	A47 Breydon Bridge	12	0	3	9
25 / 26	3	A47 / William Adams Way Roundabout	14	0	2	12
26	4	A47 / Lowestoft Road Roundabout	7	0	1	6
26 / 27	5	A47 / B1385 Roundabout	5	0	3	2
29	6	A12 / Carlton Road Junction	11	0	3	8
29	7	A12 / A1145 Roundabout	9	0	1	8
30 / 31 / 129	8	A47 / A146 Junction	29	0	3	26
32 / 33	9	A47 / Cucumber Lane Roundabout	23	0	3	20
33	10	A47, within proximity of the Plantation Road slip road.	9	0	2	7
33	11	A47, within proximity of Main Road	7	0	1	6
34	12	A47	13	0	3	10
35 / 36 / 40	13	A1270 / A1151 Roundabout	13	0	1	12
36	14	A1042 / A1151 Roundabout	12	0	1	11

[3] An injury for which a person is detained in hospital as an "in-patient", or any of the following injuries whether or not they are detained in hospital: fractures, concussion, internal injuries, crushing, burns (excluding friction burns), severe cuts, severe general shock requiring medical treatment and injuries causing death 30 or more days after the accident.

[4] An injury of a minor character such as a sprain (including neck whiplash injury), bruise or cut which are not judged to be severe, or slight shock requiring roadside attention. This definition includes injuries not requiring medical treatment.

Link	Collision Cluster Ref.	Description	No. of collisions	Collision severity		
				Fatal	Serious[3]	Slight[4]
42	15	A140 / A1402 Junction	15	0	2	13
76	16	A1067 / Hospital Lane Junction	10	0	2	8
76	17	A140 / A1067 Junction	16	0	3	13
86	18	A47 – Hockering	8	0	2	6
86	19	A47 – Necton	10	0	4	6
89/ 90 / 91 / 94	20	A47 / Bind Lane / Taverham Road Junction	10	0	3	9
93 / 94 / 95	21	A47 / Church Lane Roundabout	12	0	1	11
96	22	A1074 / Longwater Lane Junction	6	0	1	5
96	23	A1074 / Norwich Road Junction	15	0	1	14
96	24	A140 / A1074 Junction	20	0	2	18
105 / 106 / 114 / 121 / 122	25	Thickthorn Interchange	26	0	1	25
122 / 127 / 129	26	A47 south of Thickthorn Interchange	5	0	1	4
125	27	A47 / A146 Roundabout	8	0	0	8
33	28	A47 / B1140	7	0	2	5
34	29	A47 - Acle Straight	7	1	0	6
34	30	A47 / Branch Road	9	0	0	9
24 / 25 / 34	31	A47 / A149	9	0	0	9
25	32	A47 / Gapton Hall Roundabout	18	0	1	17
87	33	A47 Constitution Hill	6	3	0	3
87	34	A47 - Chalk Farm	6	0	4	2

Link	Collision Cluster Ref.	Description	No. of collisions	Collision severity		
				Fatal	Serious[3]	Slight[4]
86	35	A47 / B1146	8	1	4	3
85 / 86 / 89	36	A47 / Berrys Lane / Wood Lane	12	0	2	10
127	37	A140	5	0	3	2

173. In addition, NH requested that the A11/ Station Lane junction should be assessed in respect to collisions, irrespective of a collision cluster existing at the junction (ETG 2, 18/09/2020). A review of the Junction identified that there were no collisions recorded within the adopted five-year study period and therefore this location is not considered further.

24.5.5 Anticipated Trends in Baseline Conditions – Future Year Traffic Flows

174. The earliest date that construction could commence would be early 2025 and initially comprise enabling works (generating minimal traffic demand) with the main construction works likely to start in summer 2025.

175. In order to consider a worst-case scenario, a reference year for background traffic of 2025 has been derived. The rationale for this is later years would result in higher background traffic flows and therefore a lesser magnitude of effect.

176. To take account of changes in travel patterns and sub-regional growth in housing and employment, a proportionate approach to forecasting future traffic growth for the 2025 reference year has been agreed during traffic and transport ETG (23/03/2020) with NCC and NH. Full details are provided within **Appendix 24.1**.

24.5.6 Climate Change and Natural Trends

177. The DfT publication, Decarbonising Transport A Better Greener Britain (DfT 2021) identifies that transport is the largest contributor to UK domestic greenhouse gas (GHG) emissions, and that emissions from transport have been broadly flat for the last 30 years

178. The UK Government has enshrined in law the commitment to ‘net zero’ by 2050, and notably, has banned the sale of new petrol and diesel cars and vans from 2030.

179. To meet the commitments to net-zero, the DfT publication, Decarbonising Transport A Better Greener Britain (DfT 2021) outlines broad approaches to how transport will be ‘decarbonised’. These can be categorised as,

- Accelerating modal shift, e.g. increasing the number of journeys made by walking or cycling as opposed to road transport, and supporting the shift from road freight to rail or water, etc.
- Decarbonising emissions from all transport modes, e.g. through adoption of electric vehicles.

180. Given the rate of technological advancement in the decarbonisation of transport, and legal commitments to net-zero, it is anticipated that GHG emissions will be reduced from current baseline levels. These predictions for forecast changes in vehicle emissions are reflected in the assessment of air quality (**Chapter 22 Air Quality**).

181. The contribution of decarbonisation from modal shift is harder to forecast, especially given the significant ongoing travel choices changes related to the Covid-19 pandemic. The DfT publication, Decarbonising Transport A Better Greener Britain (DfT 2021) noted:

"Last year, we commissioned research (see Part 2) to understand the impact of COVID-19 on current and future travel choices. It now seems likely some of the necessary short-term changes brought about by the pandemic, including the rise of home working, could remain for the longer-term and could become permanent shift in travel habits. This has created additional uncertainty for projecting forward transport usage and potential carbon emissions. It seems highly unlikely that the demand, patterns, timings, and modal choices of transport users across all forms of transport will simply return to those of 2019"

182. The forecast for future traffic growth within the TTSA (outlined in **Section 24.5.5**) has a basis in pre-COVID-19 travel patterns and is considered to be an upper bound of total traffic flows and a cautious application of modal shift. The forecast for future traffic growth presented in this chapter are therefore considered to be representative of a worst-case scenario in terms of total traffic on the highway network.

24.6 Potential Impacts

183. This section of the ES considers the potential impacts of the SEP and DEP projects on sensitive receptors within the TTSA.

184. Two potential worst-case construction scenarios for SEP and DEP have been identified for this chapter:

- Construct SEP or DEP in isolation; and
- Construct SEP and DEP concurrent.

185. The SEP and DEP sequential scenario would have peak construction traffic identical to the single project scenario and so is not presented separately.

186. The identification of the traffic and transport environmental impacts is based on an assessment of the volume of traffic demand associated with the SEP and DEP projects. **Appendix 24.1** contains the derivation of SEP and DEP construction traffic flows and background (baseline) traffic flows that have informed this assessment.

187. Unless otherwise specified, SEP and DEP vehicle trips quoted herein are representative of two-way movements, i.e. quoted HGV trips represent the laden trip from source and the unladen trip back to source; and employee vehicle trips represent the inbound and outbound journeys . For example, 20 HGV trips comprise 10 laden trips from source and 10 outbound unladen trips back to source.

24.6.1 Potential Impacts During Construction

188. The potential impacts of the onshore construction of SEP and/or DEP have been assessed on traffic and transport effects. The environmental impacts arising from the construction of SEP and/or DEP are listed in **Table 24-2** together with the worst-case scenario against which each construction phase impact has been assessed.

189. The identification of the traffic and transport environmental impacts requires an assessment of the volume of traffic associated with construction activities and the magnitude of effect of this additional traffic.

24.6.1.1 Construction Traffic Impact Screening

190. With reference to the GEART (Rule 1 and Rule 2), a screening process has been undertaken for the TTSA to identify routes that are likely to have significant changes in traffic flows and therefore require further impact assessment.

191. **Table 24-19** and **Table 24-20** summarise the assigned daily peak and average vehicle trips generated by all materials, personnel and plant associated with the construction of SEP or DEP in isolation and SEP and DEP concurrently.

192. **Table 24-19** and **Table 24-20** also provide a comparison of the peak daily construction flows with the forecast background daily traffic flows in 2025 and identifies the links exceeding the GEART screening thresholds.

Table 24-19: Link Screening - SEP or DEP in Isolation

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
1	A1078 Low Road / A148 Grimston Road	Low	17,776	887	673	595	339	299	4%	67%
2	A148 from A149 to A1065	Medium	8,658	662	375	269	192	138	4%	41%
3	A148 from A1065 to A1067	Low	16,241	978	362	269	184	138	2%	27%
4	A148 from A1067 to B1149	Medium	9,530	508	331	242	142	101	3%	48%
5	A148 from B1149 to Hempstead Road	Medium	14,272	497	345	145	146	62	2%	29%
6	A148 from Hempstead Road to Bridge Road	Medium	14,272	497	252	133	105	52	2%	27%
7	Bridge Road	High	827	63	69	69	20	20	8%	109%
8	The Street	High	827	63	63	51	18	14	8%	81%
9	A149 - The Street	High	3,621	55	155	54	62	15	4%	99%
10	Holgate Hill / Holt Road	High	1,273	81	155	54	57	16	12%	67%
11	A149 from Weybourne to Weybourne Road	High	5,023	34	169	69	61	20	3%	199%
12	Station Road / Sandy Hill Lane / Gypsies' Lane	Medium	1,008	104	172	86	70	24	17%	82%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
13	A148 from Gypsie's Lane to B1436	High	15,102	679	359	143	168	62	2%	21%
14	B1436 - Felbrigg	Medium	7,290	661	325	133	144	52	4%	20%
15	A140 - Roughton	Low	5,929	516	221	133	98	52	4%	26%
16	A149 - North Walsham	Medium	9,241	378	160	133	64	52	2%	35%
17	A149 from B1145 to B1150	Low	12,980	585	160	133	64	52	1%	23%
18	A149 from B1150 to Kidas Way	Low	12,980	585	160	133	64	52	1%	23%
19	A149 from Kidas Way to Honning Road	Low	7,368	382	160	133	64	52	2%	35%
20	A149 from B1159 to Station Road	Low	9,647	543	153	133	61	52	2%	24%
21	A149 from Station Road to A1064	Medium	11,556	486	153	133	61	52	1%	27%
22	A149 from A1064 to Yarmouth Road	Low	26,297	711	133	133	52	52	1%	19%
23	A149 from Yarmouth Road to B1141	High	21,008	619	133	133	52	52	1%	21%
24	A149 from B1141 to A47	Medium	36,217	1,097	548	548	252	252	2%	50%
25	A12 from A47 to Williams Adams Way	Low	37,422	1,181	366	265	186	134	1%	22%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
26	A12 from Williams Adams Way to B1385	Medium	27,224	919	319	265	162	134	1%	29%
27	A12 from B1385 to A1117	Low	18,985	505	265	265	134	134	1%	52%
28	A12 from A1117 to Mill Road	Medium	10,109	672	265	265	134	134	3%	39%
29	A12 from Mill Road to B1384 / A1145 from B1384 to A146	Medium	11,761	446	320	320	144	144	3%	72%
30	A146 from A47 to A1145	Medium	19,940	870	772	320	379	144	4%	37%
31	A47 from A146 to A1042	Low	55,710	2,520	709	320	350	144	1%	13%
32	A47 from A1042 to Cucumber Lane	Low	46,416	2,109	587	475	286	244	1%	23%
33	A47 from Cucumber Lane to A1064	Low	46,416	2,109	614	475	298	224	1%	23%
34	A47 from A1064 to A12	Low	23,220	1,438	588	475	283	224	3%	33%
35	A1270 from A1151 to A47	Low	23,734	1,519	605	255	296	109	3%	17%
37	A149 from A1151 to B1159	Low	14,702	1,365	153	133	61	52	1%	10%
38	A149 from The Street to A1151	Medium	9,137	1,096	160	133	64	52	2%	12%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
39	A149 from Honing Road to The Street	Low	9,137	1,096	160	133	64	52	2%	12%
40	A1270 from B1150 to A1151	Low	23,734	1,519	675	255	328	109	3%	17%
41	A1270 from A140 to B1150	Low	23,734	1,519	630	255	300	109	3%	17%
42	A140 from B1149 to A1042	Medium	19,522	774	764	0	435	0	4%	0%
43	A140 from Cawston Road to A1270	Medium	15,175	632	498	232	216	80	3%	37%
44	A140 from B1145 to Cawston Road	Low	16,561	790	377	167	172	66	2%	21%
45	A140 from B1145 to Aylsham Road	Low	12,240	412	235	0	116	0	2%	0%
46	A140 from Thorpe Market Road to Aylsham Road	Low	12,240	412	312	0	157	0	3%	0%
47	A1270 from Drayton Lane to A140	Low	11,865	760	789	228	502	95	7%	30%
48	Brewery Lane / B1149 from Brewery Lane to Shorthorn Road	High	7,047	301	308	0	206	0	4%	0%
49	B1149 from Buxton Road to Shorthorn Road	Medium	7,047	301	391	75	260	19	6%	25%
50	Buxton Road	Low	750	107	80	80	24	24	11%	75%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
51	B1149 from B1145 to Buxton Road	Low	8,642	643	416	93	272	28	5%	15%
52	B1145 from B1149 to A140	Medium	4,366	357	193	167	77	66	4%	47%
53	B1145 from Old Friendship Lane to B1149	Medium	3,660	134	93	54	31	14	2%	40%
54	B1149 from Spink's Lane to B1145	Low	5,264	305	555	238	322	85	11%	78%
56	B1149 from B1354 to Spink's Lane	Low	5,264	305	536	232	265	80	10%	76%
57	B1354 east of B1149	Low	5,526	327	95	37	44	17	2%	11%
58	Unnamed Road	Low	1,101	110	289	156	156	47	26%	141%
59	B1149 from A148 to B1354	Medium	4,776	182	343	215	127	67	7%	116%
60	Hempstead Road / The Street	High	1,836	180	64	64	20	20	4%	36%
61	Church Lane / Unnamed Road	Medium	31	5	113	57	41	16	367%	1237%
62	Unnamed Road	Low	1,078	88	84	30	32	8	8%	35%
63	Unnamed Road	Low	1,078	88	89	35	37	13	8%	40%
64	Church Street / Cherry Tree Road	High	252	23	122	84	27		49%	364%
65	Northfield Lane	Low	221	20	5	5	5	5	2%	24%
66	Plumstead Road	Medium	252	23	38	38	13	13	15%	165%
67	Shorthorn Road	Low	4,357	491	180	75	65	19	4%	15%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
68	The Street / Taverham Road	High	4,357	491	106	0	46	0	2%	0%
69	Reepham Road	Low	2,436	197	247	78	105	20	10%	40%
71	Reepham Road	Low	2,436	197	163	36	74	10	7%	18%
72	A1270 from Reepham Road to Brewery Lane	Low	11,865	760	442	110	270	46	4%	15%
73	A1270 from Fir Covert Road to Reepham Road	Low	11,865	760	318	75	203	36	3%	10%
74	Fir Covert Road	Low	4,612	377	89	0	38	0	2%	0%
75	Fir Covert Road	Low	8,245	435	150	0	66	0	2%	0%
76	A1067 from Beech Avenue to A140	High	13,750	397	206	0	107	0	2%	0%
77	A1067 from A1270 to Fir Covert Road	Low	6,318	436	20	0	16	0	0%	0%
78	A1270 from A1067 to Fir Covert Road	Low	11,865	760	257	75	175	36	2%	10%
79	A1067 from Marl Hill Road to A1270	Low	11,808	755	419	129	285	72	4%	17%
80	A1067 from A148 to Marl Hill Road	Low	8,068	479	231	128	110	55	3%	27%
81	Marl Hill Road	Low	2,643	252	173	57	80	14	7%	23%
82	Ringland Lane / Morton Lane	Low	344	38	107	57	37	14	31%	149%
83	Church Street / Church Farm Close / Woodforde Close / Honingham	High	2,643	252	192	68	92	22	7%	27%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
	Road / Paddy's Lane									
84	The Broadway / Unnamed Road	High	30	2	112	68	45	22	373%	3195%
85	Wood Lane	Low	2,643	252	218	68	105	22	8%	27%
86	A47 from A1065 to Berrys Lane	Low	16,886	1,659	581	363	302	187	3%	22%
87	A47 from A10 to A1065	Low	15,021	1,586	505	363	262	187	3%	23%
88	A149 from A148 to A47	Low	26,936	1,948	363	363	187	187	1%	19%
89	A47 from Wood Lane to Taverham Road	Low	27,092	2,318	608	363	315	185	2%	16%
90	Taverham Road	Low	220	13	161	75	72	28	73%	563%
93	Unnamed Road / Dereham Road	Low	694	136	322	159	155	55	46%	117%
94	A47 from Blind Lane to Dereham Road	Low	27,092	2,318	615	363	323	187	2%	16%
95	A47 from Dereham Road to A1074	Low	54,091	3,253	686	341	361	180	1%	10%
96	A1074 from A47 to A140	Medium	15,454	902	124	0	60	0	1%	0%
97	A47 from A1074 to B1108	Low	54,091	3,253	625	341	335	180	1%	10%
98	B1108 from Landlow Lane to B1108	Low	6,641	720	226	81	128	27	3%	11%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
99	Bow Hill	Low	796	61	134	45	48	12	17%	74%
100	A148 from Bridge Road to Gypsie's Lane	High	14,272	497	232	113	98	45	2%	23%
101	Church Road / Bow Hill	Low	796	61	134	45	48	12	17%	74%
102	Unnamed Roads	High	219	39	91	60	31	17	41%	155%
103	Chapel Street	Low	1,088	104	155	67	58	20	14%	64%
104	B1108 west of Bow Hill	Low	5,962	199	191	81	89	27	3%	41%
105	A47 from B1108 to A11	Low	54,091	3,253	800	361	412	185	1%	11%
106	B1172 from Ketteringham Lane to A47	Low	16,208	919	172	64	84	30	1%	7%
107	B1172 from New Road to Ketteringham Lane	Low	16,208	919	148	64	76	30	1%	7%
108	New Road	Medium	3,561	102	0	0	0	0	0%	0%
109	Hethersett Road	Low	798	33	0	0	0	0	0%	0%
110	Melton Road / High Green	Low	798	33	102	54	31	13	13%	163%
111	B1135 from Melton Road to Norwich Common	Low	11,265	964	62	54	21	13	1%	6%
112	B1172 from B1135 to New Road	Medium	11,657	744	148	64	75	30	1%	9%
113	B1135 from B1172 to A11	Low	20,025	1,270	220	100	155	55	1%	8%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
114	A11 from B1135 to A47	Low	53,932	3,770	366	100	209	55	1%	3%
115	Ketteringham Lane	Low	647	50	17	0	9	0	3%	0%
116	High Street	Low	647	50	107	63	41	19	16%	127%
117	Low Street	High	1,070	73	90	63	32	19	8%	87%
118	Station Lane	Low	1,886	187	221	94	146	48	12%	50%
119	Hethersett Road	Low	1,886	187	220	93	130	45	12%	50%
121	A11 from A47 to A140	Medium	21,775	1,357	3	0	3	0	0%	0%
122	A47 from A11 to A140	Low	66,640	3,631	691	353	356	177	1%	10%
123	B1113 south of the A47	High	9,314	317	115	67	48	18	1%	21%
124	B1113 from A47 to A140	Low	9,314	317	115	67	46	18	1%	21%
125	A140 from A146 to A47	Low	24,018	1,059	226	67	123	18	1%	6%
126	Aylsham Road	Low	5,264	305	523	232	244	80	10%	76%
127	A140 south of the A47	Low	23,311	3,026	476	189	361	136	2%	6%
128	Mangreen	Low	333	12	411	189	330	136	124%	1523%
129	A47 from A140 to A146	Low	10,209	794	697	320	349	144	7%	40%
131	The Street	Low	2,051	58	88	54	24	11	4%	94%
132	Buxton Road / Easton Way	Medium	1,020	94	142	127	41	34	14%	136%
133	Porter's Lane / Hall Road	Medium	1,145	267	54	46	16	13	5%	17%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
136	Reepham Road from its junction with Hall Road to junction with Station Road	Medium	1,145	267	54	46	16	13	5%	17%
137	Unnamed Road, east of its junction with Grove Lane	Low	1,020	94	242	127	100	34	24%	136%
138	Broad Lane / The Street	High	301	11	111	0	55	0	37%	0%
139	Unnamed road	Low	301	11	111	0	55	0	37%	0%
141	A1082 Holway Road	High	9,352	190	169	69	59	20	2%	36%
143	Old Fakenham Road	Low	1,689	27	261	77	227	58	15%	289%
144	Ringland Lane	Low	408	38	5	0	2	0	1%	0%
146	Breck Road / Unnamed Road	Low	3,991	652	51	0	25	0	1%	0%
147	Breck Road / Weston Green Road	Medium	67	5	101	67	37	19	152%	1255%
148	Weston Road	Low	67	5	135	67	54	19	202%	1255%
149	Unnamed road	High	67	5	67	67	19	19	100%	1255%
150	Unnamed Road	Low	360	34	51	0	25	0	14%	0%
152	Burdock Lane / Landlow Lane	Low	796	61	165	69	64	22	21%	113%
153	Rectory Road / Catbridge Lane	High	1,589	190	4	0	1	0	0%	0%
*	AADT – Annual Average Daily Traffic									

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
%	Exceeds GEART screening thresholds									

Table 24-20: Link Screening - SEP and DEP Concurrently

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
1	A1078 Low Road / A148 Grimston Road	Low	17,776	887	851	743	428	379	5%	84%
2	A148 from A149 to A1065	Medium	8,658	662	481	340	210	145	6%	51%
3	A148 from A1065 to A1067	Low	16,241	978	456	340	199	145	3%	35%
4	A148 from A1067 to B1149	Medium	9,530	508	371	262	153	105	4%	52%
5	A148 from B1149 to Hempstead Road	Medium	14,272	497	448	186	169	64	3%	37%
6	A148 from Hempstead Road to Bridge Road	Medium	14,272	497	324	169	120	53	2%	34%
7	Bridge Road	High	827	63	81	81	18	18	10%	130%
8	The Street	High	827	63	71	55	18	12	9%	87%
9	A149 - The Street	High	3,621	55	257	92	79	15	7%	167%
10	Holgate Hill / Holt Road	High	1,273	81	187	58	64	15	15%	71%
11	A149 from Weybourne to Weybourne Road	High	5,023	34	239	108	70	20	5%	313%
12	Station Road / Sandy Hill Lane / Gypsies' Lane	Medium	1,008	104	209	95	90	28	21%	92%
13	A148 from Gypsie's Lane to B1436	High	15,102	679	429	179	183	63	3%	26%
14	B1436 - Felbrigg	Medium	7,290	661	395	169	158	53	5%	26%
15	A140 - Roughton	Low	5,929	516	291	169	109	53	5%	33%
16	A149 - North Walsham	Medium	9,241	378	203	169	68	53	2%	45%
17	A149 from B1145 to B1150	Low	12,980	585	203	169	68	53	2%	29%
18	A149 from B1150 to Kidas Way	Low	12,980	585	203	169	68	53	2%	29%
19	A149 from Kidas Way to Honning Road	Low	7,368	382	203	169	68	53	3%	44%
20	A149 from B1159 to Station Road	Low	9,647	543	194	169	64	53	2%	31%
21	A149 from Station Road to A1064	Medium	11,556	486	194	169	64	53	2%	35%
22	A149 from A1064 to Yarmouth Road	Low	26,297	711	169	169	53	53	1%	24%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
23	A149 from Yarmouth Road to B1141	High	21,008	619	169	169	53	53	1%	27%
24	A149 from B1141 to A47	Medium	36,217	1,097	668	668	304	304	2%	61%
25	A12 from A47 to Williams Adams Way	Low	37,422	1,181	476	336	204	140	1%	28%
26	A12 from Williams Adams Way to B1385	Medium	27,224	919	411	336	175	140	2%	37%
27	A12 from B1385 to A1117	Low	18,985	505	336	336	140	140	2%	67%
28	A12 from A1117 to Mill Road	Medium	10,109	672	336	336	140	140	3%	50%
29	A12 from Mill Road to B1384 / A1145 from B1384 to A146	Medium	11,761	446	401	401	189	189	3%	90%
30	A146 from A47 to A1145	Medium	19,940	870	1,024	401	474	189	5%	46%
31	A47 from A146 to A1042	Low	55,710	2,520	923	401	447	189	2%	16%
32	A47 from A1042 to Cucumber Lane	Low	46,416	2,109	762	603	346	273	2%	29%
33	A47 from Cucumber Lane to A1064	Low	46,416	2,109	799	603	363	273	2%	29%
34	A47 from A1064 to A12	Low	23,220	1,438	759	603	344	273	3%	42%
35	A1270 from A1151 to A47	Low	23,734	1,519	778	326	336	106	3%	21%
37	A149 from A1151 to B1159	Low	14,702	1,365	194	169	64	53	1%	12%
38	A149 from The Street to A1151	Medium	9,137	1,096	203	169	68	53	2%	15%
39	A149 from Honing Road to The Street	Low	9,137	1,096	203	169	68	53	2%	15%
40	A1270 from B1150 to A1151	Low	23,734	1,519	872	326	377	106	4%	21%
41	A1270 from A140 to B1150	Low	23,734	1,519	804	326	336	106	3%	21%
42	A140 from B1149 to A1042	Medium	19,522	774	880	0	527	0	5%	0%
43	A140 from Cawston Road to A1270	Medium	15,175	632	552	206	234	79	4%	33%
44	A140 from B1145 to Cawston Road	Low	16,561	790	443	179	184	69	3%	23%
45	A140 from B1145 to Aylsham Road	Low	12,240	412	296	0	130	0	2%	0%
46	A140 from Thorpe Market Road to Aylsham Road	Low	12,240	412	396	0	184	0	3%	0%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
47	A1270 from Drayton Lane to A140	Low	11,865	760	1,035	283	576	94	9%	37%
48	Brewery Lane / B1149 from Brewery Lane to Shorthorn Road	High	7,047	301	372	0	238	0	5%	0%
49	B1149 from Buxton Road to Shorthorn Road	Medium	7,047	301	455	74	296	19	6%	25%
50	Buxton Road	Low	750	107	79	79	23	23	11%	74%
51	B1149 from B1145 to Buxton Road	Low	8,642	643	473	92	310	27	5%	14%
52	B1145 from B1149 to A140	Medium	4,366	357	212	179	85	69	5%	50%
53	B1145 from Old Friendship Lane to B1149	Medium	3,660	134	121	54	29	12	3%	40%
54	B1149 from Spink's Lane to B1145	Low	5,264	305	594	212	357	84	11%	70%
56	B1149 from B1354 to Spink's Lane	Low	5,264	305	575	207	294	79	11%	68%
57	B1354 east of B1149	Low	5,526	327	95	50	48	18	2%	15%
58	Unnamed Road	Low	1,101	110	371	148	168	48	34%	134%
59	B1149 from A148 to B1354	Medium	4,776	182	370	169	145	67	8%	93%
60	Hempstead Road / The Street	High	1,836	180	66	66	20	20	4%	37%
61	Church Lane / Unnamed Road	Medium	31	5	123	58	44	16	399%	1259%
62	Unnamed Road	Low	1,078	88	92	31	35	8	9%	35%
63	Unnamed Road	Low	1,078	88	97	36	40	13	9%	41%
64	Church Street / Cherry Tree Road	High	252	23	134	86	53	27	53%	374%
65	Northfield Lane	Low	221	20	5	5	5	5	2%	24%
66	Plumstead Road	Medium	252	23	39	39	13	13	16%	170%
67	Shorthorn Road	Low	4,357	491	197	74	68	19	5%	15%
68	The Street / Taverham Road	High	4,357	491	125	0	50	0	3%	0%
69	Reepham Road	Low	2,436	197	383	81	157	23	16%	41%
71	Reepham Road	Low	2,436	197	265	35	119	11	11%	18%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
72	A1270 from Reepham Road to Brewery Lane	Low	11,865	760	585	116	323	49	5%	15%
73	A1270 from Fir Covert Road to Reepham Road	Low	11,865	760	431	81	217	38	4%	11%
74	Fir Covert Road	Low	4,612	377	106	0	44	0	2%	0%
75	Fir Covert Road	Low	8,245	435	197	0	75	0	2%	0%
76	A1067 from Beech Avenue to A140	High	13,750	397	289	0	128	0	2%	0%
77	A1067 from A1270 to Fir Covert Road	Low	6,318	436	28	0	16	0	0%	0%
78	A1270 from A1067 to Fir Covert Road	Low	11,865	760	340	81	186	38	3%	11%
79	A1067 from Marl Hill Road to A1270	Low	11,808	755	541	142	307	75	5%	19%
80	A1067 from A148 to Marl Hill Road	Low	8,068	479	279	139	125	58	3%	29%
81	Marl Hill Road	Low	2,643	252	243	62	93	15	9%	25%
82	Ringland Lane / Morton Lane	Low	344	38	153	62	43	15	44%	162%
83	Church Street / Church Farm Close / Woodforde Close / Honingham Road / Paddy's Lane	High	2,643	252	289	97	104	23	11%	38%
84	The Broadway / Unnamed Road	High	30	2	185	97	52	23	616%	4560%
85	Wood Lane	Low	2,643	252	311	97	119	23	12%	38%
86	A47 from A1065 to Berrys Lane	Low	16,886	1,659	786	472	402	260	5%	28%
87	A47 from A10 to A1065	Low	15,021	1,586	678	472	352	260	5%	30%
88	A149 from A148 to A47	Low	26,936	1,948	478	472	262	260	2%	24%
89	A47 from Wood Lane to Taverham Road	Low	27,092	2,318	830	472	418	259	3%	20%
90	Taverham Road	Low	220	13	281	137	82	27	128%	1027%
93	Unnamed Road / Dereham Road	Low	694	136	410	165	150	49	59%	121%
94	A47 from Blind Lane to Dereham Road	Low	27,092	2,318	774	472	430	260	3%	20%
95	A47 from Dereham Road to A1074	Low	54,091	3,253	925	417	472	253	2%	13%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
96	A1074 from A47 to A140	Medium	15,454	902	178	0	68	0	1%	0%
97	A47 from A1074 to B1108	Low	54,091	3,253	846	417	442	253	2%	13%
98	B1108 from Landlow Lane to B1108	Low	6,641	720	325	95	129	22	5%	13%
99	Bow Hill	Low	796	61	165	45	47	10	21%	75%
100	A148 from Bridge Road to Gypsie's Lane	High	14,272	497	275	120	113	46	2%	24%
101	Church Road / Bow Hill	Low	796	61	165	45	47	10	21%	75%
102	Unnamed Roads	High	219	39	90	56	31	17	41%	145%
103	Chapel Street	Low	1,088	104	176	64	55	17	16%	61%
104	B1108 west of Bow Hill	Low	5,962	199	275	95	90	22	5%	48%
105	A47 from B1108 to A11	Low	54,091	3,253	1,121	471	524	259	2%	14%
106	B1172 from Ketteringham Lane to A47	Low	16,208	919	222	91	87	30	1%	10%
107	B1172 from New Road to Ketteringham Lane	Low	16,208	919	211	91	78	30	1%	10%
108	New Road	Medium	3,561	102	4	0	1	0	0%	0%
109	Hethersett Road	Low	798	33	4	0	1	0	1%	0%
110	Melton Road / High Green	Low	798	33	137	56	31	12	17%	169%
111	B1135 from Melton Road to Norwich Common	Low	11,265	964	69	56	21	12	1%	6%
112	B1172 from B1135 to New Road	Medium	11,657	744	203	91	77	30	2%	12%
113	B1135 from B1172 to A11	Low	20,025	1,270	358	132	154	50	2%	10%
114	A11 from B1135 to A47	Low	53,932	3,770	542	132	220	50	1%	4%
115	Ketteringham Lane	Low	647	50	34	0	9	0	5%	0%
116	High Street	Low	647	50	135	58	40	17	21%	115%
117	Low Street	High	1,070	73	110	58	31	17	10%	79%
118	Station Lane	Low	1,886	187	282	99	147	45	15%	53%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
119	Hethersett Road	Low	1,886	187	270	96	130	42	14%	52%
121	A11 from A47 to A140	Medium	21,775	1,357	4	0	4	0	0%	0%
122	A47 from A11 to A140	Low	66,640	3,631	943	463	467	251	1%	13%
123	B1113 south of the A47	High	9,314	317	104	56	42	14	1%	18%
124	B1113 from A47 to A140	Low	9,314	317	104	56	40	14	1%	18%
125	A140 from A146 to A47	Low	24,018	1,059	277	56	169	14	1%	5%
126	Aylsham Road	Low	5,264	305	562	206	271	79	11%	68%
127	A140 south of the A47	Low	23,311	3,026	756	287	589	229	3%	9%
128	Mangreen	Low	333	12	667	287	554	229	200%	2316%
129	A47 from A140 to A146	Low	10,209	794	970	401	453	189	9%	51%
131	The Street	Low	2,051	58	100	54	27	11	5%	93%
132	Buxton Road / Easton Way	Medium	1,020	94	135	115	47	34	13%	123%
133	Porter's Lane / Hall Road	Medium	1,145	267	61	46	17	14	5%	17%
136	Reepham Road from its junction with Hall Road to junction with Station Road	Medium	1,145	267	61	46	17	14	5%	17%
137	Unnamed Road, east of its junction with Grove Lane	Low	1,020	94	254	115	157	34	25%	123%
138	Broad Lane / The Street	High	301	11	153	0	101	0	51%	0%
139	Unnamed road	Low	301	11	153	0	101	0	51%	0%
141	A1082 Holway Road	High	9,352	190	219	93	68	20	2%	49%
143	Old Fakenham Road	Low	1,689	27	285	77	231	59	17%	288%
144	Ringland Lane	Low	408	38	10	0	3	0	2%	0%
146	Breck Road / Unnamed Road	Low	3,991	652	69	0	30	0	2%	0%
147	Breck Road / Weston Green Road	Medium	67	5	135	79	39	20	203%	1494%
148	Weston Road	Low	67	5	178	79	58	20	267%	1494%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		Forecast Construction Vehicle Trips				Percentage Increase (based on peak Trips)	
					Peak		Average			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs
149	Unnamed road	High	67	5	79	79	20	20	119%	1494%
150	Unnamed Road	Low	360	34	69	0	30	0	19%	0%
152	Burdock Lane / Landlow Lane	Low	796	61	172	68	57	16	22%	112%
153	Rectory Road / Catbridge Lane	High	1,589	190	4	0	1	0	0%	0%
*	AADT – Annual Average Daily Traffic									
%	Exceeds GEART screening thresholds									

