



Fosse Green Energy

Preliminary Environmental Information Report

VOLUME

1

Chapter 13: Traffic and Transport

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Prepared for:

Fosse Green Energy Limited

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13. Traffic and Transport

13.1 Introduction

- 13.1.1 This chapter of the Preliminary Environmental Information (PEI) Report provides a baseline report and presents the findings of an assessment of the likely significant effects from Transport and Access as a result of the Proposed Development. For more details about the Proposed Development, refer to **PEI Report Volume 1 Chapter 2: Proposed Development Location, Chapter 3: Proposed Development Description** and **PEI Report Volume 2, Figures 3-2A and 3-2B**.
- 13.1.2 This chapter identifies and proposes measures to address the potential impacts and likely significant effects of the Proposed Development on Transport and Access during the construction, operation, and decommissioning phases of the Proposed Development.
- 13.1.3 This chapter is supported by the following appendices in **PEI Report Volume 3**:
- a. **Appendix 13-A: Traffic and Transport Policy and Guidance;**
 - b. **Appendix 13-B: Transport Scoping Presentation and Meeting Minutes;**
 - c. **Appendix 13-C: Traffic and Transport Significance Assessment Summary;** and
 - d. **Appendix 13-D: Receptor Traffic Flow Tables.**
- 13.1.4 This chapter is supported by the following figures in **PEI Report Volume 2**:
- a. **Figure 3-2A: Indicative South Facing Fixed Site Layout Plan;**
 - b. **Figure 3-2B: Indicative Single Axis Tracker Site Layout Plan**
 - c. **Figure 13-1: Transport Study Area;**
 - d. **Figure 13-2: Existing Walking and Cycling Network;**
 - e. **Figure 13-3: Traffic Survey Locations;**
 - f. **Figure 13-4: Heavy Goods Vehicle (HGV) Routing;** and
 - g. **Figure 13-5: Surrounding Highway Network.**

13.2 Legislation and Planning Policy

- 13.2.1 There are a number of policies that relate to how transport and access-related impacts should be assessed, in terms of identifying both the level of impact of the Proposed Development and any necessary mitigation.
- 13.2.2 Planning policy and guidance relating to transport (there is no relevant transport legislation) and relevant to the Proposed Development comprise

the following, of which a review is provided within **PEI Report Volume 3, Appendix 13-A:**

- a. National Planning Policy
 - i. Overarching National Policy Statement for Energy (NPS EN-1) (2023) (Ref 13-1);
 - ii. National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023) (Ref 13-2);
 - iii. National Policy Statement for Electricity Networks Infrastructure (EN-5) (2023) (Ref 13-3); and
 - iv. National Planning Policy Framework (2023) (Ref 13-4);
- b. National Guidance
 - i. National Planning Practice Guidance on Travel Plans, Transport Assessments and Statements (2014) (Ref 13-5);
 - ii. The Department for Transport (DfT) Circular 01/2022 (Ref 13-6);
 - iii. The Institute of Environmental Management and Assessment (IEMA) Guidelines for the Environmental Assessment of Traffic and Movement (2023) (Ref 13-7);
 - iv. Design Manual for Road and Bridges (DMRB) (Ref 13-8); and
 - v. Construction Logistics and Community Safety (CLOCS) CLOCS Standard, Version 4 (2022) (Ref 13-9);
- c. Local Planning Policy
 - i. Adopted Central Lincolnshire Local Plan (2023) (Ref 13-10);
 - ii. Lincolnshire Local Transport Plan 5 (2022) (Ref 13-11);
 - iii. Lincoln Transport Strategy 2020 to 2036 (2020) (Ref 13-12);
 - iv. Bassingham Neighbourhood Plan 2016-2036 (2017) (Ref 13-13); and
 - v. Thorpe on the Hill Neighbourhood Plan 2016-2036 (Made Plan) (Adopted March 2018) (Ref 13-14).

13.2.3 Tables providing details of how and where relevant elements of the above national and local planning policies (in terms of transport and access) are addressed in this PEI Report or the future Environmental Statement (ES) are provided within **PEI Report Volume 3, Appendix 13-A.**

13.3 Consultation

13.3.1 A request for an EIA Scoping Opinion was sought from the Secretary of State through the Planning Inspectorate in June 2023 as part of the EIA Scoping Process. A Scoping Opinion was received from the Planning Inspectorate on 25 July 2023 (**PEI Report Volume 3: Appendix 1-B: Scoping Opinion**).

