REPORT

Boston Alternative Energy Facility – Environmental Statement

Chapter 19 Traffic and Transport

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Executive Summary

The Boston Alternative Energy Facility (the 'Facility') is proposed to be located at Riverside Industrial Estate, Boston, Lincolnshire. The Riverside Industrial Estate is adjacent to the tidal River Witham (known as 'The Haven') and down-river from the Port of Boston.

The construction, operation and decommissioning of the proposed Facility has the potential to result in Traffic and Transport impacts for the effects of pedestrian severance, pedestrian amenity, road safety and driver delay.

An assessment has been undertaken in conformance with recognised environmental guidelines and in accordance with relevant national, regional and local policy to inform the Environment Statement (ES) of the significance of potential effects.

The assessment provides a review of the existing traffic and transport baseline within the defined study area and has been informed through, desktop studies, site visits, consultation with stakeholders and on-site surveys.

The Facility's traffic demand has been calculated using material and personnel information supplied by industry expertise. During construction, a peak worst case traffic demand scenario and average worst case scenario has been established and assigned to the highway network.

Where appropriate, mitigation has been proposed to reduce the significance of moderate and major effects (most notably it is proposed to divert traffic away from the A52 Liquorpond Street during peak construction). Mitigation measures will be secured through commitments contained in an Outline Construction Traffic Management Plan (OCTMP) (document reference 7.2) has been submitted in support of the Development Consent Order (DCO) application.

For the construction phase of the Facility, the assessment concludes predicted residual effects of:

- **negligible** to **minor adverse** for the effects of pedestrian severance and pedestrian amenity; and
- **minor adverse** for effects of road safety and driver delay.

Commitments are contained within an OCTMP to reduce the effects on driver delay associated with single occupancy vehicle travel with measures designed to increase more sustainable forms of travel.

The operational traffic demand was also determined and assessed with input from industry expertise. The operational phase assessment concludes a predicted residual effect of **negligible** to **minor adverse** for the effects of pedestrian severance, pedestrian amenity, road safety and driver delay.

Impacts during decommissioning are assumed to be no worse to those predicted for the construction phase.

The projects that could cumulatively impact with the Facility through spatial or temporal overlaps have been identified and assessed. Two cumulative projects: The Battery Energy Storage Plant and the Viking Link Interconnector UK Onshore Scheme, were assessed in further detail. A commitment for the Facility to liaise with the cumulative projects would be provided within the OCTMP to reduce the effects of peak construction Heavy Goods Vehicle (HGV) movements that may potentially occur between cumulative projects.

19 Traffic and Transport

19.1 Introduction

19.1.1 This chapter of the Environmental Statement (ES) describes the existing environment in relation to Traffic and Transport and details the assessment of the potential effects during the construction, operational and decommissioning phases of the proposed Boston Alternative Energy Facility (herein 'the Facility'). Mitigation measures are detailed, and a discussion of the residual effects provided where significant effects are identified.

19.1.2 The assessment also considers cumulative impacts of existing and proposed projects. The proposed methodology adhered to for the ES and Cumulative Impact Assessment (CIA) is discussed in **Section 19.9**.

19.1.3 It should be noted that the Facility also has the potential for wider traffic and transport impacts, which are discussed at length in other chapters within this ES. The relevant chapters are:

- **Chapter 10 Noise and Vibration**; and
- **Chapter 14 Air Quality**.

19.1.4 This chapter is supported by six appendices:

- **Appendix 19.1 Boston Waste Transfer Station Summary**;
- **Appendix 19.2 Personal Injury Collision Location Plan**;
- **Appendix 19.3 Transport Assignment on Indicative Construction Programme**;
- **Appendix 19.4 2021 and 2025 Background Forecast Traffic Flows**;
- **Appendix 19.5 Junction Modelling Matrices**; and
- **Appendix 19.6 Junction Modelling Outputs**.

19.1.5 This chapter has been prepared in accordance with the requirements set out in the National Policy Statements (NPSs) for Energy (EN-1) and Renewable Energy Infrastructure (EN-3) (see below).

19.2 Legislation, Policy and Guidance

Legislation

19.2.1 The traffic and transport assessment will be predominantly governed by the

statutory framework provided by the Highways Act 1980 which directs the management and operation of the road network in England and Wales.

19.2.2 The Traffic Management Act (TMA) was introduced in 2004 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 authorities and will be a key determinate in highway authority review of impacts.

Policy

19.2.3 This section sets out the salient traffic and transport national and local policy that has informed the development of the ES and identifies how the application has been shaped by the policy referenced.

National Policy Statements (NPSs)

19.2.4 The assessment of potential traffic and transport impacts has been made with specific reference to the NPSs. NPSs set out policies or circumstances that the UK Government consider should be taken into account in decisions on Nationally Significant Infrastructure Projects (NSIP). Those relevant to the Facility are:

- Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change (DECC, 2011a); and
- NPS for Renewable Energy Infrastructure (EN-3) (DECC, 2011b).

Table 19-1 NPS Assessment Requirements

NPS Requirement	NPS reference	ES Response
EN-1 Overarching NPS for Energy		
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 (NATA) / Transport Analysis Guidance (WebTAG) methodology stipulated in Department for Transport (DfT) guidance, or any successor to such methodology.	Section 5.13.3	The chapter has been produced in accordance with current Department for Transport (DfT) transport guidance. Full details are provided in **Section 19.2** and guidance is referenced throughout the chapter.
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	The ES chapter outlines potential mitigation measures, such as car-share and Heavy Goods Vehicle (HGV) controls. Specific mitigation for Public Right of Way (PRoW) impacts has been identified and detailed in **Section 19.7**. These parameters will be secured

NPS Requirement	NPS reference	ES Response
		in an Outline Construction Traffic Management Plan (OCTMP) (document reference 7.2) which will be submitted as part of the DCO application.
EN-3 for Renewable Energy Infrastructure		
Biomass or EfW generating stations are likely to generate considerable transport movements. For example, a biomass or EfW plant that uses 500,000 tonnes of fuel per annum might require a large number of heavy goods vehicle (HGV) movements per day to import the fuel. There will also be residues which will need to be regularly transported off site.	Section 2.5.24	The Facility is located next to the Haven with proposals to construct a wharf to take deliveries of Refuse Derived Fuel (RDF) by barge during the operational phase. This is considered 'embedded mitigation' and as a result would remove the majority of equivalent Heavy Goods Vehicle (HGV) movements off the highway network during operation. The feedstock for the Facility is to be transported by water during the operational phase.
Government policy encourages multi-modal transport and the IPC should expect materials (fuel and residues) to be transported by water or rail routes where possible. (See Section 5.13 of EN-1 on transport impacts). Applicants should locate new biomass or waste combustion generating stations in the vicinity of existing transport routes wherever possible. Although there may in some instances be environmental advantages to rail or water transport, whether such methods are viable is likely to be determined by the economics of the scheme. Road transport may be required to connect the site to the rail network, waterway or port. Therefore, any application should incorporate suitable access leading off from the main highway network. If the existing access is inadequate and the applicant has proposed new infrastructure, the IPC will need to be satisfied that the impacts of the new infrastructure are acceptable as set out in Section 5.13 of EN-1.	Section 2.5.25	

National Planning Policy Framework (2019)

19.2.5 The National Planning Policy Framework (NPPF) was published in July 2018 (subsequently updated in February 2019) by the Ministry of Housing, Communities and Local Government (MHCLG) and is the primary source of national planning guidance in England. The NPPF contains the UK Government's strategies for economic, social and environmental planning policies in England and it is designed to be a single, tightly focused document.

19.2.1 The NPPF has no formal standing in the DCO process. Notwithstanding this, the NPPF is deemed to be a material consideration and has 'set the approach' for the development of the ES.

19.2.2 At the heart of the NPPF (Paragraph 11) is a *"presumption in favour of sustainable development",* which for decision making means:

> *"c) Approving development proposals that accord with an up-to-date development plan without delay; or*
> *d) Where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:*
> *I. the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or*
> *II. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."*

19.2.3 Under the heading 'Promoting Sustainable Transport' paragraphs 102 and 103 of the NPPF requires the planning system to actively manage patterns of growth to address the potential impacts of development on transport networks.

19.2.4 Paragraph 109 of the NPPF states that "development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."

19.2.5 Paragraph 111 of the NPPF states that "all developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed." This chapter provides the required level of technical detail that would be contained within a standalone 'Transport Assessment'.

Local Planning Policy

19.2.6 EN-1 states that the Planning Inspectorate will also consider Development Plan Documents or other documents in the Local Development Framework relevant to its decision making. Notwithstanding this, where there is a conflict between local policy and the NPS, the NPS requirements would take precedence.

19.2.7 The Facility's Traffic and Transport Study Area (henceforth known as the 'Study Area' falls under the jurisdiction of Lincolnshire County Council (LCC) as the local highway authority and Boston Borough Council (BBC) as the local planning authority (LPA).

19.2.8 **Table 19-2** provides details of the local planning policy documents and the

policies contained within these which are pertinent to traffic and transport.

Table 19-2 Pertinent Local Planning Policies

Policy	Section/Policy Reference and Summary of Relevant Policies
South-East Lincolnshire Joint Strategic Planning Committee (BBC, South Holland District Council and LCC)	
South-East Lincolnshire Local Plan 2011 - 2036 Adopted March 2019	Policy 2: Development Management Proposals requiring planning permission for development will be permitted provided that sustainable development considerations are met, specifically in relation to: • access and vehicle generation levels. Policy 33: Delivering a More Sustainable Transport Network • To achieve this the following priorities and actions have been identified including; ○ Working with the Local Highway authority to mitigate against congestion at pinch points and continuing to manage roads under its control. ○ Securing the delivery of new local access roads to open up allocations and other locations for development. ○ Protecting existing footpaths, cycle routes and public rights of way from development. ○ Ensuring that major new developments provide for walking and cycling routes and/or links to existing networks to key public transport corridors and to transport interchanges. To demonstrate compliance with this policy, a Transport Assessment and associated Travel Plan should be submitted with proposals.
LCC	
4th Lincolnshire Local Transport Plan (2013/14- 2022/23) Adopted in April 2013	The Local Transport Plan Objectives are to: • Assist the sustainable economic growth of Lincolnshire, and the wider region, through improvements to the transport network; • Improve access to employment and key services by widening travel choices, especially for those without access to a car; • Make travel for all modes safer and, in particular, reduce the number and severity of road casualties; • Maintain the transport system to standards which allow safe and efficient movement of people and goods; • Protect and enhance the built and natural environment of the county by reducing the adverse impacts of traffic, including HGVs; • Improve the quality of public spaces for residents, workers and visitors by creating a safe, attractive and accessible environment; • Improve the quality of life and health of residents and visitors by encouraging active travel and tackling air quality and noise problems; and • Minimise carbon emissions from transport across the county.
Lincolnshire Network Management Plan April 2018	LCC's key aims to facilitate the objectives of the Network Management Plan are: • Safeguarding the quality and effectiveness of highways as the major transport network; • Developing a consistent and appropriate implementation of

Policy	Section/Policy Reference and Summary of Relevant Policies
	regulations. Fairly balancing the legitimate needs of road users and works promoters of all types; • Identifying and promoting good practice to all aspects of traffic and works co-ordination; • Maintaining an attitude of co-operation and pursuit of efficiency of operation of works, whilst remaining mindful of regulatory responsibilities; • Managing the road network and maintaining quality with reduced budgets through use of innovative partnerships; • Contribute to minimising carbon emissions from transport across the county; and • Investing in Infrastructure and Provision of Services.
BBC	
Boston Transport Strategy 2016 – 2036 Published 2006	The vision for the Boston Transport Strategy is: "The Transport Strategy will support a prosperous town with an attractive and safe environment and a high quality of life for all helping to make Boston a great place to live, work and visit." The aims of the Boston Transport Strategy considered pertinent to the project are to: • Reduce car usage for journeys wholly within Boston; • Reduce delays for traffic on the A52/A16 corridor with safe facilities for vulnerable users; • Improve public transport provision; • Improve road safety for pedestrians and cyclists, especially near schools; • Improve air quality in the designated AQMA; and • Improve cycling and pedestrian management in the town centre.

19.2.9 These policy objectives have informed the assessment outcomes for both the construction and operational phase of the Facility as set out in **Section 19.7**.

Guidance

Guidelines for the Environmental Assessment of Road Traffic

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

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

19.2.12 The GEART is the current guidance for producing an EIA compliant ES Traffic and Transport Chapter and is augmented by transport specific guidance to provide advice on technical input. **Section 19.4** of this chapter contains full details of how the guidance has been applied.

DfT Transport Assessment Guidance and Successors

19.2.13 The DfT Transport Assessment guidance referred to in NPS EN-1, was withdrawn in October 2014 and was replaced with the Department for Communities and Local Government (DCLG) (now MHCLG) Planning Practice Guidance (PPG). For assessing the Facility's impact, the relevant PPG is 'Travel Plans, Transport Assessment and Statements' (henceforth referred to as the Transport PPG).

19.2.14 The Transport PPG sets out the key principles to be adopted when developing a Transport Assessment to ensure that the assessment is:

- 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;
- 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
- Developed through collaborative ongoing working between the local planning authority/transport authority, transport operators, rail network operators, Highways Agency (now Highways England) where there may be implications for the strategic road network and other relevant bodies.

19.2.15 The Transport PPG key principles have shaped the development of the ES and can be seen throughout the document.

19.3 Consultation

19.3.1 Consultation undertaken throughout the pre-application phase informed the approach and the information provided in this chapter. A summary of the consultation of particular relevance to traffic and transport is detailed in **Table 19-3**.

Table 19-3 Consultation and Responses

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
Planning Inspectorate Scoping Opinion, July 2018	The Scoping Report states that an alternative access point will be provided from Marsh Road via Bittern Way. The ES should confirm whether this route would be used and assess the impacts associated. Cross references should be made to the air quality assessment chapter.	The access point and the corresponding connecting private road linking Marsh Lane via Bittern Way is already provided (by a planning consent not linked to this application). **Section 19.6** details the potential impacts on all links within the defined study area.
	The Scoping Report states that the Macmillan Way will require a permanent diversion. The ES should assess any likely significant effects associated with this proposal. Cross reference should be made to the socio-economic assessment with respect to tourism.	PRoW impacts are discussed in **Section 19.6** including any potential mitigation strategies. Tourism aspects are provided in **Chapter 20 Socio-Economics**
	Very little information has been provided regarding whether traffic modelling will be undertaken and what data would be used to undertake such modelling. The ES should describe the numbers and types of traffic movements associated with the construction and operation of the Proposed Development. The ES should also include details of the routes for construction vehicles and assess the associated significant effects.	**Section 19.5** provides details of the study area including data sources used to inform the baseline environment. **Section 19.6** provides a detailed audit of the existing environment. Traffic derivation is discussed in **Section 19.6.37** including results of junction modelling and potential mitigation strategies.
	The Scoping Report states that the Proposed Development may impact on equestrians but does not provide further detail. The ES should ensure that any user groups likely to experience significant effects as a result of the Proposed Development are assessed.	**Section 19.6.37** details the potential impacts on all affected road users and associated mitigation strategies.
	The ES should provide information regarding the anticipated transport routes which will be used to transport materials to and from the Proposed Development during construction and operation. The ES should explain if road closures will be required during construction phase and assess the impacts where significant effects are likely to occur.	**Section 19.5** provides details of the defined study area including clearly defined delivery routes. **Section 19.6** details the potential impacts including mitigation strategies
	The Scoping Report does not describe what	Traffic derivation for

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
	happens to material which is received but cannot be used by the facility. The ES should explain what contrary material is, how much is anticipated to be derived and how it would be removed from the Proposed Development. The assessment should include details relating to how many additional HGV or ship movements will result from these arisings.	operation is discussed in **Section 19.6** including the 'first principals' approach to material derivation and subsequent traffic demand. Potential mitigation strategies are discussed.
	The ES should explain the Study Area used for the assessment. The Study Area should be shown on a supporting plan contained within the ES.	**Section 19.5** provides details of the study area. The study area is illustrated in **Figure 19.2**.
Lincolnshire County Council, Formal Consultation meeting, 1st March 2019	Discussions on the Public Rights of Way where certain sections will require closure. Details of diversion routes and mitigation measures discussed including potential improvements.	PRoW impacts are discussed in **Section 19.6** including potential mitigation strategies.
Natural England (pers. Comm. Email 27th March 2019)	Discussions on the route of the England Coast Path where certain sections will require closure and diversion along existing public rights of way. Details of diversion routes and mitigation measures discussed including potential improvements	PRoW impacts are discussed in **Section 19.6** including potential mitigation strategies.
Section 42 Consultation Response – Lincolnshire County Council, 1st August 2019	Lincolnshire County Council (LCC) noted that the current bankside route is a pleasant off-road route overlooking the river and will be substituted for an industrialised route with few redeeming characteristics. Further detail will be required on the management of the point where paths 14/11 and 14/9 cross access points for vehicle within the site. LCC further noted that the Boston 14/4 and 14/5 are also recorded in the report to the Secretary of State for the English Coast Path although this stretch (Sutton Bridge to Skegness) has not yet been confirmed. Further advice will be required to be sought from Natural England.	PRoW impacts are discussed in **Section 19.6.37** including potential mitigation strategies. The permanent closures have been discussed and agreed with LCC; and Natural England.
	LCC noted that the two footpath links (14/4 and 14/5) are also utilised as part of the Macmillan Way long distance path and contact should be made with the operating organisation.	Macmillan Trust were contacted and consulted on the footpath strategy. No response was received.