193. In accordance with GEART, only those links that are showing greater than 10% increase in total traffic flows (or HGV component) for sensitive links, or greater than 30% increase in total traffic (or HGV component) for all other links, are considered when assessing the effects severance, amenity and pedestrian delay.

194. Disaggregating from **Table 24-19**, 66 of the 140 links are above the GEART screening thresholds based on the construction of SEP or DEP in isolation.

195. Similarly, disaggregating from **Table 24-20**, 76 of the 140 links are above the GEART screening thresholds based on the construction of SEP and DEP concurrently, thus the links are screened in for further assessment.

196. **Table 24-21** provides a summary of those links that will be taken forward for further assessment (for the effects of severance, amenity and pedestrian delay) and those that are screened out.

Table 24-21: Link Screening Summary

Scenario	Further Assessment	No Further Assessment
SEP or DEP in Isolation	1, 2, 4, 7-13, 16, 19, 23, 24, 27-30, 34, 43, 47, 50, 52, 53, 54, 56, 58-64, 66, 69, 82-84, 90, 93, 99-104, 110, 116-119, 123, 126, 128, 129, 131, 132, 137-139, 141, 143, 147-149 and 152.	3, 5, 6, 14, 15, 17, 18, 20, 21, 22, 25, 26, 31-33, 35, 37-42, 44-46, 48, 49, 51, 57, 65, 67, 68, 71-81, 85-89, 94-98, 105-109, 111-115, 121-122, 124, 125, 127, 133, 136, 144, 146, 150 and 153.
SEP and DEP Concurrently	1-13, 15, 16, 19-21, 23, 24, 26-30, 34, 43, 47, 50, 52, 53, 54, 56, 58-64, 66, 69, 82-85, 87, 90, 93, 99-104, 110, 116-119, 123, 126, 128, 129, 131, 132, 137-139, 141, 143, 147-149 and 152.	14, 17, 18, 22, 25, 31-33, 35, 37-42, 44-46, 48, 49, 51, 57, 65, 67, 68, 71-81, 86, 88, 89, 94-98, 105-109, 111-115, 121, 122, 124, 125, 127, 133, 136, 144, 146, 150 and 153.

24.6.1.2 Impact 1: Severance

197. Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. **Section 24.4.3.1.1** provides details of the adopted impact assessment methodology.

24.6.1.2.1 Magnitude of Effect – SEP or DEP in Isolation

198. **Table 24-22** provides a summary of the severance magnitude of effect for each of the screened links detailed in **Table 24-19**.

Table 24-22: Magnitude of Severance Effect - SEP or DEP in Isolation

Links	Magnitude of Effect	Rationale for Magnitude
1, 2, 4, 7-13, 15, 16, 19, 23, 24, 27-30, 34, 43, 47, 50, 52, 53, 54, 56, 58-60, 62, 63, 66, 69, 83, 99-101, 103, 104, 110, 116-119, 123, 126, 129, 131, 132, 137, 141, 143 and 152.	Negligible	The peak daily change in total traffic flow is less than 30%

Links	Magnitude of Effect	Rationale for Magnitude
64, 82, 93, 102, 138 and 139	Low	The peak daily change in total traffic flow is between 30% and 60%.
90	Medium	The peak daily change in total traffic flow is between 60% and 90%.
61, 84, 128, and 147-149.	High	The peak daily change in total traffic flow is above 90%

24.6.1.2.2 Magnitude of Effect – SEP and DEP Concurrently

199. **Table 24-23** provides a summary of the severance magnitude of effect for each of the screened links detailed in **Table 24-20**.

Table 24-23: Magnitude of Severance Effect - SEP and DEP Concurrently

Links	Magnitude of Effect	Rationale for Magnitude
1-13, 15, 16, 19-21, 23, 24, 30, 34, 43, 47, 50, 52, 53, 54, 56, 59, 60, 62, 63, 66, 69, 83, 85, 87, 99-101, 103, 104, 110, 116-119, 123, 126, 129, 131, 132, 137, 141, 143 and 152.	Negligible	The peak daily change in total traffic flow is less than 30%
58, 64, 82, 93, 102, 138 and 139	Low	The peak daily change in total traffic flow is between 30% and 60%.
61, 84, 90, 128, and 147-149.	High	The peak daily change in total traffic flow is above 90%

24.6.1.2.3 Impact Significance – SEP or DEP in Isolation

200. **Table 24-24** provides a summary of the sensitivity of each receptor, the magnitude of effect and an initial evaluation of the significance of the severance impact.

Table 24-24: Significance of Severance Impacts - SEP or DEP in Isolation

Links	Magnitude of Effect	Sensitivity	Impact Significance
1, 2, 4, 7-13, 15, 16, 19, 23, 24, 27-30, 34, 43, 47, 50, 52, 53, 54, 56, 58-60, 62, 63, 66, 69, 83, 99-101, 103, 104, 110, 116-119, 123, 126, 129, 131, 132, 137, 141, 143 and 152.	Negligible	Low – High	**Negligible – Minor Adverse**
82, 93 and 139	Low	Low	**Minor Adverse**

Links	Magnitude of Effect	Sensitivity	Impact Significance
64, 102 and 138	Low	High	**Moderate Adverse**
90	Medium	Low	**Minor Adverse**
128 and 148	High	Low	**Moderate Adverse**
61 and 147	High	Medium	**Major Adverse**
84 and 149	High	High	**Major Adverse**

201. **Table 24-24** identifies that links 61, 64, 84, 102, 128, 138, 147, 148 and 149 could potentially experience significant impacts and therefore a more detailed assessment has been undertaken of the factors that may be influencing the magnitude of effect to determine the scale and scope of mitigation measures.

202. To contextualise the potential effects, guidance provided in the DMRB Guidance for Population and Human Health (LA112) has been referenced. LA112 states that when considering severance for walkers, cyclists and horse-riders, roads with daily vehicle flows under 4,000 vehicles per day are considered to be of low sensitivity. This assessment adopts the LA112 threshold as a proxy for severance effects and considers any link that falls below the threshold to be subject to a low magnitude of effect.

203. **Table 24-19** summarise the forecast background daily traffic flows in 2025 in the TTSA and assigned daily peak vehicle trips associated with the construction of SEP or DEP in isolation.

204. Links 61, 128, 147 and 148 could experience maximum total traffic flows (i.e. Link 128, background plus SEP or DEP) of up to 744 vehicles per day which is significantly less than the LA112 threshold and are therefore the magnitude of effect is revised to low. A low magnitude of effect on low and medium sensitive receptors would result in **minor adverse** impacts, which is not significant in EIA terms.

205. Links 64, 84, 102, 138 and 149 experience total traffic flows of up to 412 vehicles per day which is significantly less than the LA112 threshold and are assessed as having a low magnitude of effect. A low magnitude of effect on high sensitive receptors could result in **moderate adverse** impacts.

206. An assessment of the links identified as having the potential to experience significant impacts has been undertaken utilising hourly disaggregated traffic flows to further inform an assessment upon the likely magnitude of effect. In order to consider a worst-case scenario, the peak demand hour flows include the assumption that employees (LVs) will arrive and depart within a single hour and that HGV movements would be one-tenth of the daily demand. Further details on the disaggregation of daily flows to peak hour flows is provided in Annex 6 of the TA (**Appendix 24.1**).

24.6.1.2.3.1 Link 64

207. Link 64 (Cherry Tree Road / Church Street) is an unclassified single carriageway road that routes through Plumstead. Frontage development is present along the link in Plumstead, however, there are no footways. The link is assessed to be of high sensitivity.

208. The link has a baseflow of 252 vehicle trips per day (including 23 HGV trips) and would be subject to a peak construction traffic of up to 122 vehicles trips per day (including 84 HGV trips). On average, the link would be subject to construction traffic of up to 52 vehicle trips (including 27 HGV trips) per day.

209. Disaggregating daily flows, link 64 would be subject to a peak construction traffic of up to 19 LV trips and nine HGV trips during the peak hour. On average, the link would be subject to construction traffic of up to 13 LV trips and three HGV trips in the peak hour.

210. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to nine two-way HGV trips (three HGV trips on average).

211. In consideration of hourly traffic, the magnitude of effect for severance is assessed to be revised to negligible to low on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **minor** to **moderate adverse**.

24.6.1.2.3.2 Link 84

212. Link 84 (The Broadway / Telegraph Hill) is an unclassified single carriageway that runs east of the B1535. Sporadic frontage development (including a local park) is present along the link, however, there are no footways present. The link is assessed to be of high sensitivity.

213. The link has a baseflow of 30 vehicles per day (including two HGVs) and would be subject to a peak construction traffic of up to 112 vehicles per day (including 68 HGVs). On average, the link would be subject to construction traffic of up to 45 vehicles (including 22 HGVs) per day.

214. Link 84 would be subject to a peak construction traffic of up to 22 LVs and seven HGVs during the peak hour. On average, the link would be subject to construction traffic of up to 12 LVs and three HGVs in the peak hour.

215. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to seven HGV trips (three HGV trips on average).

216. In consideration of hourly traffic, the magnitude of effect for severance is assessed to be revised to negligible to low on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **minor** to **moderate adverse**.

24.6.1.2.3.3 Link 102

217. Link 102 (Unnamed Road / Rectory Road) is a narrow unclassified single carriageway that runs southeast of High Kelling. Minimal frontage development is present along the link including a Church, however, there are no footways present. The link is assessed to be of high sensitivity.

218. The link has a baseflow of 219 vehicles per day (including 39 HGVs) and would be subject to a peak construction traffic of up to 91 vehicles per day (including 60 HGVs). On average, the link would be subject to construction traffic of up to 31 vehicles (including 17 HGVs) per day.

219. Link 102 would be subject to a peak construction traffic of up to 16 LVs and six HGVs during the peak hour. On average, the link would be subject to construction traffic of up to seven LVs and two HGVs in the peak hour.

220. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to seven HGV trips (two HGV trips on average).

221. In consideration of hourly traffic, the magnitude of effect for severance is assessed to be revised to negligible to low on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **minor** to **moderate adverse**.

24.6.1.2.3.4 Link 138

222. Link 138 (Broad Lane / The Street) is an unclassified single carriageway that runs through Swannington. Extensive frontage development is present along the link in Swannington, however, there are no footways present. The link is assessed to be of high sensitivity.

223. The link has a baseflow of 301 vehicles per day (including 11 HGVs) and would be subject to a peak construction traffic of up to 111 LV trips per day. On average, the link would be subject to construction traffic of up to 55 LV trips day. No HGV construction vehicles are forecast to travel along the link.

224. Link 138 would be subject to a peak construction traffic of up to 56 LVs during the peak hour. On average, the link would be subject to construction traffic of up to 28 LVs in the peak hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site.

225. In consideration of hourly traffic, the magnitude of effect for severance is assessed to be revised to low on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **moderate adverse**.

24.6.1.2.3.5 Link 149

226. Link 149 (Weston Road / Honingham Lane) is an unclassified single carriageway that loops around The Broadway east of Ringland. Sporadic frontage development is present along the link, there are no footways present. The link is assessed to be of high sensitivity.

227. The link has a baseflow of 67 vehicles per day (including five HGVs) and would be subject to a peak construction traffic of up to 67 HGVs per day. On average, the link would be subject to construction traffic of up to 19 vehicles per day. No LV construction vehicles are anticipated to travel along the link.

228. Link 149 would be subject to a peak construction traffic of up to seven HGVs per hour. On average, the link would be subject to construction traffic of up to two HGVs per hour.

229. In consideration of hourly traffic, the magnitude of effect for severance is assessed to be revised to negligible to low on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **minor** to **moderate adverse**.

24.6.1.2.4 Impact Significance – SEP and DEP Concurrently

230. The sensitivity of each link is detailed in **Table 24-17** and **Figure 24.7**.

231. **Table 24-25** provides a summary of the sensitivity of each receptor, the magnitude of effect and an initial evaluation of the significance of the severance impact.

Table 24-25: Significance of Severance Impacts – SEP and DEP Concurrently

Links	Magnitude of Effect	Sensitivity	Impact Significance
1-13, 15, 16, 19, 20, 21, 23, 24, 26-30, 34, 43, 47, 50, 52, 53, 54, 56, 59-60, 62, 63, 66, 69, 83, 85, 87, 99-101, 103, 104, 110, 116-119, 123, 126, 129, 131, 132, 137, 141, 143 and 152.	Negligible	Low – High	**Negligible – Minor adverse**
58, 82, 93 and 139	Low	Low	**Minor adverse**
64, 102 and 138	Low	High	**Moderate adverse**
90, 128 and 148	High	Low	**Moderate adverse**
61 and 147	High	Medium	**Major adverse**
84 and 149	High	High	**Major adverse**

232. **Table 24-25** identifies that links 61, 64, 84, 90, 102, 128, 138, 147, 148 and 149 could potentially experience significant impacts and are therefore assessed further.

233. **Table 24-20** summarise the forecast background daily traffic flows in 2025 in the TTSA and assigned daily peak vehicle trips associated with the construction of SEP and DEP.

234. Links 61, 90, 128, 147 and 148 experience total traffic flows (i.e. background plus SEP and DEP) of up to 1,000 vehicles per day which is significantly less than the LA112 threshold (4,000 vehicles per day) and are therefore the magnitude of effect is revised to low. It is assessed that a low magnitude of effect on a low or medium sensitive receptor could result in **minor adverse** impacts.

235. Links 64, 84, 102, 138 and 149 experience total traffic flows of up to 454 vehicles per day which is significantly less than the LA112 threshold and are therefore assessed as having a low magnitude of effect. It is assessed that a low magnitude of effect on a high sensitive receptor could result in **moderate adverse** impacts.

236. An assessment of the links identified as having the potential to experience significant impacts has been undertaken utilising hourly disaggregated traffic flows to further inform likely magnitude of effect. Further details on the disaggregation of daily flows to peak hour flows is provided in Annex 6 of the TA (**Appendix 24.1**).

24.6.1.2.4.1 Link 64

237. Link 64 (Cherry Tree Road / Church Street) is an unclassified single carriageway that runs through Plumstead. Frontage development is present along the link in Plumstead, however, there are no footways. The link is assessed to be of high sensitivity.

238. The link has a baseflow of 252 vehicles per day (including 23 HGVs) and would be subject to a peak construction traffic of up to 134 vehicles per day (including 86 HGVs). On average, the link would be subject to construction traffic of up to 53 vehicles per day (including 27 HGVs).

239. Link 64 would be subject to a peak construction traffic of up to 24 LVs and nine HGVs during the peak hour. On average, the link would be subject to construction traffic of up to 13 LVs and three HGVs in the peak hour.

240. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to nine HGV trips (three HGV trips on average).

241. In consideration of hourly traffic, the magnitude of effect for severance is assessed as negligible to low on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **minor** to **moderate adverse**.

24.6.1.2.4.2 Link 84

242. Link 84 (The Broadway / Telegraph Hill) is an unclassified single carriageway that runs east of the B1535. Sporadic frontage development (including a local park) is present along the link, however, there are no footways present. The link is assessed to be of high sensitivity.

243. The link has a baseflow of 30 vehicles per day (including two HGVs) and would be subject to a peak construction traffic of up to 185 vehicles per day (including 97 HGVs). On average, the link would be subject to construction traffic of up to 52 vehicles (including 23 HGVs) per day.

244. Link 84 would be subject to a peak construction traffic of up to 44 LVs and 10 HGVs during the peak hour. On average, the link would be subject to construction traffic of up to 15 LVs and three HGVs in the peak hour.

245. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to 10 HGV trips (three HGV trips on average).

246. In consideration of hourly traffic, the magnitude of effect for severance is assessed to be revised to negligible to low on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **minor** to **moderate adverse**.

24.6.1.2.4.3 Link 102

247. Link 102 (Unnamed Road / Rectory Road) is a narrow unclassified single carriageway that runs southeast of High Kelling. Minimal frontage development is present along the link including a Church, however, there are no footways present. The link is assessed to be of high sensitivity.

248. The link has a baseflow of 219 vehicles per day (including 39 HGVs) and would be subject to a peak construction traffic of up to 90 vehicles per day (including 56 HGVs). On average, the link would be subject to construction traffic of up to 31 vehicles (including 17 HGVs) per day.

249. Link 102 would be subject to a peak construction traffic of up to 17 LVs and six HGVs during the peak hour. On average, the link would be subject to construction traffic of up to seven LVs and two HGVs in the peak hour.

250. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to six HGV trips (two HGV trips on average).

251. In consideration of hourly traffic, the magnitude of effect for severance is assessed to be revised to negligible to low on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **minor** to **moderate adverse**.

24.6.1.2.4.4 Link 138

252. Link 138 (Broad Lane / The Street) is an unclassified single carriageway that runs through Swannington. Extensive frontage development is present along the link in Swannington, however, there are no footways present. The link is assessed to be of high sensitivity.

253. The link has a baseflow of 301 vehicles per day (including 11 HGVs) and would be subject to a peak construction traffic of up to 153 LV trips per day. On average, the link would be subject to construction traffic of up to 101 LV trips per day. No HGV construction vehicles are anticipated to travel along the link.

254. Link 138 would be subject to a peak construction traffic of up to 77 LVs during the peak hour. On average, the link would be subject to construction traffic of up to 51 LVs in the peak hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site.

255. In consideration of hourly traffic, the magnitude of effect for severance is assessed to be revised to medium on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **major adverse**.

24.6.1.2.4.5 Link 149

256. Link 149 (Weston Road / Honingham Lane) is an unclassified single carriageway that loops around The Broadway east of Ringland. Sporadic frontage development is present along the link, there are no footways present. The link is assessed to be of high sensitivity.

257. The link has a baseflow of 67 vehicles per day (including five HGVs) and would be subject to a peak construction traffic of up to 79 HGVs per day. On average, the link would be subject to construction traffic of up to 20 HGV trips per day. No LV construction vehicles are anticipated to travel along the link.

258. Link 149 would be subject to a peak construction traffic of up to eight HGVs during the peak hour. On average, the link would be subject to construction traffic of up to two HGVs in the peak hour.

259. In consideration of hourly traffic, the magnitude of effect for severance is assessed to be revised to negligible to low on a high sensitive receptor and is assessed to be of short-term duration, intermittent and fully reversible. The impact significance is assessed as **minor** to **moderate adverse**.

24.6.1.2.5 Mitigation – all scenarios

260. With reference to **Section 24.6.1.2.3** and **Section 24.6.1.2.4**, the links assessed as having significant adverse severance impacts following an assessment of daily and hourly traffic demand are considered in **Table 24-26**.

Table 24-26: Mitigation Measures for Severance

Links	Mitigation
64,84,102, 138 and 149.	• Peak daily HGV demand not to exceed the forecast average daily HGV demand. • Peak Hour LV demand not to exceed the forecast average peak hour demand.
Notes: Strategies for managing and monitoring HGV and LV are contained in the OCTMP (document reference 9.16).	

261. Following the implementation of the proposed mitigation measures outlined in **Table 24-26**, the magnitude of effect for links 64, 84, 102, 138 and 149 would be reduced to negligible, and is assessed to be of short-term duration, intermittent and fully reversible. The residual impact significance for severance is therefore assessed as no greater than **minor adverse**.

24.6.1.3 Impact 2: Amenity

262. Amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width and separation from traffic. It can impact a range of non-motorised users such as pedestrians, cyclists and equestrians. **Section 24.4.3.1.2** provides details on the adopted impact assessment methodology for amenity.

24.6.1.3.1 Magnitude of Effect – SEP or DEP in Isolation

263. **Table 24-27** provides an initial assessment of the magnitude of amenity effect for each of the screened links detailed in **Table 24-19**.

Table 24-27: Magnitude of Amenity Effects - SEP or DEP in Isolation

Links	Magnitude of Effect	Rationale for Magnitude

1, 2, 4, 8,10, 12, 13, 16, 19, 23, 24, 27-30, 34, 43, 47, 50, 52, 53, 54, 56, 60, 62, 63, 69, 83, 99-101, 103, 104, 117-119, 123, 126, 129, 131, 138, 139 and 141	Negligible	The change in traffic flows (or HGV component) is less than 100%
7, 9*, 11, 58, 59, 61, 64, 66, 82, 84, 90, 93, 102, 110, 116 ,128, 132, 137, 143, 147-149 and 152	Low – High	The change in traffic flows (or HGV component) is greater than 100%
* link 9 included noting that change in traffic along is close to just below 100%, at 99%.		

264. Based on **Table 24-27**, the peak daily change in total flows (or HGV component) for links 7, 9, 11, 58, 59, 61, 64, 66, 82, 84, 90, 93, 102, 110, 116 ,128, 132, 137, 143, 147-149 and 152 are greater than the 100% GEART impact threshold whereby GEART suggest negative amenity impacts may be experienced.

265. The remaining links all experience traffic flows below the 100% threshold and the magnitude of effect is assessed as negligible.

266. **Table 24-28** presents the magnitude of effect assessment for each link previously identified as having the potential for significant effects utilising GEART thresholds. To establish the context for the magnitude of assessment, reference is made to Norfolk Roads Hierarchy Plan (NCC, 2017).

267. In the UK, a 'functional road hierarchy' was established in its current form in the 1960s to provide for the efficient movement of motor vehicles on the highway network having regard to all user groups (ref. Guidance on Road Classification and the Primary Route Network, 2012, DfT). Utilising statutory powers, NCC has interpreted DfT direction at local level and this is captured in the Norfolk Roads Hierarchy Plan.

268. A functional hierarchy informs policies relating to maintenance, spatial planning and traffic management and is a clear indicator of the scale and type of user groups likely to being using a highway link. The pedestrian amenity magnitude of effect assessment has therefore been informed by the scale of forecast traffic increase in context with the function of the discreet highway link under consideration (as defined by the Norfolk Roads Hierarchy Plan).

269. A review of Norfolk's Hierarchy plan has identified that the links considered for further assessment fall under the following classes:

- Category 3b (Access routes): In residential and other built-up areas these roads have 20 or 30 mph speed limits and very high levels of pedestrian activity with some crossing facilities including zebra crossings. On-street parking is generally unrestricted except for safety reasons. In rural areas these roads link the larger villages, bus routes and HGV generators to the Strategic and Main Distributor Network.

- Category 4a (Link roads): In urban areas these are residential or industrial interconnecting roads with 20 or 30 mph speed limits, random pedestrian movements and uncontrolled parking. In rural areas these roads link the smaller villages to the distributor roads.

270. Peak hour vehicle trips have also been considered to aid a more detailed assessment of construction traffic characteristics. In order to consider a worst-case scenario, the peak demand hour flows include the assumption that employees (LVs) will arrive and depart within a single hour and that HGV movements would be one-tenth of the daily demand. Further details on the disaggregation of daily flows to peak hour flows is provided in Annex 6 of the TA (**Appendix 24.1**).

271. **Table 24-28** presents the resultant amenity magnitude of effect assessment for SEP or DEP in isolation.