- 13.3.2 Responses to comments received in the EIA Scoping Opinion in relation to traffic and transport are presented in **PEI Report Volume 3, Appendix 1-C: Scoping Opinion Responses**.
- 13.3.3 Consultation has since been undertaken with key stakeholders including Lincolnshire County Council (LCC), National Highways (NH) and North Kesteven District Council (NKDC) during a meeting on 13 December 2023 to review the following:
- The feedback received within the Scoping Opinion;
 - The latest information relating to the Proposed Development;
 - The key traffic and transport parameters relating to the construction phase, including the proposed construction programme, construction vehicle numbers, assessment scenario, working hours and travel patterns;
 - The proposed construction access points, vehicle routes and vehicle distribution methodology;
 - The proposed Study Area to inform the assessment, as well as a summary of the traffic surveys carried out in November 2023 to inform the baseline;
 - The proposed methodology for assessment and an initial highway impact assessment for the A46 during the peak construction phase;
 - The proposed scope and methodology for the transport deliverables including this PEI Report chapter and the Framework Construction Traffic Management Plan (CTMP);
 - The cumulative Proposed Developments to be considered; and
 - The Proposed Development programme leading up to submission of the Development Consent Order (DCO) Application.
- 13.3.4 During the meeting it was agreed that rather than producing a separate Transport Assessment (TA) it would be acceptable to prepare a short Transport Note containing any TA-specific content (where not covered elsewhere) and signposting the locations of the remaining TA components to minimise document crossover. A Transport Note will be prepared on this basis at ES stage.
- 13.3.5 The presentation and meeting minutes are held in **PEI Report Volume 3, Appendix 13-B**.

13.4 Assessment Methodology

- 13.4.1 This section sets out the scope and methodology for the preliminary assessment of the Traffic and Transport impacts of the Proposed Development.

Study Area

- 13.4.2 The Study Area has been defined to include areas of the highways and Public Rights of Way (PRoW) networks which, based on professional

judgement and experience of other similar solar nationally significant infrastructure projects (NSIPs), are considered to be Traffic and Transport features likely to be at risk from possible direct and indirect impacts that might arise from the Proposed Development. The Study Area is shown on **PEI Report Volume 2 Figure 13-1** and has been discussed and agreed with the local authorities. The Study Area includes an area beyond the Principal Site boundary and beyond the northern and southern extents of the Cable Corridor, as well as a section of the A15 to the east of the Site Boundary.

13.4.3 Consideration has been given to a number of locations within the surrounding highway network which could potentially be impacted. The following junctions have been considered based on traffic surveys which have been carried out within the Study Area of the Principal Site (see **PEI Report Volume 2, Figure 13-3**):

- a. Halfway House Roundabout – A46 (N)/ Unnamed Road/ A46 (S)/ Halfway House Lane;
- b. Haddington Lane/ Fosse Lane (north of the A46);
- c. North Hykeham Roundabout – A46 (N)/ Newark Road/ A46 (S)/ Middle Lane;
- d. Haddington Lane/ Old Haddington Lane (south of the A46);
- e. Haddington Lane (N)/ Butts Lane/ Haddington Lane (S)/ Stone Lane;
- f. Bridge Road/ Church Road/ Bassingham Road;
- g. Haddington Lane/ Bassingham Road/ Moor Lane; and
- h. Unnamed Road towards Witham St Hughs/ Moor Lane/ Norton Lane.

13.4.4 Additional junctions will be assessed in relation to the Cable Corridor and included in the ES.

13.4.5 The Study Area was discussed with LCC, National Highways and NKDC during the transport scoping meeting on 13 December 2023. As requested, the Study Area (as presented at the scoping meeting) was subsequently extended both north along the A46 (to include the North Hykeham Roundabout) and south on A15 towards the Springwell DCO Solar Farm. The Study Area is therefore considered to be agreed for the purposes of this PEI Report.

13.4.6 The Study Area proposed as part of this PEI Report has been determined by AECOM's understanding of the road network and where the likely impacts will be. Any additional junctions or parts of the network requested for inclusion by the highway authorities, can be assessed as part of the ES.

Sources of Baseline Information

13.4.7 The following sources of information have been used to inform the baseline and preliminary assessment presented within this chapter:

- a. Comprehensive set of traffic counts across the surrounding highway network (21 locations) in November 2023. The Transport Scoping Presentation within **PEI Report Volume 3, Appendix 13-B** as well as

PEI Report Volume 2, Figure 13-3 provide further details of the survey specification and locations;