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
	LCC noted that the greatest number of vehicle movements would be during the construction phase, and at times this will be 24 hours working. The more significant impacts of the peak movements may be capable of being mitigated through the proposed Construction Traffic Management. The Construction Traffic Management Document should be included in the Environmental Statement.	The OCTMP included with the DCO application will set out the standards and procedures for managing the impact of HGV traffic during the construction period.
	LCC noted that the appointed engineers' proposal to operate a park and ride scheme that could reduce traffic impact on parts of the highway network closest to the site. However, if the pick-up and drop-off points are within the town, this practice could in fact result in increased vehicular activity in parts of the town that are already experiencing peak period congestion and could result in town centre car parking spaces being occupied by the vehicles of those working on the proposed facility, rather than those who actually work in town. To be truly effective, this detail would need to be carefully designed.	Based on comments received from Lincolnshire County Council and additional information received from the Principal Contractor, a revised construction employee parking strategy has been proposed as set out in **Section 19.7**. There will be no park and ride scheme. Further details on traffic derivation is discussed in **Section 19.6.37** including mitigation strategies. Within the OCTMP, the outline travel plan sets out how construction employee traffic would be managed and controlled.
	LCC noted that the most significant mitigation in transportation terms comes from the fact that, once operational, the facility's feedstock and the majority of the residual material following processing would be transported by sea via the proposed new wharf. The advised vehicle movements associated with the transportation of 'waste' material that would not be removed from the site by ship would be expected to be accommodated on the existing road network. Some of that material would in fact be destined for units on the adjacent Riverside industrial area.	Traffic derivation is discussed in **Section 19.6**.

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
Section 42 Consultation Response - Boston Borough Council (BBC), 6th August 2019	BBC noted the lack of information relating to the traffic management plan both for the construction period and clarity of site operations means that a detailed assessment cannot yet be assessed.	The OCTMP included with the DCO application will set out the standards and procedures for managing the impact of HGV traffic during the construction period.
	A number of comments were raised by BBC in respect having all options for traffic routes for construction traffic and operational service traffic examined as part of the process including the options for construction a new construction/operational access road BBC have stated that they cannot support the ideas unless there is a clear mitigation of that impact on residents through a different route into the Facility site to reduce the impact of traffic movements on residential amenity.	**Section 19.5** provides details of the study area. The study area is illustrated in **Figure 19.2**. The assessment of impact of the Facility's traffic demand in the construction phase and operational phase on Link 1 and 2 (Marsh Lane) determines there is no requirement for a new construction/ operational access road. Full details are contained in **Section 19.7**
	Traffic impact, the extent of machinery and equipment to be transported to the site and whether new roads will be required. Will there be a requirement for night working and how will impact on residents and wildlife be mitigated?	**Section 19.6** provides details of Abnormal Indivisible Loads (AIL) required for construction of the Facility. **Section 19.6** also provides details on the requirement for 24-hour working.
	The construction process is proposed to take up to four years, generate up to 300 construction jobs and give rise to construction work six days a week. However, there is no information as to how this traffic management will impact on local residents and business, in addition to the wider road network impact. We believe there should be detailed consideration of an access road for the purpose of construction traffic to mitigate the impact of such heavy construction traffic on the community. We believe that this provides an opportunity to work with our colleagues at the	Traffic derivation is discussed in **Section 19.6** including associated mitigation strategies. The assessment of impact of the Facility's traffic demand in the construction phase and operational phase on Link 1 and 2 (Marsh Lane) determines there is no requirement for

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
	County Council is terms of how this might be upgraded to provide a permanent road to reduce ongoing impact of the use of the site once fully operational.	a new construction/ operational access road. Full details are contained in **Section 19.7**.
	BBC are mindful that Boston has two AQMAs in operation and we are concerned not to have received the detail in relation to traffic movements for both construction and operation that would enable the Council to fully assess the potential impact, including shipping traffic and how this may be mitigated. We require detailed traffic assessment information before the project progresses further to the next stage.	The traffic flow data presented in this chapter has been used to inform the **Chapter 14 Air Quality** Assessment. **Chapter 14** includes a detailed dispersion modelling assessment of the impacts associated with traffic generated by the Facility.
	BBC note that one of the by-products will be aggregate. To lower the carbon footprint, by reducing haulage of this product, and provide additional employment opportunities and to further support the local economy, BBC suggest provision, at the design stage, to enable local distribution of aggregate products direct to local markets via road.	The revised scheme design of the Facility involves the removal of manufactured aggregate by ship, thus removal of aggregate by road does not form part of the scope of the current Transport Assessment.
	BBC note that ferrous and non-ferrous metals will be removed, collected in separate skips and sent for processing off-site - what traffic movements are these expected to generate and what end use might these have?	The Facilities design updates post PEIR has significantly reduced the amount of metals that require removal. Details of traffic movements associated with metals are discussed in **Section 19.6.37**
Section 42 Consultation Response – Natural England, 6th August 2019	Natural England (NE) note that at paragraph 19.7.58 the diversion of the England Coast Path is covered which is described as a minor adverse effect. We would wish to confirm if the England Coast Path project team has been consulted or is aware of this diversion.	The England Coast Path team at Natural England has been consulted on the diversion routes.
Section 42 Consultation Response – North East Lincolnshire Council	The North East Lincolnshire Highways Development Control team were consulted and have requested that they be given an opportunity to review the Transport Assessment and Construction Traffic Management Plan, or documents similar entitled, on behalf of the North East Lincolnshire Council Local Planning Authority. This is in order to assess any impacts, if any, to the North East Lincolnshire borough as a result of the proposed development. As such we would request that we be consulted during the Development Consent Order Process with this further information.	All DCO documentation will be readily available on the Planning Inspectorate website. Relevant stakeholders will be contacted when documentation has been uploaded.

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
Boston Borough Council, Lincolnshire County Council - 25th September 2019	Round table meeting to discuss traffic and transport for the proposed scheme including potential impacts to sensitive junctions, delays to waste and recycling servicing vehicles and consideration of mitigation measures.	Traffic derivation is discussed in **Section 19.6.37**. **Section 19.6.37** includes a full junction capacity/delay assessment on the four identified sensitive junctions within the study area.

19.4 Assessment Methodology

19.4.1 This section describes the assessment methodology, including data collation, effects and impact assessment criteria that were used in the traffic and transport assessment.

Impact Assessment Methodology

19.4.2 The criteria for determining the significance of effects is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the effects. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential effects. The terms used to define sensitivity and magnitude are adopted from GEART.

Sensitive Receptors

19.4.3 GEART identifies that it is useful to identify particular groups or locations which may be sensitive to changes in traffic conditions and provides a checklist of sensitive locations and groups; however, the list is not exhaustive and can be added to by the assessor. Sensitive locations include:

- Hospitals;
- Churches;
- Schools;
- Tourist attractions, including historical buildings;
- Open spaces and recreational sites;
- Shopping areas;
- Residential areas; and
- Sites of ecological/nature conservation value.

19.4.4 Sensitive groups include:

- Children;
- The elderly;
- The disabled; and
- People walking and cycling.

Receptor Susceptibility to Changes in Traffic

19.4.5 GEART notes that

> *"The perception of changes in traffic by humans, and the impact of traffic changes on various ecological systems will also vary according to such factors as:*
> - *Existing traffic levels;*
> - *The location of traffic movements;*
> - *The time of day;*
> - *Temporal and seasonal variation in traffic;*
> - *Design and layout of the road;*
> - *Land-use activities adjacent to the route; and*
> - *Ambient conditions of adjacent land-uses."*

19.4.6 A desktop exercise augmented by site observations has been undertaken to identify the main sensitive receptors in the study area.

19.4.7 The highway network within the study area has been divided up into discrete lengths (links) reflecting the highway/spatial character. The sensitive receptors within the study area have been assigned to the nearest highway link, and the relationship with the highway environment has been examined to understand the sensitivity of those receptors to change.

19.4.8 The sensitivity of a road (link) can be defined by the type of user groups who may use it, e.g. the elderly or children and the level of protection afforded to them by the existing highway network. A sensitive area may be a village environment or areas of high pedestrian or cyclist activity, for example, near a school.

19.4.9 The link sensitivity has been determined by the concentration of sensitive receptors and the highway environment. For example, pedestrians are less sensitive to changes in traffic if there are adequate footways and crossing facilities. However, links where there will be high concentrations of sensitive

locations (such as hospitals and schools) are likely to be highly sensitive to changes in traffic flow unless there is separation from traffic.

19.4.10 **Table 19-4** sets out broad definitions of the different sensitivity levels which have been applied to the assessment.

Table 19-4 Link Based Sensitive Receptors

Link Sensitivity	Link Characteristics
Negligible	Links that fall below GEART Rule 1 and 2 screening thresholds.
Low	Few sensitive receptors and/or highway environment can accommodate changes in volumes of traffic.
Medium	A low concentration of sensitive receptors (e.g. residential dwellings, pedestrian desire lines, etc.) and limited separation from traffic provided by the highway environment. Junctions approaching or at capacity.
High	High concentrations of sensitive receptors (e.g. hospitals, schools, areas with high tourist footfall etc.) and limited separation provided by the highway environment. Defined Collision Cluster (four personal injury collisions occurring in a five year period in a 50m radius). Junctions with negative spare capacity.

19.4.11 All links within the Study Area have been assessed and assigned link sensitivity. The sensitivity of the links is detailed in **Table 19-5** and illustrated in **Figure 19.3**

Table 19-5 Link Sensitivity

Link	Description	Link sensitivity	Rationale for link sensitivity
1	Marsh Lane	Low	Industrial area with minimal residential development.
2	Marsh Lane	Medium	Public House, wide road with footway provision.
3	A16	Low	A modern 'A' road with no frontage development, designed to carry high quantities of traffic.
4	A16	Low	A modern 'A' road with non-frontage development, designed to carry high quantities of traffic.
5	A16 (Spalding Road)	Low	A modern 'A' road with no frontage development, designed to carry high quantities of traffic. Access to industrial areas; no frontage development.
6	A52 (Liquorpond Street)	High	Main 'A' road with direct frontage development (residential properties and shops) with little separation from the road.
7	A16 (John Adams Way)	Medium	Main 'A' road fronted by residential properties with little separation from the road, high quantities of traffic.
8	B1397 (London Road)	High	Direct frontage development and a church along the road with minimal separation from traffic. Cycle links line the road, leading to a school.

Link	Description	Link sensitivity	Rationale for link sensitivity
9	Wyberton Low Road	High	Residential area with narrow carriageway and on street parking, leading to a school.
10	Nursery Road	Low	Industrial area.
11	Marsh Lane	Low	Industrial area.
12	Bittern Way	Low	Industrial area.

Scale of Assessment

19.4.12 To develop a proportional assessment, the following rules, taken from the GEART, have been used:

- 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 other specifically sensitive areas where traffic flows (or HGV component) are predicted to increase by 10% or more.

19.4.13 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".*

19.4.14 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 taken further in this traffic and transport assessment.

19.4.15 The exception to the GEART Rule 1 and 2 is the consideration of the effects of driver delay and road safety. These effects can be potentially significant for lower changes in traffic flow.

Assessment of Impacts

19.4.16 Having applied the screening exercise to narrow down the study area to only those links that have the potential to experience a significant effect, it is necessary to establish the significance of any effect. The methodology achieves this by

quantifying the 'magnitude of effect' on the sensitive routes.

19.4.17 A magnitude of effect is derived by applying GEART recommendations, which 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.

19.4.18 The following environmental effects have been identified as being susceptible to changes in traffic flow and are appropriate to gauge the magnitude of effect within the study area.

Severance

19.4.19 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 heavily trafficked road or a physical barrier created by the road itself. It can also relate to quite minor traffic flows if they impede pedestrian access to essential facilities. Severance effects could equally be applied to residents, motorists, cyclists or pedestrians.

19.4.20 GEART suggests that changes in total traffic flow of 30%, 60% and 90% are considered to be 'slight', 'moderate' and 'substantial' respectively.

Pedestrian Amenity

19.4.21 Pedestrian 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. The definition of amenity also takes into consideration pedestrian fear and intimidation, consideration of the exposure to noise and air pollution, and the overall relationship between pedestrians and traffic.

19.4.22 GEART suggests that a threshold of a doubling of total traffic flow or the HGV component may lead to a negative effect upon pedestrian amenity.

19.4.23 PRoW are also considered within the context of pedestrian amenity effects. If a PRoW would require a permanent or temporary closure / diversion because of construction or operation activities, the assessment would determine if the alternative route was equally convenient or enjoyable to the public.

Road Safety

19.4.24 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."

19.4.25 In accordance with the guidance, an examination of the existing collisions within the study area has been undertaken to identify any areas with an emerging pattern of collision types (cluster sites). These sites are considered to be sensitive to changes in traffic flows (sensitive receptors) and therefore more detailed analysis is required.

Driver Delay

19.4.26 GEART recommends the use of proprietary software packages to model junction delay and therefore estimate increased 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.

19.4.27 Four potentially sensitive junctions have been identified due to high baseline traffic flows that would require an assessment of potential delays for drivers during peak hours. The junctions are detailed below, and the locations are shown graphically in **Figure 19.4.**

- Junction 1 - Roundabout junction of the A16 / Marsh Lane.
- Junction 2 - Signalised junction of the Marsh Lane / Wyberton Low Road.
- Junction 3 - Roundabout junction B1397 (London Road) / A16.
- Junction 4 - Roundabout junction A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street).

Abnormal Indivisible Loads (AILs)

19.4.28 The importing of large AILs and abnormal loads may lead to delays on the highway network. The Facility will likely require a number of long, wide and heavy loads for a number of the Facilities infrastructure components. **Table 19-6** identifies the AIL requirements that are currently known (at the time of application).

Table 19-6 Potential AIL and Abnormal Load Information

Infrastructure Components	AIL Type	Quantity	Qualifying Weight, Width or Length	Origin	Distance from the Facility
Civils Works (Crane)	Wide Load	2	3 m+	Crowland	25 miles
RDF Processing Facility	Long Load	30	16.5m	TBC	TBC
	Wide Load	6	3.4 m	Hull	69 miles
	Heavy Load	8	60 t	Hull	69 miles
Thermal Treatment Plant	Heavy Load	3	140 t	TBC	TBC
Air Cooled Condenser	Wide	30	3.5 m	TBC	TBC

19.4.29 The movement of AILs would be subject to separate agreement with the relevant highway authorities and police through the Electronic Service Delivery for Abnormal Loads (ESDAL) system which regulates the process to ensure minimum disruption to the public and property. Therefore, no further assessment of AIL is undertaken in the ES.

Other Impacts

19.4.30 Traffic-borne noise and vibration effects and air quality effects will be informed by the traffic data outlined in this chapter. These effects are assessed in **Chapter 10 Noise and Vibration** and **Chapter 14 Air Quality**, respectively.

Impact Evaluation

19.4.31 **Table 19-7** details the assessment framework used herein adapted from GEART. These thresholds are guidance only and provide a starting point from which additional evidence (for example more detailed traffic analysis and site observations) and professional judgement will inform an analysis of the magnitude of effect.