Table 24-28: Magnitude of Amenity Effects - SEP or DEP in Isolation

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
7	Bridge Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 827 vehicles trips (including 63 HGV trips) per day and would be subject to construction traffic of up to 69 HGV trips per day at its peak. On average, the link would be subject to construction traffic of up to 20 HGV trips per day. Peak construction traffic would result in an increase in traffic of 8% for all vehicles and 109% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately seven HGV trips per hour during the defined hours of construction. On average, receptors would be subject to approximately two additional HGV trips per hour.	Low	Negligible
9	The Street	Special Access – 3B	Assessment Trigger The link has a baseflow of 3,621 vehicle trips (including 55 HGV trips) per day and would be subject to construction traffic of up to 155 vehicle trips (including 54 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 62 vehicle trips (including 15 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 4% for all vehicles and 99% for HGVs. As the change in HGV component is close to 100%, the HGV traffic along the link is considered in detail.	Low	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately six HGV trips per hour during the defined hours of construction. On average, receptors would be subject to approximately two additional HGV trips per hour.		
11	A149 from Weybourne to Weybourne Road	Special Access – 3B	Assessment Trigger The link has a baseflow of 5,023 vehicle trips (including 34 HGV trips) per day and would be subject to construction traffic of up to 169 vehicle trips (including 69 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 61 vehicle trips (including 21 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 3% for all vehicles and 199% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately seven HGV trips per hour during the defined hours of construction. On average, receptors would be subject to approximately two additional HGV trips per hour.	Low	Negligible
58	Unnamed Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 1,101 vehicle trips (including 110 HGV trips) per day and would be subject to construction traffic of up to 289 vehicle trips (including 156 HGV trips) per day at its	Medium	Low

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			peak. On average, the link would be subject to construction traffic of up to 156 vehicle trips (including 47 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 26% for all vehicles and 141% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of approximately 16 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to approximately five additional HGV trips per hour.		
59	B1149 from A148 to B1354	Main Distributor – 3A	<u>Assessment Trigger</u> The link has a baseflow of 4,776 vehicle trips (including 182 HGV trips) per day and would be subject to construction traffic of up to 343 vehicle trips (including 215 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 127 vehicle trips (including 67 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 7% for all vehicles and 118% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. To manage the potential for cumulative impacts between Norfolk Vanguard and Hornsea Project Three, a cap was agreed between the	Low	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			forementioned projects and NCC. This agreement imposed a cap upon daily HGV trips along the B1149 to 289 HGV trips per day (Norfolk Vanguard Outline Construction Traffic Management Plan (Vattenfall, 2019)). It can be noted that the peak increase for SEP or DEP is less than this cap at 215 HGV trips per day. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately 22 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to approximately seven additional HGV trips per hour.		
61	Church Lane / Unnamed Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 31 vehicle trips (including five HGV trips) per day and would be subject to construction traffic of up to 113 vehicle trips (including 57 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 41 vehicle trips (including 16 HGV trips) per day. Peak increases in construction traffic would result in an increase in traffic of 367% for all vehicles and 1,237% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of up to 28 LV trips and six HGV trips per hour during the peak	High	Low

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			hours of construction. On average, receptors would be subject to construction traffic of up to 13 LV trips and two HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to six HGV trips (two HGV trips on average).		
64	Church Street / Cherry Tree Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 252 vehicle trips (including 23 HGV trips) per day and would be subject to construction traffic of up to 122 vehicle trips (including 84 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 52 vehicle trips (including 27 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 49% for all vehicles and 364% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately nine HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately three HGV trips per hour.	Medium	Negligible
66	Plumstead Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 252 vehicle trips (including 23 HGV trips) per day and would be subject to construction	Low	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			traffic of up to 38 HGV trips per day at its peak. On average, the link would be subject to construction traffic of up to 13 HGV trips per day. Peak construction traffic would result in an increase in traffic of 15% for all vehicles and 165% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately four HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.		
82	Ringland Lane / Morton Lane	Minor Local – 4A	Assessment Trigger The link has a baseflow of 344 vehicle trips (including 38 HGV trips) per day and would be subject to construction traffic of up to 107 vehicle trips (including 57 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 37 vehicle trips (including 14 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 31% for all vehicles and 149% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately six HGV trips	Low	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.		
84	The Broadway / Unnamed Road	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 30 vehicle trips (including two HGV trips) per day and would be subject to construction traffic of up to 112 vehicle trips (including 68 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 45 vehicle trips (including 22 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 373% for all vehicles and 3,195% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of up to 22 LV trips and seven HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of up to 12 LV trips and three HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to seven HGV trips (two HGV trips on average).	Medium	Negligible
90	Taverham Road	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 220 vehicle trips (including 13	Low	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			HGV trips) per day and would be subject to construction traffic of up to 161 vehicle trips (including 75 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 72 vehicle trips (including 28 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 73% for all vehicles and 563% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of approximately eight HGVs per hour during the peak hours of construction. On average, receptors would be subject to construction traffic of approximately three HGV trips per hour.		
93	Unnamed Road / Dereham Road	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 694 vehicle trips (including 136 HGV trips) per day and would be subject to construction traffic of up to 322 vehicles trips (including 159 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 155 vehicle trips (including 55 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 46% for all vehicles and 117% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail.	Medium	Low

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately 16 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately six HGV trips per hour.		
102	Unnamed Roads	Minor Local – 4A	Assessment Trigger The link has a baseflow of 219 vehicles (including 39 HGVs) per day and would be subject to construction traffic of up to 91 vehicles (including 60 HGVs) per day at its peak. On average, the link would be subject to construction traffic of up to 31 vehicles (including 17 HGVs) per day. Peak construction traffic would result in an increase in traffic of 41% for all vehicles and 155% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately six HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.	Low	Negligible
110	Melton Road / High Green	Minor Local – 4A	Assessment Trigger The link has a baseflow of 798 vehicle trips (including 33 HGV trips) per day and would be subject to construction traffic of up to 102 vehicle trips (including 54 HGV trips) per day at its peak. On average, the link would be	Negligible	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			subject to construction traffic of up to 31 vehicle trips (including 13 HGVs trips) per day. Peak construction traffic would result in an increase in traffic of 13% for all vehicles and 163% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately six HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.		
116	Ketteringham Lane	Minor Local – 4A	Assessment Trigger The link has a baseflow of 647 vehicle trips (including 50 HGV trips) per day and would be subject to construction traffic of up to 107 vehicle trips (including 63 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 41 vehicle trips (including 19 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 16% for all vehicles and 127% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately seven HGV trips per hour during the defined hours of construction.	Negligible	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.		
128	Mangreen	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 333 vehicle trips (including 12 HGV trips) per day and would be subject to construction traffic of up to 411 vehicle trips (including 189 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 330 vehicle trips (including 136 HGV trips) per day. Peak construction traffic would result in a increase in traffic of 124% for all vehicles and 1,523% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of up to 111 LV trips and 19 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of up to 97 LV trips and 14 HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to 19 HGV trips (14 HGV trips on average).	High	High
132	Buxton Road / Easton Way	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 1,020 vehicle trips (including 94 HGV trips) per day and would be subject to construction traffic of up to	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			142 vehicle trips (including 127 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 41 vehicle trips (including 34 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 14% for all vehicles and 136% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of approximately 13 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately four HGV trips per hour.		
137	Unnamed Road, east of its junction with Grove Lane	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 1,020 vehicle trips (including 94 HGV trips) per day and would be subject to construction traffic of up to 242 vehicle trips (including 127 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 100 vehicle trips (including 34 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 24% for all vehicles and 136% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u>	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			Receptors would experience a peak increase in flow of approximately 13 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately four HGV trips per hour.		
143	Old Fakenham Road	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 1,689 vehicle trips (including 27 HGV trips) per day and would be subject to construction traffic of up to 261 vehicle trips (including 77 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 227 vehicle trips (including 58 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 15% for all vehicles and 289% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of approximately eight HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately six HGV trips per hour.	Medium	Low
147	Breck Road / Weston Green Road	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 67 vehicle trips (including five HGV trips) per day and would be subject to construction traffic of up to 101 vehicle trips (including 67 HGV trips) per day at its peak. On average, the link would be	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			subject to construction traffic of up to 37 vehicle trips (including 19 HGV trips) per day. Peak construction traffic would result in a increase in traffic of 152% for all vehicles and 1,255% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of up to 17 LV trips and seven HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of up to nine LV trips and two HGV trips per hour.		
148	Weston Road	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 67 vehicle trips (including five HGV trips) per day and would be subject to construction traffic of up to 135 vehicle trips (including 67 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 54 vehicle trips (including 19 HGV trips) per day. Peak construction traffic would result in a increase in traffic of 202% for all vehicles and 1,255% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of up to 34 LV trips and seven HGV trips per hour during the	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			defined hours of construction. On average, receptors would be subject to construction traffic of up to 18 LV trips and two HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to seven HGV trips (two, HGV trips on average).		
149	Unnamed road	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 67 vehicle trips (including five HGV trips) per day and would be subject to construction traffic of up to 67 HGV trips per day at its peak. On average, the link would be subject to construction traffic of up to 19 HGV trips per day. Peak construction traffic would result in an increase in traffic of 100% for all vehicles and 1,255% for HGVs. As there is no LV construction traffic anticipated on the link, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of approximately seven HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.	Medium	Negligible
152	Burdock Lane / Landlow Lane	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 796 vehicle trips (including 61 HGV trips) per day and would be subject to construction traffic of up to 165 vehicle	Low	Negligible

Link	Link Description	NCC Route Hierarchy	Magnitude of Effect Assessment	Magnitude of Effect (Peak SEP or DEP Traffic)	Magnitude of Effect (Average SEP or DEP traffic)
			trips (including 69 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 64 vehicle trips (including 22 HGV trips) per day. Peak construction traffic would result in a increase in traffic of 21% for all vehicles and 113% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of approximately seven HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately three HGV trips per hour.		

24.6.1.3.2 Magnitude of Effect – SEP and DEP Concurrently

272. **Table 24-29** provides an initial assessment of the magnitude of amenity effect for each of the screened links detailed in **Table 24-20**.

Table 24-29: Magnitude of Amenity Effect - SEP and DEP Concurrently

Links	Magnitude of Effect	Rationale for Magnitude
1-6, 8, 10-13, 15, 16, 19-21, 23, 24, 26-30, 34, 43, 47, 50, 52, 53, 54, 56, 59, 60, 62, 63, 69, 83, 85, 87, 99-101, 103, 104, 117-119, 123, 126, 129, 131, 138, 139 and 141	Negligible	The change in traffic flows (or HGV component) is less than 100%
7, 9, 58, 61, 64, 66, 82, 84, 90, 93, 102, 110, 116 ,128, 132, 137, 143, 147-149 and 152	Low – High	The change in traffic flows (or HGV component) is greater than 100%

273. Based on **Table 24-20**, the peak daily change in total flows (or HGV component) for links 7, 9, 58, 61, 64, 66, 82, 84, 90, 93, 102, 110, 116 ,128, 132, 137, 143, 147-149 and 152 are greater than the 100% GEART impact threshold whereby GEART suggest negative amenity impacts may be experienced.

274. The remaining links all experience traffic flows below the 100% threshold and the magnitude of effect is assessed as negligible.

275. **Table 24-30** presents the magnitude of effect assessment for each link exceeding GEART amenity thresholds utilising the more detailed assessment parameters for amenity magnitude of effect set out in **Section 24.4.3.1.2**.

Table 24-30: Magnitude of Amenity Effects - SEP and DEP Concurrently

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
7	Bridge Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 827 vehicle trips (including 63 HGV trips) per day and would be subject to construction traffic of up to 81 HGV trips per day at its peak. On average, the link would be subject to construction traffic of up to 18 HGV trips per day. Peak construction traffic would result in an increase in traffic of 10% for all vehicles and 130% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately nine additional HGV trips per hour during the peak hours of construction. On average, receptors would be subject to approximately two additional HGV trips per hour.	Low	Negligible
9	The Street	Special Access – 3B	Assessment Trigger The link has a baseflow of 3,621 vehicle trips (including 55 HGV trips) per day and would be subject to construction traffic of up to 257 vehicle trips (including 92 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 79 vehicle trips (including 15 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 7% for all vehicles and 167% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately 10 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to approximately two additional HGV trips per hour.	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
11	A149 from Weybourne to Weybourne Road	Special Access – 3B	Assessment Trigger The link has a baseflow of 5,023 vehicle trips (including 34 HGV trips) per day and would be subject to construction traffic of up to 239 vehicle trips (including 108 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 70 vehicle trips (including 20 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 5% for all vehicles and 313% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately 11 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to approximately two additional HGV trips per hour.	Medium	Negligible
58	Unnamed Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 1,101 vehicle trips (including 110 HGV trips) per day and would be subject to construction traffic of up to 371 vehicle trips (including 148 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 168 vehicle trips (including 48 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 34% for all vehicles and 134% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately 15 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to approximately five additional HGV trips per hour.	Medium	Low

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
61	Church Lane / Unnamed Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 31 vehicle trips (including five HGV trips) per day and would be subject to construction traffic of up to 123 vehicle trips (including 58 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 44 vehicle trips (including 16 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 399% for all vehicles and 1,259% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of up to 33 LV trips and six HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of up to 14 LV trips and two HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to six HGV trips (two HGV trips on average).	High	Low
64	Church Street / Cherry Tree Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 252 vehicle trips (including 23 HGV trips) per day and would be subject to construction traffic of up to 134 vehicle trips (including 86 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 53 vehicle trips (including 27 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 53% for all vehicles and 374% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail.	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately nine HGV trips per hour during the peak hours of construction. On average, receptors would be subject to construction traffic of approximately three HGV trips per hour.		
66	Plumstead Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 252 vehicle trips (including 23 HGV trips) per day and would be subject to construction traffic of to 39 HGV trips per day at its peak. On average, the link would be subject to construction traffic of up to 13 HGV trips per day. Peak construction traffic would result in an increase in traffic of 16% for all vehicles and 170% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately four HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.	Low	Negligible
82	Ringland Lane / Morton Lane	Minor Local – 4A	Assessment Trigger The link has a baseflow of 344 vehicle trips (including 38 HGV trips) per day and would be subject to construction traffic of up to 153 vehicle trips (including 62 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 43 vehicle trips (including 15 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 44% for all vehicles and 162% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail.	Low	Negligible

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately seven HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.		
84	The Broadway / Unnamed Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 30 vehicle trips (including two HGV trips) per day and would be subject to construction traffic of up to 185 vehicle trips (including 97 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 52 vehicle trips (including 23 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 616% for all vehicles and 4,560% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of up to 44 LV trips and 10 HGV trips per hour during the peak hours of construction. On average, receptors would be subject to construction traffic of up to 15 LV trips and three HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to 10 HGV trips (three HGV trips on average).	Medium	Negligible
90	Taverham Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 220 vehicle trips (including 13 HGV trips) per day and would be subject to construction	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			traffic of up to 281 vehicle trips (including 137 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 82 vehicle trips (including 27 HGV trips) per day. Peak construction traffic would result in a increase in traffic of 128% for all vehicles and 1,027% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of up to 72 LV trips and 14 HGV trips per hour during the peak hours of construction. On average, receptors would be subject to construction traffic of up to 28 LV trips and three HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to 14 HGV trips (three HGV trips on average).		
93	Unnamed Road / Dereham Road	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 694 vehicle trips (including 136 HGV trips) per day and would be subject to construction traffic of up to 410 vehicle trips (including 165 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 150 vehicle trips (including 49 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 59% for all vehicles and 121% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u>	Medium	Low

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			Receptors would experience a peak increase in flow of approximately 17 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately five HGV trips per hour.		
102	Unnamed Roads	Minor Local – 4A	Assessment Trigger The link has a baseflow of 219 vehicle trips (including 39 HGV trips) per day and would be subject to construction traffic of up to 90 vehicle trips (including 56 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 31 vehicle trips (including 17 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 41% for all vehicles and 145% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately six HGV trips per hour during the peak hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.	Low	Negligible
110	Melton Road / High Green	Minor Local – 4A	Assessment Trigger The link has a baseflow of 798 vehicle trips (including 33 HGV trips) per day and would be subject to construction traffic of up to 137 vehicle trips (including 56 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 31 vehicle trips (including 12 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 17% for all vehicles and 169% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand	Negligible	Negligible

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			Receptors would experience a peak increase in flow of approximately six HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.		
116	Ketteringham Lane	Minor Local – 4A	Assessment Trigger The link has a baseflow of 647 vehicle trips (including 50 HGV trips) per day and would be subject to construction traffic of up to 135 vehicle trips (including 58 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 40 vehicle trips (including 17 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 21% for all vehicles and 115% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately six HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.	Negligible	Negligible
128	Mangreen	Minor Local – 4A	Assessment Trigger The link has a baseflow of 333 vehicle trips (including 12 HGV trips) per day and would be subject to construction traffic of up to 667 vehicle trips (including 287 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 554 vehicle trips (including 229 HGV trips) per day. Peak construction traffic would result in a peak increase in traffic of 200% for all vehicles and 2,316% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail.	High	High

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of up to 190 LV trips and 29 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of up to 163 LV trips and 23 HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to 29 HGV trips.		
132	Buxton Road / Easton Way	Minor Local – 4A	Assessment Trigger The link has a baseflow of 1,020 vehicle trips (including 94 HGV trips) per day and would be subject to construction traffic of up to 135 vehicle trips (including 115 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 47 vehicle trips (including 34 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 13% for all vehicles and 123% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately 12 HGV trips per hour during the peak hours of construction. On average, receptors would be subject to construction traffic of approximately four HGV trips per hour.	Medium	Negligible
137	Unnamed Road, east of its junction with Grove Lane	Minor Local – 4A	Assessment Trigger The link has a baseflow of 1,020 vehicle trips (including 94 HGV trips) per day and would be subject to construction traffic of up to 254 vehicle trips (including 115 HGV trips) per day at its peak. On average, the link would be subject to	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			construction traffic of up to 157 vehicle trips (including 34 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 25% for all vehicles and 123% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately 12 HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately four HGV trips per hour.		
143	Old Fakenham Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 1,689 vehicle trips (including 27 HGV trips) per day and would be subject to construction traffic of up to 285 vehicle trips (including 77 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 231 vehicle trips (including 59 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 17% for all vehicles and 288% for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of approximately eight HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately six HGV trips per hour.	Medium	Low
147	Breck Road / Weston Green Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 67 vehicle trips (including five HGV trips) per day and would be subject to construction traffic of up to 135 vehicle trips (including 79 HGV trips) per	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			day at its peak. On average, the link would be subject to construction traffic of up to 39 vehicle trips (including 20 HGV trips) per day. Peak construction traffic would result in a peak increase in traffic of 203% for all vehicles and 1,494% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. Disaggregated Peak Hour Construction Traffic Demand Receptors would experience a peak increase in flow of up to 28 LV trips and eight HGV trips per hour during the peak hours of construction. On average, receptors would be subject to construction traffic of up to 10 LV trips and two HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to eight HGV trips (two, HGV trips on average).		
148	Weston Road	Minor Local – 4A	Assessment Trigger The link has a baseflow of 67 vehicle trips (including five HGV trips) per day and would be subject to construction traffic of up to 178 vehicle trips (including 79 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 58 vehicle trips (including 20 HGV trips) per day. Peak construction traffic would result in an increase in traffic of 267% for all vehicles and 1,494% for HGVs. Both the change in total traffic and change in HGV component are greater than 100% and are thus considered in detail. Disaggregated Peak Hour Construction Traffic Demand	Medium	Negligible

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			Receptors would experience a peak increase in flow of up to 50 LV trips and eight HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of up to 19 LV trips and two HGV trips per hour. The peak demand would be for two hours during the day when construction personnel are arriving and departing from site, after which the 'interpeak' hourly demand would revert to eight HGV trips (two, HGV trips on average).		
149	Unnamed road	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 67 vehicle trips (including five HGV trips) per day and would be subject to construction traffic of up to 79 HGV trips per day at its peak. On average, the link would be subject to construction traffic of up to 20 HGV trips per day. This would result in a peak increase in traffic of 119% for all vehicles and 1,494% for HGVs. As there is no LV construction traffic anticipated on the link, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of approximately seven HGVs trip per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.	Medium	Negligible
152	Burdock Lane / Landlow Lane	Minor Local – 4A	<u>Assessment Trigger</u> The link has a baseflow of 796 vehicle trips (including 61 HGV trips) per day and would be subject to construction traffic of up to 172 vehicle trips (including 68 HGV trips) per day at its peak. On average, the link would be subject to construction traffic of up to 57 vehicle trips (including 16 HGV trips) per day. Peak construction traffic would result in	Low	Negligible

Link	Link Description	NCC Route Hierarchy	Rationale	Magnitude of Effect (Peak SEP and DEP traffic)	Magnitude of Effect (Average SEP and DEP traffic)
			a peak increase in traffic of 22% for all vehicles and 112 % for HGVs. As the change in HGV component is greater than 100%, the HGV traffic along the link is considered in detail. <u>Disaggregated Peak Hour Construction Traffic Demand</u> Receptors would experience a peak increase in flow of approximately seven HGV trips per hour during the defined hours of construction. On average, receptors would be subject to construction traffic of approximately two HGV trips per hour.		

24.6.1.3.3 Impact Significance – SEP or DEP in Isolation

276. **Table 24-31** provides a summary of the sensitivity of each receptor (as detailed in **Table 24-17** and **Figure 24.7**), the magnitude of effect and assessed significance of the amenity effect.

Table 24-31: Significance of Amenity Impacts - SEP or DEP in Isolation

Links	Magnitude of Effect	Sensitivity	Impact Significance
1, 2, 4, 8, 10, 12, 13, 16, 19, 23, 24, 27-30, 34, 43, 47, 50, 52, 53, 54, 56, 59, 60, 62, 63, 69, 83, 99-101, 103, 104, 110, 116-119, 123, 126, 129, 131, 138, 139 and 141	Negligible	Low – High	**Negligible – Minor adverse**
82, 90, and 152.	Low	Low	**Minor adverse**
66		Medium	**Minor adverse**
7, 9, 11, and 102.		High	**Moderate adverse**
58, 93, 137, 143 and 148	Medium	Low	**Minor adverse**
132 and 147		Medium	**Moderate adverse**
64, 84 and 149		High	**Major adverse**
128	High	Low	**Minor adverse**[1]
61		Medium	**Major adverse**

[1] Link 128 (Mangreen) has been identified as a low sensitivity link and it is considered that the lack of pedestrian and cyclist facilities or attractions along the extent of the link signifies that there would be few pedestrians or cyclists to experience any potential adverse impact. On this basis, the impact significance is downgraded from potential Moderate Adverse to Minor Adverse.

277. **Table 24-31** identifies that links 7, 9, 11, 61, 64, 84, 102, 132, 147 and 149 could potentially experience significant adverse impacts and therefore are assessed for mitigation.

24.6.1.3.4 Impact Significance – SEP and DEP Concurrently

278. **Table 24-32** provides a summary of the sensitivity of each receptor (as detailed in **Table 24-17** and **Figure 24.7**), the magnitude of effect and overall significance of the amenity impact.

Table 24-32: Significance of Amenity Impacts - SEP and DEP Concurrently

Links	Magnitude of Effect	Sensitivity	Impact Significance
1-6, 8, 10, 12, 13, 15, 16, 19-21, 23, 24, 26-30, 34, 43, 47, 50, 52, 53, 54, 56, 59, 60, 62, 63, 69, 83, 85, 87, 99-101, 103, 104, 110, 116-119, 123, 126, 129, 131, 138, 139 and 141	Negligible	Low – High	**Negligible – Minor adverse**
82, and 152	Low	Low	**Minor adverse**
66		Medium	**Minor adverse**
7 and 102		High	**Moderate adverse**
58, 90, 93, 137, 143 and 148	Medium	Low	**Minor adverse**
132 and 147		Medium	**Major adverse**
9, 11, 64, 84 and 149		High	**Major adverse**
128	High	Low	**Minor adverse**[1]
61		Medium	**Major adverse**

[1] Link 128 (Mangreen) has been identified as a low sensitivity link and it is considered that the lack of pedestrian and cyclist facilities or attractions along the extent of the link signifies that there would be few pedestrians or cyclists to experience any potential adverse impact. On this basis, the impact significance is downgraded from potential Moderate Adverse to Minor Adverse.

279. **Table 24-32** identifies that links, 7, 9, 11, 61, 64, 84, 102, 132, 147 and 149 could potentially experience significant impacts and therefore are assessed for mitigation.

24.6.1.3.5 Mitigation – all scenarios

280. With reference to **Table 24-31** and **Table 24-32**, a mitigation strategy for the links assessed as having significant adverse amenity impacts are set out in **Table 24-33**.

Table 24-33: Amenity Mitigation

Link	Impact trigger	Mitigation
7, 9, 11, 64, 102, 132 and 149	Increase in daily HGV traffic.	Peak daily HGV demand not to exceed the forecast average daily HGV demand.
61	Increase in peak hour LV traffic	Peak Hour LV demand not to exceed the forecast average peak hour demand.
84, 147.	Increase in daily HGV traffic and peak hour LV traffic	• Peak daily HGV demand not to exceed the forecast average daily HGV demand.

		• Peak Hour LV demand not to exceed the forecast average peak hour demand.

Notes:
Strategies for managing and monitoring HGV and LV are contained in the OCTMP (document reference 9.16).

281. Following the implementation of the proposed mitigation measures outlined in **Table 24-33**, the magnitude of effect is assessed to reduce from low to negligible, and is assessed to be of short-term duration, intermittent and fully reversible. The residual impact significance for amenity is therefore assessed as no greater than **minor adverse**.

24.6.1.4 Impact 3: Pedestrian Delay

282. The GEART guidance identifies that pedestrians can experience delays and difficulties crossing roads related to changes in traffic, volume, composition and speed.

283. Potential delays for pedestrians trying to cross all roads have been calculated (using the formulas prescribed within TRRL 356). As a worst-case scenario, the peak hour flows constitute a single hour, assuming that employees (LVs) will arrive and depart within a single hour and that HGV movements would be one tenth of daily demand. Further details on the disaggregation of daily flows to peak hour flows is provided in Annex 6 of the TA (**Appendix 24.1**).

284. It has also been assumed (for the purposes of a worst-case scenario) that SEP and DEP construction employees would overlap during a typical am peak hour of 8am to 9am. This hour would typically coincide with heavier pedestrian and cyclist trips due to travelling to work or travelling to school, etc.

285. The calculation of delays has been undertaken for the 2025 background reference year and the 2025 background plus SEP and DEP construction traffic.

286. GEART does not prescribe a threshold for where changes in delay may become significant, and instead advises that assessors should use professional judgement.

24.6.1.4.1 Magnitude of Effect – SEP or DEP in Isolation

287. **Appendix 24.3** details the peak hour delay calculations and supporting evidence for each of the screened links detailed in **Table 24-19**. **Table 24-34** presents the assessment summary for pedestrian delay and the resulting magnitude of effect.

Table 24-34: Pedestrian Delay Magnitude of Effect Summary - SEP or DEP in Isolation

Links	Magnitude	Rationale for Magnitude
1, 2, 4, 7-13, 16-19, 23, 24, 27-30, 34, 43,47, 50, 52, 53, 54, 56, 58-64, 66, 69, 80, 82-84, 90, 93, 99-104, 110, 116-119, 123, 126, 128, 129, 131, 132, 137-139, 141, 143, 147-149 and 152.	Negligible	The change in delay is less than five seconds.

24.6.1.4.2 Magnitude of Effect – SEP and DEP Concurrently

288. **Appendix 24.3** also details the peak hour delay calculations and supporting evidence for each of the screened links detailed in **Table 24-20**. **Table 24-35** presents the assessment summary for pedestrian delay and the resulting magnitude of effect.

Table 24-35: Pedestrian Delay Magnitude Summary - SEP and DEP Concurrently

Links	Magnitude	Rationale for Magnitude
1-13, 15, 16, 19-21, 23, 24, 26-30, 34, 43, 47, 50, 52, 53, 54, 56, 58-64, 66, 69, 82-85, 87, 90, 93, 99-104, 110, 116-119, 123, 126, 128, 129, 131,132, 137-139, 141, 143, 147-149 and 152.	Negligible	The change in delay is less than five seconds.

24.6.1.4.3 Impact Significance – SEP or DEP in Isolation

289. The sensitivity of each link is detailed in **Table 24-17** and **Figure 24.7**.

290. **Table 24-36** provides a summary of the sensitivity of each receptor, the magnitude of effect and overall significance of the severance impact.

Table 24-36: Significance of Pedestrian Delay Impacts - SEP or DEP in Isolation

Links	Magnitude of Effect	Sensitivity	Impact Significance
1, 2, 4, 7-13, 16-19, 23, 24, 27-30, 34, 35, 43,47, 50, 52, 53, 54, 56, 58-64, 66, 69, 80, 82-84, 90, 93, 99-104, 110, 116-119, 123, 126, 128, 129, 131, 132, 137-139, 141, 143, 147-149 and 152	Negligible	Low – High	**Negligible – Minor Adverse**

24.6.1.4.4 Impact Significance – SEP and DEP Concurrently

291. **Table 24-37** provides a summary of the sensitivity of each receptor, the magnitude of effect and overall significance of the severance impact.

Table 24-37: Significance of Pedestrian Delay Impacts - SEP and DEP Concurrently

Links	Magnitude of Effect	Sensitivity	Impact Significance
1-13, 15, 16, 19-21, 23, 24, 26-30, 34, 43, 47, 50, 52, 53, 54, 56, 58-64, 66, 69, 82-85, 87, 90, 93, 99-104, 110, 116-119, 123, 126, 128, 129, 131, 132, 137-139, 141, 143, 147-149 and 152	Negligible	Low – High	**Negligible – Minor Adverse**

24.6.1.4.5 Mitigation – all scenarios

292. Pedestrian delay impacts are assessed as no greater than **minor adverse** for all screened links, therefore, no further mitigation beyond that embedded within the design of SEP and DEP is considered necessary for construction.

24.6.1.5 Impact 4: Road Safety

293. In order to understand the potential impact of changes in traffic (associated with SEP and DEP) on the existing road safety baseline, an examination of the recorded collisions occurring within the TTSA has been undertaken in context of the development proposals.

24.6.1.5.1 Magnitude of Effect – SEP or DEP in Isolation

294. The initial review of the existing road safety baseline has identified those areas where there are concentrations of collisions (known as collision clusters) which may be sensitive to changes in traffic flows. **Section 24.4.3.1.4** provides full details on the methodology for identifying these 37 collision clusters.

295. **Table 24-38** provides a review of the significance of SEP or DEP traffic upon these 37 collision clusters in the context of the changes in forecast daily traffic flows in 2025. Details of the percentage changes in daily traffic flows have been summarised from **Table 24-19**.

296. **Table 24-38** presents an initial review of all 37 collision clusters to screen out any locations where the change in traffic flows is assessed to be an effect of negligible magnitude. Where changes in traffic flows are assessed to be greater than negligible, a further detailed review of the causes of the existing collisions is presented to understand if they could be exacerbated by SEP or DEP traffic.

Table 24-38: Collision Cluster Information – SEP or DEP in Isolation

Link	Cluster Ref	Description	% Increase		Summary
			All	HGVs	
23/ 24	C1	A149 roundabout with Fuller's Hill	1% - 2%	21% - 50%	It is assessed that the change in

Link	Cluster Ref	Description	% Increase		Summary
			All	HGVs	
24/ 25/ 34	C31	A47 roundabout with A149	1% - 3%	22% -50%	HGV traffic is potentially significant and therefore the magnitude is between low-high.
25	C2	A47 Breydon Bridge	1%	22%	
	C32	A47 roundabout with Pasteur Road			
25/ 26	C3	A47 roundabout with William Adams Way	1%	22%- 29%	
26	C4	A47 Hopton roundabout	1%	29%	
26/ 27	C5	A47 roundabout with B1385	1%	29% - 52%	
29	C6	A12 junction with Long Road	3%	72%	
	C7	A12 roundabout with A1117			
30/ 31/ 129	C8	A47 junction with A146	1% - 7%	13% - 39%	
32/ 33	C9	A47 roundabout with Cucumber Lane	1%	23%	
33	C10	A47 Blofield Bypass	1%	23%	
	C11	A47			
	C28	A47 junction with B1140			
33/ 34	C29	A47 roundabout with A1064	1% - 3%	23% - 33%	
34	C12	A47 Acle Straight	3%	33%	
	C30	A47 junction with Branch Road			
35/ 40	C13	A1270 roundabout with A1151	3%	17%	
42	C15	A1042 junction with A1402	4%	0%	It is assessed that a peak

Link	Cluster Ref	Description	% Increase		Summary
			All	HGVs	
76	C16	A1067 junction with Hospital Lane	2%	0%	change in total traffic of up to 4% represents a negligible magnitude of effect.
	C17	A140 junction with A1067			
85/ 86/ 89	C36	A47 junction with Wood Lane	2% -8%	16% - 27%	It is assessed that the change in HGV traffic is potentially significant and therefore the magnitude is between low-high.
86	C18	A47	3%	22%	
	C19	A47			
	C35	A47 junction with B1146			
87	C33	A47	3%	23%	
	C34	A47			
89/ 90/ 94	C20	A47 junction with Taverham Road	2% - 73%	16% - 563%	It is assessed that the change in total traffic and HGV traffic is potentially significant and therefore the magnitude is between low-high.
93/ 94/ 95	C21	A47 roundabout with Dereham Road	1% - 46%	10% - 117%	
96	C22	A1074 junction with Longwater Lane	1%	0%	It is assessed that a peak change in total traffic of up to 1% represents a negligible magnitude of effect.
	C23	A1074 junction with Norwich Road			
	C24	A140 roundabout with A1074			
105/ 106/ 114/ 121/ 122	C25	A47 roundabout with A11	0% - 1%	0% - 11%	It is assessed that the change in HGV traffic is potentially significant and therefore the
122	C26	A47	1%	10%	
122/ 125/ 127/ 129	C27	A47 roundabout with A140	1% - 7%	6% - 40%	

Link	Cluster Ref	Description	% Increase		Summary
			All	HGVs	
					magnitude is between low-high.
127	C37	A140	2%	6%	It is assessed that a peak change in total traffic of 2% and HGV traffic of 6% represents a negligible magnitude of effect.

24.6.1.5.2 Impact Significance – SEP or DEP in Isolation

297. **Table 24-39** provides a summary of the sensitivity of each receptor, the magnitude of effect and overall significance of the road safety effect.

Table 24-39: Significance of Road Safety Impacts - SEP or DEP in Isolation

Cluster Sites	Magnitude of Effect	Sensitivity	Impact Significance
C14 – C17, C22-C24 and C37	Negligible	High	Minor Adverse
C1-C13, C18-C21 and C25-C36	Low to High	High	Moderate – Major Adverse

298. **Table 24-39** identifies that of the 37 collision cluster sites within the TTSA, eight would experience a minor adverse effect and are therefore not considered further. The remaining 29 collision cluster sites could potentially experience significant impacts and are therefore considered further.

299. The STATS19[5] collision data has been examined to identify any emerging patterns or factors that could be exacerbated by SEP or DEP' traffic generation. The review is summarised below with full details included in the TA (**Appendix 24.1**)

24.6.1.5.2.1 Cluster Site 1

300. Cluster site 1 is a four-arm roundabout of the A149 and the B1141 in Great Yarmouth.

[5] collisions on the public highway that are reported to the police and which involve injury or death are recorded by the police on a STATS19 form and collated by the local highway authority. The data includes a wide variety of information about the collision, such as time, date, location, road conditions

301. Within the five-year study period, the roundabout junction has experienced 13 collisions of which 12 resulted in slight injury and one in serious injury. In total of the 13 collisions, five were collisions occurring due to vehicles failing to give way at the roundabout and four were rear end shunt type collisions. The remaining four collisions included two vehicles losing control at the approach to the roundabout, a collision on the roundabout carriageway and a collision involving a motorcycle filtering through traffic.

302. Emerging patterns of collisions occurring due to vehicles failing to give way at the roundabout and rear end shunt type collisions have been identified.

303. Further consideration of these collisions has identified that the collisions were spread across the arms of the roundabout and are not specific to one arm or location on the roundabout. These collisions are therefore considered to be typical of a four-arm roundabout.

304. It is also noteworthy that the roundabout has recently been subject to a junction improvement scheme to increase the capacity of the roundabout and reduce congestion particularly on the North Quay approach where significant queuing was experienced.

305. It is assessed that whilst there is a cluster of collisions at the junction, there is no significant emerging pattern in collision type and location and collision types would be typical for a roundabout junction. It is also noted that the junction has been subject to recent improvements. The junction is therefore assessed as medium sensitivity.

306. Cluster site 1 located on the intersection of link 23 and 24 that are projected to experience an increase in HGV traffic of up to 50%. Whilst a cluster of collisions is identified, the existing cause of collisions would not be disproportionately impacted by vehicle composition and therefore it is more appropriate to focus upon the total change in traffic rather than changes in HGVs.

307. It is assessed that an increase in total traffic of up to 2% represents a negligible magnitude of effect on a medium sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.2 Cluster Site 2

308. Cluster site 2 is located on the A47 Breydon Bridge in Great Yarmouth.

309. Within the five-year study period, there have been 12 collisions of which eight collisions resulted in slight injuries and three in serious injuries. Eleven of the 12 collisions were rear end shunt type collisions and one was due to a motorcyclist losing control.

310. Of the 11 rear end shunt type collisions, one occurred in 2015, three in 2016, one in 2017, four in 2018 and two in 2019, an average of 2.2 rear end shunt type collisions a year.

311. Further consideration of the cluster location has identified that mitigation measures such as “Slow” and “Queues Likely” signage have been introduced to make the drivers aware of the potential for queuing traffic in this location. Cluster site 2 is therefore assessed as of medium sensitivity

312. Cluster site 2 located on link 25, traffic flows through the junction are forecast to increase by up to 1% and HGV flows by 22%. Whilst a pattern of rear end shunt collisions is identified, these types of collisions would not be disproportionately impacted by vehicle composition and therefore it is more appropriate to focus upon the total change in traffic rather than changes in HGVs.

313. It is assessed that an increase in total traffic of 1% through the junction represents a negligible magnitude of effect on a medium sensitive receptor, resulting in a **minor adverse** impact.

24.6.1.5.2.3 Cluster Site 3

314. Cluster site 3 is a four-arm roundabout of the A47 in Great Yarmouth.

315. Within the five-year study period, there have been 14 collisions of which 12 were slight and two resulted in serious injuries. Of the 14 collisions, eight involved rear end shunt type collisions and three involved vehicles failing to give way at the roundabout. The remaining three collisions involved a motorcycle which was hit whilst filtering through traffic, a vehicle which caught fire due to a mechanical fault and a vehicle which collided with a pedestrian on the carriageway.

316. Emerging patterns of collisions occurring due to vehicles failing to give way at the roundabout and rear end shunt type collisions have been identified.

317. Further consideration of the collision locations has identified that the three collisions involving vehicles failing to give way occurred on the eastern approach of William Adams Way. Of the eight rear end shunt type collisions, three occurred on the eastern approach of William Adams Way, three on the northern approach of the A47, one on the southern approach of the A47 and one on the roundabout carriageway.

318. It is assessed that there is no significant emerging pattern in the location of these rear end shunt type collisions and the collisions would be typical for a roundabout junction. It is also noted that the collisions involving vehicles failing to give way occur on the eastern arm of William Adams way, an arm which is not forecast to be utilised by construction traffic. Cluster site 3 is therefore assessed as of medium sensitivity.

319. Cluster site 3 is located between link 25 and 26 that are projected to experience an increase in HGV traffic of up to 29%. Whilst a pattern of rear end shunt and collisions involving vehicles failing to give way are identified, these types of collisions would not be disproportionately impacted by vehicle composition and therefore it is more appropriate to focus upon the total change in traffic rather than changes in HGVs.

320. It is assessed that an increase in total traffic of up to 1% represents a negligible magnitude of effect on a medium sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.4 Cluster Site 4

321. Cluster site 4 is situated at a three-arm roundabout junction of the A12 and Lowestoft Road to the west of Hopton.

322. Within the five-year study period, the roundabout has experienced six slight and one serious collision. Of the seven collisions, three were rear end shunts, of which two occurred on the A12 southern approach and one on the eastern arm of the roundabout. The remaining four collisions involved a single vehicle losing control, a vehicle striking the roundabout, a vehicle failing to give way at the roundabout and a vehicle swerving to avoid a collision with a turning vehicle.

323. It is assessed that there is no significant emerging pattern in collision type and location and collision types would be typical for a roundabout junction. The junction is therefore assessed as medium sensitivity.

324. Cluster site 4 is located on link 26 which is projected to experience an increase in HGV traffic of up to 29%. Whilst a cluster of collisions is identified, the types of collisions occurring would not be disproportionately impacted by vehicle composition and therefore it is more appropriate to focus upon the total change in traffic rather than changes in HGVs.

325. It is assessed that an increase in total traffic of up to 1% represents a negligible magnitude of effect on a medium sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.5 Cluster Site 5

326. Cluster site 5 is situated at a five-arm roundabout junction of the A47 and A1117 in Great Yarmouth.

327. Within the five-year study period, the roundabout has experienced five collisions of which two resulted in slight injury and three in serious injuries. Of the five collisions recorded, two involved vehicles losing control and one was a rear end shunt type collision. The other two collisions involved a vehicle colliding with a cyclist on the roundabout and a vehicle failing to give way at the roundabout.

328. It is assessed that there is no significant emerging pattern in collision type and location and the recorded collision types would be typical for a roundabout junction. The junction is therefore assessed as medium sensitivity.

329. Cluster site 5 is located between links 26 and 27 which are projected to experience an increase in HGV traffic of up to 52%. Whilst a cluster of collisions is identified, the types of collisions recorded would not be disproportionately impacted by vehicle composition and therefore it is more appropriate to focus upon the total change in traffic rather than changes in HGVs.

330. It is assessed that an increase in total traffic of up to 1% represents a negligible magnitude of effect on a medium sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.6 Cluster Site 6

331. Cluster site 6 is located at a crossroad junction of the A12 with Carlton Road and Long Road in Lowestoft.

332. Within the five-year study period, the junction has experienced 11 collisions, of which eight resulted in slight and three in serious injuries. Of the 11 collisions, four involved vehicles turning at the junction, two involved rear end shunt type collisions and three involved the contravention of traffic signals. The remaining two collisions involved vehicles failing to give way at the junction.

333. Emerging patterns of vehicles colliding whilst turning and contravention of traffic lights at the junction have been identified.

334. Of the four collisions involving vehicles turning, two occurred west of the Blackheath Road arm, one on the junction itself and one east of the Blackheath Road arm. All three collisions involving contravention of traffic signals occurred on the A12 (two in the north and one to the south of the junction).

335. The collisions involving vehicles turning all occur on Blackheath Road arms. The junction is therefore assessed as high sensitivity.

336. Cluster site 6 is located on link 29 which is projected to experience an increase in HGV traffic of up to 72%. It is forecast that HGV traffic associated with SEP and DEP would not utilise the Blackheath Road arms (where collisions involving vehicles turning all occur). It is therefore considered to be more appropriate to focus upon the total change in traffic through the junction rather than changes in HGVs.

337. It is assessed that an increase in total traffic of up to 3% represents a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.7 Cluster Site 7

338. Cluster site 7 is a six-arm roundabout of the A12 and A1145 in Pakefield.

339. Within the five-year study period, the roundabout has experienced nine collisions, of which eight resulted in slight and one in serious injury. Of the nine collisions, five involved rear end shunt type collisions, one involved a pedestrian contravening a traffic signal and one involved a vehicle failing to give way at the roundabout. The other two collisions involved vehicles colliding whilst negotiating the roundabout.

340. An emerging pattern of rear end shunt type collisions has been identified at this cluster location.

341. Further consideration of the rear end shunt type collision locations has identified that the four collisions occurred on different arms of the roundabout.

342. It is assessed that there is no significant emerging pattern in the location of these rear end shunt type collisions and the collisions would be typical for a roundabout junction. Cluster site 7 is therefore assessed as medium sensitivity.

343. Cluster site 7 is located on link 29 which is projected to experience an increase in HGV traffic of up to 72%. Whilst a cluster of collisions is identified, the types of collisions recorded would not be disproportionately impacted by vehicle composition and therefore it is considered to be more appropriate to focus upon the total change in traffic rather than changes in HGVs.

344. An increase in total traffic of up to 3% is assessed to represent a negligible magnitude of effect on a medium sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.8 Cluster Site 8

345. Cluster site 8 is a grade separated junction at intersection of the A47 and the A146 south of Trowse Newton.

346. Within the five-year study period, the junction as a whole has experienced 29 collisions of which 26 resulted in slight injury and three in serious injuries. Notably, 12 of the 29 collisions involved rear end shunt type collisions and nine were due to the contravention of traffic signals. Of the 29 collisions, four involved HGVs.

347. Further consideration of the collision locations at the junction identified that:

- eight collisions occurred on the A47's eastern junction with the A146;
- seven on the A47's western junction with the A146;
- seven on the A146 carriageway; and
- eight on the A47 carriageway.

348. Within the other cluster, two secondary cluster locations have been identified at the eastern and western junctions of the A47 with the A146 and are considered further.

349. Of the eight collisions on the eastern junction, five involved the contravention of traffic signals, a driver impaired by alcohol, a rear end shunt type collision and an ambulance on response.

350. Of the seven collisions on the western junction, three were rear end shunt type collisions, two were due to the contravention of traffic signals, one due to a police vehicle on response and one due to the driver suffering a medical episode.

351. Emerging patterns of vehicles contravening traffic signals and rear end shunt type collisions have been identified at this cluster location. The junction is therefore assessed as a high sensitive receptor.

352. A review of the baseline highway environment has identified that there is good forward visibility of the traffic signals on both approaches to the junctions. It is therefore reasoned that as drivers from the A47 would be approaching the junction at relatively high speeds, some drivers could perceive it to be safer to cross the junction rather than stop when faced with an amber traffic light. If they are unable to do so on time, the drivers would be on the carriageway conflicting traffic flow oncoming from A146.

353. Noting that there is good forward visibility at the junction, the pattern of rear end shunt type collisions is likely attributable to driver inattention rather than a deficiency with the existing highway layout.

354. Cluster site 8 is located between links 30, 31 and 129 which are projected to experience an increase in HGV traffic of up to 40%. Noting the proportion of collisions that involved HGVs and that the type of collisions recorded would not be disproportionately impacted by vehicle composition, the percentage change in HGV traffic alone is not considered to be a material consideration.

355. It is therefore assessed that an increase in total traffic of up to 7% represents a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.9 Cluster Site 9

356. Cluster site 9 is a four-arm roundabout of the A47 north of Brundall.

357. Within the five-year study period, the roundabout has experienced 23 collisions, of which 20 resulted in slight and three in serious injuries. Of the 23 collisions, seven involved rear end shunt type collisions, six were attributable to drivers colliding with other vehicles whilst negotiating the roundabout and five involved vehicles losing control. Of the remaining five collisions, two involved vehicles colliding as they approached the roundabout, one involved a driver suffering from a medical episode and one occurred due to a driver overshooting the roundabout. Causation details of the last collision was not recorded.

358. Of the 23 collisions, only one collision involved a HGV.

359. Four of the seven rear end shunt type collisions occurred on the A47 arms to the roundabout with three occurring on the western arm and one on the eastern arm. Two occurred on the roundabout carriageway and one occurred on Cucumber Lane.

360. All except one of the collisions resulting from drivers colliding with other vehicles whilst negotiating the roundabout occurred as vehicles travelled across the roundabout on the A47. The loss of control collisions occurred on the A47 approaches to the roundabout, with four of the five collisions due to loss of control occurring whilst the carriageway was wet.

361. Emerging patterns of rear end shunt type collisions, drivers colliding with other vehicles whilst negotiating the roundabout and collisions due to loss of control have been identified. The junction is therefore assessed as a high sensitive receptor.

362. Cluster site 9 is located between link 32 and link 33 and these links are projected to experience an increase in HGV traffic of up to 23%. Noting the proportion of collisions that involved HGVs and that the types of recorded collisions would not be disproportionately impacted by vehicle composition, the percentage change in HGV traffic alone is not considered to be a material consideration.

363. It is therefore assessed that an increase in total traffic of up to 1% represents a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.10 Cluster Site 10

364. Cluster site 10 is located at the on-slip from Plantation Road to the A47. Within the five-year study period, there have been nine collisions of which seven resulted in slight injury and two in serious injuries. All collisions recorded were rear end shunt type collisions with the exemption of two collisions attributed to loss of control. None of the recorded collisions involved HGVs.

365. Noting the pattern of rear end shunt collisions, the cluster is assessed as a high sensitive receptor.

366. A review of the baseline highway environment has identified that the on-slip to the A47 is of standard-length and advance warning signs are also provided to make drivers aware of the on-slip. It is therefore reasoned that the collisions are likely as a result of driver inattention rather than a deficiency with the existing highway layout.

367. Cluster site 10 is located on link 33 that is projected to experience an increase in HGV traffic of up to 23%. Noting that none of the recorded collisions involved HGVs and that the collisions are of a type that would be attributable to driver inattention rather than vehicle type, the percentage change in HGV traffic alone is not considered to be a material consideration.

368. It is therefore assessed that a change in total traffic of 1% through Cluster site 10 represents a negligible magnitude of effect on a high sensitive receptor resulting in a **minor adverse** impact.

24.6.1.5.2.11 Cluster Site 11

369. Cluster site 11 is located on the A47 south of North Burlingham within proximity of the staggered junction of the B1140 and Acle Road.

370. Cluster site 11 is located along a section of the A47 which would form part of NH' Blofield to North Burlingham A47 corridor improvement Road Investment Strategy (RIS) scheme.

371. NH identify that the corridor acts as a bottleneck creating congestion and as a result, exhibits a poor safety record. The preferred route proposed involves dualling a new section of the A47 south of the existing Lingwood Lane junctions and constructing a new junction at the B1140. The DCO examination closed in December 2021 and is awaiting approval from the Secretary of State.

372. The construction of the proposed improvements is projected to start 2022/2023 and should be complete by the start of SEP and DEP' construction programme in 2025.

373. It is considered that the proposed corridor improvement programme would address the existing road safety issues and therefore the receptor can be reclassified as low sensitivity.

374. It is assessed that a change in total traffic of 1% through Cluster site 11 represents a negligible magnitude of effect on a low sensitive receptor resulting in a **negligible** impact.

24.6.1.5.2.12 Cluster Site 12

375. Cluster site 12 is located on link 34, approximately 2.7km southeast of Acle on the A47 New Road.

376. Within the five-year study period, there have been ten slight and three serious collisions.

377. Eight of the collisions were rear end shunt type collisions, one was due to a poor overtaking manoeuvre, and one was due to an animal on the carriageway. The remaining three collisions involved a collision with an oncoming vehicle, a loss of control collision and a collision whilst a driver was making a u turn.

378. Of the eight rear end shunt collisions, seven involved eastbound vehicles of which a majority were attributable to vehicles colliding as a result of stationary traffic.

379. It is assessed that there is a pattern of rear end shunt collisions and is therefore assessed as a high sensitive receptor.

380. A review of the highway environment within the vicinity of Cluster site 12 has identified that there is good forward visibility and as such the pattern of rear end shunt type collisions are likely attributable to driver inattention rather than a deficiency with the existing highway layout.

381. Cluster site 12 is located on link 34 that is projected to experience an increase in HGV traffic of up to 33%. Whilst a cluster of collisions is identified, the types of collisions recorded would not be disproportionately impacted by vehicle composition and therefore it is considered to be more appropriate to focus upon the total change in traffic rather than changes in HGVs.

382. It is assessed that a change in total traffic of 3% through Cluster site 12 represent a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.13 Cluster Site 13

383. Cluster site 13 is located on a four-arm roundabout of the A1270 northeast of Norwich (known as the Northern Distributor Road).

384. There have been 12 slight and one serious collision within the five-year study period. All 12 collisions were recorded in the latest two years (of the five year study period), of which four occurred in 2018 and nine in 2019.

385. The 12 collisions included five rear end shunt type collisions, six collisions resulting from drivers colliding with other vehicles whilst negotiating the roundabout and one occurred whilst overtaking. Of the 13 collisions recorded, none involved HGVs.

386. Further consideration of the rear end shunt type collisions has identified that the collisions were spread across the arms of the roundabout and are not specific to one arm or location on the roundabout.

387. An emerging pattern involving drivers colliding with other vehicles whilst negotiating the roundabout has been identified.

388. A review of the existing highway environment has identified a number of existing targeted road safety measures provided including advanced direction signing, street lining, and lane delineators. It is therefore reasoned that the collisions are likely the result of driver inattention rather than a deficiency with the existing highway layout. The road has been open for four years and would therefore still be subject to road safety audit monitoring by NCC in which potential road safety issues identified would be remediated.

389. However, taking into consideration the emerging pattern identified, and the high collision average. The junction is assessed as a high sensitive receptor.

390. Cluster site 13 is located between links 35 and 40 that are projected to experience an increase in total traffic of up to 3% and HGV traffic of up to 17%. Noting that no collisions involved HGVs and that the types of collisions recorded would not be disproportionately impacted by vehicle composition, the percentage change in HGV traffic alone is not considered to be a material consideration.

391. It is therefore assessed that an increase in total traffic of up to 3% represents a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.14 Cluster Site 18

392. Cluster site 18 is located on the A47 south of Hockering.

393. Cluster site 18 is located along a section of the A47 which would form part of NH' North Tuddenham to Easton improvement A47 corridor improvement RIS scheme.

394. National Highways identify that the corridor acts as a bottleneck creating congestion and as a result, a poor safety record. The proposals involve the upgrading the A47 between North Tuddenham and Easton in Norfolk to a dual carriageway with two new junctions at Berry's Lane and at Blind Lane. The proposals also result in the removal of the Easton roundabout. The DCO examination closed in February 2022 and is awaiting approval from the Secretary of State.

395. The construction of the proposed improvements is projected to start 2022/2023 and should be complete by the start of SEP and DEP' construction programme in 2025.

396. It is considered that the proposed corridor improvement programme would be appropriate to mitigate the existing road safety issues and therefore the discrete cluster location assessed as a low sensitivity receptor.

397. Cluster site 18 link 86 and is projected to experience an increase in total traffic of up to 3%. An increase in total traffic of 3% is assessed to represent a negligible magnitude of effect on a low sensitivity receptor resulting in a **negligible** impact.

24.6.1.5.2.15 Cluster Site 19

398. Cluster site 19 is located on the A47 north of Necton within proximity of its junction with Tuns Road.

399. There have been six slight and four serious injury type collision within the five-year study period of which six involved collisions between vehicles turning, two involved rear end shunt type collisions, and one involved a vehicle drifting into the wrong lane. The last collision involved a vehicle failing to negotiate the gradual bend.

400. An emerging pattern of collisions occurring whilst vehicles turn is identified. Further consideration of the collisions involving vehicles turning identified that five of the six collisions involved vehicles turning from Tuns Road onto the A47. The location is therefore assessed as a high sensitive receptor.

401. A review of the existing highway environment has identified that there is good visibility for drivers on Tuns Road at the junction with the A47.

402. Cluster site 19 is located on link 86 and is projected to experience an increase in total traffic of up to 3% and HGV traffic of up to 22%.

403. As no HGV traffic is expected to turn in or out of Tuns Road, the percentage change in HGV traffic alone is not considered to be a material consideration.

404. It is therefore assessed that an increase in total traffic of up to 3% represents a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.16 Cluster Site 20

405. Cluster site 20 is located on the A47 crossroad staggered junctions with Taverham Road and Blind Lane.

406. Temporary mitigation measures are proposed for Cluster site 20 by HP3 which include the closure of the A47's junction with Blind Lane and the conversion of the A47 junction with Taverham Road to a left in/left out arrangement. The Applicant has committed to working with HP3 to retain these measures as embedded mitigation (**Table 24-3**) for SEP and DEP.

407. Furthermore, Cluster site 20 is also located along a section of the A47 which would form part of NH' North Tuddenham to Easton improvement A47 corridor improvement RIS scheme.

408. Highway England identify that the corridor acts as a bottleneck creating congestion and as a result, a poor safety record. The proposals involve the upgrading the A47 between North Tuddenham and Easton in Norfolk to a dual carriageway with two new junctions at Berry's Lane and at Blind Lane. The proposals also result in the removal of the Easton roundabout. The DCO examination closed in February 2022 and is awaiting approval from the Secretary of State.

409. The construction of the proposed RIS improvements is projected to start 2022/2023 and should be complete by the start of SEP and DEP construction programme in 2025. HP3 is currently forecast to commence construction in 2022 and be complete by 2028.

410. It is considered that the proposed temporary improvements to Cluster site 20 by HP3 or the permanent NH' RIS scheme would be appropriate to mitigate the existing road safety issues and therefore the discrete cluster location is assessed as of negligible sensitivity.

411. Cluster site 20 is located between link 89 and 94 (A47) and link 90 (Taverham Road).

412. The A47 is projected to experience an increase in total traffic of up to 2% and HGV traffic of up to 16% whilst Taverham Road projected to experience an increase in total traffic of up to 73% and an increase in HGV traffic of up to 563%.

413. An increase in total traffic on the A47 of up to 2% is assessed as a negligible magnitude of effect, whilst a change in total traffic of up to 73% of Taverham Road is assessed as a medium magnitude of effect. A negligible to medium magnitude of effect on a receptor of negligible sensitivity would result in a **negligible** to **minor adverse** impact.

24.6.1.5.2.17 Cluster Site 21

414. Cluster site 21 is located at the A47 four-arm roundabout with Dereham Road north of Easton (the intersection of links 93, 94 and 95).

415. Cluster site 21 is located along a section of the A47 which would form part of NH' North Tuddenham to Easton improvement A47 corridor improvement RIS scheme.

416. Highway England identify that the corridor acts as a bottleneck creating congestion and as a result, a poor safety record. The proposals involve the upgrading the A47 between North Tuddenham and Easton in Norfolk to a dual carriageway with two new junctions at Berry's Lane and at Blind Lane. The proposals also result in the removal of the Easton roundabout. The DCO examination closed in February 2022 and is awaiting approval from the Secretary of State.

417. The construction of the proposed improvements is projected to start 2022/2023 and should be complete by the start of SEP and DEP construction programme in 2025.

418. The proposed corridor improvement programme would remove the existing roundabout where the cluster is located and therefore there would be no residual impact.

24.6.1.5.2.18 Cluster Site 25

419. Cluster site 25 is located on a six-arm roundabout of the A47 and A11, west of Cringleford.

420. Cluster site 25 is located along a section of the A47 which would form part of NH' A47 Thickthorn junction corridor improvement RIS scheme.

421. Highway England identify that the local growth is likely to increase congestion on the junction and the local roads that feed into it and as a result, a poor safety record. The proposals involve the provision of two new free-flowing slip roads that will connect the A47 with the A11. The DCO examination closed in March 2022 and is awaiting approval from the Secretary of State.

422. The construction of the proposed improvements is projected to start 2023 and should be complete by the start of SEP and DEP construction programme in.

423. It is assessed that the proposed corridor improvement programme would be appropriate to mitigate the existing road safety issues and therefore the discrete cluster location assessed as a low sensitivity receptor

424. Cluster site 25 is located between links 105, 106, 114, 121 and 122 and are projected to experience an increase in total traffic of up to 1% and HGV traffic of up to 11%.

425. An increase in total traffic of up to 1% is assessed to represent a negligible magnitude of effect on a low sensitivity receptor resulting in a **negligible** impact.

24.6.1.5.2.19 Cluster Site 26

426. Cluster site 26 is located at the A47 south of its roundabout with the A11, west of Cringleford.

427. Within the five-year study period, there have been five collisions of which four resulted in slight and one in a serious injury. Of the five collisions, three were rear ends shunt type collisions, one occurred due to a loss of control and one due to the vehicle existing the hard shoulder into the path of an oncoming vehicle.

428. It is assessed that there is no significant emerging pattern in collision type and location and collision types would be typical for such a road. The location is therefore assessed as medium sensitivity.

429. Cluster site 26 is located on link 122 which is projected to experience an increase in total traffic of up to 1% and an increase in HGV traffic of up to 10%. Whilst a cluster of collisions is identified, the collisions would not be disproportionately impacted by vehicle composition and therefore it is more appropriate to focus upon the total change in traffic rather than changes in HGVs.

430. An increase in total traffic of 1% is assessed to represent a negligible magnitude of effect on a medium sensitive receptor resulting in a **minor adverse** impact.

24.6.1.5.2.20 Cluster Site 27

431. Cluster site 27 is located at the A47 roundabout with A140, south of Norwich. The roundabout is a six-arm grade separated roundabout.

432. Within the five-year study period, there have been eight slight collisions of which seven were rear end shunt type collisions and one was due to a vehicle losing control on the roundabout. Of the seven rear end shunt type collisions, four occurred on the eastern approach of the A47, two on the A47 through road and one on the northern approach of the A140.

433. It is assessed that there is a pattern of rear end shunt collisions on the eastern approach to the roundabout, and as such the site is assessed as a high sensitive receptor.

434. Cluster site 27 is located between links 122, 125, 127 and 129 that are projected to experience an increase in HGV traffic of up to 40%. Whilst a pattern of rear end shunt type collisions is identified, the types of collisions recorded would not be disproportionately impacted by vehicle composition and therefore it is considered to be more appropriate to focus upon the total change in traffic rather than changes in HGVs.

435. An increase in total traffic of up to 7% is assessed to represent a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.21 Cluster Site 28

436. Cluster site 28 is located at the A47 junction with B1140 south of North Burlingham.

437. Cluster site 28 is located along a section of the A47 which would form part of NH' Blofield to North Burlingham A47 corridor improvement RIS scheme.