Table 19-7 Transport and Traffic Assessment Framework

Effect	Magnitude of effect			
	Very low	Low	Medium	High
Severance	Change in total traffic flow of less than 30%	Change in total traffic flows of 30-60%	Change in total traffic flows of 60-90%	Changes in total traffic flows of over 90%
Pedestrian amenity	Changes in traffic flow (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/cycle demand.		
Road safety	Informed by a review of existing collision patterns and collision clusters based upon the existing personal injury collision records and the forecast increase in traffic.			
Driver delay	Informed by projected traffic increases through sensitive junctions within the study area and further detailed junction modelling analysis as required.			

Impact Significance

19.4.32 **Table 19-8** sets out the assessment matrix adopted for routes that meet the screening criteria (Rule 1 and 2). This combines the assessment of the magnitude of effect, derived from the framework included in **Table 19-7**, with the receptor value presented in **Table 19-5** in order to determine the significance of the predicted effect.

19.4.33 The predicted effect is then further evaluated against the criteria of timescale frequency and extents to refine the predicted impact determination.

Table 19-8 Impact Significance Matrix

Receptor/link sensitivity	Magnitude of impact			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible

19.4.34 Note that for the purposes of the ES, **major** and **moderate** effects are deemed to be significant. In addition, whilst minor effects are not strictly considered to be significant in their own right, it is important to distinguish these from other non-

significant effects, as they may contribute to significant effects cumulatively or through effect interactions.

Cumulative Impact Assessment

19.4.35 For a general introduction to the methodology used for the cumulative impact assessment, please refer to **Chapter 6 Approach to Environmental Impact Assessment**. This chapter assesses those cumulative impacts that are specific to traffic and transport.

19.4.36 To take account of sub-regional growth in housing and employment, vehicle flows have been factored to the future year baseline traffic demand using the Department for Transport Trip End Model Presentation Programme (TEMPro) Version 7.2 with data set 7.0 for Boston geographical areas.

19.4.37 In addition to TEMPro growth, it will be necessary to identify where the Facility potential to overlap with similar impacts arising from:

- Recent development, either built or under construction (which is not considered as part of the baseline);
- Approved development, awaiting implementation: and
- Proposals awaiting determination within the planning process with design information in the public domain.

19.4.38 The CIA considers whether impacts on a receptor can occur on a cumulative basis between the Facility and other activities, projects and plans for which sufficient information regarding location and scale exist.

19.4.39 For further details of the methods used for the cumulative impact assessment for traffic and transport, see **Section 19.9**.

19.5 Scope

Study Area

19.5.1 The traffic and transport study area has been informed by the most probable routes for traffic, for both the movement of materials and personnel, during the construction and operational phase of the Facility. The study area is illustrated in **Figure 19.2**.

Data Sources

19.5.2 Traffic flow data for all key links within the study area have been captured from several primary and secondary sources. The datasets used in the assessment are summarised in **Table 19-9**.

Table 19-9 Data Sources

Data Source	Year	Link Coverage	Confidence	Notes
Classified Automatic Traffic Counts (ATC)	2018	A16	High	Seven day continuous ATC undertaken on the A16 south of the roundabout junction with Marsh Lane commissioned by RHDHV.
Manual Classified Turning Counts (MCTC)	2018	1-9	High	8-Hour Traffic counts commissioned by RHDHV. The 8-hour totals have been factored to 24 hour Annual Average Daily Traffic (AADT) via the A16.
Estimated Traffic Flows	2019	10-12	Medium	For links with limited baseline flows have been estimated based on data sources for similar links within the study area.
Personal Injury Collision (PIC) Data	30 June 2018	1-9	High	PIC data obtained from LCC for the most recent five year period.
2011 Census Data	2011	n/a	High	Census data utilised for employee's method of travel to work within the Boston area.

Assumptions and Limitations

19.5.3 The baseflows for three links (10, 11 and 12) have been estimated based on their location, characteristics and compared with adjacent link base flows which are of similar nature.

19.6 Existing Environment

19.6.1 **Figure 19.1** details the local highway network surrounding the Facility.

19.6.2 The A52 and A16 are primary routes within the study area. The A52 routes in a predominantly west to east direction and connects Grantham with Skegness. The A16 routes in a south to north direction linking Peterborough and Spalding with Grimsby. Both the A16 and A52 are of good standard and accommodate large volumes of HGV movements.

19.6.3 A full commentary of the characteristics of the key roads (links) is set out below.

Link 1 Marsh Lane

19.6.4 Marsh Lane routes westbound until its crossroads with Wyberton Low Road and

provides access to the Riverside Industrial Estate to the east. The road is a single carriageway road subject to a speed limit of 30 mph. Footways along both sides of the road are provided with street lighting present.

Link 2 Marsh Lane

19.6.5 Marsh Lane continues westbound until its roundabout junction with the A16. The road allows access to industrial units on both sides of the road. The road is a single carriageway road subject to a speed limit of 30 mph. A footway is provided along the north verge of the road with street lighting present.

Link 3 A16

19.6.6 The A16 is a principal single carriageway road which connects Spalding to the south with Boston to the north. Link 3 (of the A16) encompasses the southern entry into the Study Area and terminates at the roundabout junction with Marsh Lane. The A16 is subject to the National Speed Limit.

Link 4 A16

19.6.7 North from the roundabout junction with Marsh Lane, the A16 becomes a two lane dual carriageway and terminates at the roundabout junction with the B1397. The road is subject to the National Speed Limit. The road has street lighting and an intermittent footway along the east side of the road.

Link 5 A16 (Spalding Road)

19.6.8 After the roundabout junction with the B1397 (London Road) the A16 continues northbound (Spalding Road) and reverts to a single carriageway road with dual lanes northbound and a single lane southbound. The A16 passes over the South Forty Foot Drain and is subject to the National Speed Limit. There is an intermittent footway with street lighting along the east side of the road.

Link 6 A52 (Liquorpond Street)

19.6.9 The A52 (Liquorpond Street) routes westbound from its roundabout adjoining The A16 to the south with the A16 (John Adams Way) to the northeast. The A52 (Liquorpond Street) is a single carriageway with two lanes westbound and a single lane eastbound. The road is subject to a speed limit of 30 mph and street lighting and footways are provided along both sides of the roads.

Link 7 A16 (John Adams Way)

19.6.10 The A16 (John Adams Way) is a dual carriageway which routes northeast from its roundabout junction with the A52. The road is subject to a 40 mph speed limit and has a footway with street lighting along the west side of the road.

Link 8 B1397 (London Road)

19.6.11 London Road is a single carriageway which routes northeast until it joins a roundabout which links Spalding Road to the north and the A16 to the south. The road is subject to a 30 mph speed limit and has street lighting. There are footways on both sides of the road and a on road marked cycle lane when travelling southwest.

Link 9 Wyberton Low Road

19.6.12 Wyberton Low Road is a single carriageway road which routes northbound until it meets a junction with Marsh Lane which routes east-west. The road is in a residential area and is subject to a 30 mph speed limit. There is street lighting and footways on both sides of the road. On street parking is also present on the road.

Link 10 Lealand Way / Nursery Road

19.6.13 Lealand Way is a single carriageway road which routes northwest through an industrial estate until reaching its T-junction with Nursery Road. Nursery Road continues south through further industrial buildings and terminates at the entrance to the project site boundary. The link is subject to a 30 mph national speed limit and there is street lighting and a footway to the west of the road.

Link 11 Marsh Lane

19.6.14 Link 11 encompasses Marsh Lane from its junction with Lealand Way southbound to Bittern Way. The road is subject to a 30 mph speed limit and has a footway with street lighting along the East side of the road. A segregated cycle/pedestrian path is provided on the western side of Marsh Lane with further street lighting.

Link 12 Bittern Way

19.6.15 Bittern Way links between Marsh Lane and the southwestern boundary of the project site. The road is subject to a 30 mph speed limit and has footways with street lighting along both sides of the carriageway, although these cease at the point it becomes a private road.

Baseline Traffic Flows

19.6.16 **Table 19-10** provides a summary of the daily traffic flows for links 1 to 12 within the study area and details the source of the data.

Table 19-10 Traffic Flow Data

Link	Description	Year	Background flows (24hr AADT*)		Background flows (18hr AAWT*)		Source
			All vehicles	HGVs	All vehicles	HGVs	
1	Marsh Lane	2018	6,654	433	6,683	481	MCTC
2	Marsh Lane	2018	9,165	449	9,205	498	MCTC
3	A16	2018	19,143	941	19,227	1,045	MCTC
4	A16	2018	24,535	950	24,642	1,056	MCTC
5	A16 Spalding Road	2018	27,324	1,082	27,443	1,202	MCTC
6	A52 (Liquorpond Street)	2018	29,808	681	29,938	757	MCTC
7	A16 (John Adams Way)	2018	39,970	1,424	40,145	1,582	MCTC
8	B1397 (London Road)	2018	12,315	235	12,369	261	MCTC
9	Wyberton Low Road	2018	2,924	10	2,937	11	MCTC
10	Nursery Road / Lealand Way	2019	1,500	100	1,500	100	Estimated
11	Marsh Lane	2019	3,000	200	3,000	200	Estimated
12	Bittern Way	2019	1,000	50	1,000	50	Estimated
*Derived from an 8hr MCTC surveys factored utilising a seven-day ATC located on the A16 - South of Marsh Lane roundabout.							

19.6.17 This assessment uses the term HGV as a proxy for a collective of large vehicle types above 3.5 tonnes (i.e. HGVs, buses and coaches) for both baseline data, development generated traffic and the impact assessment (recognising the similar environment characteristics of the vehicle types).

19.6.18 Vehicle data related to the Waste Transfer Station at Slipper Gowt Lane has been provided by Lincolnshire County Council and a summary is presented in **Table 19-11** indicating average daily movements that currently use Marsh Lane for access. **Appendix 19.1** provides the monthly summaries in more detail.

Table 19-11 Boston Waste Transfer Station Throughput

Boston Waste Transfer Station	June 2019		November 2019	
	Arrivals	Departures	Arrivals	Departures
Average Daily Arrivals / Departures	27	6	31	6
Average Daily Movements (two-way)	53	12	63	12
Total Average Daily Movements	65		75	

19.6.19 As can be seen from **Table 19-11**, an average daily movement of 65 vehicles in June and 75 movements in November have been derived. These vehicles are assumed to be contained within the surveyed traffic flows presented in **Table 19-10** for Links 1, 2 and 11. Thus it is inherent that all subsequent impact assessments including driver delay will have taken account of any potential effects to waste and recycling movements within the study area.

Sustainable Transport

Walking

19.6.20 Walking represents the most sustainable mode of travel. The Chartered Institution of Highways and Transportation (CIHT) document 'Guidelines for Providing for Journeys on Foot', notes that an average walking speed of three miles per hour could be assumed. By this measure, in 15 minutes, a pedestrian could walk approximately 1,200 m (1.2 km) and in 25 minutes, up to 2,000 m (2 km).

19.6.21 A walking distance of 2 km is the maximum desirable commuting distance stated by the CIHT. The 2 km walking catchment covers the entirety of central Boston town centre as well as south and north western areas of nearby settlements. In total, approximately 65% of Boston is within walking distance of the Facility work areas.

19.6.22 The presence of continuous footways and PRoW within the study area suggests that the Facility is highly accessible by walking.

Public Rights of Way

19.6.23 There are several public rights of way that cross the Facility area. The Boston Public Footpath No.14 (Macmillan Way) starts in Boston and follows the A16 (London Road) south over The Haven and merges with the existing footpaths along The Haven: BOST/14/12, BOST/14/2, BOST/14/4, BOST/14/5 and BOST/14/7). Footpaths 'BOST14/4' and 'BOST14/5' follow the crest of the primary flood bank that routes in parallel to The Haven. Footpath 'BOST/14/11' and 'BOST14/9', follow the route of Roman Bank (also known as 'Sea Bank'), which continues along the banks heading south from the Principal Application Site.

Cycling

19.6.24 Although there is no specific cycling infrastructure in the immediate vicinity of the Facility, the rural nature, gentle gradients and lightly trafficked nature suggests that it provides a conducive environment for cycling.

19.6.25 The CIHT guidance 'Cycle Friendly Infrastructure, Guidelines for Planning and Design' (CIHT, 1996) states that three quarters of journeys by all modes are 8 km (less than 5 miles) and that this distance could be cycled comfortably by a fit person. This distance corresponds to an approximate 25-minute travel time.

19.6.26 Using 8 km as the basis for assessing cycle accessibility of the Principal Application Site, it is possible to obtain a cycling 'catchment area'. Applying this, the town of Boston is entirely in the catchment area to the northeast as are the outlying settlements of Fishtoft, Wyberton, Frampton. Freiston and Hubbert's Bridge.

19.6.27 To the north of the Facility, the National Cycle Route (NCR) 1 provides a connection between Wisbech to the south and Lincoln to the north. As it passes through Boston the NCR1 utilises Wyberton Low Road (Link 9) before crossing over Marsh Lane (Link 1). Most of the route is on road, with a small section using a segregated cycle lane at the junction between Marsh Lane and Wyberton Low Road.

Equestrian Routes

19.6.28 There are no designated or formal equestrian routes that exist in the study area.

Bus

19.6.29 The nearest bus stops to the Facility are the Boston Middlecott Close and the St Thomas Church bus stops stop which are located 1.3 km from the Facility.

19.6.30 Details of the approximate daytime frequency of buses for the Boston Middlecott Close and St Thomas Church stops is set out in **Table 19-12**.

Table 19-12 Summary of Bus Frequencies

Service number	Route	Approximate frequency								
		Monday - Friday			Saturday			Sunday		
		First	Freq.	Last	First	Freq.	Last	First	Freq.	Last
Boston Middlecott Close										
K58	Boston - Kirton	08:28	Every 60 mins	16:36	09:36	Every 60 mins	16:36	No service		
St Thomas Church										
B13	Boston – Pinchbeck – Spalding	06:46	Every 60 mins	19:52	06:46	Every 60 mins	18:40	No service		
B13	Spalding - Boston	06:32	Every 60 mins	19:27	06:46	Every 60 mins	17:07	No service		
F41	Wyberton – Old Leake	07:49*			No service					
F41	Old Leake – Wyberton	16:18*			No service					
G68	Boston - Kirton	15:55*			No service					
G68	Kirton - Boston	08:08*			No service					
K58	Boston – Kirton	08:28	Every 60 mins	16:36	09:36	Every 60 mins	16:36	No service		
K58	Kirton - Boston	09:05	Every 60 mins	15:01	09:05	Every 60 mins	16:01	No service		
*Service runs only on schooldays.										

Rail

19.6.31 Boston Railway station is located 2.3 km from the Facility. The train station is managed by East Midlands Trains and provides services to Nottingham and Skegness.

19.6.32 Direct services run from Boston to Nottingham to the west (via Sleaford and Grantham) and to Skegness to the north-west on an hourly basis. Services to Nottingham start from 06:13 daily from Boston and the last train departs at 21:37. Services to Skegness start at 06:25 leaving Boston and the last train to depart is at 20:18.

Summary of Sustainable Transport

19.6.33 The review of the existing sustainable transport options set out above demonstrates that there are good opportunities for personnel and visitors based in nearby settlements to travel by sustainable modes of transport.

19.6.34 The OCTMP to be submitted with the DCO will set out an action plan for reducing single occupancy car travel.

Road Safety

19.6.35 To establish whether there are any inherent road safety issues, a search of the study area utilising collision data obtained from LCC (known as STATS19[1]) has been undertaken to establish if there is a pattern that could be exacerbated by the Facility's traffic demand.

19.6.36 Within the study area, a total of 51 collisions occurred within the most recent five year period available (30 June 2013 to 30 June 2018). Of these, 44 were slight, six were serious and one fatal collision occurred. **Table 19-13** provides a summary of the collisions and their locations are detailed in **Appendix 19.2.**

Table 19-13 Summary of Collision Data

Link	Description	No. of collisions			Summary
		Fatal	Serious	Slight	
1	Marsh Lane	1	0	4	One fatal and four slight collisions recorded; no patterns identified.
2	Marsh Lane	0	2	2	Two serious collisions recorded; no pattern identified. Two slight collisions recorded at the roundabout which links with the A16.

[1] *Accidents 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. The form collects a wide variety of information about the accident (such as time, date, location, road conditions).*

Link	Description	No. of collisions			Summary
		Fatal	Serious	Slight	
3	A16	0	0	1	One slight collision recorded at the roundabout which links with Marsh Lane.
4	A16	0	1	10	One serious collision recorded; no pattern identified. Ten slight collisions recorded. One collision at the roundabout which links with Marsh Lane. Five collisions at the roundabout which links to the B1397 (London Road).
5	A16 (Spalding Road)	0	3	11	Three serious collisions recorded. One collision identified at a protected level crossing. One collision identified at the roundabout which links to the A52 (Liquorpond Street). Eleven slight collisions recorded. Two collisions at the roundabout which links to the B1397 (London Road). Two collisions were recorded at the protected level crossing. Four collisions recorded at the roundabout which links to the A52 (Liquorpond Street).
6	A52 (Liquorpond Street)	0	0	7	Seven slight collisions recorded. Six collisions recorded at the roundabout which links to the A16.
7	A16 (John Adams Way)	0	0	4	Four slight collisions recorded. Two collisions recorded at the roundabout which links to the A52 (Liquorpond Street).
8	B1397 (London Road)	0	0	5	Five slight collisions recorded. Four collisions recorded on the roundabout which links to the A16.
9	Wyberton Road	0	0	0	No recorded collisions within the last five years.
10	Nursery Road	0	0	0	No recorded collisions within the last five years.
11	Marsh Lane	0	0	0	No recorded collisions within the last five years[2].
12	Bittern Way	0	0	0	No recorded collisions within the last five years[2].
Total		**1**	**6**	**45**	

[2] *Data obtained from www.crashmap.co.uk for a five year period of 2014-2018 inclusive.*

19.6.37 **Table 19-13** establishes the road safety environment for the study area. This data has been screened to identify sites that could be sensitive to changes in traffic ('collision cluster sites'). The collision cluster screening criteria has been based on four personal injury collisions occurring in a five year period in a 50 m radius.

19.6.38 Three collision cluster sites have been identified, **Table 19-14** provides a summary of the collision clusters with the locations graphically shown in **Figure 19.6**.

Table 19-14 Collision Cluster Information

Link	Cluster Ref no.	Location Description	No of Collisions			
			Total	Fatal	Serious	Slight
5/6/7	C1	Signalised Roundabout junction A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street)	13	0	1	12
4/5/8	C2	Roundabout junction B1397 (London Road)/A16	12	0	1	11
2/3/4	C3	Roundabout junction of the A16 / Marsh Lane	4	0	0	4

19.6.1 The collision clusters are assessed further in **Section 19.7** to determine if there are emerging patterns or trends that could potentially be exacerbated by an increase in traffic, leading to significant adverse effects.

19.7 Potential Impacts

Embedded Mitigation

19.7.1 As part of the project design, several embedded mitigation measures have been incorporated to reduce potential effects on traffic and transport as detailed in **Table 19-15**.

Table 19-15 Embedded Mitigation Measures for Traffic and Transport

Parameter	Mitigation Measures Embedded into the Project Design
Construction	
Delivery of raw materials by water	Delivery of raw materials will be via both ship and road. The Wharf construction will be split into two phases. The first phase of the wharf construction will be undertaken to expedite delivery of a large proportion of the raw materials to be delivered by ship rather than transportation by local roads. The second phase is to complete construction of the entire wharf.
Construction Traffic Routing	No HGV construction traffic to route through the A52 Liquorpond Street as a result of the feedback received from the initial PEIR impact assessment.
Pedestrian access through construction site.	A fenced public footbridge to be provided across the existing gap in the Roman Bank which will enhance pedestrian safety.

Parameter	Mitigation Measures Embedded into the Project Design
Operation	
Delivery of RDF	RDF delivered by water to the proposed wharf. To minimise vehicle movements into the project site.
Access Strategy	The operational access strategy consists of three accesses. Two primary accesses include a main site access on Nursery Road for employees and HGVs and an 'Exit Only' access is provided on Bittern Way leading to Marsh Lane for HGVs. This strategy reduces HGV conflicts at the main site entrance and along Nursery Road increasing site safety and reducing traffic delay. A secondary access is provided at the end of the un-named spur road leading to the wharf and will only be utilised for very infrequent maintenance vehicles at the wharf and Lightweight Aggregate Plant.
Pedestrian access through the operational site.	A fenced public footbridge to be provided across the existing gap in the Roman Bank which will enhance pedestrian safety.

Worst Case

19.7.2 This section establishes the Worst Case Scenario (WCS) for each key impact category, forming the basis for the subsequent impact assessment. Full details of the range of development options being considered are provided within **Chapter 5 Project Description**.

19.7.3 For this chapter, only those design parameters with the potential to influence the level of impact to relevant receptors are identified. Therefore, if the design parameter is not described below in **Table 19-16**, it is not considered to have a material bearing on the outcome of this assessment.

Table 19-16 Worst Case Assumptions

Impact	Parameter
Construction	
Earliest start of construction	2022 is the earliest realistic construction start date. Notwithstanding, for a robust transport assessment, a construction start date of 2021 has been assumed for the assessment of environmental impacts. Background flows will be lower during 2021 than they would be during 2022. Thus, the worst case impacts of construction traffic will be greater when assessed against 2021 background traffic.
Construction Duration	The minimum realistic duration for the works is 48 months.
Construction Programme – Peak	Construction of the first stage of the wharf is required early in the construction programme and is a critical establishing phase to allow for future raw material delivery's by ship. This will result in an intensification of material deliveries by HGVs early in the

Impact	Parameter
	construction programme for the benefit of reduced overall HGV demand.
Construction Timings: Typical Working Week	Assessment based upon a 6 day working week Monday to Saturday) with a 12 hour working day either 8am to 8pm (or 7am to 7pm. However, some slip forming concrete activities would take place over a 24 hour period. No activity on Public Holidays. Vehicle movements associated with transport of employees and deliveries are condensed over six days rather than seven.
Construction Timings – Material and Equipment Deliveries	Typically, an 8am to 8pm (or 7am to 7pm) (12hr) 'delivery window'; has been assumed with 10 hours delivery time allocated.
Construction Worker Hours	Workers departing for home are assumed to overlap the evening network peak hour (5pm to 6pm) The nature of construction works typically requires that employees work longer hours in the summer and shorted hours in the winter to take advantage of the available daylight. Therefore, as a worst case, peak construction worker movements are assumed to overlap with peak background traffic.
Contingency	An appropriate level of contingency reflecting uncertainties in the design (10%) is applied to all infrastructure material quantities. This ensures minor omissions or design changes can be accommodated within the assessed traffic flows.
Construction Worker Quantum	250 to 300 at peak construction. As a worst case, 300 construction workers will be assessed.
Construction Worker Access	Two car parks will be provided at the Facility. The northern car park will be the main construction car park, accessed / egressed from Nursery Road. The southern car park will be the over-spill car park accessed via an 'entry only' access off Marsh Lane and exit provided on Nursery Road. 11 seater minibuses will transfer workers from the two car parks to their place of work on-site via the site entrance on Nursery Road
Visitors Parking & Access	Visitor parking will be provided within the northern car park.
Operation	
Earliest start of operation	2026 is the earliest realistic opening year of operation for the assessment of environmental impacts.
HGV Movement Limits	7am to 7pm Monday to Friday. 8am to 1pm Saturday.

Impact	Parameter
Operational Worker Hours	The Facility will operate 24 hours a day consisting of three shifts.
Decommissioning	
HGV and construction staff vehicle traffic demand as per construction, assuming minimal opportunities to leave components in-situ or recycle materials on site.	Represents peak decommissioning traffic impacts.

Potential Impacts during Construction

19.7.4 This section examines the WCS assumptions, forecasts the traffic generated by the Facility and distributes vehicle trips to the study area to establish a basis for assessing the potential transport impacts.

Construction Programme

19.7.5 A draft construction programme has been produced and is provided in **Appendix 19.3**. It is understood that a realistic construction start date will begin mid-2022 and continue for a period of 48 months, resulting in a construction end year of 2026.

19.7.6 As a WCS, the transport assessment considers that construction will commence in 2021 (lower background traffic flows) and peak activity occurs in week 41 of Year 1 (2021). To assess this, a reference year of 2021 for background traffic has been derived. Background traffic flows for 2021 are presented in **Appendix 19.4**.

HGV Traffic Demand

19.7.7 Draft details of materials, plant and timescales for the Facility have been informed by work undertaken by the Developer's Principal Contractor. **Appendix 19.3** shows the disaggregation of component traffic demand by activity over time. This data facilitates the derivation of total deliveries and HGV movements per day.

Peak HGV Construction Demand

19.7.8 **Appendix 19.3** shows the highest levels of HGV demand occur in week 41 of Year 1 (2021) of the construction programme with 293 daily movements. The majority of these movements relate to the delivery of Ready Mixed Concrete (RMC) and are forecast to last for one week only. This period of intensification of HGV movements is to allow for the Phase 1 Wharf construction which is a critical establishing phase for future delivery of raw materials by water.

19.7.9 During this intensified period of activity, it is necessary to operate 24 hour working due to the construction method of slip forming.

Average (Typical) HGV Construction Demand

19.7.10 **Table 19-17** presents the annual daily average HGV movements that the Facility would generate over the remainder of the construction programme outside of the peak period. Annual peak daily movements and their duration are shown for comparison purposes.

Table 19-17 Average (Typical) Yearly Daily HGV Movements

Year	Average Daily HGV Movements	Peak Daily HGV Movements	Peak Duration
Year 1 (Oct 2021 - Mar 2022)	56	293	1 week
Year 2 (Mar 2022 - Mar 2023)	66	220	1 week
Year 3 (Mar 2023 - Mar 2023)	70	136	2 weeks
Year 4 (Mar 2024 - Mar 2025)	31	54	3 weeks
Year 5 (Mar 2025 – Dec 2025)	8.5	11	n/a

19.7.11 As shown in **Table 19-17**, the Average WCS would occur in Year 3 (2023) with an average of 70 daily HGV movements. This figure would reduce year on year until Year 5 when the Facility would generate on average, 9 daily HGV construction movements.

19.7.12 The Year 3 average figure of 70 daily HGV movements represents a decrease of 223 movements from week 41 of Year 1 (2021) peak figure of 293 daily HGV movements

19.7.13 Thus, to ensure the assessment considers the short term worst case impacts and the medium term average impacts within the study area, this chapter will present the Peak WCS of 293 daily HGV and Average WCS of 70 daily HGV movements.

Employee Traffic Demand

19.7.14 The Developer's Principal Contractor has provided details of the expected resourcing requirements during the construction programme. Based on this input, it is estimated that a workforce of 300 employees will be required during construction peaks.

19.7.15 It is envisaged that construction employees will work during the hours of 8am to 8pm (with option of 7am to 7pm).

19.7.16 The 2011 'method to travel to work' census data identified that 63% of employees

travel to work by Single Occupancy Vehicle (SOV) within the Boston area. This equates to 188 out of 300 employees using a car to travel to the Facility with the remaining employees utilising sustainable transport.

HGV Distribution

19.7.17 During the Peak WCS, the majority of the HGV traffic movements would comprise of ready-mix concrete (RMC) trucks for the phase one construction of the wharf. The Developer's Principal Contractor has indicated that these are likely to be sourced within the county of Lincolnshire.

19.7.18 The appointed engineers have indicated that the a large contingent of cement will be required for the on-site batching plant once the phase 1 wharf construction has been completed and will run through the remaining period of the construction programme. This cement will either come from the Ketton Cement works, or if that is unavailable, then the Purfleet or Tyneside alternative cement deposits. It has been considered not practicable to deliver cement via ship due to two reasons

- The larger size of vessel required being too large for navigation on the Haven.
- Vessels would need to be booked approximately two years in advance, with a required flexibility of two weeks for deliveries.

19.7.19 The appointed engineers have viewed these reasons as inflexible and impracticable for the Facility.

19.7.20 At this stage, as definitive sources of materials (RMC) and plant are unknown for the Peak WCS and Average WCS, the respective traffic demands have been assigned to both the A16 originating from the north (Link 7) and the A16 originating from the south (Link 3).

Employee Distribution

19.7.21 Within the Preliminary Environmental Information Report (PEIR), the appointed engineers proposed to operate a Park and Ride scheme to control the available parking during the Facility's construction and to minimise the employee movements to the facility. However, based on comments received from stakeholders during consultation, a revised employee strategy has been proposed. All employees are now proposed to travel directly to the Facility and park at one of two on-site car parks.

19.7.22 A northern and southern car park will be provided at the Facility. The northern car park will be accessed and egressed from Nursery Road. The southern (over-spill) car park will be accessed via an 'entry only' access off Marsh Lane and exits

provided onto Nursery Road. The location of the car parks are identified in **Figure 19.7**. The northern car park will be for employee's light vehicles only with an area allotted to visitors to the Facility. The southern car park will provide larger spaces (4m x 7m) for worker vans.

19.7.23 Employees will transfer into 11 seater minibuses from the car parks and transported to their place of work via the site entrance on Nursery Road. This will allow employees to get to the relevant parts on site quicker and increases operational safety on the Principal Application Site by minimising pedestrian traffic.

19.7.24 Origins have been assumed for the 188 employees who would drive directly to the Facilities on-site car parks:

- 25 % arrive from Link 6 (A52 Liquorpond Street);
- 25 % arrive from Link 7 (A16 North);
- 25 % arrive from Link 8 (B1397 - London Road); and
- 25 % arrive from Link 3 (A16 South).

19.7.25 The remaining 112 employees are assumed to use sustainable modes of transport to travel directly to the Facility. A commitment within the OCTMP to undertake daily recording of employee travel methods is included. This will continually monitor staff modes of travel during construction.

Traffic Impact Screening

19.7.26 With reference to the GEART (Rule 1 and Rule 2), a screening process has been undertaken for the Study Area to identity routes that are likely to have an increase in traffic flows that would require further impact assessment.

19.7.27 **Table 19-18** summarises the total daily peak vehicle movements (i.e. arrivals and departures) of all materials, personnel and plant for the peak period. The table also provides a comparison of the peak daily construction flows with the forecast background daily traffic flows for 2021 (assumed worst case start of construction). Cells highlighted blue indicate GEART Rule 1 or Rule 2 screening thresholds have been met.

Table 19-18 Link Screening (Construction)

Link	Description	Link Sensitivity	Background 2021 Flows (24hr AADT)		2021 Peak Daily Construction Vehicle Movements		Percentage Increase		2021 Average Daily Construction Vehicle Movements		Percentage Increase	
			All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
1	Marsh Lane	Low	6,921	451	668	293	9.7%	65.0%	445	70	6.4%	15.6%
2	Marsh Lane	Medium	9,532	467	668	293	7.0%	62.8%	445	70	4.7%	15.0%
3	A16	Low	19,911	979	349	293	1.8%	29.9%	126	70	0.6%	7.2%
4	A16	Low	25,519	988	612	293	2.4%	29.6%	389	70	1.5%	7.1%
5	A16 (Spalding Road)	Low	28,420	1,125	555	293	2.0%	26.0%	333	70	1.2%	6.2%
6	A52 (Liquorpond Street)	High	31,003	709	131	0	0.4%	0.0%	131	0	0.4%	0.0%
7	A16 (John Adams Way)	Medium	41,573	1,481	424	293	1.0%	19.8%	201	70	0.5%	4.7%
8	B1397 (London Road)	High	12,809	244	56	0	0.4%	0.0%	56	0	0.4%	0.0%
9	Wyberton Low Road	High	3,042	10	0	0	0.0%	0.0%	0	0	0.0%	0.0%
10	Nursery Road /	Low	1,664	104	480	293	28.9%	281.7%	258	70	15.5%	67.4%

Link	Description	Link Sensitivity	Background 2021 Flows (24hr AADT)		2021 Peak Daily Construction Vehicle Movements		Percentage Increase		2021 Average Daily Construction Vehicle Movements		Percentage Increase	
			All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
	Lealand Way											
11	Marsh Lane	Low	3,328	208	188	0	5.6%	0.0%	188	0	5.6%	0.0%
12	Bittern Way	Low	1,092	52	0	0	0.0%	0.0%	0	0	0.0%	0.0%
%	Exceeds GEART screening thresholds											

19.7.28 In accordance with GEART, only those sensitive links that show greater than 10% increase in total traffic flows (or HGV component) or, for all other links, a greater than 30% increase in total traffic of the HGV component are considered when assessing the traffic effect of severance and pedestrian amenity upon receptors.