438. NH identify that the corridor acts as a bottleneck creating congestion and as a result, exhibits a poor safety record. The preferred route proposed route involves dualling a new section of the A47 south of the existing Lingwood Lane junctions and constructing a new junction at the B1140. The DCO examination closed in December 2021 and is awaiting approval from the Secretary of State.

439. The construction of the proposed improvements is projected to start 2022/2023 and should be complete by the start of SEP and DEP' construction programme in 2025.

440. It is considered that the proposed corridor improvement programme would be appropriate to mitigate the existing road safety issues and therefore the discrete cluster location assessed as a low sensitivity receptor

441. Cluster site 28 is located along link 33 and is projected to experience an increase in total traffic of up to 1% and HGV traffic of up to 23%.

442. An increase in total traffic of up to 1% is assessed to represent a negligible magnitude of effect on a low sensitivity receptor resulting in a **negligible** impact.

24.6.1.5.2.22 Cluster Site 29

443. Cluster site 29 is located on the A47 south of its roundabout with A1064, east of Acle.

444. Within the five-year period, there have been seven collisions of which six resulted in slight injury and one in a fatal injury. The slight injury collisions involved five rear end shunt type collisions and a collision due to vehicles skidding. The fatal collision involved an inexperienced driver who lost control and went over the central island and roundabout and collided with a recovery vehicle.

445. The five rear end shunt type collisions involved drivers approaching the roundabout from the east. A review of the existing highway environment for drivers approaching from the east has identified that the junction already benefits from targeted road safety measures including advanced warning signs and high friction surfacing on the approach to the junction.

446. However, a review of forward visibility to the give-way line (using online mapping) shows overgrown vegetation. Drivers approaching from the east could therefore fail to see a vehicle stopped at the give-way line, potentially contributing to the pattern of rear end shunts. It is therefore concluded that Cluster site 29 is of high sensitivity.

447. Cluster site 29 is located at the intersection of links 33 and 34 that are projected to experience an increase in HGV traffic of up to 33%. Whilst a cluster of collisions is identified, the types of collisions recorded would not be disproportionately impacted by vehicle composition and therefore it is more appropriate to focus upon the total change in traffic rather than changes in HGVs.

448. An increase in total traffic of 3% is assessed to represent a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

449. Notwithstanding, the above, the OCTMP (document reference 9.16) also includes embedded road safety commitments in relation to overgrown verges and vegetation. These measures would seek to assist the highway authorities in ensure that forward visibility is maintained at critical accesses, junctions and collision cluster locations.

24.6.1.5.2.23 Cluster Site 30

450. Cluster site 30 is located at the priority junction of the A47 with Branch Road.

451. During the five-year study period there have been nine rear end shunt type collisions which all resulted in slight injuries.

452. An emerging pattern of rear end shut collisions has been identified. Further consideration of the collisions has identified that only one of the nine collisions involved a HGV. The cluster site is therefore assessed as a high sensitive receptor.

453. A review of the existing highway environment has identified a number of existing targeted road safety measures are provided including advanced direction signing, street lighting, and high friction surfacing. In addition, there is also good forward visibility for drivers on the A47 of right turning traffic. It is therefore reasoned that the rear end shunt collisions are likely the result of driver inattention rather than a deficiency with the existing highway layout.

454. Cluster site 30 is located on link 34 that is projected to experience an increase in total traffic of up to 3% and HGV traffic of up to 33%. Noting the proportion of collisions that involved HGVs, and that the types of collisions recorded would not be disproportionately impacted by vehicle composition, the percentage change in HGV traffic alone is not considered to be a material consideration.

455. It is therefore assessed that an increase in total traffic of up to 3% represents a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.24 Cluster Site 31

456. Cluster site 31 is situated at a four-arm roundabout junction of the A149, A12 and A47 to the north of Great Yarmouth. The junction forms part of NH' Great Yarmouth Junction Improvements as part of the A47 corridor improvement RIS scheme.

457. NH identified that the junction experiences heavy congestion during peak hours. A preferred route announcement has been made by NH which would involve the following;

- A larger roundabout with traffic lights and a widened bridge over the railway line to accommodate widening of the A47 southern exit and approach
- Realignment to current highway standards to improve driver experience and safety.

458. The construction of the proposed improvements is projected to start by 2023/2024 and should be complete by 2025 prior to the commencement of SEP and DEP' construction. However, NH noted that the scheme has been paused pending a review.

459. This assessment therefore assumes that the improvements may not be delivered prior to the commencement of construction of SEP and DEP.

460. During the five-year study period there have been nine collisions, all of which resulted in slight injuries. Eight of the nine collisions involved rear end shunt type collisions. The final collision was due to the driver failing to give way at the roundabout.

461. It is noted that whilst there is a pattern of rear end shunt collision types at Cluster site 31, these types of collisions are not concentrated at any particular arm and are of a type that would be typical for this form of junction. The junction is therefore assessed as a medium sensitive receptor. If the improvements were implemented by National Highway the sensitive would however be assessed to reduce to low.

462. Cluster site 31 is located at the intersection of link 24, 25 and 34, that are projected to experience an increase in total traffic of up to 3% and HGV traffic of up to 50%. Noting that the existing collision types would not be disproportionately impacted by vehicle composition, the percentage change in HGV traffic alone is not considered to be a material consideration.

463. An increase in total traffic of up to 3% is therefore assessed to represent a negligible magnitude of effect on a medium sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.25 Cluster Site 32

464. Cluster site 32 is situated at a partially traffic signal controlled four-arm roundabout junction of the A12 and A1243 to the west of Great Yarmouth. The junction also forms part of NH' Great Yarmouth Junction Improvements as part of the A47 corridor improvement RIS scheme.

465. NH identified that the junction experiences heavy congestion during peak hours. A preferred route announcement has been made by NH which would involve installing traffic signals on the existing roundabout.

466. The construction of the proposed improvements is projected to start by 2023/2024 and should be complete by 2024/2025 prior to the commencement of SEP and DEP' construction. However, NH noted that the scheme has been paused pending a review.

467. This assessment therefore assumes that the improvements may not be delivered prior to the commencement of construction of SEP and DEP.

468. During the five-year study period there have been 18 collisions which 17 resulted in slight and one in a serious injury. The 18 collisions included seven rear end shunt type collisions and four collisions due to poor manoeuvring at the roundabout. Two of the 18 collisions involved HGVs.

469. Four of the seven rear end shunt type collisions occurred on the northern arm of the A12. A total of three collisions involving pedestrians and a cyclist also occurred at the northern arm of the A12.The roundabout is therefore assessed as a high sensitive receptor.

470. A review of the existing highway environment for vehicles approaching from the north on the A12 has identified a number of existing targeted road safety measures are provided including advanced warning signs, street lighting, and high friction surfacing. It is therefore reasoned that the collisions are likely the result of driver inattention rather than a deficiency with the existing highway layout.

471. Cluster site 32 is located on link 25 that is projected to experience an increase in HGV traffic of up to 22%. Noting that the majority of the existing collision types would not be disproportionately impacted by vehicle composition, the percentage change in HGV traffic alone is not considered to be a material consideration.

472. It is assessed that an increase in total traffic of up to 1% represents a negligible magnitude of effect on a high sensitivity receptor resulting in a **minor adverse** impact.

24.6.1.5.2.26 Cluster Site 33

473. Cluster site 33 is located on the A47, southeast of King's Lynn.

474. During the five-year study period, six collisions were recorded in which three resulted in slight and three in fatal type injuries.

475. The three slight collisions were rear end shunt type collisions. The three fatal collisions included two collisions involving vehicles drifting into the opposite lane and a rear end shunt type collision. Two of the three fatal collisions involved HGVs.

476. An emerging pattern of rear end shunt type collisions and collisions involving HGV traffic is identified at this location. The location is therefore assessed as a high sensitive receptor.

477. A review of the existing highway environment has identified that there is limited forward visibility at the location with no warning signs of the layby (predominantly used by HGVs). This suggests that drivers are having to slow down relatively late which could be attributed to the collisions.

478. Cluster site 33 is located on link 87 that is projected to experience an increase total traffic of up to 3% and in HGV traffic of up to 23%. The magnitude of effect is therefore assessed to be low on a high sensitivity receptor resulting in a **moderate adverse** impact.

24.6.1.5.2.27 Cluster Site 34

479. Cluster site 34 is located on the A47, within proximity of the Chalk Farm Clay Ground access, southeast of Narborough.

480. During the five-year study period, six collisions were recorded of which two resulted in slight and four in serious type injuries. Of the six collisions, four were rear end shunt type collisions, one was due to overtaking and one was due to a vehicle turning left at the junction. The two of slight collisions involved HGVs.

481. An emerging pattern of rear end shunt type collisions is identified at this location. The location is therefore assessed as a high sensitive receptor.

482. Cluster site 34 is located on link 87 that is projected to experience an increase in HGV traffic of up to 23%. Whilst a cluster of collisions is identified, the types of collisions recorded would not be disproportionately impacted by vehicle composition and therefore it is considered to be more appropriate to focus upon the total change in traffic rather than changes in HGVs.

483. It is assessed that an increase in total traffic of 3% represents a negligible magnitude of effect on a high sensitive receptor resulting in a **minor adverse** impact.

24.6.1.5.2.28 Cluster Site 35

484. Cluster site 35 is located at the A47 junction with the B1146, southwest of Dereham.

485. During the five-year study period, eight collisions were recorded of which three resulted in slight, four in serious and one in a fatal injury. Three collisions including the fatal collision involved vehicles failing to give way whilst driving down Drayton Hall Lane onto the A47. The other collisions included four rear end shunt type collisions and one collision as a result of a car swerving into the opposite lane.

486. It is noted that whilst there is an emerging pattern of rear end shunt collisions at Cluster site 35, the collisions are not concentrated at any particular arm and are of a type that would be typical for this form of junction.

487. It is also noted that there is a pattern of collisions involving vehicles turning from the B1146 into the path of oncoming vehicles on the A47. A review of forward visibility to the east has identified that existing vegetation is overgrown. Drivers approaching from the north could therefore fail to see oncoming vehicles, potentially contributing to the pattern of collisions involving vehicles turning into the path of oncoming vehicles. It is therefore assessed that Cluster site 35 is of high sensitivity.

488. Cluster site 35 is located on link 86 that is projected to experience an increase in HGV traffic of up to 22%. Whilst a pattern of collisions is identified, the collisions are of a type that would not be disproportionately impacted by vehicle composition and therefore it is considered to be more appropriate to focus upon the total change in traffic rather than changes in HGVs.

489. It is assessed that an increase in total traffic of 3% represents a negligible magnitude of effect on a high sensitive receptor resulting in a **minor adverse** impact.

490. Notwithstanding, the above, the OCTMP (document reference 9.16) also includes embedded road safety commitments in relation to overgrown verges and vegetation. These measures would seek to assist the highway authorities in ensure that forward visibility is maintained at critical accesses, junctions and collision cluster locations.

24.6.1.5.2.29 Cluster Site 36

491. Cluster site 36 is located at the A47 junction with Berry's Lane and Wood Lane, northeast of Honingham.

492. Cluster site 36 is located along a section of the A47 which would form part of NH' North Tuddenham to Easton improvement A47 corridor improvement RIS scheme.

493. NH identify that the corridor acts as a bottleneck creating congestion and as a result, a poor safety record. The proposals involve the upgrading the A47 between North Tuddenham and Easton in Norfolk to a dual carriageway with two new junctions at Berry's Lane and at Blind Lane. The proposals also result in the removal of the Easton roundabout.

494. The construction of the proposed improvements is projected to start 2022/2023 and should be complete by the start of SEP and DEP' construction programme in 2025.

495. It is considered that the proposed corridor improvement programme would be appropriate to mitigate the existing road safety issues and therefore the discrete cluster location assessed as a low sensitivity receptor

496. Cluster 36 is located at the intersection of link 85, 86 and 89, that are projected to experience an increase in traffic of up to 8%.

497. An increase in total traffic of up to 8% is assessed to represent a low magnitude of effect on a low sensitivity receptor resulting in a **negligible** impact.

24.6.1.5.3 Magnitude of Effect and Impact Significance – SEP and DEP Concurrently

498. The initial review of the existing road safety baseline has identified those areas where there are concentrations of collisions (known as collision clusters) which may be sensitive to changes in traffic flows. **Section 24.4.3.1.4** provides full details on the methodology for identifying these 37 collision clusters.

499. **Table 24-40** provides a review of the significance of SEP and DEP traffic upon these 37 collision clusters in the context of the changes in forecast daily traffic flows in 2025. Details of the percentage changes in daily traffic flows have been summarised from **Table 24-20**.

500. The SEP or DEP in isolation assessment (**Section 24.6.1.5.1**) has undertaken a further assessment of the baseline highway characteristics and causation of all collisions to refine the magnitude of effect findings. This refinement applies to the SEP and DEP scenario also, and the findings are summarised in **Table 24-40** in support of the magnitude of effect findings.

Table 24-40: Collision Cluster Information– SEP and DEP Concurrently

Link	Cluster Ref	Description	% Increase		In Isolation findings valid for SEP and DEP Concurrently	Summary
			All	HGVs		
23/ 24	C1	A149 roundabout with Fuller's Hill	1% - 2%	27% -61%	A review of the causation of the collisions undertaken for the in isolation assessment identified that they would not be disproportionately impacted by HGV composition and the assessment of magnitude of effect should consider total traffic rather than HGV composition.	It is assessed that a peak change in total traffic of between 1 and 3% represents a negligible magnitude of effect.
24/ 25/ 34	C31	A47 roundabout with A149	1% - 3%	28% -61%		
25	C2	A47 Breydon Bridge	1%	28%		
	C32	A47 roundabout with Pasteur Road				
25/ 26	C3	A47 roundabout with William Adams Way	1% - 2%	28% - 37%		
26	C4	A47 Hopton roundabout	2%	37%		
26/ 27	C5	A47 roundabout with B1385	2%	37% - 67%		
29	C6	A12 junction with Long Road	3%	90%	A review of the location of collision undertaken for the in isolation assessment identified that HGV traffic associated with SEP and DEP would not utilise those arms where a pattern of collisions involving vehicles turning occurs. It was therefore considered to be more appropriate to focus upon the total change in traffic through the junction rather than changes in HGVs.	It is assessed that a peak change in total traffic of 3% represents a negligible magnitude of effect.
	C7	A12 roundabout with A1117	3%	90%	A review of the causation of the collisions undertaken	It is assessed that a peak change in total

Link	Cluster Ref	Description	% Increase		In Isolation findings valid for SEP and DEP Concurrently	Summary
			All	HGVs		
30/ 31/ 129	C8	A47 junction with A146	2% - 9%	16% - 51%	for the in isolation assessment identified that they would not be disproportionately impacted by HGV composition and the assessment of magnitude of effect should consider total traffic rather than HGV composition.	traffic of up to 9% represents a negligible magnitude of effect.
32/ 33	C9	A47 roundabout with Cucumber Lane	2%	29%		
33	C10	A47 Blofield Bypass	2%	29%		
	C11	A47			The in isolation assessment identified proposed highway improvements by NH and considered that these would be appropriate to mitigate the existing road safety issues.	It is assessed that a peak change in total traffic of 2% represents a low magnitude of effect.
	C28	A47 junction with B1140				
33/ 34	C29	A47 roundabout with A1064	2% - 3%	29% - 42%	A review of the causation of the collisions undertaken for the in isolation assessment identified that they would not be disproportionately impacted by HGV composition and the assessment of magnitude of effect should consider total traffic rather than HGV composition.	It is assessed that a peak change in total traffic of between up to 4% represents a negligible magnitude of effect.
34	C12	A47 Acle Straight	3%	42%		
	C30	A47 junction with Branch Road				
35/ 40	C13	A1270 roundabout with A1151	3% - 4%	21%		
42	C15	A1042 junction with A1402	5%	0%	No assessment presented for in Isolation as changes	It is assessed that a peak change in total

Link	Cluster Ref	Description	% Increase		In Isolation findings valid for SEP and DEP Concurrently	Summary
			All	HGVs		
76	C16	A1067 junction with Hospital Lane	2%	0%	in traffic flows were assessed to be negligible.	traffic of up to 5% represents a negligible magnitude of effect.
	C17	A140 junction with A1067				
85/ 86/ 89	C36	A47 junction with Wood Lane	3% -12%	20% - 38%	The in isolation assessment identified proposed highway improvements by NH and considered that these would be appropriate to mitigate the existing road safety issues.	It is assessed that a peak change in total traffic of up to 12% represents a low magnitude of effect.
86	C18	A47	5%	28%	A review of the location of collision undertaken for the in isolation assessment identified that HGV traffic associated with SEP and DEP would not utilise the arm where a pattern of collisions involving vehicles turning occurs. It was therefore considered to be more appropriate to focus upon the total change in traffic through the junction rather than changes in HGVs.	It is assessed that a peak change in total traffic of up to 5% represents a negligible magnitude of effect.
	C19	A47				
	C35	A47 junction with B1146			A review of the causation of the collisions undertaken for the in isolation assessment identified that	It is assessed that a peak change in total traffic of up to 4% represents a

Link	Cluster Ref	Description	% Increase		In Isolation findings valid for SEP and DEP Concurrently	Summary
			All	HGVs		
					they would not be disproportionately impacted by HGV composition and the assessment of magnitude of effect should consider total traffic rather than HGV composition.	negligible magnitude of effect.
87	C33	A47	5%	30%	A review of the causation of the collisions undertaken for the in isolation assessment identified they could be disproportionately impacted by HGV composition.	It is assessed that a peak change in HGV traffic of up to 30% represents a low magnitude of effect.
	C34	A47			A review of the causation of the collisions undertaken for the in isolation assessment identified that they would not be disproportionately impacted by HGV composition and the assessment of magnitude of effect should consider total traffic rather than HGV composition.	It is assessed that a peak change in total traffic of up to 5% represents a negligible magnitude of effect.
89/ 90/ 94	C20	A47 junction with Taverham Road	3% - 128%	20% - 1,027%	The in isolation assessment identified proposed highway improvements by NH and considered that these would be appropriate to	It is assessed that a peak change in total traffic of 3% of the A47 represents a negligible magnitude of effect, whilst a change of

Link	Cluster Ref	Description	% Increase		In Isolation findings valid for SEP and DEP Concurrently	Summary
			All	HGVs		
					mitigate the existing road safety issues.	up to 128% on Taverham Road represents a high magnitude of effect.
93/ 94/ 95	C21	A47 roundabout with Dereham Road	2% - 59%	13% - 121%		It is assessed that a peak change in total traffic of 2 - 3% of the A47 represents a negligible magnitude of effect.
96	C22	A1074 junction with Longwater Lane	1%	0%	No assessment presented for in Isolation as changes in traffic flows were assessed to be negligible.	It is assessed that a peak change in total traffic of up to 1% represents a negligible magnitude of effect.
	C23	A1074 junction with Norwich Road				
	C24	A140 roundabout with A1074				
105/ 106/ 114/ 121/ 122	C25	A47 roundabout with A11	0% - 2%	0% - 14%	The in isolation assessment identified proposed highway improvements by NH and considered that these would be appropriate to mitigate the existing road safety issues.	It is assessed that a peak change in traffic of between 1 and 9% represents a negligible magnitude of effect.
122	C26	A47	1%	13%	A review of the causation of the collisions undertaken for the in isolation assessment identified that they would not be disproportionately impacted by HGV composition and the assessment of	
122/ 125/ 127/ 129	C27	A47 roundabout with A140	1% - 9%	5% - 51%		

Link	Cluster Ref	Description	% Increase		In Isolation findings valid for SEP and DEP Concurrently	Summary
			All	HGVs		
					magnitude of effect should consider total traffic rather than HGV composition.	
127	C37	A140	3%	9%	No assessment presented for in isolation as changes in traffic flows were assessed to be negligible.	It is assessed that a peak change in total traffic of 3% and HGV traffic of 9% represents a negligible magnitude of effect.

501. **Table 24-41** provides a summary of the sensitivity of each receptor, the magnitude of effect and overall significance of the road safety impact.

502. The sensitivity of collision clusters has been refined through a review of baseline highway characteristics and causation of all collisions presented within the in isolation assessment (**Section 24.6.1.5.2**). These findings from the in isolation assessment (in regard to sensitivity) apply to the SEP and DEP concurrently scenario also and are summarised in **Table 24-41**.

Table 24-41: Significance of Road Safety Impacts - SEP and DEP Concurrently

Cluster Sites	Magnitude	Sensitivity	Impact Significance
C1 – C19, C22 – C32, C34, C35, C37	Negligible	Low - High	**Minor Adverse**
C20	Low – High	Negligible	**Negligible – Minor Adverse**
C36	Low	Low	**Minor Adverse**
C21	No residual impact		
C33	Low	High	**Moderate – Major Adverse**

24.6.1.5.4 Mitigation– SEP and/or DEP all scenarios

503. An assessment of 37 collision cluster locations has identified that road safety impacts are no greater than minor adverse for all cluster locations with the exception of Cluster site 33. With the exception of Cluster site 33, no further mitigation beyond that embedded within the design of SEP and DEP is considered necessary.

504. Cluster site 33 is assessed to have a significant impact and is considered further for mitigation.

505. A review of the existing highway environment of Cluster site 33 has identified that there is limited forward visibility at the location with no warning signs of the layby (predominantly used by HGVs). This suggests that drivers are having to slow down relatively late which could be attributed to the collisions.

506. To mitigate the potential for construction traffic to exacerbate the identified pattern of rear end shunt collisions at Cluster site 33 ‘Slow Down”, “Layby Ahead” and “Vehicles Turning” signage would be introduced to make drivers aware of the potential for queuing and turning traffic in this location.

507. With the implementation of the additional mitigation measures the sensitivity of the Cluster site 33 would be expected to reduce to medium sensitivity. The magnitude of effect remains low upon a medium sensitive receptor resulting in a **minor adverse** residual impact.

24.6.1.6 Driver Delay (Impact 5, 6 and 7)

508. The Driver Delay impact assessment has been sub-divided into three discrete effects each of which have the potential to induce significant impacts on highway network users. These effects are:

- Impact 5: Driver Delay (Capacity) - delays induced by the highway networks' lack of spare capacity to accommodate additional traffic flow;
- Impact 6: Driver Delay (Highway Constraints) – delays induced by constrained road space forcing vehicles to slow or stop to traverse the highway network; and
- Impact 7: Driver Delay (Road Closures) – delays to diverted traffic re-routing on the highway network due to road closures necessitated by 'open cut' trench cable road crossings.

509. The assessment of driver delay applies to all vehicle users of the highway network including:

- Cars and LVs;
- Motorcyclists;
- Public Transport;
- Private Transport (e.g. taxis);
- HGVs; and
- Emergency services.

24.6.1.7 Impact 5: Driver Delay (Capacity)

510. The GEART screening thresholds do not apply to the effect of Driver Delay. The impact is defined as potentially significant when the highway network surrounding the development under consideration is at or close to capacity (congested).

511. NH and NCC have been engaged to identify which parts of the highway network within the TTSA are congested and therefore have the potential to exhibit significant Driver Delay impacts when the construction traffic demand is introduced.

512. NH and NCC have adopted a different approach to identifying sensitive parts of the highway network recognising the different operation characteristics of the SRN to the local highway network. As set out in **Table 24-9**, NH have identified 11 junctions that they consider to be sensitive to increases in daily traffic flow. As set out in **Table 24-10** NCC, applying their statutory duties have identified that 59 of the 140 links within the TTSA could be sensitive to increases in traffic during defined peak periods.

513. The sensitive junctions and links identified by the relevant highway authorities have been assessed for baseline conditions and with SEP and DEP construction traffic added to determine the sensitivity value, the magnitude of effect and the resultant impact significance.

514. The detailed traffic derivation, baseline traffic flows, baseline models and model inputs/outputs are contained in the TA (**Appendix 24.1**). A summary of these outputs is outlined under the following magnitude of effect and impact significance headings.

24.6.1.7.1 Magnitude of Effect and Impact Significance – all scenarios

24.6.1.7.1.1 Sensitive Junctions

515. It has been agreed with NH that a representative worst-case scenario for assessing sensitive junctions would be during the period immediately preceding the morning network peak and immediately following evening network peaks, (known as shoulder peaks). These shoulder peak periods are identified as:
    - 06:30 – 07:30; and
    - 17:25 – 18:25.

516. The rational for these worst-case scenarios is that this representants the time when the peak SEP and DEP traffic demand associated with employee movements could manifest if there was any divergence in the working hours of 7am to 7pm (e.g. administration staff arriving later or earlier as shifts finish to accommodate onward travel to home). The peak periods would also contain the hourly SEP and DEP HGV demand as delivery to and from site would have commenced.

517. **Table 24-42** summarises the SRN sensitive junctions' modelled outputs and the associated Driver Delay magnitude of effect for SEP and/or DEP. Full junction modelling outputs are provided within the supporting TA (**Appendix 24.1**).

Table 24-42: Summary of effects and impacts on sensitive junctions

Junction-ID	Location	Summary of junction modelling
Junction 1	Junction of the A47, B1535 and Berrys Lane to the East of Hockering/West of Honingham.	The TA (**Appendix 24.1**) shows that the existing junction operates with spare capacity, the junction is therefore assessed as of low sensitivity. It is forecast that with the peak increases in traffic from SEP and/or DEP, the junction would operate over capacity. The magnitude of effect is therefore assessed as high, on a receptor of low sensitivity resulting in a **moderate adverse impact**.
Junction 2	Junction of the A47, Blind Lane and Taverham Road to the East of Honingham.	The TA (**Appendix 24.1**) shows that the existing junctions (2 to 6) operate with spare capacity, these junctions are therefore assessed as of low sensitivity. It is forecast that with the peak increases in traffic from SEP and/or DEP, the junctions would continue to operate with spare capacity. The magnitude of effect is therefore assessed as negligible, on a receptor of low sensitivity resulting in a **negligible impact**.
Junction 3	Junction of the A47, Church Lane and Dereham Road to the West of Easton.	
Junction 4	Junction of the A11 and Station Lane to the North of NCC Highway Depot (South)/North of East Carleton.	
Junction 5	Junction of the A11, A47 (Northbound, Southbound - Off ramp), B1172 and Newmarket Road to the Northwest of Cringleford.	

Junction-ID	Location	Summary of junction modelling
Junction 6	Junction of the A47 (Westbound, East bound - Off ramp), A140, Markshall Farm Road and Harford Park and Ride Road to the North of Dunston.	
Junction 7	Junction of the A47 and Norwich Road to the East of Honingham.	The TA (**Appendix 24.1**) shows that the existing junction is operating over capacity, the junction is therefore assessed as of high sensitivity. It is forecast that with the peak increases in traffic from SEP and/or DEP, the junction would continue to operate over capacity. The magnitude of effect is therefore assessed as low, on a receptor of high sensitivity resulting in a **moderate adverse impact**.
Junction 8	Junction of the A47, A1074 and William Frost Way at Longwater.	The TA (**Appendix 24.1**) shows that the existing junctions (8 to 11) operate with spare capacity, these junctions are therefore assessed as of low sensitivity. It is forecast that with the forecast peak increases in traffic from SEP and/or DEP, the junctions would continue to operate with spare capacity. The magnitude of effect is therefore assessed as negligible, on a receptor of low sensitivity resulting in a **negligible impact**.
Junction 9	Junction of the A47, Long Lane and Derenham Road to the South of Longwater.	
Junction 10	Junction of the A47, B1108 and Green Access to the South-West of Three Score.	
Junction 11	Junction of the A47 and B1108 to the South-Eats of Bawburgh.	

24.6.1.7.1.2 Sensitive links

518. During a traffic and transport ETG (dated 31 March 2021) NCC advised of those locations considered particularly sensitive to driver delay effects

519. **Table 24-10** identifies 59 of the 140 links forming the TTSA as being potentially sensitive to increases in HGV traffic. The sensitive periods were defined by NCC as:

- The morning peak, 07:30 – 09:00;
- The evening peak (assumed 16:25 – 17:25); and
- The Summer school holiday period.

520. It can be identified from **Table 24-19** and **Table 24-20** that of these 59 links, HGV traffic from SEP and DEP would impact upon 47 links. These links are therefore assessed further.

521. During the morning peak (07:30 – 09:00), industry experience indicates that the majority of the construction workforce would have already arrived in order to be available to start work at 07:00 and maximise productivity during the defined working hours for SEP and DEP (07:00 – 19:00). Equally, experience indicates that employees would leave after 18:00 in the evening thus avoiding the evening peak period.

522. In order to consider an absolute worst-case scenario for capacity impacts, it has however, been assumed that up to 25% of the employee demand would occur during the NCC defined morning and evening peak hours and that one tenth of daily HGV movements would also occur during that period. Further details on the disaggregation of daily flows to peak hour flows is provided in Annex 6 of the TA (**Appendix 24.1**).

523. **Table 24-43** summarises the percentage change in peak hour traffic flows for each of the 47 links identified by NCC as sensitive for SEP or DEP in isolation and SEP and DEP.