19.7.29 It is noted from **Table 19-18** that three of the 12 links are above the GEART screening thresholds during the Peak WCS, In addition, Links 3 and 4 experience increases close to the 30% threshold (both at 29.6%) and as such, a small change in demand or background traffic flows could result in potentially significant effects. Within the Average WCS, only Link 10 experiences impacts above the GEART. **Table 19-19** provides a summary of those links that will be taken forward for further assessment and those that are screened out for the Peak and Average WCSs.

Table 19-19 Link Screening Summary

WCS Period	Further Assessment (Links)
Peak	1,2,3, 4 and 10
Average	10

Impact 1: Severance

19.7.30 With reference to **Table 19-18** and **Table 19-7**, it is noted that the forecast daily change in total traffic flow is within the 'very low' magnitude of effect (i.e. 30% threshold) for both Peak and Average WCSs. This results in the magnitude of effect assessed as very low on low to high sensitivity links leading to impact significance on all links of a **negligible** to **minor adverse** effect.

Impact 2: Pedestrian Amenity

19.7.31 GEART suggests that a threshold of a doubling of total traffic flow or the HGV component may lead to a negative effect upon pedestrian amenity. During the Peak WCS, Links 1-9, 11 and 12 all experience traffic flows significantly below the 100% threshold. This results in the magnitude of effect assessed as very low on low to high sensitive links leading to impact significance on all links of a **negligible** to **minor adverse** effect.

19.7.32 Link 10 experiences traffic flows greater than the 100% GEART impact thresholds whereby GEART suggests negative effects may be experienced and is assessed further.

19.7.33 During the Peak WCS, Link 10 receptors would experience a peak flow of 34 HGVs per hour during the defined hours of construction. The road serves existing industrial estates and commercial properties. Pedestrians are facilitated with a

single footpath approximately 1.5 m wide which is provided along the extent of the route. This results in a magnitude of effect assessed as medium on a low sensitive link leading to impact significance of a **minor adverse** effect.

19.7.34 During the Average WCS, Link 10 would experience traffic flows significantly below the 100% GEART threshold and thus a magnitude of effect assessed as very low on low sensitive links leading to an impact significance on Link 10 as **negligible**.

Public Right of Way Closures

19.7.35 During the construction, the following footpath sections would be permanently closed: BOST/14/4, BOST/14/10 and BOST/14/5. The closure would also affect the England Coast Path route which follows these footpaths, as does Macmillan Way (which is a series of inter-connected footpaths). The diversion for these route closures would follow the route of an existing footpath, which follows the route of Roman Bank (also known as 'Sea Bank') along footpath sections BOST/14/11 and BOST/14/9. See **Chapter 5 Project Description**, **Figure 5.3** which shows the footpath network and identifies the footpath sections to be closed.

19.7.36 The diversion would affect pedestrians at two specific sections along the diversion. Firstly, the route of footpath section BOST/14/11 crosses over the unnamed spur road which served the former Mick George' and which is within the Facility's site construction boundary.

19.7.37 Secondly, pedestrians will be further affected because the route of footpath section Bost/14/11 at the intersection with Bost/14/9 is within the construction boundary of the Facility at an existing gap in the Roman Bank (also known as 'Sea Bank'. Therefore, pedestrians would be routed to cross the site road within closer proximity of construction traffic vehicles, thus decreasing the relative pleasantness of the journey.

19.7.38 In response to the second point, embedded mitigation is provided via a fenced public footbridge which will be constructed early in the construction programme. This will provide access across the existing gap in the Roman Bank allowing for increased pedestrian safety when negotiating access over the construction site.

19.7.39 This would result in a low magnitude of effect in perception of amenity for pedestrians. The low magnitude of effect on a high sensitive receptor would result in a **moderate adverse** effect.

19.7.40 To mitigate and to allow pedestrians to safely cross over the unnamed spur road within the construction site boundary and continue their journey along

BOST/14/11, there is potential to use traffic lights, barrier gates or banksmen to monitor the crossing of BOST/14/11 by potential construction traffic during the construction period.

19.7.41 This strategy, in addition to the embedded mitigation would negate the need for a total diversion route around the Facility that would increase the distance pedestrians would have to travel. The resultant impact would be continuous, local and long term. The magnitude of effect would be reduced to very low on a high sensitive receptor resulting in a **minor adverse** effect.

Impact 3: Road Safety

19.7.42 **Section 19.6** established the road safety environment for the study area. This data has been screened to identify sites that could be sensitive to changes in traffic, known as collision cluster sites. The collision cluster screening criteria has been based on four personal injury collisions occurring in a five year period in a 50 m radius.

19.7.43 Three collision cluster sites have been identified with the locations shown in **Figure 19.6**.

19.7.44 **Table 19-20** provides a summary of the collision clusters and includes details of the Peak and Average WCS construction flows in comparison to the forecast background daily traffic flows in 2021.

Table 19-20 Collision Cluster Information (2021 - Construction).

Link	Cluster Ref no.	Location	Peak WCS % Increase		Average WCS % Increase		Summary
			All Vehicles	HGVs	All Vehicles	HGVs	
5/6/7	C1	Roundabout junction A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street)	0.4% – 2.0%	0.0% - 26.0%	0.3% - 0.9%	0.0% - 6.2%	It is considered that the change in HGV traffic could lead to potentially significant impacts during Peak WCS only.
4/5/8	C2	Roundabout junction B1397 (London Road)/A16	0.4% – 2.4%	0.0% - 29.6%	0.3% - 1.2%	0.0% - 7.1%	It is considered that the change in HGV traffic could lead to potentially significant impacts during Peak WCS

Link	Cluster Ref no.	Location	Peak WCS % Increase		Average WCS % Increase		Summary
			All Vehicles	HGVs	All Vehicles	HGVs	
							only.
2/3/4	C3	Roundabout junction of the A16 / Marsh Lane	1.8% – 9.7%	29.6% - 62.8%	0.3% - 3.9%	7.1% - 15.0 %	It is considered that the change in HGV traffic could lead to potentially significant impacts during Peak WCS only.

19.7.45 **Table 19-20** identifies that all three collision clusters within the study area would experience increases in HGV traffic which could potentially result in significant effects during the short term Peak WCS and are therefore considered further in this assessment.

19.7.46 The medium term Average WCS traffic demand indicates that all three collision clusters within the study area would experience very low magnitude of effect on low to high sensitive receptors resulting in a **negligible** to **minor adverse** effect.

19.7.47 The STATS19 collision data has been examined to identify any emerging patterns or factors that could be exacerbated by the Facility's traffic generation.

Cluster Site 1

19.7.48 Cluster Site 1 is located at the three-arm roundabout junction of the A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street).

19.7.49 A more detailed investigation of the 13 collisions was undertaken to understand if the projected increase in traffic through Cluster Site 1 could have a potentially significant effect. Of the 13 collisions, 12 were classified as slight and one serious.

19.7.50 It has been established that of the 13 collisions, three were rear end shunt type collisions, eight were attributable to drivers failing to give way and entering the roundabout, colliding with other vehicles, one loss of control on the roundabout by a cyclist and no details were provided for one collision. A pattern of failing to give way, entering the roundabout and colliding with other road users is identified, thus the sensitivity of the receptor is deemed as High

19.7.51 The pattern of collisions is likely to be caused by a departure from standards for the roundabout geometry, noting a small Inscribed Circle Diameter (ICD) and reduced deflection on the approach arms. The design is most likely as a result of

increasing capacity of the roundabout and reducing traffic delays. As a result, drivers are potentially approaching at higher speeds resulting in poor gap acceptance when entering the roundabout circulatory streams.

19.7.52 Cluster Site 1 is located at the intersection of links 5, 6 and 7, that are projected to experience an increase in total traffic up-to 2.0% and HGV flows by 26% during the Peak WCS. Whilst a pattern of failing to give way at the roundabout type collisions is identified, these types of collisions would not be impacted by vehicle composition and therefore it is more appropriate to focus on total changes in total traffic rather than changes in HGVs.

19.7.53 It is considered that an increase in total traffic of 2.0% at the intersection of links 5, 6 and 7 represents a very low magnitude of effect on a high sensitive receptor resulting in a **minor adverse** effect.

Cluster Site 2

19.7.54 Cluster Site 2 is located at the four-arm roundabout junction of the B1397 (London Road) / A16.

19.7.55 Within the latest five-year study period, there have 12 collisions of which nine were rear end shunt type collisions, all of which resulted in slight injury. Two further collisions resulted in slight injuries and included a vehicle failing to stop at a signalised pedestrian crossing and a vehicle swerving to avoid an adjacent vehicle overtaking. The final, serious injury was a result of an intoxicated driver losing control of the vehicle and colliding with the railings at the roundabout.

19.7.56 It is noted that whilst there is a pattern of rear end shunt collision types at Cluster site 2, the 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 low sensitive receptor.

19.7.57 Cluster Site 2 is located at the intersection of link 4, 5 and 8, that are projected to experience an increase in total traffic up-to 2.4% and HGV flows by 29.6% during the Peak WCS. Noting that none of the recorded collisions involved HGVs, the percentage change in HGV traffic alone is not considered to be a material consideration. It is therefore considered that a change in total traffic of 2.4% through Cluster Site 2 represent a very low magnitude of effect on a low sensitivity receptor resulting in a **negligible** effect.

Cluster Site 3

19.7.58 Cluster Site 3 is located at the three-arm roundabout junction of the A16 and Marsh Lane.

19.7.59 Within the latest five-year study period, there have been four collisions of which all resulted in slight injuries. In total of the four collisions, one was a rear end shunt and three were attributable to collisions due to drivers not staying within their lane whilst negotiating the roundabout. Of these three collisions, one involved a cyclist and one involved a goods vehicle of unknown weight.

19.7.60 It is concluded 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 low sensitivity.

19.7.61 Cluster Site 3 is located on the intersection of links 1, 3 and 4 that is projected to experience an increase of up-to 9.7% total traffic and HGV flows by 62.8% during the Peak WCS. This is considered to represent a medium magnitude of effect on a low sensitivity receptor resulting in a **minor adverse** effect.

Impact 4: Driver Delay

19.7.62 The GEART screening thresholds do not apply to this effect because the potential effect is defined as significant when the traffic system surrounding the Facility under consideration is at or close to capacity.

19.7.63 To facilitate the assessment of driver delay, four junctions have been selected based on high baseline traffic flows, consultation feedback and site observations and are considered potentially sensitive to an increase in construction traffic and are as follows:

- Junction 1 - Roundabout junction of the A16 / Marsh Lane.
- Junction 2 - Signalised junction of the Marsh Lane / Wyberton Low Road.
- Junction 3 - Roundabout junction A16 / B1397 (London Road).
- Junction 4 - Roundabout junction A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street).

19.7.64 The most sensitive scenario for driver delay could be if the construction shift starts or finishes at the same time as the morning or evening network peak hours.

19.7.65 To assess if this has the potential for significant effects, the traffic generation associated with all construction employees arriving/departing work has been assigned to each respective junction during the network peak hours. In addition, the hourly construction HGV movements (daily HGV demand profiled across 12 hours for Peak WCS) has been considered. In reality it is unlikely this magnitude of HGV movements would occur at the same time as the arrival or departure of the construction employees; thus, the scenario provides additional robustness in

the assessment.

19.7.66 When assessing junction capacity, reference has been made to the Ratio of Flow to Capacity (RFC) and Degree of Saturation (DoS). RFC is the standard recognised threshold for roundabout junctions in the UK and DoS is the standard recognised threshold for signalised junctions, both are typically reported by junction approach arm. When values for RFC and DoS are above 0.85 and 90% respectively, a junction is considered to be operating beyond its desirable capacity (but within its's theoretical maximum capacity) and mitigation measures may be required.

19.7.67 In assessment terms, the baseline RFC/DoS gives indication of a junction's sensitivity to changes in traffic throughput, whereas, with the addition of construction traffic, the level of change in RFC/DoS gives an indication of the magnitude of effect.

19.7.68 The standard variation in daily traffic is considered to be ±10%, and any additional construction traffic resulting in a rise of up to 10% would therefore be imperceptible to daily fluctuations. However, upon request of LCC, full junction capacity assessments has been undertaken to understand the true impacts associated with the additional construction traffic during the Peak WCS. This modelling will also serve to contextualise the potential Average WCS impacts

19.7.69 Modelling of the roundabout junctions has been undertaken with the use of industry standard software (Junctions 8) and LinSig for signalised junctions. The Junction Traffic Flow Matrices are provided within **Appendix 19.5** with full modelling outputs provided within **Appendix 19.6**.

Junction 1 – A16 / Marsh Lane

19.7.70 The traffic flows of the Wyberton Low Road and Marsh Lane signalised junction are presented in **Table 19-21** for the weekday am peak and pm peak with the resultant percentage impact of the Peak WCS construction traffic.

Table 19-21 Peak Hour Traffic Flows Through Junction 1

Scenario	Total Junction Traffic	Total Construction Traffic (HGVs) Contingent	Percentage of Construction Traffic
2021 Forecast + Facility Construction Traffic AM Peak	2,671	212 (24)	7.9%
2021 Forecast + Facility Construction Traffic PM Peak	2,552	212 (24)	8.3%
2021 Forecast + Facility Average Construction Traffic AM Peak	2,671	195 (7)	7.3%

Scenario	Total Junction Traffic	Total Construction Traffic (HGVs) Contingent	Percentage of Construction Traffic
2021 Forecast + Facility Average Construction Traffic PM Peak	2,552	195 (7)	7.6%

19.7.71 Examining the flows, it can be seen that the largest total vehicle flows would occur during the morning of the Peak WCS, which details that 212 construction traffic movements against a forecast background flows of 2,671 total traffic passing through the junction would equate to a percentage impact of 7.9%. This level of impact is below the standard variation in daily traffic.

19.7.72 As the transport assessment has undertaken a worst case scenario where 100% of the HGV traffic demand has been assigned to both originating from the north and the south of Boston, the junction 1 capacity assessment presents and assesses the following two scenarios:

- 100% of Construction HGVs originating from the A16 North (Junction 1a)
- 100% of Construction HGVs originating from the A16 South (Junction 1b)

19.7.73 The outputs of Junction 1 roundabout junction models are presented in **Table 19-22** for the weekday am and pm Peak WCS.

Table 19-22 Junction 1a and 1b Capacity and Delay Results (HGVs originating from the A16 North)

Scenario	Arm	AM Peak (07:35-08:35)			PM Peak (16:25-17:25)		
		RFC	Delay (s)	Queue (Veh)	RFC	Delay (s)	Queue (Veh)
2021 Forecast Base	A16 (North)	0.55	3.87	1.24	0.48	3.14	0.92
	Marsh Lane	0.35	4.59	0.53	0.44	5.02	0.79
	A16 (South)	0.54	3.67	1.15	0.46	3.28	0.86
Junction Level of Service		A			A		
2021 Forecast Base + Peak WCS Construction Traffic (100% HGVs from the north)	A16 (North)	0.65	5.02	1.86	0.49	3.25	0.96
	Marsh Lane	0.37	4.85	0.57	0.62	7.39	1.60
	A16 (South)	0.56	3.86	1.24	0.50	3.79	1.00
Junction Level of Service		A			A		
2021 Forecast Base + Peak WCS Construction Traffic (100% HGVs from the south)	A16 (North)	0.65	4.94	1.82	0.49	3.20	0.94
	Marsh Lane	0.37	4.85	0.57	0.63	7.66	1.66
	A16 (South)	0.56	3.92	1.28	0.51	3.86	1.03
Junction Level of Service		A			A		

19.7.74 **Table 19-22** indicates that both the am and pm peak hours during the forecast 2021 base scenario that all arms currently operate within capacity with a maximum RFC of 0.55, with average queues of no more than two vehicles and a maximum delay of 5.02 seconds. The junction is therefore considered to be operating with spare capacity and is therefore considered to be of low sensitivity.

19.7.75 With the addition of the construction traffic, the traffic model indicates that the junction would continue to operate with spare capacity (with a maximum RFC of 0.65) and with continued queues of no more than two vehicles. Delays are expected to increase to 7.66 seconds (from 5.02 seconds).

19.7.76 It is considered that with the addition of the Facility's Peak WCS construction

traffic (in both HGV origin scenarios), the junction would be operating with spare capacity and therefore the magnitude of change is assessed as low on a receptor of low sensitivity resulting in a short term **negligible** effect.

19.7.77 It is therefore implicit that the Average WCS impact would result in a medium term **negligible** effect or lower.

Junction 2 – Wyberton Low Road / Marsh Lane

19.7.78 The traffic flows of the Wyberton Low Road and Marsh Lane signalised junction are presented in **Table 19-23** for the weekday AM peak and PM Peak with the resultant percentage impact of the peak WCS construction traffic.

Table 19-23 Peak Hour Traffic Flows Through Junction 2

Scenario	Total Junction Traffic	Total Construction Traffic (HGVs)	Percentage of Construction Traffic
2021 Forecast + Peak WCS Construction Traffic AM Peak	1155	212 (24)	18.4%
2021 Forecast + Peak WCS Construction Traffic PM Peak	1067	212 (24)	19.8%
2021 Forecast + Average WCS Construction Traffic AM Peak	1155	195 (7)	16.8%
2021 Forecast + Average WCS Construction Traffic PM Peak	1067	195 (7)	18.2%

19.7.79 As detailed in **Table 19-23**, the percentage of construction traffic is at 18.4% (am) and 19.8% (pm).

19.7.80 The outputs of Junction 2 signalised junction models are presented in **Table 19-24** for the am and pm Peak WCS.

Table 19-24 Junction 2 Capacity and Delay Results

Scenario	Arm	AM Peak (07:40-08:40)			PM Peak (16:00-17:00)		
		DoS	Delay (s)	MMQ* (PCU)	DoS	Delay (s)	MMQ* (PCU)
2021 Forecast Base	Wyberton Low Road (North)	10.8%	114.1	0.2	18.1%	117.3	0.3
	Marsh Lane (East)	86.2%	102.4	10.1	79.9%	63.8	14.9
	Wyberton Low Road (South)	86.1%	96.8	10.7	76.1%	103.6	5.6
	Marsh Lane (West)	88.3%	62.2	23.1	79.1%	61.4	15.1
Practical Reserve Capacity over all lanes		1.9%			12.7%		
2021 Forecast Base + Facility Peak WCS Construction Traffic	Wyberton Low Road (North)	10.8%	115.0	0.2	17.9%	117.5	0.3
	Marsh Lane (East)	85.8%	95.7	10.9	87.2%	58.4	23.1
	Wyberton Low Road (South)	86.1%	96.8	11.4	83.1%	122.9	6.2
	Marsh Lane (West)	88.3%	47.9	29.4	88.6%	76.3	18.0
Practical Reserve Capacity over all lanes		2.0%			1.6%		
*MMQ = Mean Max Queue in Passenger Car Units (PCUs)							

19.7.81 **Table 19-24** shows that the junction works within capacity during both the Forecast 2021 with and without the Peak WCS construction traffic scenarios, with all arms operating under the recognised 90% DoS threshold. Although the junction arms are forecast to be approaching capacity in both scenarios, the PRC values of 1.9% (am) and 12.7% (pm) demonstrates that it will operate satisfactory. The junction is therefore considered to be operating close to capacity and thus considered to be of medium sensitivity.

19.7.82 With the addition of the Peak WCS construction traffic, the am peak is broadly similar to the forecast base. An increase in DoS is evident on the pm peak for all

arms with a worst case rise on Marsh Lane (west) from 79.1% to 88.6%. It is considered that both am, and pm peak are considered a low magnitude of change, as the increase in traffic still shows all arms below the 90% DoS threshold and PRC still operating with spare capacity.

19.7.83 It is considered that with the addition of the proposed Facility's construction traffic, the magnitude of change is assessed as low on a receptor of medium sensitivity resulting in a short term **minor adverse** effect.

19.7.84 It is therefore implicit that the Average WCS impact would result in a medium term **minor adverse** effect or lower.

Junction 3 – A16 / B1397 (London Road).

19.7.85 The traffic flows of the A16 and London Road roundabout junction are presented in **Table 19-25** for the weekday am and pm peak with the resultant percentage impact of the construction traffic.

Table 19-25 Peak Hour Traffic Flows Through Junction 3

Scenario	Total Junction Traffic	Total Construction Traffic (HGVs)	Percentage of Construction Traffic
2021 Forecast + Peak WCS Construction Traffic AM Peak	3,423	184 (24)	5.4%
2021 Forecast + Peak WCS Construction Traffic PM Peak	3,429	184 (24)	5.4%
2021 Forecast + Average WCS Construction Traffic AM Peak	3,423	167 (7)	4.9%
2021 Forecast + Average WCS Construction Traffic PM Peak	3,429	167 (7)	4.9%

19.7.86 As detailed in **Table 19-25,** the percentage of Peak WCS construction traffic is at 5.4% (am) and 5.4% (pm)

19.7.87 The outputs of Junction 3 roundabout junction models are presented in **Table 19-26** for the am and pm Peak WCS.

Table 19-26 Junction 3 Capacity and Delay Results

Scenario	Arm	AM Peak (07:35-08:35)			PM Peak (16:25-17:25)		
		RFC	Delay (s)	Queue (Veh)	RFC	Delay (s)	Queue (Veh)
2021 Forecast Base	A16 (North)	0.72	8.42	2.54	0.72	7.85	2.51
	London Road (east)	0.51	9.51	1.05	0.60	11.74	1.45
	A16 (South)	0.72	7.15	2.57	0.78	9.4	3.38
	London Road (west)	0.70	10.90	2.24	0.54	6.63	1.15
Junction Level of Service		A			A		
2021 Forecast Base + Peak WCS Facility Construction Traffic	A16 (North)	0.84	14.52	4.9	0.73	8.40	2.71
	London Road (east)	0.62	14.34	1.56	0.61	12.43	1.53
	A16 (South)	0.74	7.58	2.75	0.89	18.61	7.43
	London Road (west)	0.74	12.76	2.71	0.60	8.68	1.50
Junction Level of Service		B			B		

19.7.88 **Table 19-26** indicates that all arms in both the am and pm peak hours during the forecast 2021 base scenario currently operate within capacity with a maximum RFC of 0.78 and average queues of no more than four vehicles and a maximum delay of 11.74 seconds. The junction is therefore considered to be operating with spare capacity and is therefore considered to be of low sensitivity.

19.7.89 With the addition of the Facility's Peak WCS construction traffic, the traffic model indicates that the junction would continue to operate within the theoretical capacity. However, the A16 south would experience a maximum RFC of 0.89 which is slightly over the recognised threshold of 0.85 in the pm peak. This corresponds with an increase of queues from 4 to 8 vehicles. Delays are expected to increase 18.61 seconds (from 9.4 seconds).

19.7.90 It is considered that with the addition of the proposed Facility's construction traffic the magnitude of change is assessed as medium on a receptor of low sensitivity resulting in a short term **minor adverse** effect.

19.7.91 It is therefore implicit that the Average WCS impact would result in a medium term **minor adverse** residual effect or lower, once mitigation has been included.

Junction 4 – A16 / A52 (Liquorpond Street).

19.7.92 The traffic flows of the A16 and the A52 roundabout junction are presented in **Table 19-27** for the weekday am peak and pm peak with the resultant percentage impact of the Facility's construction traffic.

Table 19-27 Peak Hour Traffic Flows Through Junction 4

Scenario	Total Junction Traffic	Total Construction Traffic (HGVs)	Percentage of Construction Traffic
2021 Forecast + Peak WCS Construction Traffic AM Peak	4,021	156 (24)	3.9%
2021 Forecast + Peak WCS Construction Traffic PM Peak	4,247	156 (24)	3.7%
2021 Forecast + Average WCS Construction Traffic AM Peak	4,021	139 (7)	3.5%
2021 Forecast + Average WCS Construction Traffic PM Peak	4,247	139 (7)	3.3%

19.7.93 Examining the flows, it can be seen that the largest impact would occur during the pm peak, which details that 156 of the Facility's Peak WCS construction traffic movements against a forecast background of 4,247 total traffic passing through the junction would equate to a percentage impact of 3.7%.

19.7.94 The outputs of Junction 4 roundabout junction models are presented in **Table 19-28** for the Peak WCS weekday am and pm peak for both the 2021 forecast base year and the 2021 forecast plus construction traffic.

Table 19-28 Junction 4 Capacity and Delay Results

Scenario	Arm	AM Peak (07:50-08:50)			PM Peak (16:40-17:40)		
		RFC	Delay (s)	Queue (Veh)	RFC	Delay (s)	Queue (Veh)
2021 Forecast Base	A52 (Liquorpond Street)	0.69	6.94	2.24	0.72	8.82	2.49
	A16 (John Adams Way)	0.71	4.51	2.81	0.78	6.04	3.58
	A16 (Spalding Road)	0.68	6.57	2.65	0.82	12.31	4.33
Junction Level of Service		A			A		
2021 Forecast Base + Peak WCS Facility Construction Traffic	A52 (Liquorpond Street)	0.75	9.94	2.95	0.76	10.67	2.99
	A16 (John Adams Way)	0.79	6.63	3.78	0.79	6.34	3.77
	A16 (Spalding Road)	0.74	8.34	2.85	0.92	25.71	9.82
Junction Level of Service		A			B		

19.7.95 **Table 19-28** indicates that all arms in both the am and pm peak hours during the forecast 2021 base scenario currently operate within capacity with a maximum RFC of 0.82 (pm peak), with average queues of no more than five vehicles and a maximum delay of 13 seconds. The junction is therefore considered to be operating close to capacity and is therefore considered to be of medium sensitivity.

19.7.96 With the addition of the Facility's Peak WCS construction traffic, the traffic model indicates that the junction would continue to operate within the theoretical capacity, however the A16 (Spalding Road) would experience a maximum RFC of 0.92 which is over the recognised threshold of 0.85 in the pm peak (but within theoretical capacity). This corresponds with an increase of queues from 5 to 10 vehicles. Delays are expected to increase to 25.71 seconds (from 12.31 seconds).

19.7.97 It is considered that with the addition of the proposed Facility's Peak WCS construction traffic therefore the magnitude of change is assessed as medium on a receptor of medium sensitivity resulting in a short term **moderate adverse** effect.

19.7.98 The junction capacity assessment assumes that all employees travel to and from site during the network peak hours as a worst case scenario. In reality, employees are likely to arrive before 8am and depart after 8pm in accordance with the defined working hours of 8am to 8pm (with option of 7am to 7pm). As such employee traffic is likely to not occur within the network peak hour flows and the impact on the junction is likely to be reduced.

19.7.99 Notwithstanding, to provide further mitigation and to reduce any impacts on Junction 4 (and consequently all junctions in the study area, the OCTMP includes details of measures to encourage car sharing to reduce daily employee vehicle movements. These measures will further reduce the potential for employee vehicle movements that could occur during peak hours, ensuring that delays are managed to low magnitude levels.

19.7.100 The resultant impact would be infrequent, local and short term. The magnitude of effect could be reduced to low on a medium sensitive receptor resulting in a short term **minor adverse** residual effect.

19.7.101 It is therefore implicit that the Average WCS impact would result in a medium term **minor adverse** residual effect or lower, once mitigation has been included.

Potential Impacts during Operation

19.7.102 This section examines the WCS assumptions, forecasts the traffic generated by the Facility and assigns vehicle trips to the study area to establish a basis for assessing the potential transport impacts.

HGV Traffic Assumptions

19.7.103 The Developer's Principal Contractor has provided details of the predicted HGV traffic demand required for the Facilities infrastructure components. These are discussed below and include the predicted traffic distribution. **Chapter 5 Project Description** provides a full detail on the operation and process required of the Facility.

19.7.104 The traffic derivation is informed by a working pattern of 312 working days a year (Monday to Saturday) to begin in 2026 which is assumed to be the realistic start of operation. Notwithstanding, and in accordance with the 48 month construction programme (assessed as worst case commencing in 2021), the operational transport assessment assesses a worst case scenario of 2025 as start of operation.

Bale Shredding and Waste Bunker

19.7.105 It is anticipated that almost 100% of the composition of the RDF would be suitable for the thermal treatment plant due to the degree of off-site pre-processing and the versatility of the moving grate combustion process. Up to 1,200,000 tonnes of processed RDF would be supplied into the thermal treatment plant each year.

19.7.106 There will be some segregation of large metal particles which will be stored in a skip. As a WCS, there will be approximately 4,000 tonnes of waste produced per annum.

19.7.107 The total 4,000 tonnes of metal removal would equate to approximately 2 HGV movements per day.

19.7.108 The following raw materials are required per annum for the thermal treatment process:

- Limestone (984 tonnes per annum (p.a.));
- 25.5% Urea (6,459 tonnes p.a.);
- 100.0% Hydrated Lime (7,526 tonnes p.a.); and
- Activated Carbon (652 tonnes p.a.).

19.7.109 This equates to approximately six HGV movements per day and delivery by typical 20 t HGVs.

19.7.110 The Fuel Store will require a constant supply of oil which will be delivered by oil tankers and is predicted to be approximately six HGV movements per day.

19.7.111 The Carbon Recovery Plant is anticipated to require 12 HGV movements per day in relation to the carbon dioxide (CO_2) recovery process.

19.7.112 To cover for unforeseen HGV movements such as miscellaneous deliveries associated with servicing and waste management of the Facility, an additional 4 HGV movements per day have been included. **Table 19-29** provides a summary of the proposed operation daily traffic movements.

Table 19-29 Summary of Operation Traffic Movements

Operational Activity	Daily Traffic Movements
Bale Shredding plant (and waste bunker)	2
Thermal Treatment plant	6
Fuel Store	6

Operational Activity	Daily Traffic Movements
Carbon Recovery Plants	12
Miscellaneous	4
Totals	**30**

19.7.113 The operational access strategy consists of three accesses. Two primary accesses including a main site access on Nursery Road for employees and HGVs and an 'Exit Only' access is provided on Bittern Way leading to Marsh Lane for HGVs.

19.7.114 This strategy reduces HGV conflicts at the main site entrance and along Nursery Road increasing site safety and reducing traffic delay.

19.7.115 A secondary access is provided at the end of the un-named spur road leading to the wharf and will only be utilised for very infrequent maintenance vehicles at the wharf and Lightweight Aggregate Plant and thus traffic movements would be negligible.

19.7.116 In summary, approximately 30 HGV daily movements are predicted to be required during operation of the Facility. Most HGV movements are removal of materials to local sites which are within 500 m of the Facility. Notwithstanding to fully assess the impacts of the HGV demand, the HGVs have been assumed to travel outside of the immediate Boston area into the wider Lincolnshire county as a WCS.

Employee Traffic Assumptions

19.7.117 The Applicant's Principal Contractor has provided details of the expected resourcing requirements during operation. Based on this input, it is estimated that a workforce of 108 employees will be required during operation peaks. Details of the known workforce and likely shift patterns are provided in **Table 19-30**.

Table 19-30 Employee Demand and Shift Patterns

Operational Activity	Shift Pattern	Quantum of Operatives
Wharf and RDF bale storage area	24/7 utilising a three shift pattern	22
Conveyor systems	No employees required	
Bale shredding plant	24/7 utilising a three shift pattern	6
Thermal treatment plant	Monday to Friday Dayshift – general site roles	16
	24/7 utilising a three shift pattern	32
Air cooled condensers	No employees required	

Carbon recovery plants	9 hour day - Monday to Saturday	4
LWA plant	24/7 utilising a three shift pattern	28
Totals		**108**

19.7.118 The 2011 'method to travel to work' census data identified that 63% of employees travel to work by SOV within the Boston area. This equates to 68 out of 108 employees using a car to travel to the Facility. To cover uncertainties in operatives travel, a 28% contingency factor has been applied to the SOV employees equating to 173 vehicle trips (rounded up) (86 arrivals and 86 departures).

19.7.119 Distribution of employees has been estimated to be 70% arriving from the north of the Facility and 30% from the south. It is assumed that most of the operational workforce will live locally within Boston and thus distribution is weighted to the north of the Facility where the majority of the residential areas are located.

Traffic Impact Screening

19.7.120 With reference to the GEART (Rule 1 and Rule 2), a screening process has been undertaken for the study area to identity routes that are likely to have an increase in traffic flows that would require further impact assessment.

19.7.121 **Table 19-31** summarises the total daily peak vehicle movements (i.e. arrivals and departures) of all materials and personnel for operation. The table also provides a comparison of the peak daily operational flows with the forecast background daily traffic flows for 2025.