Table 24-43: Summary of effects on sensitive links

Link	2025 Background Traffic Flows		Peak Hour Construction Flows (SEP or DEP in Isolation)	Peak Hour Construction Flows (SEP and DEP Concurrently)	Percentage Increase (SEP or DEP in Isolation)		Percentage Increase (SEP and DEP Concurrently)	
	AM Peak	PM Peak			AM Peak	PM Peak	AM Peak	PM Peak
1	1,557	1,408	79	101	5%	6%	6%	7%
2	758	686	53	69	7%	8%	9%	10%
3	1,423	1,286	50	63	4%	4%	4%	5%
4	835	755	46	53	6%	6%	6%	7%
5	1,250	1,130	64	84	5%	6%	7%	7%
6	1,250	1,130	43	56	3%	4%	4%	5%
9	262	338	31	50	12%	9%	19%	15%
11	214	506	32	44	15%	6%	20%	9%
13	982	1,343	68	80	7%	5%	8%	6%
14	496	646	61	73	12%	10%	15%	11%
15	404	526	35	47	9%	7%	12%	9%
16	629	819	20	25	3%	2%	4%	3%
17	884	1,151	20	25	2%	2%	3%	2%
18	884	1,151	20	25	2%	2%	3%	2%
19	507	647	20	25	4%	3%	5%	4%
20	653	829	18	23	3%	2%	4%	3%
21	782	993	18	23	2%	2%	3%	2%

Link	2025 Background Traffic Flows		Peak Hour Construction Flows (SEP or DEP in Isolation)	Peak Hour Construction Flows (SEP and DEP Concurrently)	Percentage Increase (SEP or DEP in Isolation)		Percentage Increase (SEP and DEP Concurrently)	
	AM Peak	PM Peak			AM Peak	PM Peak	AM Peak	PM Peak
22	1,779	2,260	13	17	1%	1%	1%	1%
23	1,421	1,805	13	17	1%	1%	1%	1%
35	1,606	2,040	113	146	7%	6%	9%	7%
37	995	1,264	18	23	2%	1%	2%	2%
38	628	802	20	25	3%	3%	4%	3%
39	628	802	20	25	3%	3%	4%	3%
40	1,746	2,139	130	169	7%	6%	10%	8%
41	1,746	2,139	119	152	7%	6%	9%	7%
43	1,044	1,413	90	107	9%	6%	10%	8%
44	1,139	1,542	69	84	6%	4%	7%	5%
49	485	656	86	102	18%	13%	21%	16%
51	663	814	90	104	14%	11%	16%	13%
52	335	411	23	26	7%	6%	8%	6%
53	281	345	15	22	5%	4%	8%	6%
54	417	365	103	117	25%	28%	28%	32%
56	417	365	99	113	24%	27%	27%	31%
57	407	498	18	16	4%	4%	4%	3%
59	347	472	54	67	15%	11%	19%	14%

Link		2025 Background Traffic Flows		Peak Hour Construction Flows (SEP or DEP in Isolation)		Peak Hour Construction Flows (SEP and DEP Concurrently)		Percentage Increase (SEP or DEP in Isolation)		Percentage Increase (SEP and DEP Concurrently)	
		AM Peak	PM Peak					AM Peak	PM Peak	AM Peak	PM Peak
72		909	1,099	91		129		10%	8%	14%	12%
73	909	1,099	68	96	8%	6%	11%	9%			
78		909	1,099	53		73		6%	5%	8%	7%
79	947	1,160	85	114	9%	7%	12%	10%			
80		647	792	39		49		6%	5%	8%	6%
88		2,360	2,133	36		49		2%	2%	2%	2%
98	627	669	44	67	7%	7%	11%	10%			
104		563	601	36		55		6%	6%	10%	9%
112		915	981	27		37		3%	3%	4%	4%
123		673	870	19		18		3%	2%	3%	2%
124		673	870	19		18		3%	2%	3%	2%
141		608	832	32		41		5%	4%	7%	5%

Key

	Links exceeding 10% increase

524. It can be noted from **Table 24-43** that of the links designated as traffic sensitive routes by NCC, the peak hour construction traffic demand for all scenarios is no greater than 10% on 34 of the 47 links. Demand is greater than 10% for links 9, 11, 14, 15, 49, 51, 54, 56, 59, 72, 73, 79 and 98.

525. A change in traffic of 10% or less is within day to day fluctuations in traffic and is therefore perceived as being indiscernible. The magnitude of effect is therefore assessed as negligible on receptors of high sensitivity, resulting in a **minor adverse impact**.

526. The change in traffic on links 9, 11, 14, 15, 49, 51, 54, 56, 59, 72, 73, 79 and 98 is between 10 and 32%, the magnitude of effect is therefore assessed as low on potentially high sensitivity receptors, potentially resulting in a **moderate adverse impact**.

24.6.1.7.2 Mitigation - all scenarios

24.6.1.7.2.1 Sensitive Junctions

527. Junction modelling has identified that of the 11 junctions identified by highways stakeholders as being potentially sensitive, there could be potentially significant driver delay impacts associated with SEP and/or DEP at junction 1 and 7.

528. Driver delay impacts the remaining nine junctions are assessed as **negligible** and therefore, no further mitigation beyond that embedded within the design of SEP and/or DEP is considered necessary for construction

529. National Highways are however proposing to remove both junction 1 and 7 as part of the A47 North Tuddenham to Easton improvement scheme. This scheme would remove these existing junctions providing new grade separated junctions on the A47. The improvement works are proposed to be complete by 2024/2025 and should therefore be in place prior to the commencement of SEP and/or DEP (scheduled to start in 2025 at the earliest). The residual impact of SEP and/or DEP traffic would therefore be assessed as negligible.

530. However, should the improvement works not be implemented prior to the commencement of construction of SEP and/or DEP, the OCTMP (document reference 9.16) sets out a range of potential mitigation measures to ensure impacts are not significant.

24.6.1.7.2.2 Sensitive Links

531. An assessment of 47 sensitive links has identified that impacts are no greater than minor adverse for 35 of the links. No further mitigation beyond that embedded within the design of SEP and/or DEP is considered necessary for these 34 links.

532. Potentially significant impacts are however identified for links 13 links (links 9, 11, 14, 15, 49, 51, 54, 56, 59, 72, 73, 79 and 98). These links are assessed to have a potentially significant impact and are therefore considered further for mitigation.

533. **Section 24.6.1.3** outlines mitigation measures for the effects of amenity upon link 7, 9, and 11, Bridge Road and the A149 west and east of Weybourne (respectively). These measures would reduce peak daily HGV demand to average levels. It is assessed that a reduction from peak to average HGV trips during the peak hour would reduce the magnitude of effect to negligible on a receptor of high sensitivity resulting in a **minor adverse** residual impact.

534. Link 14 and 15 and comprises of the B1436 and A140 (respectively) in the vicinity of Roughton. It is assessed that the proposed mitigation for links 7, 9 and 11 of limiting peak HGV movements to both links would by definition reduce the peak HGV movements on links 14 and 15 as HGV traffic travelling to links 7, 9 and 11 from Lowestoft and Great Yarmouth pass via these links.

535. For link 11, 14 and 15, it is assessed that a reduction from peak to average HGV trips during the peak hour would reduce the magnitude of effect to negligible on a potentially high sensitivity receptor, resulting in a **minor adverse** residual impact.

536. Links 49, 51, 54, 56 and 59 comprise of the B1149 between the A148 (Holt) to the north and Horsford to the south. To manage the potential for cumulative impacts between Norfolk Vanguard and Hornsea Project Three, a cap was agreed between the forementioned projects and NCC. This agreement imposed a cap upon daily HGV trips along the B1149 to 289 HGV trips per day (Norfolk Vanguard Outline Construction Traffic Management Plan (Vattenfall, 2019)).

537. The OCTMP (document reference 9.16) outlines how SEP and/or DEP will also comply with this target. It is assessed that compliance with the agreed cap would ensure that residual impacts along the B1149 are no greater than **minor adverse**.

538. It can be noted from **Table 24-43** that when considering links 72, 73, 79 and 98 the change in total traffic is only greater than 10% for SEP and DEP concurrently. Consequently, for SEP and DEP in isolation the magnitude of effect is assessed as negligible on a receptor of high sensitivity resulting in a **minor adverse** residual impact.

539. It is therefore proposed that vehicle movements via links 72, 73, 79 and 98 are capped to not exceed those proposed for SEP or DEP in isolation. The OCTMP (document reference 9.16) outlines how SEP and DEP will also comply with this cap.

540. It is assessed that compliance with this cap would reduce the magnitude of effect to negligible on potentially high sensitivity receptors, resulting in a **minor adverse** residual impact.

24.6.1.8 Impact 6: Driver Delay (Highway Constraints)

541. Driver Delay (Highway Constraints) impacts are considered to have the potential for significant impacts where the highway network within the TTSA is of constrained width to prevent two HGVs from passing (therefore leading to delays associated within waiting and manoeuvring). A review of all links has been undertaken to identify ‘constrained width’, defined as roads less than 5.5m wide.

24.6.1.8.1 Magnitude of Effect – SEP or DEP in Isolation

542. **Table 24-44** provides a summary of the magnitude of effect for each of the 43 links identified as of constrained width.

Table 24-44: Highway Constraints Magnitude of Effect Assessment – SEP or DEP in Isolation

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
7	Narrow two lane road ~ 1.6km long, 4.5 to 5 m wide.	0	7	The road allows passing of two LVs. One formal and two informal passing places are provided; however, these do not allow two HGVs to pass. An increase of up to seven HGV trips per hour could lead to conflict when attempting to pass each other.	Medium
8	Narrow two lane road ~ 2.1km long, 5 to 5.5 m wide.	6	6	The road allows passing of two LVs. Approximately 15% of the route allows two-way HGV movement. An increase of up to six HGV trips per hour could lead to conflict when attempting to pass each other.	Medium
10	Narrow two lane road ~ 5.3km long, 4 to 5 m wide.	51	6	The road allows passing of two LVs. One formal and one informal passing place are provided, however these do not allow two HGVs to pass. An increase of up to six HGV trips per hour could potentially lead to conflict when attempting to pass each other.	Medium
12	Narrow two lane road ~ 3.3km long, 4 to 5 m wide.	43	9	The road allows passing of two LVs. One formal and eight informal passing places are provided, however these do not allow two HGVs to pass but would allow an HGV to pass an LV. Approximately 20% of the route allows two-way HGV movement. An increase of up to nine HGV trips per hour could potentially lead to conflict when attempting to pass each other.	Medium
50	Narrow two lane road ~ 4.4km long, 4.4m wide.	0	8	The road does not allow passing of two HGVs. An increase of up to eight HGV trips per hour could potentially lead to conflict when attempting to pass each other.	Medium
58	Narrow two lane road ~ 5.2km long, 4 to 5 m wide.	67	16	The road allows passing of two LVs. Approximately 10% of the route allows two-way HGV movement. In addition, seven formal and five informal passing places are provided which mostly allow two HGVs to pass. An increase of 16 HGV trips per hour could lead to conflict when attempting to pass each other.	Medium
60	Narrow two lane road ~ 5.2km long, 3.7 to 4.5m wide.	0	7	One formal and eight informal passing places are provided, however these do not allow two HGVs to pass. Approximately 10% of the route allows two-way	Medium

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
				HGV movement. An increase of up to seven HGV trips per hour could potentially lead to conflict when attempting to pass each other.	
61	One lane road ~ 2.4km long, 2.5-3m wide.	29	6	The road does not allow the passing of two LVs and no passing places provided. An increase of up to 29 LV trips and six HGV trips per hour could lead to conflict when attempting to pass each other.	High
62	Narrow two lane road ~ 0.9km long, 4.5 to 5m wide.	27	3	The road allows passing of two LVs. One informal passing place is provided, however this does not allow two HGVs to pass but would allow an HGV to pass an LV. Approximately 10% of the route allows two-way HGV movement. An increase of up to three HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
63	Narrow two lane road ~ 0.7km long, 5m wide.	27	4	The road allows passing of two LVs. No passing places are provided. An increase of up to four HGV trips per hour could occasionally lead to conflict when attempting to pass each other.	Low
64	Narrow two lane road ~ 1.9km long, 4m wide.	20	9	The road does not allow the passing of two LVs. Two informal and three formal passing places are provided, however these do not allow two HGVs to pass. An increase of up to 20 LV trips and nine HGV trips per hour could lead to conflict when attempting to pass each other.	High
66	One lane road ~ 1.5km long, 3.5 – 4m wide.	0	4	One informal passing place is provided, however this does not allow two HGVs to pass. An increase of up to four HGV trips per hour could occasionally lead to conflict when attempting to pass each other.	Low
68	Narrow two lane road ~ 2.7km long, 5 – 5.3m wide.	53	0	The road allows passing of LVs and no HGV movements are proposed.	Negligible
81	Narrow two lane road ~ 1.1km long, 5 – 5.3m wide.	59	6	The road allows passing of two LVs. Approximately 10% of the route allows two-way HGV movement. In addition, three informal passing places are provided which allow two HGVs to pass. An increase of up to six HGV trips per hour would unlikely lead to conflict when attempting to pass each other.	Negligible

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
82	One lane road ~ 2.6km long, 3.5 – 4m wide.	26	6	The road does not allow the passing of two LVs. There are three formal and five informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 26 LV trips and six HGV trips per hour could lead to conflict when attempting to pass each other.	High
83	Narrow two lane road ~ 2.8km long, 4.3 – 5m wide.	62	7	The road allows passing of two LVs. Three formal and two informal passing places are provided, however only one allows two HGVs to pass. An increase of up to seven HGV trips per hour could potentially lead to conflict with other HGVs.	Medium
84	One lane road ~ 2.5km long, 3m wide.	22	7	The road does not allow the passing of two LVs. There are five informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 22 LV trips and seven HGV trips per hour could lead to conflict when attempting to pass each other.	High
90	One lane road ~ 1.64m long, 2.5 -3m wide.	43	8	The road does not allow the passing of two LVs. There are eight formal and six informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 43 LV trips and eight HGV trips per hour could lead to conflict when attempting to pass each other.	High
93	One lane road ~ 3.3km long, 3.2 -3.4m wide.	82	16	The road does not allow the passing of two LVs. Approximately 10% of the route allows two-way HGV movement. In addition, there are 10 formal and nine informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 82 LV trips and 16 HGV trips per hour could lead to conflict when attempting to pass each other.	High
99	Narrow two lane road ~ 0.5km long, 4.6m wide.	45	5	The road allows passing of LVs and one formal and one informal passing place is provided, however these do not allow two HGVs to pass. An increase of up to five HGV trips per hour could potentially lead to conflict with other HGVs given the length of the road.	Medium
101	Narrow two lane road ~ 1.1km long, 4.3m wide.	45	5	The road allows passing of LVs and one formal and one informal passing place is provided, however these do not allow two HGVs to pass. An increase	Medium

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
				of up to five HGV trips per hour could potentially lead to conflict with other HGVs given the length of the road.	
102	One lane road ~ 3.5km long, 3.5 – 4m wide.	16	6	The road does not allow the passing of two LVs. There are two informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 16 LV trips and six HGV trips per hour could lead to conflict when attempting to pass each other.	High
103	Narrow two lane road ~ 1km long, 4.3 – 4.7m wide.	44	7	The road allows passing of two LVs but not two HGVs. An increase of up to seven HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
110	Narrow two lane road ~ 3.9km long, 4.9 – 5m wide.	24	6	The road allows passing of LVs and one formal and three informal passing places are provided, however only one allows two HGVs to pass. The road width would also allow an LV to pass an HGV. An increase of up to six HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
116	One lane road ~ 0.4km long, 3.4m wide.	22	7	The road does not allow the passing of two LVs. There is an informal passing place provided, however this does not allow two HGVs to pass. An increase of up to 22 LV trips and six HGV trips per hour could lead to conflict when attempting to pass each other.	High
117	Narrow two lane road ~ 1.7km long, 4.7m wide.	14	7	The road allows passing of LVs and an LV to pass a HGV. Three formal and two informal passing places are provided, however these are not large enough for HGVs. An increase of seven HGV trips per hour could potentially lead to conflict when attempting to pass each other.	Medium
118	Two lane road ~ 0.9km long, 4.5 – 5.0m wide.	64	10	Approximately 50% of the route is wide enough for two HGVs to pass and the remainder is wide enough for an HGV to pass a LV. An increase of up to 64 LV trips and 10 HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
119	Narrow two lane road ~ 1.4km long, 4.5m wide.	64	10	The road allows passing of LVs and a HGV to pass a LV. One formal and two informal passing places are provided, which allow two HGVs to pass. An increase of up to 10 HGV trips per hour could potentially lead to conflict with other HGVs.	Medium

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
131	Narrow two lane road ~ 1km long, 4.5 – 4.8m wide.	17	6	The road allows passing of LVs and an HGV to pass an LV. Three formal passing places are provided, however only one allows two HGVs to pass. An increase of up to six HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
132	Narrow two lane road ~ 1.8km long, 4.6 – 5.3m wide.	8	13	The road allows passing of LVs and a HGV to pass an LV. Two formal and seven informal passing places are provided, however only the two formal passing places allow two HGVs to pass. An increase of up to 13 HGV trips per hour could lead to conflict with other HGVs.	High
133	Narrow two lane road ~ 2.7km long, 4.2 – 5m wide.	4	5	Whilst there are no passing places present, the road allows the passing of two LVs and a HGV to pass an LV. An increase of up to five HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
136	Two Lane Road ~ 0.9km long, 5.5m	4	5	The majority of the link allows the passing of two HGVs. An increase of up to five HGV trips per hour would be unlikely lead to conflict with other vehicles.	Negligible
137	Narrow two lane road ~ 1.8km long, 4.3 – 4.8m wide.	58	13	The road allows passing of LVs and a LV to pass a HGV. Whilst two informal passing places are provided, these do not allow two HGVs to pass. An increase of up to 13 HGV trips per hour could lead to conflict with other HGVs.	High
138	Narrow road ~ 1.4km long, 2.9 – 4.2m wide.	56	0	A majority of the road does not allow the passing of two LVs. Whilst four informal passing places are provided, these do not allow two LVs to pass. An increase of up to 56 LV trips per hour could lead to conflict when attempting to pass each other.	High
139	Narrow road ~ 3.1km long, 3 – 4.3m wide.	56	0	A proportion of the road does not allow the passing of two LVs. Three formal and 12 informal passing places are provided however, these do not allow the passing of two LVs. An increase of up to 56 LV trips per hour could lead to conflict when attempting to pass each other.	High
143	Narrow two lane road ~ 0.3km long, 4.9 – 5.3m wide.	92	8	The road allows passing of LVs and a HGV to pass an LV. Approximately 40% of the route allows two-way HGV movement. In addition, a formal	Low

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
				passing place that allows two HGVs to pass is provided. An increase of up to eight HGV trips per hour could occasionally lead to conflict with other HGVs.	
144	Narrow one lane road ~ 0.3km long, 2.4m wide.	3	0	The road does not allow the passing of two LVs. An increase of up to three LV trips per hour could occasionally lead to conflict with other LVs.	Low
146	Two lane road ~ 2.2km long, 4.6 – 6m wide.	26	0	The road allows passing of LVs and no HGV movements are proposed.	Negligible
147	One lane road ~ 0.9km long, 3.2m wide.	18	7	The road does not allow the passing of two LVs. An increase of up to 18 LV trips and seven HGV trips per hour could lead to conflict with other LVs.	High
148	One lane road ~ 0.9km long, 3.5 – 3.6m wide.	34	7	The road does not allow the passing of two LVs. An increase of up to 34 LV trips and seven HGV trips per hour could lead to conflict with other LVs.	High
149	One lane road ~ 0.8km long, 3m wide.	0	7	The road does not allow the passing of two HGVs. An increase of up to seven HGV trips per hour could potentially lead to conflict with other LVs.	Medium
152	Narrow road ~ 2.7km long, 3.6 – 4.5m wide.	48	7	A proportion of the road does not allow the passing of two LVs. Three formal and 10 informal passing places are provided, however these do not allow two HGVs to pass. An increase of up to 48 LV trips and seven HGV trips per hour would be unlikely to lead to conflict.	High
153	Narrow road ~ 1.9km long, 3.6 – 5.5m wide.	2	0	The road allows passing of LVs and no HGV movements are proposed.	Negligible

24.6.1.8.2 Magnitude of Effect – SEP and DEP Concurrently

543. **Table 24-45** provides a summary of the magnitude of effect for each of the 43 links identified as of constrained width. The impact upon the remaining 83 links where the road is greater than 5.5m in width is assessed as negligible.

Table 24-45: Highway Constraints Magnitude of Effect Assessment – SEP and DEP Concurrently

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
7	Narrow two lane road ~ 1.6km long, 4.5 to 5 m wide.	0	9	The road allows passing of two LVs. One formal and two informal passing places are provided; however, these do not allow two HGVs to pass. An increase of up to nine HGV trips per hour could lead to conflict when attempting to pass each other.	Medium
8	Narrow two lane road ~ 2.1km long, 5 to 5.5 m wide.	9	6	The road allows passing of two LVs. Approximately 15% of the route allows two-way HGV movement. An increase of up to six HGV trips per hour could occasionally lead to conflict when attempting to pass each other.	Low
10	Narrow two lane road ~ 5.3km long, 4 to 5 m wide.	65	6	The road allows passing of two LVs. One formal and one informal passing place are provided, however these do not allow two HGVs to pass. An increase of up to six HGV trips per hour could potentially lead to conflict when attempting to pass each other.	Medium
12	Narrow two lane road ~ 3.3km long, 4 to 5 m wide.	57	10	The road allows passing of two LVs. One formal and eight informal passing places are provided, however these do not allow two HGVs to pass. Approximately 20% of the route allows two-way HGV movement. An increase of up to 10 HGV trips per hour could potentially lead to conflict when attempting to pass each other.	Medium
50	Narrow two lane road ~ 4.4km long, 4.4m wide.	0	8	The road does not allows passing of two HGVs. An increase of up to eight HGV trips per hour could potentially lead to conflict when attempting to pass each other.	Medium
58	Narrow two lane road ~ 5.2km long, 4 to 5 m wide.	112	15	The road allows passing of two LVs. Approximately 10% of the route allows two-way HGV movement. In addition, seven formal and five informal passing places are provided which mostly allow two HGVs to pass. An increase of 15 HGV trips per hour could lead to conflict when attempting to pass each other.	High

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
60	Narrow two lane road ~ 5.2km long, 3.7 to 4.5m wide.	0	7	One formal and eight informal passing places are provided, however these do not allow two HGVs to pass. Approximately 10% of the route allows two-way HGV movement. An increase of up to seven HGV trips per hour could potentially lead to conflict when attempting to pass each other.	Medium
61	One lane road ~ 2.4km long, 2.5-3m wide.	33	6	The road does not allow the passing of two LVs and no passing places provided. An increase of up to 33 LV trips and six HGV trips per hour could lead to conflict when attempting to pass each other.	High
62	Narrow two lane road ~ 0.9km long, 4.5 to 5m wide.	31	4	The road allows passing of two LVs. One informal passing place is provided, however this does not allow two HGVs to pass. Approximately 10% of the route allows two-way HGV movement. An increase of up to four HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
63	Narrow two lane road ~ 0.7km long, 5m wide.	31	4	The road allows passing of two LVs. No passing places are provided. An increase of up to four HGV trips per hour could occasionally lead to conflict when attempting to pass each other.	Low
64	Narrow two lane road ~ 1.9km long, 4m wide.	24	9	The road does not allow the passing of two LVs. Two informal and three formal passing places are provided, however these do not allow two HGVs to pass. An increase of up to 24 LV trips and nine HGV trips per hour could lead to conflict when attempting to pass each other.	High
66	One lane road ~ 1.5km long, 3.5 – 4m wide.	0	4	One informal passing place is provided, however this does not allow two HGVs to pass. An increase of up to four HGV trips per hour could occasionally lead to conflict when attempting to pass each other.	Low
68	Narrow two lane road ~ 2.7km long, 5 – 5.3m wide.	63	0	The road allows passing of LVs and no HGV movements are proposed.	Negligible
81	Narrow two lane road ~ 1.1km long, 5 – 5.3m wide.	91	7	The road allows passing of two LVs. Approximately 10% of the route allows two-way HGV movement. In addition, three informal passing places are provided which allow two HGVs to pass. An increase of up to seven HGV trips per hour would unlikely lead to conflict when attempting to pass each other.	Negligible

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
82	One lane road ~ 2.6km long, 3.5 – 4m wide.	46	7	The road does not allow the passing of two LVs. There are three formal and five informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 46 LV trips and seven HGV trips per hour could lead to conflict when attempting to pass each other.	High
83	Narrow two lane road ~ 2.8km long, 4.3 – 5m wide.	96	10	The road allows passing of two LVs. Three formal and two informal passing places are provided, however only one allows two HGVs to pass. An increase of up to ten HGV trips per hour could potentially lead to conflict with other HGVs.	Medium
84	One lane road ~ 2.5km long, 3m wide.	44	10	The road does not allow the passing of two LVs. There are five informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 44 LV trips and 10 HGV trips per hour could lead to conflict when attempting to pass each other.	High
90	One lane road ~ 1.64m long, 2.5 -3m wide.	72	14	The road does not allow the passing of two LVs. There are eight formal and six informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 72 LV trips and 14 HGV trips per hour could lead to conflict when attempting to pass each other.	High
93	One lane road ~ 3.3km long, 3.2 -3.4m wide.	123	17	The road does not allow the passing of two LVs. Approximately 10% of the route allows two-way HGV movement. In addition, there are 10 formal and nine informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 123 LV trips and 17 HGV trips per hour could lead to conflict when attempting to pass each other.	High
99	Narrow two lane road ~ 0.5km long, 4.6m wide.	60	5	The road allows passing of LVs and one formal and one informal passing place is provided, however these do not allow two HGVs to pass. An increase of up to five HGV trips per hour could potentially lead to conflict with other HGVs given the length of the road.	Medium
101	Narrow two lane road ~ 1.1km long, 4.3m wide.	60	5	The road allows passing of LVs and one formal and one informal passing place is provided, however these do not allow two HGVs to pass. An increase of up to five HGV trips per hour could potentially lead to conflict with other HGVs given the length of the road.	Medium

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
102	One lane road ~ 3.5km long, 3.5 – 4m wide.	17	6	The road does not allow the passing of two LVs. There are two informal passing places provided, however these do not allow two HGVs to pass. An increase of up to 17 LV trips and six HGV trips per hour could lead to conflict when attempting to pass each other.	High
103	Narrow two lane road ~ 1km long, 4.3 – 4.7m wide.	56	7	The road allows passing of two LVs but not two HGVs. An increase of up to seven HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
110	Narrow two lane road ~ 3.9km long, 4.9 – 5m wide.	41	6	The road allows passing of LVs and one formal and three informal passing places are provided, however only one allows two HGVs to pass. The road width would also allow an LV to pass an HGV. An increase of up to six HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
116	One lane road ~ 0.4km long, 3.4m wide.	39	6	The road does not allow the passing of two LVs. There is an informal passing place provided, however this does not allow two HGVs to pass. An increase of up to 39 LV trips and six HGV trips per hour could lead to conflict when attempting to pass each other.	High
117	Narrow two lane road ~ 1.7km long, 4.7m wide.	27	6	The road allows passing of LVs and an LV to pass a HGV. Three formal and two informal passing places are provided, however these are not large enough for HGVs. An increase of six HGV trips per hour could potentially lead to conflict when attempting to pass each other.	Medium
118	Two lane road ~ 0.9km long, 4.5 – 5.0m wide.	92	10	Approximately 50% of the route is wide enough for two HGVs to pass and the remainder is wide enough for an HGV to pass a LV. An increase of up to 92 LV trips and 10 HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
119	Narrow two lane road ~ 1.4km long, 4.5m wide.	87	10	The road allows passing of LVs and a HGV to pass a LV. One formal and two informal passing places are provided, which allow two HGVs to pass. An increase of up to 10 HGV trips per hour could potentially lead to conflict with other HGVs.	Medium
131	Narrow two lane road ~ 1km long, 4.5 – 4.8m wide.	23	6	The road allows passing of LVs and an HGV to pass an LV. Three formal passing places are provided, however only one allows two HGVs to pass. An	Low

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
				increase of up to six HGV trips per hour could occasionally lead to conflict with other HGVs.	
132	Narrow two lane road ~ 1.8km long, 4.6 – 5.3m wide.	10	12	The road allows passing of LVs and a HGV to pass an LV. Two formal and seven informal passing places are provided, however only the two formal passing places allow two HGVs to pass. An increase of up to 12 HGV trips per hour could lead to conflict with other HGVs.	High
133	Narrow two lane road ~ 2.7km long, 4.2 – 5m wide.	8	5	Whilst there are no passing places present, the road allows the passing of two LVs and a HGV to pass an LV. An increase of up to five HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
136	Two Lane Road ~ 0.9km long, 5.5m	8	5	The majority of the link allows the passing of two HGVs. An increase of up to five HGV trips per hour would be unlikely lead to conflict with other vehicles.	Negligible
137	Narrow two lane road ~ 1.8km long, 4.3 – 4.8m wide.	70	12	The road allows passing of LVs and a LV to pass a HGV. Whilst two informal passing places are provided, these do not allow two HGVs to pass. An increase of up to 12 HGV trips per hour could lead to conflict with other HGVs.	High
138	Narrow road ~ 1.4km long, 2.9 – 4.2m wide.	77	0	A majority of the road does not allow the passing of two LVs. Whilst four informal passing places are provided, these do not allow two LVs to pass. An increase of up to 7 LV trips per hour could lead to conflict when attempting to pass each other.	High
139	Narrow road ~ 3.1km long, 3 – 4.3m wide.	77	0	A proportion of the road does not allow the passing of two LVs. Three formal and 12 informal passing places are provided however, these do not allow the passing of two LVs. An increase of up to 84 LV trips per hour could lead to conflict when attempting to pass each other.	High
143	Narrow two lane road ~ 0.3km long, 4.9 – 5.3m wide.	104	8	The road allows passing of LVs and a HGV to pass an LV. Approximately 40% of the route allows two-way HGV movement. In addition, a formal passing place that allows two HGVs to pass is provided. An increase of up to eight HGV trips per hour could occasionally lead to conflict with other HGVs.	Low
144	Narrow one lane road ~ 0.3km long, 2.4m wide.	5	0	The road does not allow the passing of two LVs. An increase of up to five LV trips per hour could occasionally lead to conflict with other LVs.	Low

Link	Link Description	Peak hourly construction vehicle trips		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs		
146	Two lane road ~ 2.2km long, 4.6 – 6m wide.	35	0	The road allows passing of LVs and no HGV movements are proposed.	Negligible
147	One lane road ~ 0.9km long, 3.2m wide.	28	8	The road does not allow the passing of two LVs. An increase of up to 28 LV trips and eight HGV trips per hour could lead to conflict with other LVs.	High
148	One lane road ~ 0.9km long, 3.5 – 3.6m wide.	50	8	The road does not allow the passing of two LVs. An increase of up to 50 LV trips and eight HGV trips per hour could lead to conflict with other LVs.	High
149	One lane road ~ 0.8km long, 3m wide.	0	8	The road does not allow the passing of two HGVs. An increase of up to eight HGV trips per hour could potentially lead to conflict with other LVs.	Medium
152	Narrow road ~ 2.7km long, 3.6 – 4.5m wide.	53	7	A proportion of the road does not allow the passing of two LVs. Three formal and 10 informal passing places are provided, however these do not allow two HGVs to pass. An increase of up to 53 LV trips and seven HGV trips per hour would be unlikely to lead to conflict.	High
153	Narrow road ~ 1.9km long, 3.6 – 5.5m wide.	2	0	The road allows passing of LVs and no HGV movements are proposed.	Negligible

24.6.1.8.3 Impact Significance – SEP or DEP in Isolation

544. The sensitivity of each link is detailed in **Table 24-17** and **Figure 24.7**.

545. **Table 24-46** provides a summary of the sensitivity of each receptor, the magnitude of effect and overall significance of the driver delay (highway constraints) impact.