Table 19-31 Link Screening (2025 - Operation)

Link	Description	Link Sensitivity	Background 2025 Flows (24hr AADT*)		2025 Peak Daily Operational Vehicle Movements		Percentage Increase	
			All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
1	Marsh Lane	Low	7,404	482	203	30	2.7 %	6.2 %
2	Marsh Lane	Medium	10,198	499	203	30	2.0 %	6.0 %
3	A16	Low	21,303	1,047	56	30	0.3 %	2.9 %
4	A16	Low	27,303	1,057	177	30	0.6 %	2.8 %
5	A16 (Spalding Road)	Low	30,406	1,204	151	30	0.5 %	2.5 %
6	A52 (Liquorpond Street)	High	33,170	758	60	0	0.2 %	0.0 %
7	A16 (John Adams Way)	Medium	44,479	1,584	90	30	0. 2%	1.9 %
8	B1397 (London Road)	High	13,704	261	26	0	0.2 %	0.0 %
9	Wyberton Low Road	High	3,254	11	0	0	0.0 %	0.0 %
10	Nursery Road / Lealand Way	Low	1,780	111	188	15	10.5 %	13.5 %
11	Marsh Lane	Low	3,561	223	15	15	0.4 %	6.7 %
12	Bittern Way	Low	1,168	56	15	15	1.3 %	27.0 %

19.7.122 In accordance with GEART only those links that are showing greater than a 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 potential traffic impact upon receptors.

19.7.123 It is noted from **Table 19-31** that no links within the study area are meeting the GEART rules. However, Link 12 experience increases close to the 30 % HGV component Rule 2 threshold and as such, a small change in demand or background traffic flows could result in potentially significant effects. Therefore, Link 12 is taken forward for further assessment.

Impact 1: Severance

19.7.124 With reference to Table 19-31 and Table 19-7, it is noted that Link 12 experiences traffic flows below the 30 % magnitude of effect threshold. This results in the magnitude of effect assessed as very low on a low sensitivity link leading to effect significance of **negligible**.

Impact 2: Pedestrian Amenity

19.7.125 GEART suggests that a threshold of a doubling of total traffic flow or the HGV component may lead to a negative impact upon pedestrian amenity. Link 12 experience traffic flows significantly below the 100% threshold as identified by **Table 19-31**, this results in a magnitude of effect as very low on a low sensitive link giving an effect significance of **negligible**.

Public Right of Way Closures

19.7.126 The footpath sections closed during construction would remain permanently closed during operation. This affects BOST/14/4, BOST/14/10 and Bost/14/5. The diversion for these route closures would follow the route of an existing footpath, which follows the route of Roman Bank (also known as ‘Sea Bank’) along footpath sections BOST/14/11 and BOST/14/9. See **Chapter 5 Project Description**, **Figure 5.3** which shows the footpath network and identifies the footpath sections to be closed.

19.7.127 The diversion would affect pedestrian amenity because the route of footpath section BOST/14/11 at the intersection with BOST/14/9 is within the operational boundary of the Facility. Therefore, pedestrians would be routed close to the site roads within close proximity of operational site traffic vehicles, thus decreasing the relative pleasantness of the journey.

19.7.128 Embedded mitigation is provided via a fenced public footbridge which will

be constructed during construction and will provide access across the existing gap in the Roman Bank which will allow for increased pedestrian safety when negotiating access over the conveyor system.

19.7.129 The following improvements have been discussed with LCC and BBC to provide additional community benefit along the Roman Bank footpath route:

- relocation of flood bank fencing;
- vegetation clearance;
- aesthetic improvements; and
- improving accessibility to the remaining routes in the area.

19.7.130 Consequently, this would result in a very low magnitude of effect in perception of amenity for pedestrians.

19.7.131 Thus, a very low magnitude of effect is assessed on a high sensitive receptors which would result in a **minor adverse** effect.

Impact 3: Road Safety

19.7.132 **Section 19.6** established the road safety environment for the study area. This data has been screened to identify sites that could be sensitive to changes in traffic, known as ‘collision cluster’ sites. The collision cluster screening criteria has been based on four personal injury collisions occurring in a five year period in a 50m radius.

19.7.133 Three collision cluster sites have been identified with the locations shown in **Figure 19.6**.

19.7.134 **Table 19-32** provides a summary of the collision cluster and includes details of the peak operational flows in comparison to the forecast background daily traffic flows in 2025.

Table 19-32 Collision Cluster Information (2025 - Operation)

Link	Cluster Ref no.	Location	All Vehicles	HGVs	Summary
5/6/7	C1	Roundabout junction A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street)	0.2 % – 0.5 %	0.0 % - 2.5 %	It is considered that a peak change in total traffic of 0.5 % and HGV traffic of 2.5% represents a very low magnitude of effect on a high sensitive receptor (as determined in **Section 19.7**). Therefore, the impact is assessed as **minor adverse.**
4/5/8	C2	Roundabout junction B1397 (London Road)/A16	0.2 % – 0.6 %	0.0 % - 2.5 %	It is considered that a peak change in total traffic of 0.6 % and HGV traffic of 2.5 % represents a very low magnitude of effect on a low sensitive receptor (as determined in **Section 19.7**. Therefore, the impact is assessed as **negligible.**
2/3/4	C3	Roundabout junction of the A16 / Marsh Lane	0.3% – 2.0%	2.8 % - 6.0 %	It is considered that a peak change in total traffic of 2.0 % and HGV traffic of 6.0% represents a very low magnitude of effect on a low sensitive receptor (as determined in **Section 19.7**. Therefore, the impact is assessed as **negligible.**

19.7.135 **Table 19-32** identifies that all three collision clusters within the study area would experience very low magnitude of effect on low to high sensitive receptors resulting in a **negligible** to **minor adverse** effect.

Impact 4: Driver Delay

19.7.136 The GEART screening thresholds do not apply to this effect as the potential effect is defined as significant when the traffic system surrounding the Facility under consideration is at or close to capacity.

19.7.137 As set out in **Table 19-31**, 30 HGVs are predicted to be generated by the Facility per day in operation, this equates to approximately three HGV movements per hour when profiled over a 10 hour day within a typical 12 hour delivery window (7am to 7pm). It is proposed that no HGVs will deliver outside of the defined delivery hours.

19.7.138 It is also likely that the 86 arrivals and 86 departures of operatives, when disaggregated to the different shift patterns and shift times would average approximately 29 arrivals and departures during shift change over.

19.7.139 The workforce shift patterns have yet to be confirmed. However, it is unlikely that the operatives would arrive and depart within the traditional highway peak hours (considered to be 8am to 9am and 5pm to 6pm) as the times of the shift patterns would fall outside of these hours. As such operational traffic would be present on the highway network during relatively quieter traffic periods and in isolation would not significantly increase existing highway network congestion issues.

19.7.140 The magnitude of effect for the combined profile of HGVs and operatives is therefore assessed as very low on low to high value receptors resulting in a **negligible** to **minor adverse** effect.

19.8 Potential Impacts during Decommissioning

Assessment assumptions and limitations

19.8.1 The following assumptions have been made for the decommissioning of the Facility:

- The Facility will be demolished or redeveloped (except for the wharf which forms the flood defence); and
- Demolition will be undertaken to current best practices.

19.8.2 Whilst details regarding the decommissioning of the Facility are currently

unknown, considering the WCS which would be the removal and reinstatement of the current land use at the Principal Application Site, it is anticipated that the impacts would be no worse than those during construction.

19.8.3 The decommissioning methodology would need to be finalised nearer to the end of the lifetime of the Facility to be in line with guidance, policy and legislation at the point of decommissioning. Any such methodology would be agreed with the relevant authorities and statutory consultees. The decommissioning works could be subject to a separate licensing and consenting approach.

19.8.4 It is anticipated that the impacts during decommissioning will be similar in nature to those of construction with reduced traffic generation.

19.9 Cumulative Impacts

19.9.1 The assessment of cumulative impact will be undertaken as a two stage process. Firstly, all the impacts from previous section will be assessed for potential to act cumulatively with other projects. This summary assessment is set out in **Table 19-33**.

Table 19-33 Potential Cumulative Impacts

Impact	Potential for cumulative impact	Rationale
Construction		
Severance	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Amenity	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Road Safety	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Driver Delay	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Operation		
Severance	No	Impacts were observed as negligible during the operational assessment and can be scoped out for cumulative assessment.
Amenity	No	Impacts were observed as negligible during the operational assessment and can be scoped out for cumulative assessment.
Road Safety	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Driver Delay	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
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 relevant authorities. A decommissioning		

Impact	Potential for cumulative impact	Rationale
plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

19.9.2 The second stage of the CIA is an assessment of the Facility's study area and the potential effects of other projects scoped into the CIA upon the same receptors. To identify whether this may occur, the potential nature and extent of effects arising from all projects scoped into the CIA are to be identified.

19.9.3 The projects identified for potential cumulative impacts with the Facility have been discussed and agreed with BBC. **Table 19-34** summarises those projects which have been scoped into the CIA due to their temporal or spatial overlap with the potential effects arising from the Facility.

Table 19-34 Summary of Projects Considered for the CIA in Relation to Traffic and Transport

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
Boston Barrier Flood Defence	Transport and Works Act Order consented	2017 – ongoing (completed August 2021)	Boston Barrier at closest point to the Application Site is 500 m.	ES	Complete / high	No	Based on the latest Boston Barrier Flood Defence timescales, it is determined that the scheme will complete by August 2021 ahead of the planned earliest start date of construction of the Facility.
Battery Energy Storage Plant (Marsh Lane) B/17/0467	Application approved	2017 - ongoing	Beeston Farm less than 10 m from the Application Site	Detailed application	Incomplete / low	Yes	The construction traffic associated with the Battery Energy Storage Plant will travel on some of the same road links as the proposed Facility. Therefore, cumulative impacts are possible. Minimal maintenance traffic is associated with the operation of the Battery Energy Storage Plant. The CIA therefore focuses on the potential for construction impacts only.
The Quadrant Mixed-use development of 502 dwellings and commercial/ leisure uses B/14/0165	Application approved Construction started	2014 - ongoing	Quadrant 1 1.2 km from the Application Site	Details within ES	Quadrant 1 – Complete/ high Quadrant 2 - Incomplete/ low	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
Land to the west of Stephenson Close Residential Development of up to 85 dwellings B/17/0515	Application not yet determined	2017 - ongoing	From the most eastern part of the Scheme to the Application Site is 550 m.	Outline only	Incomplete/ low	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Triton Knoll Offshore Wind Farm	DCO consented	2008 - ongoing	Onshore cable corridor and Construction compound at Langrick 9.7 km from the Application Site	ES	Complete/ high	No	Based on the latest Triton Knoll Electrical System Cable Route Sequencing Plan (Murphy, 2019). The Cable route and substation will be completed within Q4 of 2020 ahead of the planned earliest start date of construction of the Facility.
Viking Link Interconnector B/17/0340	Application approved	2014 - 2023	Bicker Fen substation 14.4 km from the Application Site	ES	Incomplete / low	Yes	The construction traffic associated with the Viking Link Interconnector will travel on some of the same road links as the proposed Facility. Therefore, cumulative impacts are possible. Minimal maintenance traffic is associated with the operation of the Viking Link Interconnector. The CIA therefore focuses on the potential for construction impacts only

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
Sutterton Demolition of garage buildings and the construction of 21 no. dwellings Station Road, Sutterton, Boston, Lincolnshire PE20 2JH B/15/0084	Application approved	2015 – ongoing	10.3 km south (following A16 and B1397) of the Application Site	Outline only	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land west of Boston Road, Kirton, Boston, Lincolnshire, PE20 1ES B/15/0266	Application approved	2015 – ongoing	4 km south west of the Application Site	Approval of reserved matters	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land adjacent to London Road/Drainside for construction of 21 no. dwellings South, Kirton, Boston, Lincolnshire, PE20 1JH	Application approved	2015 – ongoing	6 km south west of the Application Site	Outline only	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
B/17/0362 in relation to B/16/0457							
Land south of Endeavour Way, PE20 0JA Erection of 14,655sq.m Class B2 (general industrial) floor space B/15/0506	Application Approved	2015 – ongoing	10 km south west of the Application Site	Detailed application	Complete / high	No	The Transport Statement provided in support of the planning application indicated that traffic increases would not be significant during operation.
Land off Station Road, PE20 3NX Erection of 63 no. residential dwellings with associated infrastructure B/16/0052	Application approved	2016 – ongoing	8 km west of the Application Site	Detailed application	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
The Junction Community Hall, PE20 1QJ Construction of community building B/16/0062	Application approved	2016 – ongoing	4 km south west of the Application Site	Detailed application	Complete / high	No	The traffic increases during construction and operation of the community building would be negligible and do not warrant further assessment.

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
Yew Lodge, PE20 2EE Demolition of outbuildings and the construction of 14 no. dwellings B/16/0313	Application approved	2016 – ongoing	8 km south west of the Application Site	Outline application with some matters reserved for later approval	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land at Station Road, PE20 2JH Erection of 21 dwellings, new vehicular access, private access road and associated works B/16/0409	Application approved	2016 – ongoing	8 km south west of the Application Site	Detailed application	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land west of Boston Road, Kirton B/17/0171	Application approved	2017 - ongoing	3 km south west of the Application Site	Detailed application	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Woods Nurseries Site, Swineshead, Boston Proposed residential	Application approved	2017 – ongoing	9 km west of the Application Site	Outline application	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
development of 41 market and affordable dwellings B/17/0244							cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land to the rear of Westminster Terrace, Swineshead, Boston Construction of 18 dwellings B/17/0396	Application approved	2017 – ongoing	8 km west of the Application Site	Detailed application	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land adjacent to Avalon Road, PE20 1QR Construction of 4 no. detached buildings comprising 16 no. industrial units B/18/0057	Application approved	2018 – ongoing	6 km south west of the Application Site	Detailed application	Complete / high	No	The traffic increases during construction and operation of the commercial buildings would be negligible and do not warrant further assessment.
Land to the north and west of Coles Lane, PE20 3NS Change in site boundary of planning	Application approved	2018 – ongoing	8 km west of the Application Site	Detailed application	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
permission B/17/0404 B/18/0382							projects is inherent in the traffic and transport impact assessments.
Plots C and D, The Quadrant, Land adjacent to A16, Wyberton, Boston For approval of reserved matters (appearance, layout and scale) for the construction of hotel, public restaurant and drive-thru B/18/0413	Application approved	2018 – ongoing	1 km south west of the Application Site	Application for approval of reserved matters	Complete / high	No	The Transport Statement provided in support of the planning application indicated that traffic increases would not be significant during operation. Refer to outline planning application B/14/0165 for CIA assessment rationale.
The Quadrant, PE21 7HT Application for approval of reserved matters from application B/14/0165 (roads 6, 7 and 8) B/19/0027	Application approved	2018 – ongoing	1 km south west of the Application Site	Application for approval of reserved matters	Complete / high	No	Construction of existing roads as part of ongoing development of the Quadrant. Refer to outline planning application B/14/0165 for CIA assessment rationale.

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
Wash Road/ Station Road. Kirton Demolition of dwelling and erection of 30 dwellings. B/15/0503	Application approved at appeal	2015 – ongoing	4 km south west of the Application Site	Application for demolition, outline application for erection of dwellings and matters reserved for later consideration	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Phase 2 Heron Park Construction of 32 dwellings B/18/0489	Application approved	2018 - ongoing	0.61 km south west of the Application Site	Detailed application	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land south of Wainfleet Road, Boston, PE21 9RN Construction of 200 dwellings B/17/0511	Outline application approved	2017 - ongoing	3.07 km north east of the Application site	Detailed application	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
Land east of Lindis Road (inc. former Shooters Yard), Fishtoft, Boston 178 dwellings following approval of B/16/0436 B/18/0405	Application approved	2016 - ongoing	1.9 km north east of the Application site	Application for approval of reserved matters	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land north of Middlegate Road (west), Frampton, Boston, PE20 1BX 195 dwellings following approval of B/16/0380 B/18/0039	Application approved at appeal	2016 - ongoing	3.8 km south west of the Application Site	Application for approval of reserved matters	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land off Wash Road, Kirton, Boston Storage and distribution park comprising of approximately 58,000sq.m of B8, B2 and B1.	Application approved	2005 - 2006	3.8 km south west of the Application Site	Detailed application	Complete / high	No	The Transport Assessment details that the traffic increases during construction and operation of the distribution buildings would not be significant.

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
B/05/0562							
Land off Gilbert Drive, Boston, Lincolnshire 1200 dwellings and associated infrastructure B/17/0367	Application not yet determined	2017 - ongoing	3.6 km west of the Application Site	Outline planning application with all matters (layout, scale, appearance, landscaping and access) reserved for later consideration	Complete / high	No	The Transport Assessment provided in support of the planning application indicated that traffic increases would not be significant during operation within the Facility's Study Area.
Land at Station Road/Spalding Road, Sutterton, Boston, PE20 2EU Residential development of 256 no. dwellings with associated access and infrastructure B/19/0383	Application not yet determined	2017 - ongoing	9 km south of the Application Site	Detailed application	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land North of Tytton Lane East, Wyberton, Boston, PE21 7TD	Application not yet determined	2020 – ongoing	1.26 km west of the Application Site	Outline planning permission with all matters reserved	Complete / high	No	Sub-regional growth in housing as adopted by the region's Local Plans has been captured within TEMPro future year growth factors for 2021 and 2025. Therefore, the

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
132 dwellings with all matters reserved B/20/0235				(Access, Appearance, Landscaping, Layout and Scale)			cumulative effect of housing projects is inherent in the traffic and transport impact assessments.
Land off Lealand Way, Marsh Lane Industrial Estate, Boston, PE21 7SW Installation of a 6.0 MW Gas Fired Power Generation Site, associated infrastructure and new means of access B/19/0474	Application approved	2019 – ongoing	422 m north of the Application Site	Detailed Application	Incomplete / low	No	No Traffic Assessment has been provided for the application, it is unlikely that a site of this nature would generate significant traffic during the construction and operation of the generation site.

19.9.4 **Table 19-35** details the following projects which will be assessed for potential direct cumulative impacts.

Table 19-35 Cumulative Projects for Assessment

Construction (2021 – 2025)
Battery Energy Storage Plant (Marsh Lane) B/17/0467
Viking Link Interconnector UK Onshore Scheme – B/17/0340
Operation (2025 onwards)
None

Cumulative Impacts During Construction

Battery Energy Storage Plant (BESP) (Marsh Lane) B/17/0467

19.9.5 The application seeks consent for an Energy Storage System which will provide ancillary services to the National Grid, providing frequency response by discharging power into the grid when demand exceeds supply and taking power from the grid when supply exceeds demand.

19.9.6 Information relating to the BESP has been taken from the Boston BESP Planning Statement (TAC_Architects, 2018) which was published in January 2018.

19.9.7 The construction period of the BESP is estimated at a maximum of 26 weeks. The hours of work are proposed between 7am to 6pm Monday to Friday and 7am to 2pm on Saturdays.

19.9.8 The Planning Statement identifies a peak period during construction of 8 weeks which will see 90 daily HGV vehicles routing along Marsh Road and Nursery Road. An additional average of 10 vehicle movements are associated with employee arriving / departing from site. The route utilises the Facility's study area links 1, 2 and 10, **Table 19-36** assigns the BESP peak movements to the Facility's study area.

Table 19-36 BESP Peak Daily Traffic Movements Assigned to Cumulative Highway Links

Facility Links	BESP Employee Vehicle	BESP HGVs	BBFD Total Vehicles
Link 1	10	90	100
Link 2	10	90	100
Link 10	10	90	100

19.9.9 As there are no details regarding an indicative construction timeline of the BESP it is assumed that potential overlap of construction between the BESP and the

Facility could occur.

Viking Link Interconnector (VLI) UK Onshore Scheme - B/17/0340

19.9.10 The National Grid produced an ES in August 2017 in support of a planning application for the following UK Onshore Scheme:

- 67 km underground high voltage Direct Current (DC) cable from the proposed landfall at Boygrift to the proposed converter station at North Ing Drove;
- A single converter station;
- 2.34 km of underground Alternating Current (AC) cable from convertor station and to existing Bicker Fen Substation; and
- 2.8 km permanent access road from the convertor station to the A52.

19.9.11 The onshore planning application was granted consent in 2018, with construction due to begin in 2020 and completion by the end of 2023.

19.9.12 Information relating to the UK Onshore Scheme has been taken from the ES which was published in August 2017, in particular, Chapter 14 Traffic and Transport (DC Underground Cable) (National Grid Viking Link Limited 2017, 2017) and Chapter 25 Traffic and Transport (Converter Station) (National Grid Viking Limited, 2017) has been used to inform this CIA.

19.9.13 The UK Onshore Scheme construction programme pertinent to the underground DC cable (2020 to 2023) occurs during the same time period as the Facility (2021 – 2024) with the hours of construction stated as 7am to 7pm, Monday to Saturday. The construction traffic associated with the VLI will travel on some of the same roads links as the BEAF, Specifically Links 3, 4, 5, 6 and 7.

19.9.14 The DC cable route, extending from the landfall site to the converter station site has been split into four route sections. Peak traffic distributions for both HGVs and employees have been assigned to the highway network for each route section. This has provided a robust assessment to determine the maximum environmental impacts associated with the scheme.

19.9.15 This CIA has utilised the VLI assessment scenario of uplifted construction traffic (20%) as a worst case which were assigned to a number of receptor sites surrounding Boston. The following receptor sites have a direct impact on the Facility's Study Area:

- 25 – A16 Hilldyke (north of Boston).

- 58 – A1121 Hubbert's Bridge (west of Boston).
- 61 – A16 Kirton (south of Boston).

19.9.16 **Table 19-37** presents the peak worst case VLI traffic assignment according to route section number and associated receptor site number for links which share traffic between each project.

Table 19-37 VLI DC Underground Cable Peak Daily Traffic Movements Assigned to Cumulative Highway Links.

Facility Links	VLI Receptor no. (Route Section no.)	VLI Employee Vehicle	VLI HGVs	VLI Total Vehicles
Link 3	61 (3)	8	82	90
Link 4	61 (3)	8	82	90
Link 5	61 (3)	8	82	90
Link 7	25 (1)	11	120	131

19.9.17 The UK Onshore Scheme construction programme pertinent to the converter station (2019 to 2022) occurs during the same time period as the Facility (2021 – 2025) with the hours of construction stated as 7am to 7pm, Monday to Saturday. The construction traffic associated with the converter station will travel on some of the same roads links as the Facility.

19.9.18 The converter station is to be located at Bicker Fen off the A52. A review of the HGV traffic generation within the ES identified a peak daily total of 66 daily HGV movements (including a 20% HGV uplift). Of these 66 HGV movements 33% would travel along Links 6 and 7 of the Facility. 70% of the identified 47 employee movements (including 20% uplift) 70% would travel along links 6 and 7. The resultant peak traffic movements associated with the converter station are presented in **Table 19-38** which share traffic on the links with the Facility.

Table 19-38 VLI Converter Station Peak Daily Traffic Movements Assignbed to Cumulative Highway Links.

Facility Links	Employee Vehicle	HGVs	Total Vehicles
Link 7	33	22	55

Cumulative Traffic Impact Screening

19.9.19 With reference to the GEART (Rule 1 and Rule 2), a cumulative screening process has been undertaken for the Study Area to identity routes that are likely to have an increase in traffic flows for the two identified projects in combination with the Facility's traffic that would require further impact assessment.

19.9.20 **Table 19-39** summarises the total daily peak vehicle movements (i.e. arrivals and departures) of all materials, personnel and plant for the Peak and Average WCS of the Facility together with the two identified cumulative projects. Only links which share cumulative traffic flows within the study area have been presented.

19.9.21 **Table 19-39** also provides a comparison of the Peak and Average WCS daily in conjunction with each individual cumulative project construction flows with the forecast background daily traffic flows for 2021 (assumed worst cast realistic start of construction). Cells highlighted blue indicate GEART Rule 1 or Rule 2 screening thresholds have been met.

19.9.22 As detailed construction programmes are not available for each cumulative project, the base assumption is that the peak traffic demand for each project overlap providing a WCS.

Table 19-39 Cumulative Screening Process

Link	Description	Background 2021 Flows (24hr AADT*)		2021 Peak WCS Daily Facility Construction Vehicle Movements		2021 Average WCS Daily Facility Construction Vehicle Movements		Cumulative Projects				Cumulative Assessment			
								BESP		VLI UK Onshore Scheme		Percentage Increase of Cumulative projects and Facility Peak WCS Construction Movements		Percentage Increase of Cumulative projects and Facility Average WCS Construction Movements	
		All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
1	Marsh Lane	6,470	451	668	293	445	70	100	90	0	0	11.1%	85.0%	7.9%	35.5%
2	Marsh Lane	9,065	467	668	293	445	70	100	90	0	0	8.1%	82.1%	5.7%	34.3%
3	A16	18,932	979	349	293	126	70	0	0	90	82	2.3%	38.3%	1.1%	15.5%
4	A16	24,531	988	612	293	389	70	0	0	90	82	2.9%	37.9%	1.9%	15.4%
5	A16 (Spalding Road)	27,295	1,125	555	293	333	70	0	0	90	82	2.4%	33.3%	1.5%	13.5%
6	A52 (Liquorpond Street)	30,295	709	131	0	131	0	0	0	121	100	0.8%	14.1%	0.8%	14.1%
7	A16 (John Adams Way)	40,093	1,481	424	293	201	70	0	0	186	142	1.3%	26.5%	0.7%	11.5%
10	Nursery Road / Lealand Way	1,780	104	480	293	258	70	100	90	0	0	34.9%	368.2%	21.5%	154.0%

19.9.23 In accordance with GEART, only those sensitive links that show greater than 10% increase in total traffic flows (or HGV component) or, for all other links, a greater than 30% increase in total traffic of the HGV component are considered when assessing the traffic effect of severance and pedestrian amenity upon receptors.

19.9.24 It is noted from **Table 19-39**, that links 1, 2 and 10 are above the GEART screening thresholds during the Peak WCS and Average WCS during cumulative movements between the BESP and the Facility and as such could result in potentially significant effects.

19.9.25 As detailed above, the peak period of the BESP is predicted to last a total of 8 weeks, thus it is proposed that a commitment is to be contained within the Facility's OCTMP for the Applicant and its contractors to engage with the BESP contractors. Liaison between both projects would enable opportunities in programming project peak construction activities so that they do not coincide together thus avoiding significant impacts of cumulative peak traffic.

19.9.26 It is noted from **Table 19-39**, that links 3, 4 and 5 are above the GEART screening thresholds during the Peak WCS only during the VLI and Facility cumulative movements and as such could result in potentially significant effects.

19.9.27 As the duration of the peak VLI period is unknown it is proposed that a commitment is to be contained within the Facility's OCTMP for the Applicant (Alternative Use Boston Projects Ltd) and its contractors to engage with National Grid. Liaison between both projects would enable opportunities in programming project peak construction activities so that they do not coincide together thus avoiding significant effects of cumulative peak traffic.

Cumulative Impacts During Operation

19.9.28 As detailed in **Table 19-31**, there are no operational impacts associated with the Facility, thus no cumulative impacts are anticipated.

Cumulative Impacts During Decommissioning

19.9.29 Whilst details regarding the decommissioning of the Facility are currently unknown, considering the WCS which would be the removal and reinstatement of the current land use at the Application Site, it is anticipated that the impacts would be no worse than those during construction.

19.9.30 The decommissioning methodology would need to be finalised nearer to the end of the lifetime of the Facility to be in line with guidance, policy and legislation at the point of decommissioning. Any such methodology would be agreed with the

relevant authorities and statutory consultees. The decommissioning works could be subject to a separate licensing and consenting approach.

19.9.31 It is anticipated that the impacts during decommissioning will be similar in nature to those of construction with reduced traffic generation.

19.10 Transboundary Impacts

19.10.1 There are no transboundary impacts with regard to traffic and transport as the Facility 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.

19.11 Inter-Relationships with Other Topics

19.11.1 To address the environmental impact of the Facility 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 19-41** summarises the inter-relationships that are considered of relevance to traffic and transport and identifies where they have been considered within the ES.

Table 19-40 Chapter Topic Inter-Relationships

Topic and Description	Related Chapter	Where addressed in this Chapter
The relationship between traffic and noise upon local residents.	**Chapter 10 Noise and Vibration**	Traffic data included in the assessment in **Section 19.5** and **Section 19.6.37** informs **Chapter 10 Noise and Vibration**.
The relationship between traffic and related air quality upon local residents.	**Chapter 14 Air Quality**	Traffic data included in the assessment in **Section 19.5** and **Section 19.6.37** informs **Chapter 14 Air Quality**.
The relationship between traffic and related emissions upon the health of local residents.	**Chapter 22 Health**	Traffic data included in the assessment in **Section 19.5** and **Section 19.6.37** informs **Chapter 22 Health**.

19.12 Interactions

19.12.1 The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic effects because of that interaction. The worst case impacts assessed within the chapter take these interactions into account and for the impact assessments are considered conservative and robust. For clarity, the areas of interaction between impacts are presented in **Table 19-41**, along with an indication as to whether the interaction may give rise to synergistic effects.

Table 19-41 Interaction Between Impacts

Construction						
	Severance	Pedestrian Amenity	Road Safety	Driver Delay	Noise and Vibration*	Air Quality*
Severance	-	Yes	Yes	Yes	Yes	Yes
Pedestrian Amenity	Yes	-	Yes	Yes	Yes	Yes
Road Safety	Yes	Yes	-	Yes	Yes	Yes
Driver Delay	Yes	Yes	Yes	-	Yes	Yes
Noise and Vibration*	Yes	Yes	Yes	Yes	-	Yes
Air Quality*	Yes	Yes	Yes	Yes	Yes	-
*Air quality and noise impacts are discussed in **Chapter 10 Noise and Vibration** and **Chapter 14 Air Quality** respectively.						
Operation						
No significant impacts						
Decommissioning						
It is anticipated that the decommissioning impacts will be similar in nature to those of construction.						

19.13 Summary

19.13.1 The summary of the impacts and mitigation measures are detailed in **Table 19-42** below.

Table 19-42 Impact Summary

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Effects
Construction – Peak WCS						
Impact 1: Pedestrian Severance	1, 2, 3, 4, 10.	Low to High	Very Low	Negligible - Minor	N/A	Negligible - Minor
Impact 2: Pedestrian Amenity	7	Medium	Very Low	Minor	N/A	Minor
	1, 2, 3, 4, 5	Low – Medium	Low - Medium	Minor	N/A	Minor
	10	Low	Medium	Minor	N/A	Minor
	6	High	Very Low	Minor	N/A	Minor
Impact 2: PRoW Closures	Boston Public Footpath No. 14.	High	Low	Moderate	Utilise traffic lights or banksmen to monitor crossing of section 14/11 during construction period.	Minor
Impact 3: Road Safety	Cluster 1	Very Low	High	Minor	N/A	Minor
	Cluster 2	Very Low	Low	Negligible	N/A	Negligible
	Cluster 3	Medium	Low	Minor	N/A	Minor
Impact 4: Driver Delay	Junction 1	Low	Low	Negligible	N/A	Negligible
	Junction 2	Medium	Low	Minor	N/A	Minor
	Junction 3	Low	Medium	Minor	N/A	Minor

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Effects
	Junction 4	Medium	Medium	Moderate	Commitment to be contained within OCTMP for details of employee traffic management for reduction in SOV.	Minor
Operation						
Impact 1: Pedestrian Severance	10	Low	Low	Negligible	N/A	Negligible
Impact 2: Pedestrian Amenity	10	Low	Very Low	Negligible	N/A	Negligible
Impact 2: PRoW Closures	Boston Public Footpath No. 14	High	Low	Minor	N/A	Minor
Impact 3: Road Safety	Cluster 1.	Very Low	High	Minor	N/A	Minor
	Cluster 2, 3.	Very Low	Low	Negligible	N/A	Negligible
Impact 4: Driver Delay	Junctions 1, 2, 3, 4.	Very low	Low - High	Negligible - Minor	N/A	Negligible - Minor
Decommissioning						
Whilst details regarding the decommissioning of the Facility 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 during construction. It is anticipated that the impacts during decommissioning will be similar in nature to those of construction with reduced traffic generation.						
Cumulative Construction Impacts with Other Developments						
The CIA has identified the potential for cumulative impacts with the Battery Energy Storage Plant and the Viking Link Interconnector UK Onshore Scheme. Therefore, the CIA presented in this ES examines the potential for cumulative impacts.						
Cumulative Operation Impacts with Other Developments						

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Effects
No significant impacts.						
Cumulative Decommissioning Impacts with Other Developments						
Whilst details regarding the decommissioning of the Facility 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 during construction. It is anticipated that the impacts during decommissioning will be similar in nature to those of construction with reduced traffic generation.						

19.14 References

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