Table 24-46: Significance of Driver Delay (Highway Constraints) Impacts - SEP or DEP in Isolation

Links	Magnitude	Sensitivity	Impact Significance
68, 81, 136, 146 and 153	Negligible	High	**Minor Adverse**
62, 63, 66, 103, 110, 118, 131, 133, 143 and 144	Low		**Moderate Adverse**
7, 8, 10, 12, 50, 58, 60, 83, 99, 101, 117, 119 and 149	Medium		**Major Adverse**
61, 64, 82, 84, 90, 93, 102, 116, 132, 137-139, 147, 148 and 152	High		**Major Adverse**

24.6.1.8.4 Impact Significance – SEP and DEP Concurrently

546. The sensitivity of each link is detailed in **Table 24-17** and **Figure 24.7**.

547. **Table 24-47** provides a summary of the sensitivity of each receptor, the magnitude of effect and overall significance of the driver delay (highway constraints) impact.

Table 24-47: Significance of Driver Delay (Highway Constraints) Impacts - SEP and DEP Concurrently

Links	Magnitude	Sensitivity	Impact Significance
68, 81, 136, 146, and 153	Negligible	High	**Minor Adverse**
8, 62, 63, 66, 103, 110, 118, 131, 133, 143 and 144	Low		**Moderate Adverse**
7, 10, 12, 50, 60, 83, 99, 101, 117, 119 and 149	Medium		**Major Adverse**
61, 58, 64, 82, 84, 90, 93, 102, 116, 132, 137-139, 147, 148 and 152	High		**Major Adverse**

24.6.1.8.5 Mitigation– SEP and/or DEP all scenarios

548. **Table 24-46** and **Table 24-47** identifies that SEP and DEP' construction traffic could result in potentially significant impacts upon 37 of the 43 links identified to be of constrained width.

549. **Table 24-48** details mitigation measures that would be applied to reduce the potentially significant adverse driver delay (highway constraints) impacts.

Table 24-48: Potential Mitigation Measures for Driver Delay (Highway Constraints)

Links	Potential Mitigation Measures
7, 10, 12, 58, 60, 62, 66, 83, 99, 101,	The links are identified as wide enough to accommodate SEP and/or DEP increase in LV traffic but would not accommodate two-way HGV traffic. To accommodate the additional HGV traffic, either the existing passing places would be widened or new

Links	Potential Mitigation Measures
110, 117, 131, 132, 137, 143,	passing places provided to allow two HGVs to pass; or an escort vehicle would be used to guide HGVs along the link and hold back conflicting traffic.
8, 50, 63, 103, 118, 119, 133	The links are identified as wide enough to accommodate SEP and/or DEP increase in LV traffic but would not accommodate two-way HGV traffic. To accommodate the additional HGV traffic new passing places would be provided to allow two HGVs to pass or an escort vehicle would be used to guide HGVs along the link and hold back conflicting traffic.
64, 82, 84, 90, 93, 102, 116, 152	The links are identified as not being wide enough to allow two vehicles to pass. To accommodate the additional HGV traffic either the existing passing places would be widened to allow two HGVs to pass, or an escort vehicle would be used to guide HGVs along the link and hold back conflicting traffic. LV trips would also be reduced through either the scheduling of works to reduce peak employee demand or through the use of travel planning measures such as car-sharing and/or minibuses.
61, 147, 148, 149	The links are identified as not being wide enough to allow two vehicles to pass. To accommodate the additional HGV traffic either new passing places would be provided to allow two HGVs to pass, or an escort vehicle would be used to guide HGVs along the link and hold back conflicting traffic. LV trips would also be reduced through either the scheduling of works to reduce peak employee demand or through the use of travel planning measures such as car-sharing and/or minibuses.
138, 139, 144	The links are identified as not being wide enough to allow two vehicles to pass, however no HGV traffic is proposed to use these links. LV trips would be reduced through either the scheduling of works to reduce peak employee demand or through the use of travel planning measures such as car-sharing and/or minibuses.

550. Following the implementation of the proposed mitigation measures outlined in **Table 24-48**, the magnitude of effect is reduced to negligible on high sensitivity receptors resulting in a **minor adverse** residual impact.

551. The measures outlined in **Table 24-48** are captured within the OCTMP (document reference 9.16) and are intended to provide an indicative and proportionate means of mitigating the potential impacts. The final measures and details will be agreed with the NCC through the development of the CTMP prior to commencement of the authorised project.

24.6.1.9 Impact 7: Driver Delay (Road Closures)

552. During the main cable installation works, the onshore cable corridor would be installed across a number of minor public roads using open cut trenching techniques. Traffic signal controlled single lane ‘shuttle’ traffic management would be utilised during duct installation providing a safe working area is achievable within the highway envelope. Where this is not possible, it is proposed to close the road for a short period of time (up to two weeks).

553. Access for pedestrians and cyclists would be maintained at all times in both the single lane ‘shuttle’ traffic management scenario or in the event of a road closure.

24.6.1.9.1 Magnitude of Effect – SEP or DEP in Isolation

554. **Table 24-49** provides a summary of the magnitude of effect of all open-cut onshore cable corridor minor road crossings required during the main installation stage and including proposed traffic management measures. The initial assessment considers a worst-case scenario that a full road closure is required, i.e. a shuttle traffic management scenario is not implemented. The location of the proposed road closures and the associated diversion routes are highlighted in **Figure 24.5**.

555. In assessing the magnitude of effect, consideration has been given the additional delay drivers would experience if a road is closed and they need to divert, and also, if the closed road accommodates scheduled bus services.

Table 24-49: Road Closures Magnitude of Effect Assessment – SEP or DEP in Isolation

Crossing Location	Link ID	Crossing ID[1]	Footway/ Cycleway	Bus Route	Alternative Diversion Route ID[1]	Magnitude of Effect	Rationale
Rectory Road	102	RDX006	Yes	No	DR 004	Negligible	A suitable alternative route exists which would add three minute delay to travel times.
New Road	n/a	RDX007	No	No	DR 005	Low	A suitable alternative route exists which would add a six minute delay to travel times.
Gresham Road	n/a	RDX009	No	No	DR 007	Negligible	A suitable alternative route exists which would add a two minute delay to travel times.
Church Lane	61	RDX010	No	No	DR 008	Negligible	A suitable alternative route exists which would add a one minute delay to travel times.
Church Street	64	RDX012	No	Yes	DR 010	Low	A suitable alternative route exists which

Crossing Location	Link ID	Crossing ID[1]	Footway/ Cycleway	Bus Route	Alternative Diversion Route ID[1]	Magnitude of Effect	Rationale
							would add a three minute delay to travel times. However, the magnitude of this effect is increased noting the route is used by buses.
Unnamed Road	58	RDX013	No	No	DR 011	Negligible	A suitable alternative route exists which would add less than a one minute delay to travel times.
The Street	130	RDX014	No	No	DR 012	Negligible	A suitable alternative route exists which would add a two minute delay to travel times.
Unnamed Road	58	RDX015	No	No	DR 013	Low	A suitable alternative route exists which would add a five minute delay to travel times.
Unnamed Road	58	RDX016	No	No	DR 014	Low	A suitable alternative route

Crossing Location	Link ID	Crossing ID[1]	Footway/ Cycleway	Bus Route	Alternative Diversion Route ID[1]	Magnitude of Effect	Rationale
							exists which would add a five minute delay to travel times.
Birds Lane	n/a	RDX022	No	No	DR 019	Negligible	A suitable alternative route exists which would add a one minute delay to travel times.
Old Friendship Lane	n/a	RDX024	No	No	DR 020	Negligible	A suitable alternative route exists which would add a two minute delay to travel times.
Church Lane	140	RDX027	No	No	DR 023	Negligible	A suitable alternative route exists which would add a three minute delay to travel times.
Clay Lane	142	RDX028	No	No	DR 024	Negligible	A suitable alternative route exists which would add a three minute delay to travel times.

Crossing Location	Link ID	Crossing ID[1]	Footway/ Cycleway	Bus Route	Alternative Diversion Route ID[1]	Magnitude of Effect	Rationale
School Road	n/a	RDX029	No	No	DR 025	Negligible	A suitable alternative route exists which would reduce travel by one minute.
Reepham Road	69	RDX030	No	No	n/a	Negligible	A suitable alternative route exists which would add a three minute delay to travel times.
Felthorpe Road	n/a	RDX031	No	No	DR 026	Negligible	A suitable alternative route exists which would add a one minute delay to travel times.
Weston Road	148	RDX035	No	No	DR 028	Low	A suitable alternative route exists which would add a five minute delay to travel times.
Unnamed Road	93	RDX039	No	No	DR 031	Negligible	A suitable alternative route exists which would not

Crossing Location	Link ID	Crossing ID[1]	Footway/ Cycleway	Bus Route	Alternative Diversion Route ID[1]	Magnitude of Effect	Rationale
							increase delay to travel times.
Broom Lane	n/a	RDX040	No	No	DR 032	Negligible	A suitable alternative route exists which would reduce travel by one minute.
Burdock Lane	152	RDX044	No	Yes	DR 034	Negligible	A suitable alternative route exists which would reduce travel by one minute.
Skoyes Lane	n/a	RDX045	No	No	DR 035	Negligible	A suitable alternative route exists which would add a three minute delay to travel times.
Gowthorpe Lane	n/a	RDX052	No	No	DR 042	Low	A suitable alternative route exists which would add a six minute delay to travel times.

Notes:
1. Crossing ID locations and alternative diversion routes are shown in **Figure 24.5**.

24.6.1.9.2 Magnitude of Effect – SEP and DEP Concurrently

556. The assessment of magnitude of effect for the in isolation scenario (**Section 24.6.1.9.1**) considers the delay to drivers who may need to divert and if the diversion would impact upon a scheduled bus service. These parameters would not change for the SEP and DEP scenario. Furthermore, the SEP and DEP scenario would not result in a change in locations where the use of open-cut crossings would be proposed. No separate assessment of magnitude of effect and impact significance for the SEP and DEP scenario is therefore presented.

24.6.1.9.3 Impact Significance – all scenarios

557. **Table 24-50** provides a summary of the sensitivity of each receptor, the magnitude of effect and overall significance of the driver delay (highway constraints) impact.

Table 24-50: Significance of Driver Delay (Road Closures) Impacts – all scenarios

Crossing Location	Link ID	Crossing ID	Link Sensitivity	Magnitude of Effect	Impact Significance
Rectory Road	102	RDX006	High	Negligible	**Minor Adverse**
New Road	n/a	RDX007	Medium	Low	**Minor Adverse**
Gresham Road	n/a	RDX009	Low	Negligible	**Negligible**
Church Lane	61	RDX010	Medium	Negligible	**Minor Adverse**
Church Street	64	RDX012	High	Low	**Moderate Adverse**
Unnamed Road	58	RDX013	Low	Negligible	**Negligible**
The Street	130	RDX014	Low	Negligible	**Negligible**
Unnamed Road	58	RDX015	Low	Low	**Minor Adverse**
Unnamed Road	58	RDX016	Low	Low	**Minor Adverse**
Birds Lane	n/a	RDX022	Low	Negligible	**Negligible**
Old Friendship Lane	n/a	RDX024	Medium	Negligible	**Minor Adverse**
Church Lane	140	RDX027	Low	Negligible	**Negligible**
Clay Lane	142	RDX028	Low	Negligible	**Negligible**
School Road	n/a	RDX029	Low	Negligible	**Negligible**
Reepham Road	69	RDX030	Low	Negligible	**Negligible**
Felthorpe Road	n/a	RDX031	Low	Negligible	**Negligible**
Weston Road	148	RDX035	Low	Low	**Minor Adverse**
Unnamed Road	93	RDX039	Low	Negligible	**Negligible**
Broom Lane	n/a	RDX040	Low	Negligible	**Negligible**
Burdock Lane	152	RDX044	Low	Negligible	**Negligible**
Skoyes Lane	n/a	RDX035	Low	Negligible	**Negligible**
Gowthorpe Lane	n/a	RDX052	Low	Low	**Minor Adverse**

24.6.1.9.4 Mitigation – all scenarios

558. **Table 24-50** identifies that link 64 would experience moderate adverse impact as a result of a temporary road closure. The remaining 21 road closures are assessed to result in negligible to minor adverse impacts and are not assessed further.

559. The proposed diversion routes (depicted in **Figure 24.5**) and associated management measures for pedestrians and cyclists are captured within the OCTMP (document reference 9.16). The final diversion routes and timing of closures would be agreed with the NCC and NH through the development of the CTMP prior to commencement of the authorised project.

560. Link 64 (Cherry Tree Road / Church Street) is an unclassified single carriageway road that routes through Plumstead. A potentially significant impact is identified as a result of drivers being delayed by up to three minutes and the impact upon a scheduled bus services. A review of these services notes that they comprise of school bus services and a once weekly bus. Noting these considerations, the following mitigation measures could be employed to reduce the impacts upon users of link 64:

- Implementation of advanced signing to assist drivers in finding alternative routes.
- Ensuring that any road closures on nearby roads are staggered to minimise any cumulative traffic impacts within the same area.
- Ensuring all works would be undertaken during school holidays to minimise any impacts on school bus services.
- Liaising with bus operators to coordinate and facilitate bus routing amendments.

561. The measures outlined above are captured within the OCTMP (document reference 9.16) and are intended to provide an indicative and proportionate means of mitigating the potential impacts. The final measures and details with regards to timing of road closures will be agreed with the NCC through the development of the CTMP prior to commencement of the authorised project.

562. Following the implementation of the proposed mitigation measures in relation to road closures, the magnitude of effect is assessed as negligible on a receptor of high sensitivity resulting in a **minor adverse** residual impact.

24.6.2 Potential Impacts During Operation

563. No significant traffic impacts are anticipated during the O&M phase and as agreed with stakeholders through the EPP and as set out in the scoping opinion, no operational scenarios have been assessed within this traffic and transport impact assessment.

24.6.3 Potential Impacts During Decommissioning

564. No decision has been made regarding the final decommissioning policy for the onshore infrastructure, as it is recognised that industry best practice, rules and legislation change over time.

565. A full EIA will be carried out ahead of any decommissioning works being undertaken. The programme for decommissioning is expected to be similar in duration to the onshore construction phase. The detailed activities and methodology for decommissioning will be determined later within the project lifetime, in line with relevant policies at that time, but would be expected to include:

- Dismantling and removal of electrical equipment;
- Removal of cabling from site;

- Removal of any building services equipment;
- Demolition of the buildings and removal of fences; and
- Landscaping and reinstatement of the site.

566. The decommissioning methodology cannot be finalised until immediately prior to decommissioning but would be in line with relevant policy at that time.

567. Whilst details regarding the decommissioning of the onshore infrastructure are currently unknown, considering the worst-case scenario which would be the removal and reinstatement of the current land use at the site, it is anticipated that the impacts would be no worse than those assessed during construction.

24.7 Cumulative Impacts

568. **Section 24.4.4** details the assessment methodology adopted in this CIA.

24.7.1 Identification of Potential Cumulative Impacts

569. The first step in the cumulative assessment is the identification of which residual impacts assessed for SEP and/or DEP on their own have the potential for a cumulative impact with other plans, projects and activities (described as 'impact screening'). This information is set out in **Table 24-51** below. Only potential impacts assessed in **Section 24.6** as greater than negligible are included in the CIA (i.e. those assessed as 'negligible' are not taken forward as there is no potential for them to contribute to a cumulative impact).

570. It is noted in **Section 24.6** that assessed impacts are greatest for SEP and DEP concurrently (as opposed to SEP or DEP in isolation). Therefore, in order to present a proportionate CIA (and consider a worst-case scenario), traffic flows for SEP and DEP concurrently are used herein.

571. **Table 24-51** concludes that in relation to traffic and transport all identified environmental effects have the potential for cumulative impacts.

Table 24-51: Potential Cumulative Impacts (Impact Screening)

Impact	Potential for Cumulative Impact	Rationale
Construction		
Impact 1: Severance	Yes	Cumulative impacts are considered possible upon all screened in links due to the increase in traffic from the SEP and DEP. Links below GEART screening thresholds are not considered further within this CIA.
Impact 2: Amenity	Yes	
Impact 3: Pedestrian delay	No	The magnitude of effect for all screened links is assessed as negligible and therefore there is no potential for cumulative impacts to occur.

Impact	Potential for Cumulative Impact	Rationale
Impact 4: Road safety	Yes	Cumulative impacts are considered possible upon collision clusters C20, 21, 33 and 36 where the magnitude of effect is assessed as greater than negligible due to the increase in traffic from the SEP and DEP.
Impact 5: Driver delay (capacity)	Yes	*Sensitive junctions* Cumulative impacts are considered possible at junctions 1 and 7 where the magnitude of effect is greater than negligible.
		Sensitive links Cumulative impacts are considered possible at links 9, 11, 53, 54, 56 and 59 where the magnitude of effect is greater than negligible.
Impact 6: Driver delay (highway constraints)	Yes	Cumulative impacts are considered possible upon all links that are identified to be of constrained width.
Impact 7: Driver delay (road closures)	Yes	Cumulative impacts are considered possible upon all links that may need to be closed to install cables for SEP and DEP.
Operation		
Operational impacts were scoped out of the assessment in **Section 24.3.2.3** therefore there would be no cumulative operational impacts.		
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning programme will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be the same as those identified during the construction stage.		

24.7.2 Other Plans, Projects and Activities

572. The second step in the cumulative assessment is the identification of the other plans, projects and activities that may result in cumulative impacts for inclusion in the CIA (described as 'project screening').

573. The project screening has been informed by the development of a CIA Project List which forms an exhaustive list of plans, projects and activities relevant to SEP and DEP.

574. In order to provide a proportionate traffic and transport CIA, it was agreed with NCC and NH (at an ETG 3 on the 13/07/2021) that the following projects from the CIA Project List could act cumulatively with SEP and DEP:

- Wind Farm Schemes:
  - Norfolk Vanguard (NV) - an offshore wind farm;
  - Hornsea Project Three (HP3) - an offshore wind farm;
  - Norfolk Boreas (NB) - an offshore wind farm)
- Highway Schemes:
  - A47 North Tuddenham to Easton RIS - a highway improvement scheme;
  - A47 Blofield to North Burlingham RIS - a highway improvement scheme;
  - A47/A11 Thickthorn junction improvement RIS - a highway improvement scheme;
  - A47 Great Yarmouth - junction improvements; and
  - Norwich Western Link - a highway improvement scheme.

575. Different approaches on the cumulative assessment of wind farm schemes and highway schemes have been agreed with the NCC and NH as detailed in **Section 24.4.4** and are considered below.

24.7.3 Assessment of Cumulative Impacts (Highway Schemes)

576. Having established the residual impacts from SEP and DEP with the potential for a cumulative impact, along with the other relevant plans, projects and activities, the following sections provide an assessment of the level of impact that may arise from the highway schemes.

577. An overview of the latest forecast for the construction programmes for the highway schemes (based upon the latest publicly available information) is presented in **Table 24-16**. It can be identified from **Table 24-16** that the highway schemes are currently scheduled to be complete by 2025 and as such there may be no overlap with the construction phase of SEP and DEP, which is scheduled to commence summer 2025 (at the earliest).

578. At the ETG meeting (13/07/2021) with NCC and NH, it was agreed that potential cumulative impacts between the construction phases of the highway schemes plus SEP and DEP could therefore be managed through the respective CTMPs. On this basis, no further assessment is presented in this chapter.

579. NH have however requested the CIA consider the potential for cumulative impacts from SEP and DEP upon the operational capacity of the three constructed RIS schemes.

580. **Table 24-52** details the cumulative assessment of the three RIS schemes.

Table 24-52: Cumulative Assessment of RIS Highway Schemes

Scheme	Description	Cumulative Assessment
A47 North Tuddenham to Easton Dualling (NH, 2021)	NH are proposing to upgrade the A47 between North Tuddenham and Easton in Norfolk to a dual carriageway. This will complete the dual carriageway between Norwich and Dereham and NH project that the works would be completed by 2025. NH identify that the objectives of the proposed A47 North Tuddenham to Easton Dualling scheme are to support economic growth by reducing congestion related delay, improve overall journey time reliability and increase the overall capacity for future traffic growth. The scheme is also proposed to provide a safe and reliable network and also a more free-flowing network. NH identify that the scheme would result in an increase in the overall traffic flows across the extents of the scheme by up to 85% in 2025 (opening year) and 145% in 2040 (design year).	It is noted that one of the main objectives of the proposed A47 North Tuddenham to Easton Dualling scheme is to increase the capacity of the A47 to accommodate future traffic growth. It is forecast that within the extents of the scheme (links 86, 89, 94 and 95) there would be an increase in traffic (when compared to current future year traffic flows without the scheme) as a result of SEP and DEP of up to 4%. A change in traffic of up to 4% is significantly within day-to-day fluctuations in traffic flows. The basis of design of the proposed A47 North Tuddenham to Easton Dualling scheme is to accommodate future traffic growth of up to 140% by 2040 and 85% by 2025. It is therefore evident that a temporary increase in traffic of up to 4% between 2025 and 2027 can be accommodated within the design capacity of the A47 dualling scheme. On the basis of the above, SEP and DEP is considered to have a negligible impact upon the future capacity of the A47 North Tuddenham to Easton Dualling scheme.

A47 Blofield to North Burlingham (NH 2020)	NH are proposing to upgrade the A47 between Blofield and North Burlingham to dual carriageway to ease congestion and support economic growth in the area. NH project that works would be completed by 2025. NH identify that the objectives of the proposed A47 Blofield to North Burlingham scheme are to support economic growth by reducing congestion related delay, improving overall journey time reliability and capacity. The scheme is also proposed to provide a safe and reliable network and also a more free-flowing network. NH identify that the scheme is forecast to increase the overall traffic flows across the extents of the scheme by up to 22% in 2025 and 29% in 2040.	It is noted that one of the main objectives of the proposed A47 Blofield to North Burlingham scheme is to increase the capacity of the A47 to accommodate future traffic growth. It is forecast that within the extents of the scheme (link 33) there would be an increase in traffic (when compared to current future year traffic flows without the scheme) as a result of SEP and DEP of up to 2%. A change in traffic of up to 2% is significantly within day-to-day fluctuations in traffic flows. The basis of design of the proposed A47 Blofield to North Burlingham scheme is to accommodate future traffic growth of up to 29% by 2040 and 22% by 2025. It is therefore evident that a temporary increase in traffic of up to 2% between 2025 and 2027 can be accommodated within the design capacity of the scheme. On the basis of the above, SEP and DEP is considered to have a negligible cumulative impact upon the future capacity of the A47 Blofield to North Burlingham scheme.
A47 - A11 Thickthorn Junction (NH, 2021)	NH are proposing to improve the junction between the A47 and the A11 by adding two new link roads to ease congestion in the area. NH project that the works would be completed by 2025.	It is noted that one of the main objectives of the proposed A47 - A11 Thickthorn Junction scheme is to increase the capacity. It is forecast that within the extents of the scheme (links 105, 112, 114 and 121) there would be an increase in traffic (when compared to current future year traffic flows without the scheme) as a result of SEP and DEP of up to 2%. A change in traffic of up to 2% is significantly within day-to-day fluctuations in traffic flows.

	NH identify that the objectives of the proposed A47 - A11 Thickthorn Junction scheme are to reduce congestion related delay, improve journey time reliability and increase the overall capacity of the A47. The scheme is also proposed to provide a safe and reliable network and also a more free-flowing network. NH identify that the scheme is forecast to increase the overall traffic flows across the extents of the scheme by up to 14% in 2025 and 25% in 2040. However, due to the construction of the new link roads, traffic flows through the existing Thickthorn junction will be reduced by up 27% in 2025 and 17% in 2040.	The basis of design of the proposed A47 - A11 Thickthorn Junction scheme is to accommodate future traffic growth of up to 14% by 2040 and 25% by 2025. It is therefore evident that a temporary increase in traffic of up to 2% between 2025 and 2027 can be accommodated within the design capacity of the scheme. Furthermore, the existing junction will see a reduction in total traffic flows of up to 27% in 2035 providing capacity to accommodate a temporary increase in SEP and DEP traffic. On the basis of the above, SEP and DEP is considered to have a negligible cumulative impact upon the future capacity of the proposed A47 - A11 Thickthorn Junction scheme.

581. It can be identified from **Table 24-52** that changes in total traffic from SEP and/or DEP would have a negligible impact on the highway schemes. Therefore, by definition, these negligible impacts would not give rise to a significant cumulative impact.

24.7.4 Assessment of Cumulative Impacts (Wind Farm Schemes)

582. Having established the residual impacts from SEP and DEP, the following sections provide an assessment of the level of cumulative impact that may arise from the wind farm schemes.

583. As detailed in **Section 24.7.2**, this cumulative assessment considers the NV and HP3 wind farm schemes. **Table 24-16** identifies that there could be a degree of overlap of NV and HP3 with the construction of SEP and DEP. **Table 24-53** details the traffic count sources for the wind Farm schemes.

Table 24-53: Traffic Data Sources for Offshore Wind Farms

Project	Data Source
NV	Outline Construction Traffic Management Plan (Vattenfall, 2019)
HP3	Outline Construction Traffic Management Plan (Orsted, 2019)

584. This CIA excludes links where the primary assessment of the respective schemes has identified the respective increase in traffic flows to be negligible.

585. **Table 24-54** summarises the assigned daily peak trips associated with the pertinent cumulative links of SEP and DEP plus NV and HP3.

586. Full details of the cumulative traffic flows for all links are provided in **Appendix 24.4.**

Table 24-54: Cumulative Assessment Link Screening

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		SEP and DEP Concurrently		NV		HP3		Percentage Increase (Background + SEP and DEP + NV +HP3)	
					Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs	All	HGVs
2	A148 from A149 to A1065	Medium	8,658	662	481	340	756	721	-	-	14%	160%
3	A148 from A1065 to A1067	Low	16,241	978	456	340	747	671	-	-	7%	103%
4	A148 from A1067 to B1149	Low	9,530	508	371	262	463	414	295	156	12%	agreed cap
5	A148 from B1149 to Hamstead Road	Low	14,272	497	448	186	491	420	205	122	8%	146%
6	A148 from Hemsetad Road to Bridge Road	Low	14,272	497	324	169	491	420	205	122	7%	143%
9	The Street	High	3,621	55	257	92	-	-	210	77	13%	306%
11	A149 from Weybourne to Weybourne Road	Medium	5,023	34	239	108	-	-	210	77	9%	536%
15	A140 - Roughton	Low	5,929	516	291	169	356	344	-	-	11%	100%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		SEP and DEP Concurrently		NV		HP3		Percentage Increase (Background + SEP and DEP + NV +HP3)	
					Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs	All	HGVs
16	A149 - North Walsham	Medium	9,241	378	203	169	468	311	-	-	7%	127%
19	A149 from Kidas Way to Honning Road	Low	7,368	382	203	169	358	244	-	-	8%	108%
20	A149 from B1159 to Station Road	Low	9,647	543	194	169	340	294	-	-	6%	85%
21	A149 from Station Road to A1064	Medium	11,556	486	194	169	338	294	-	-	5%	95%
23	A149 from Yarmouth Road to B1141	High	21,008	619	169	169	300	294	-	-	2%	75%
24	A149 from B1141 to A47	Medium	36,217	1,097	668	668	938	932	-	-	4%	146%
26	A12 from Williams Adams Way to B1385	Medium	27,224	919	411	336	725	721	-	-	4%	115%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		SEP and DEP Concurrently		NV		HP3		Percentage Increase (Background + SEP and DEP + NV +HP3)	
					Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs	All	HGVs
28	A12 from A1117 to Mill Road	Medium	10,109	672	336	336	723	721	-	-	10%	157%
29	A12 from Mill Road to B1384 / A1145 from B1384 to A146	Medium	11,761	446	401	401	319	312	-	-	6%	160%
30	A146 from A47 to A1145	Medium	19,940	870	1,024	401	340	312	114	20	7%	84%
34	A47 from A1064 to A12	Low	23,220	1,438	759	603	679	639	-	-	6%	86%
43	A140 from Cawston Road to A1270	Medium	15,175	632	552	206	-	-	431	149	6%	56%
47	A1270 from Drayton Lane to A140	Low	11,865	760	1,025	283	402	335	380	104	15%	95%
52	B1145 from	Low	4,366	357	212	179	180	331	81	-	11%	143%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		SEP and DEP Concurrently		NV		HP3		Percentage Increase (Background + SEP and DEP + NV +HP3)	
					Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs	All	HGVs
	B1149 to A140											
53	B1145 from Old Friendship Ln to B1149	Medium	3,660	134	121	54	266	112	370	127	21%	Agreed cap
54	B1149 from Spink's Lane to B1145	Low	5,264	305	594	212	390	235	-	-	19%	147%
59	B1149 from A148 to B1354	Medium	4,776	182	370	169	180	140	394	162	20%	Agreed cap
80	A1067 from A148 to Marl Hill Road	Low	8,068	479	279	139	579	431	157	85	13%	137%
90	Taverham Road	Low	220	13	246	102	-	-	140	68	175%	1,275%
126	Aylsham Road	Low	5,264	305	562	206	-	-	394	162	18%	121%
129	A47 from A140 to A146	Low	10,209	794	928	359	-	-	570	159	15%	65%
131	The Street	Low	2,051	58	100	54	176	96	248	118	26%	462%

Link ID	Link Description	Link Sensitivity	Background 2025 flows (24hr AADT)		SEP and DEP Concurrently		NV		HP3		Percentage Increase (Background + SEP and DEP + NV +HP3)	
					Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)		Peak 2025 flows (24hr AADT)			
			All	HGVs	All	HGVs	All	HGVs	All	HGVs	All	HGVs
132	Buxton Road / Easton Way	Medium	1,020	94	135	115	-	-	162	66	29%	194%
143	Old Fakenham Road	Low	1,689	27	285	77	-	-	65	31	21%	404%
	Capped Cumulative Flows (with HP3) as identified within the Norfolk Vanguard Outline Construction Traffic Management Plan (Vattenfall, 2019)											

587. **Table 24-54** identifies that there are established cumulative capped flows on Links 4, 53 and 59 between NV and HP3. SEP and DEP would therefore comply with these agreed caps. Details of how SEP and DEP will comply with these cumulative caps is provided within the OCTMP (document reference 9.16).

588. The remaining 30 links are considered further for each of the potential cumulative impacts detailed in **Table 24-51**.

24.7.4.1 Cumulative Impact 1: Severance

589. Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. **Section 24.4.3.1.1** provides full details on the adopted impact assessment methodology for severance.

24.7.4.1.1 Magnitude of Effect

590. **Table 24-55** provides a summary of the severance magnitude of effect for each of the screened links detailed in **Table 24-54**.

Table 24-55: Magnitude of Cumulative Severance Effects

Links	Magnitude of Effect	Rationale for Magnitude
2, 3, 4, 5, 6, 9, 11, 15, 16, 19, 20, 21, 23, 24, 26, 28, 29, 30, 34, 43, 47, 52, 53, 54, 59, 80, 90, 128, 129, 131, 132, 143	Negligible	The peak daily change in cumulative traffic flow is less than 30%
90	High	The peak daily change in total traffic flow is above 90%

24.7.4.1.2 Impact Significance

591. The sensitivity of each link is detailed in **Table 24-17** and **Figure 24.7**.

592. **Table 24-56** provides a summary of the sensitivity of each receptor, the magnitude of effect and an initial evaluation of the significance of the severance impact.

Table 24-56: Significance of Cumulative Severance Impacts

Links	Magnitude of Effect	Sensitivity	Impact Significance
2, 3, 4, 5, 6, 9, 11, 15, 16, 19, 20, 21, 23, 24, 26, 28, 29, 30, 34, 43, 47, 52, 53, 54, 59, 80, 128, 129, 131, 132, 143	Negligible	Low – High	Negligible – Minor Adverse
90	High	Low	Moderate Adverse

593. **Table 24-56** identifies that link 90 could potentially experience significant impacts and is therefore assessed further. **Table 24-54** summarise the forecast background daily traffic flows in 2025 in the TTSA and assigned daily peak vehicle trips associated with the construction of SEP and DEP, NV, and HP3.

594. Link 90 could experience total traffic flows (i.e. background, plus SEP and DEP and HP3) of up to 606 vehicles per day which is significantly less than the LA112 threshold (4,000 vehicles per day) and the magnitude of effect is therefore revised to low. It is assessed that a low magnitude of effect on a low sensitive receptor could result in **minor adverse** cumulative impact.

24.7.4.1.3 Mitigation

595. Noting that the cumulative severance impacts are assessed as no greater than minor adverse for all screened links, no further mitigation beyond that embedded within the design of SEP and DEP is considered necessary for construction.

24.7.4.2 Cumulative Impact 2: Amenity

596. Amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width and separation from traffic. It can impact a range of non-motorised users such as pedestrians, cyclists and equestrians. **Section 24.4.3.1.2** provides full details on the adopted impact assessment methodology for amenity.

24.7.4.2.1 Magnitude of Effect

597. **Table 24-57** provides an initial assessment of the magnitude of amenity impact for each of the screened links detailed in **Table 24-54**.

598. To establish the context for the magnitude of assessment, reference is made to Norfolk Roads Hierarchy Plan (NCC, 2017).

599. In the UK, a 'functional road hierarchy' was established in its current form in the 1960s to provide for the efficient movement of motor vehicles on the highway network having regard to all user groups (ref. Guidance on Road Classification and the Primary Route Network, 2012, DfT). Utilising statutory powers, NCC has interpreted DfT direction at local level and this is captured in the Norfolk Roads Hierarchy Plan.

600. A functional hierarchy informs policies relating to maintenance, spatial planning and traffic management and is a clear indicator of the scale and type of user groups likely to being using a highway link. The pedestrian amenity magnitude of effect assessment has therefore been informed by the scale of traffic increase in context with the function of the discreet highway link under consideration (as defined by the Norfolk Roads Hierarchy Plan).

Table 24-57: Magnitude of Cumulative Amenity Effects

Links	Magnitude of Effect	Rationale for Magnitude
20, 21, 23, 30, 34, 43, 47, 129	Negligible	The change in cumulative traffic flows (or HGV component) is less than 100%

Links	Magnitude of Effect	Rationale for Magnitude
2, 3, 5, 6, 15, 16, 19, 24, 26, 28, 29, 80.	Low	The peak change in cumulative HGV flows is between 100% and 200%. The links however, are all 'A' roads and are defined in the Norfolk Roads Hierarchy Plan as Primary Roads, Principal Roads and Main Distributor Roads.
52 and 54	Low	The peak change in cumulative HGV flows is between 100% and 150%. The links are however, B roads and are defined in the Norfolk Roads Hierarchy Plan as Distributor Roads.
126	Low	Link 126 is a local link, however the peak change in cumulative HGV flows is just over 100% at, 121%.
9, 11, 90, 131, 132, 143	High	The peak change in cumulative HGV flows is greater than 150% and the links are local links.

24.7.4.2.2 Impact Significance

601. The sensitivity of each link is detailed in **Table 24-17** and **Figure 24.7**.

602. **Table 24-58** provides a summary of the sensitivity of each receptor, the magnitude of effect and an initial evaluation of the significance of the severance impact.

Table 24-58: Significance of Cumulative Amenity Impacts

Links	Magnitude of Effect	Sensitivity	Impact Significance
20, 21, 23, 30, 34, 43, 47, 129	Negligible	Low – High	Negligible – Minor Adverse
2, 16, 24, 26, 28, 29	Low	Medium	Minor Adverse
3, 5, 6, 15, 19, 52, 54, 80, 126	Low	Low	Minor Adverse
90, 131, 143	High	Low	Moderate Adverse
132	High	Medium	Major Adverse
9 and 11	High	High	Major Adverse

603. **Table 24-58** identifies that links 9, 11, 90, 131, 132, and 143 could potentially experience significant adverse cumulative amenity impacts.

24.7.4.2.3 Mitigation

604. The primary assessment for SEP and DEP (**Section 24.6.1.2**) identifies significant amenity impacts are forecast on link 9, 11 and 132 and mitigation measures are proposed for SEP and DEP to ensure peak daily HGV demand not to exceed the forecast average daily HGV demand. These mitigation measures ensure that residual magnitude of change would be negligible and therefore no cumulative impacts are forecast.

605. With regard to links 90, 131 and 143 cumulative traffic flows from SEP and DEP plus HP3 would be capped to not exceed those peak levels assessed in the primary assessment for SEP and DEP (**Section 24.6.1.3**).

606. This capping of cumulative traffic flows would be achieved through liaison with HP3 to establish their potential forward programme for deliveries via these links. Where potential exceedances of the caps are identified, the Contractor for SEP and DEP would reschedule deliveries to ensure the cumulative caps are not exceeded. The proposed approach to manage potential cumulative amenity impacts upon links 90, 132, and 143 is captured within the OCTMP (document reference 9.16).

24.7.4.3 Cumulative Impact 4: Road Safety

607. **Section 24.5.4** identified 37 collision clusters within the TTSA. These sites are considered to be potentially sensitive to changes in traffic and have been assessed further in **Section 24.6** to understand the potential impacts of SEP and DEP on road safety.

608. The primary assessment for SEP and DEP (**Section 24.6**) identified that the magnitude of effect is assessed as greater than negligible due to the increase in traffic from the SEP and DEP at four of the 37 collision clusters, namely clusters C20, 21, 33 and 36.

609. **Table 24-59** presents an analysis of the cumulative traffic flows (taken from **Table 24-54**) through these clusters to understand the potential for cumulative impacts.

Table 24-59: Significance of Cumulative Road Safety Impacts

Link	Cluster Reference	Description	SEP and DEP peak % Increase		Cumulative % Increase		Summary
			All	HGVs	All	HGVs	
85/ 86/ 89	C36	A47 junction with Wood Lane	3% - 12%	20% - 38%	4% - 12%	28% - 39%	The primary assessment for SEP and DEP identified proposed highway improvements by NH and considered that these would be appropriate to mitigate the existing road safety issues. The primary assessment identified that an increase in total traffic of up to 12% is assessed to represent a low magnitude of effect on a low sensitivity receptor resulting in a negligible impact. Noting that there would be no material change in total traffic resulting from a cumulative projects traffic, the residual impact is assessed to remain as negligible.
87	C33	A47	5%	30%	5%	30%	No increase in traffic is forecast through cluster 33 from HP3 or NV.
89/ 90/ 94	C20	A47 junction with Taverham Road	3% - 128%	20% - 1,027%	3% - 191%	20% - 1,537%	The primary assessment for SEP and DEP identified proposed highway improvements by HN and considered that these would be appropriate to mitigate the existing road safety issues. The primary assessment identified that an increase in total traffic on the A47 of up to 3% would lead to a negligible magnitude of effect, whilst the change in total traffic of up to 128% of Taverham Road could result in a high magnitude of effect. A negligible to high magnitude of effect on a receptor of negligible sensitivity was assessed to result in a negligible to minor adverse impact. The proposed change in traffic flows on the A47 would not materially change as a result of the cumulative projects and therefore the magnitude of effect would remain as negligible. The proposed change in traffic on Taverham Road would increase from a peak of 128% to 191%, the magnitude of effect would remain high on a receptor of negligible sensitivity. The residual cumulative impact is therefore assessed to remain as minor adverse.

Link	Cluster Reference	Description	SEP and DEP peak % Increase		Cumulative % Increase		Summary
			All	HGVs	All	HGVs	
93/ 94/ 95	C21	A47 roundabout with Dereham Road	2% - 59%	13% - 121%	2% - 59%	13% - 121%	No increase in traffic is forecast through cluster 21 from HP3 or NV.

24.7.4.4 Cumulative Impact 5: Driver Delay (Capacity)

24.7.4.4.1.1 Sensitive Junctions

610. **Section 24.4.3.2.4** identified 11 junctions within the TTSA that NH considered to be potentially sensitive to changes in traffic and have been assessed further in **Section 24.6** to understand the potential impacts of SEP and DEP on driver delay (capacity).

611. The primary assessment for SEP and DEP (**Section 24.6**) identified that the magnitude of effect is assessed as greater than negligible due to the increase in traffic from the SEP and DEP at two of the 11 junctions, namely junctions 1 and 7.

612. The primary assessment for SEP and DEP identifies that NH are however proposing to remove both junction 1 and 7 as part of the A47 North Tuddenham to Easton improvement scheme. This scheme would remove these existing junctions providing new grade separated junctions on the A47. The improvement works are proposed to be complete by 2024/2025 and should therefore be in place prior to the commencement of SEP and DEP (scheduled to start in 2025 at the earliest). The residual impact of SEP and DEP traffic would therefore be assessed as negligible and no cumulative impacts would be forecast.

613. However, should the improvement works not be implemented prior to the commencement of construction of SEP and DEP, the OCTMP (document reference 9.16) sets out a range of potential mitigation measures to ensure impacts are not significant. In defining the potential mitigation measures that may be required, the OCTMP outlines that updated junction capacity modelling will be undertaken and that this will include consideration of cumulative traffic flows.

614. It is considered that this approach will ensure that cumulative impacts are negligible.

24.7.4.4.1.2 Sensitive Links

615. **Section 24.4.3.2.4** identified 59 links within the TTSA that NCC considered to be potentially sensitive to changes in traffic and have been assessed further in **Section 24.6** to understand the potential impacts of SEP and DEP on driver delay (capacity).

616. The primary assessment for SEP and DEP (**Section 24.6**) identified that the magnitude of effect is assessed as greater than negligible due to the increase in traffic from the SEP and DEP at 13 links, namely links 9, 11, 14, 15, 49, 51, 54, 56, 59, 72, 73, 79 and 98.

617. The primary assessment outlines mitigation measures for links 9, 11, 14 and 15 to reduce the HGV trips to average levels, and therefore the magnitude of effect to negligible. It is therefore assessed that the application of mitigation measures by SEP and DEP would result in no significant cumulative impacts.

618. Links 49, 51, 54, 56 and 59 comprise of the B1149 between the A148 (Holt) to the north and Horsford to the south. The primary assessment identifies that to manage the potential for cumulative impacts between Norfolk Vanguard and Hornsea Project Three, a cap was agreed with NCC for daily HGV trips along the B1149 (Norfolk Vanguard Outline Construction Traffic Management Plan (Vattenfall, 2019)).

619. This cap limits daily HGV trips along the B1149 to 289 HGV trips per day. The OCTMP (document reference 9.16) outlines how SEP and DEP will comply with this target.

620. It is assessed that compliance with the agreed cap would ensure that residual cumulative impacts along the B1149 are no greater than **minor adverse**.

621. The primary assessment outlines mitigation measures for links 72, 73, 79 and 98 to cap trips via these links at levels where the magnitude of effect is assessed as negligible. It is therefore assessed that the application of mitigation measures by SEP and DEP would result in no significant cumulative impacts.

24.7.4.5 Cumulative Impact 5: Driver Delay (Highways Constraints)

622. For this effect, an evaluation has been undertaken of where the highway network within the TTSA is of constrained width to prevent two HGVs from passing (therefore leading to delays associated within waiting and manoeuvring). A review of all links has been undertaken to identify these links, defined as roads less than 5.5m wide.

24.7.4.5.1 Magnitude of Effect

623. The primary assessment has identified that a total of 43 links are of constrained width. Of these 43 links, four may also be required to accommodate cumulative traffic trips from HP3 and NV. Further details are provided in **Appendix 24.4**.

624. **Table 24-60** provides a summary of the forecast peak cumulative hourly traffic flows that could be experienced on each of the four links from the respective projects.

625. In order to calculate peak hour flows, the sourced total daily HGV flows for NV and HP3 have been assumed to occur over 10 hours and all non HGV flows (employee movements) assumed to occur for two hours, i.e. all employees would arrive and depart within one hour.

626. For example, HP3 identify a peak of 140 vehicle trips per day to link 90 of which 68 trips are noted to be HGVs. Peak hour HGV flows are therefore calculated by dividing 68 by 10. Peak hour employee flows are calculated by deducting 68 HGV trips from the total 140 vehicles trips per day and dividing the remaining 72 trips by two.

Table 24-60: Cumulative Highway Constraints Magnitude of Effect Assessment

Link	Link Description	SEP and DEP Peak hourly construction flows		HP3 Peak hourly construction flows		NV Peak hourly construction flows		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs	LVs	HGVs	LVs	HGVs		
90	One lane road ~ 1.64m long, 2.5 -3m wide.	72	14	36	7	0	0	The existing road allows passing of LVs and one formal and one informal passing place is provided, however these do not allow two HGVs to pass. SEP and DEP propose to either widen the existing passing places to allow two HGVs to pass or use an escort vehicle to guide HGVs along the link. LV trips would also be reduced through either the scheduling of works to reduce peak employee demand or through the use of travel planning measures such as car-sharing and/or minibuses. HP3 also propose a series of highway improvements and mitigation measures to the link which include the installation of a single, 35m long passing bay on Taverham Road to the north of the bridge above the River Tun and give way priority system (Orsted, 2019).	Negligible
131	Narrow two lane road ~ 1km long, 4.5 – 4.8m wide.	23	6	65	12	40	10	The existing road allows passing of LVs and an HGV to pass an LV. Three formal passing places are provided, however only one allows two HGVs to pass. SEP and/or DEP propose to either widen the existing passing places to allow two HGVs to pass or use an escort vehicle to guide HGVs along the link. NV (Vattenfall, 2019) and HP3 (Orsted, 2019) also propose a series of highway improvements and mitigation measures to the link which include up to eight	Negligible

Link	Link Description	SEP and DEP Peak hourly construction flows		HP3 Peak hourly construction flows		NV Peak hourly construction flows		Rationale for Magnitude	Magnitude of effect
		LVs	HGVs	LVs	HGVs	LVs	HGVs		
								passing places along The Street for HGV opposing traffic (using Grasscrete paving) resulting in an overall carriageway width of 6.0m and the widening of The Street near Dorking farm access. In addition, NV has committed to not routing HGV construction traffic along Oulton Street north of the junction between The Street and Heydon Road. (Vattenfall, 2019)	
132	Narrow two lane road ~ 1.8km long, 4.6 – 5.3m wide.	10	12	48	7	0	0	The existing road allows passing of LVs and a HGV to pass an LV. Two formal and seven informal passing places are provided, however only the two formal passing places allow two HGVs to pass. SEP and/or DEP propose to either widen the existing passing places to allow two HGVs to pass or use an escort vehicle to guide HGVs along the link. No mitigation measures are identified by HP3.	Negligible
143	Narrow two lane road ~ 0.3km long, 4.9 – 5.3m wide.	104	8	17	4	0	0	The existing road allows passing of LVs and a HGV to pass an LV. Approximately 40% of the route allows two-way HGV movement. In addition, a formal passing place that allows two HGVs to pass is provided. SEP and/or DEP propose to either widen the existing passing places to allow two HGVs to pass or use an escort vehicle to guide HGVs along the link. No mitigation measures are identified by HP3.	Negligible

24.7.4.5.2 Impact Significance

627. The sensitivity of each link is detailed in **Table 24-17** and **Figure 24.7**.

628. **Table 24-60** identifies that links 90, 131, 132 and 143 would all experience negligible magnitudes of effect on high sensitive receptors. The cumulative impacts are therefore assessed as **minor adverse** significance.

629. Notwithstanding, the OCTMP (document reference 9.16) contains a commitment to liaison with HP3 and NV to co-ordinate the implementation of mitigation measures (such as passing places) to ensure timely delivery, reduce abortive work and minimise delays to highway users.

24.7.4.6 Cumulative Impact 7: Driver Delay (Road Closures)

630. During the main cable installation works, the onshore cable corridor would need to be installed, using open cut trenching techniques, across 22 minor public roads.

631. **Appendix 24.4** outlines that no HP3 or NV traffic is forecast along these roads, therefore no cumulative driver delay (road closure) impacts are forecast.

24.8 Transboundary Impacts

632. There are no transboundary impacts with regard to traffic and transport as the onshore infrastructure is within the UK and is not located near to any international boundaries. Transboundary impacts are therefore scoped out of the assessment and are not considered further.

24.9 Inter-relationships

633. In order to address the environmental impact of the project as a whole, this section establishes the inter-relationships between traffic and transport and other physical, environmental and human receptors. The objective is to identify where the accumulation of impacts on a single receptor, and the relationship between those impacts, may give rise to a need for additional mitigation. **Table 24-61** summarises the inter-relationships that are considered of relevance to traffic and transport and identifies where they have been considered within this ES.

Table 24-61: Traffic and Transport Inter-relationships

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Construction			
Impact 1: Severance	**Chapter 27 Socio-Economics and Tourism**	**Section 24.6.1.2**	Traffic associated with construction may impact the local demography.
Impact 2: Amenity	**Chapter 27 Socio-Economics and Tourism**	**Section 24.6.1.3**	Traffic associated with construction may impact the local demography.
Impact 3: Pedestrian Delay	**Chapter 27 Socio-Economics and Tourism**	**Section 24.6.1.4**	Traffic associated with construction may impact the local demography.

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Impact 4: Road Safety	**Chapter 27 Socio-Economics and Tourism**	**Section 24.6.1.4**	Traffic associated with construction may impact the local demography.
Impact 5 - 7: Driver Delay	**Chapter 22 Air Quality**	**Section 24.6.1.7** **Section 24.6.1.8** **Section 24.6.1.9**	Traffic has the potential to temporarily affect air quality and impact upon local residents.
	Chapter 23 Noise and Vibration		Increased traffic has the potential to increase noise disturbance temporarily.
	Chapter 28 Health		Traffic associated with construction may generate localised dust emissions leading to potential complaints.

634. The potential for inter-related human health impacts is assessed further in **Chapter 28 Health**.

24.10 Interactions

635. The impacts identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between impacts are presented in **Table 24-62**. This provides a screening tool for which impacts have the potential to interact.

636. Impacts 1, 2 and 3 are considered to be closely related and **Table 24-11** identifies that traffic would impact upon similar receptor groups (pedestrians, cyclists and equestrians). Therefore, the maximum forecast impact for Impacts 1,2 or 3 would not be exceeded due to interactions. However, there is potential for Impacts 1,2 and 3 to collectively interact with Impact 4 (road safety). **Table 24-62** identifies this interaction.

637. **Table 24-62** also identifies that impacts 5, 6 and 7 are also considered to be closely related and have potential interactions to increase driver delay significance.

638. **Appendix 24.5** contains a detailed assessment of the identified interactions (Impacts 1, 2, 3 + 4 and Impacts 5, 6 and 7) and concludes that that there are no significant inter-related impacts from the construction of SEP and/or DEP on traffic and transport.

Table 24-62: Interaction between Impacts - Screening

Potential Interaction between Impacts							
Construction							
	Impact 1: Severance	**Impact 2**: Amenity	**Impact 3**: Pedestrian Delay	**Impact 4**: Road Safety	**Impact 5**: Driver Delay (Capacity)	**Impact 6**: Driver Delay (Highway Constraints)	**Impact 7**: Driver Delay (Road Closures)
Impact 1: Severance	-	Yes	Yes	Yes	No	No	No
Impact 2: Amenity	Yes	-	Yes	Yes	No	No	No
Impact 3: Pedestrian Delay	Yes	Yes	-	Yes	No	No	No
Impact 4: Road Safety	Yes	Yes	Yes	-	No	No	No
Impact 5: Driver Delay (Capacity)	No	No	No	No	-	Yes	Yes
Impact 6: Driver Delay (Highway Constraints)	No	No	No	No	Yes	-	Yes
Impact 7: Driver Delay (Road Closures)	No	No	No	No	Yes	Yes	-
Operation							
No significant impacts.							
Decommissioning							
No final decision has yet been made regarding the final decommissioning policy for SEP and DEP infrastructure including landfall, onshore cable corridor and onshore substation. It is also recognised that legislation and industry best practice change over time. However, it is likely that SEP and DEP equipment, including the cable, will be removed, reused or recycled where possible, with the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that, for the purposes of a worst-case scenario, the impacts will be no greater than those identified for the construction phase.							

24.11 Potential Monitoring Requirements

639. The OCTMP (document reference 9.16) provides details of the proposed approach to monitoring of traffic movements associated with SEP and DEP. In summary, these include commitments to monitoring and reporting of:

- Vehicle numbers against agreed targets;
- Transgressions of HGVs from routes;
- Accidents and near misses;
- Highway condition; and
- Complaints.

24.12 Assessment Summary

640. This chapter has assessed the potential impacts of the onshore infrastructure of SEP and DEP on the surrounding traffic sensitive receptors.

641. This chapter has been developed with regard to the legislative and policy framework outlined in **section 24.4.1** and further informed by consultation with NCC and NH.

642. Traffic demand has been forecast applying a first principles approach to generate traffic volumes from an understanding of material quantities and personnel numbers. This traffic demand has been assigned to access locations serving the onshore development area applying a package of embedded mitigation to minimise the magnitude of effects.

643. In accordance with national guidance, a TTSA has been identified, baseline conditions established and sensitive receptors within the TTSA identified. The TTSA area was screened to identify routes that could be potentially adversely impacted by the SEP and DEP traffic generation.

644. A total of 140 highway links, 37 cluster sites, 11 sensitive junctions within the TTSA have been assessed for the effects of amenity, severance, pedestrian delay, road safety and driver delay. With the application of additional mitigation measures (as appropriate) the residual impact upon all receptors was assessed to be not significant.

645. This detailed assessment concluded that no residual moderate or major adverse impacts would arise, with all impacts being of either minor adverse or negligible as shown in **Table 24-63**.

Table 24-63: Summary of Potential Impacts on Traffic and Transport

Potential impact	Project	Receptor	Magnitude	Sensitivity	Pre-Mitigation Impact	Mitigation Measures Proposed	Residual Impact	Cumulative Residual Impact
Construction								
Impact 1: Severance	SEP or DEP in Isolation	**Links (various)**	Negligible - Medium	Low - High	**Negligible – Moderate Adverse**	• Peak daily HGV demand not to exceed the forecast average daily HGV demand. • Peak Hour LV demand not to exceed the forecast average peak hour demand.	**Negligible - Maximum Minor Adverse**	**Negligible - Maximum Minor Adverse**
	SEP and DEP Concurrently	**Links (various)**	Negligible - Medium	Low - High	**Negligible – Moderate Adverse**	• Peak daily HGV demand not to exceed the forecast average daily HGV demand.	**Negligible – Minor Adverse**	**Negligible - Maximum Minor Adverse**

Potential impact	Project	Receptor	Magnitude	Sensitivity	Pre-Mitigation Impact	Mitigation Measures Proposed	Residual Impact	Cumulative Residual Impact
						• Peak Hour LV demand not to exceed the forecast average peak hour demand.		
Impact 2: Amenity	SEP or DEP in Isolation	**Links (various)**	Negligible - High		**Negligible – Moderate Adverse**	• Peak daily HGV demand not to exceed the forecast average daily HGV demand.	**Negligible – Minor Adverse**	**Negligible – Minor Adverse**
	SEP and DEP Concurrently	**Links (various)**	Negligible - High	Low - High	**Negligible – Major Adverse**	• Peak daily HGV demand not to exceed the forecast average daily HGV demand.	**Negligible – Minor Adverse**	**Negligible – Minor Adverse**

Potential impact	Project	Receptor	Magnitude	Sensitivity	Pre-Mitigation Impact	Mitigation Measures Proposed	Residual Impact	Cumulative Residual Impact
						• Peak daily HGV demand not to exceed the forecast average daily HGV demand. • Peak Hour LV demand not to exceed the forecast average peak hour demand. • Peak Hour LV demand not to exceed the forecast average peak hour demand.		
Impact 3: Pedestrian Delay	SEP or DEP in Isolation	**Links (various)**	Negligible	Low – High	**Negligible – Minor Adverse**	n/a	**Negligible – Minor Adverse**	**Negligible – Minor Adverse**
Impact 3: Pedestrian Delay	SEP and DEP Concurrently	**Links (various)**	Negligible	Low – High	**Negligible – Minor Adverse**	n/a	**Negligible – Minor Adverse**	**Negligible – Minor Adverse**

Potential impact	Project	Receptor	Magnitude	Sensitivity	Pre-Mitigation Impact	Mitigation Measures Proposed	Residual Impact	Cumulative Residual Impact
Impact 4: Road Safety	SEP and/ or DEP	**Cluster Sites (various)**	Negligible - High	Low - High	**Negligible – Moderate Adverse**	• Provision of 'Slow Down", "Layby Ahead" and "Vehicles Turning" signage	**Negligible – Minor Adverse**	**Negligible – Minor Adverse**
Impact 5: Driver Delay (Capacity)	SEP or DEP in Isolation	**Sensitive Links and Junctions (various)**	Negligible - High	Low – High	**Negligible – Moderate Adverse**	• Peak Hour LV demand not to exceed the forecast average peak hour demand. • HGV demand to be capped on certain links.	**Negligible – Minor Adverse**	**Negligible – Minor Adverse**
Impact 5: Driver Delay (Capacity)	SEP and DEP Concurently	**Sensitive Links and Junctions (various)**	Negligible - High	Low – High	**Negligible – Moderate Adverse**	• Peak Hour LV demand not to exceed the forecast average peak hour demand.	**Negligible – Minor Adverse**	**Negligible – Minor Adverse**

Potential impact	Project	Receptor	Magnitude	Sensitivity	Pre-Mitigation Impact	Mitigation Measures Proposed	Residual Impact	Cumulative Residual Impact
						• HGV demand to be capped on certain links.		
Impact 6: Driver Delay (Highway Constraints)	SEP and/or DEP	**Links** (various)	Negligible - High	High	**Minor - Major Adverse**	A range of mitigation measures are proposed, including: • Widening of passing places; • Providing new passing places; • Use of an escort vehicle to guid HGVs; and/or • Reduction in peak LV trips.	**Minor Adverse**	**Negligible – Minor Adverse**
Impact 7: Driver Delay	SEP and/or DEP	**Crossing Locations** (various)	Low - High	Negligible - Low	**Negligible – Moderate Adverse**	A range of mitigation measures are	**Negligible - Minor Adverse**	**Negligible – Minor Adverse**

Potential impact	Project	Receptor	Magnitude	Sensitivity	Pre-Mitigation Impact	Mitigation Measures Proposed	Residual Impact	Cumulative Residual Impact
(Road Closures)						proposed, including: • Advanced signing. • Staggering of closures. • Working during school holidays. • Liaising with bus operators.		
Operation								
No significant impacts								
Decommissioning								
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning programme will be provided. As such, impacts during the decommissioning stage are assumed to be the same as those identified during the construction stage.								

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