- b. Baseline traffic data obtained for the A46 and South Hykeham Road based on Department for Transport (DfT) traffic counts to supplement the above;
- c. Traffic growth has been calculated using National Road Traffic Forecast (NRTF) growth factors and by applying National Transport Model (NTM) adjustments within the Trip Ends Model Program (TEMPro) (Ref 13-16) using National Trip Ends Model (NTEM) dataset v8.1 and the N RTP 2022 Core dataset;
- d. Local travel and network information gathered from various sources including local rail and bus operators;
- e. Personal Injury Collision (PIC) data from LCC for the highway network in the Study Area of the Proposed Development. This Study Area has been reviewed with LCC, National Highways, and NKDC (see above);
- f. Ordnance Survey (OS) Base Mapping to ascertain an accurate geographical representation of the areas in the Study Area of the Proposed Development;
- g. The construction staff distribution has been informed by:
 - i. 2021 Census data (TS060 – Industry dataset) to identify the approximate origins of residents who work within the construction industry and live within a 60-minute catchment of the site. Whilst it is acknowledged that this dataset was collected during the COVID-19 pandemic, this represents the latest information currently available;
 - ii. 2011 Census data (WU03EW – Location of usual residence and place of work by method of travel to work) to identify the approximate origins of residents who commute to the area (North Kesteven MSOA 003) as a car driver, and live within a 60-minute catchment of the site, in the absence of more recent journey to work data; and
- h. Route planning software, such as Google Maps, to inform the review of the most direct and functional routes to the Principal Site, based on the points of origin (above) and the proposed access points for the Proposed Development.

Scope of the Assessment

13.4.8 The following potential impacts have been considered as part of the EIA for the Proposed Development, based on the 2023 IEMA Guidelines for the Environmental Assessment of Traffic and Movement (Ref 13-7), for which a preliminary assessment is provided Section 13.7 of this chapter:

- a. During the construction and decommissioning phases:
 - i. Severance of communities;
 - ii. Pedestrian delay (incorporating delay to all non-motorised users);
 - iii. Non-motorised user amenity;

- iv. Fear and intimidation on and by road users;
- v. Road vehicle driver and passenger delay;
- vi. Road user and pedestrian safety; and
- vii. Large loads.

13.4.9 There are not expected to be any Hazardous and Dangerous Loads associated with the Proposed Development e.g. vehicles transporting explosives, oxidising/ toxic substances, radioactive material or corrosive substances. Therefore, Hazardous and Dangerous Loads have not been considered further in this assessment.

13.4.10 Through the EIA Scoping process, the Planning Inspectorate has agreed that the potential impacts listed above do not need to be considered in detail during the operation (and maintenance) phase as part of the EIA for the Proposed Development. The potential impacts listed above for the construction and decommissioning phases are therefore not considered further for the operation (and maintenance) phase and will not be considered as part of the ES.

Assessment Scenarios

13.4.11 The nature of the proposal is such that the greatest impact is likely to occur during the construction and decommissioning phases. The construction of the Principal Site is anticipated to take place over a 24 month period, or 30 months if phased, between 2031 and 2033, with peak construction expected to occur in 2032. The 24 month programme is expected to be the most rapid build-out, which will generate the highest predicted road trips; a slower or phased construction would therefore generate the same or lower impacts. In order to determine the likely effects of the Proposed Development, and in view of the above, the following scenarios have been considered:

- a. Baseline (2023) – AM, PM and Daily; and
- b. Peak Construction Year (2032) With and Without Development – AM, PM and Daily.

13.4.12 The baseline reporting sets out the existing conditions within the Study Area against which the construction impacts have then been assessed.

13.4.13 It is not considered that the conclusions of this PEI Report would change in the instance that the start of construction is delayed. For example, other cumulative Proposed Developments may have been completed by the time the Proposed Development construction begins, which would elevate the trips on the local road network in the future baseline. As the assessment criteria is based on a percentage change of vehicle numbers, a higher baseline flow would reduce the proportional impact that the Proposed Development has on the road network. This would reduce or maintain the levels of effect presented in this chapter.

13.4.14 As above, the decommissioning assessment year is assumed to be 2093 (60 years from opening) which is considered to be too far into the future to accurately predict traffic flows or junction forms. Therefore, the assessment of the construction phase has been used to determine the anticipated impact

of the Proposed Development during its decommissioning phase. This is likely to overestimate decommissioning impacts, which is expected to be shorter duration and will have fewer road trips than during construction.

Impact Assessment Methodology

Key Principles

- 13.4.15 The assessment methodology adopted in this PEI Report has been informed by the 2023 IEMA Guidelines (Ref 13-7). The guidelines outline the issues and the respective changes in volume and composition of traffic regarded as necessary before each issue results in traffic and transport impacts. The following criteria has been considered in this assessment:
- a. Severance;
 - b. Pedestrian Delay;
 - c. Non-Motorised User Amenity;
 - d. Fear and Intimidation;
 - e. Driver Delay;
 - f. Road Safety; and
 - g. Large Loads.
- 13.4.16 As agreed in the transport scoping presentation (**PEI Report Volume 3, Appendix 13-B**), an initial screening process of links and junctions has been conducted to identify receptors which record hourly traffic flow increases of less than 30 vehicles as a result of the Proposed Development. Receptors which do not meet this 30 vehicle threshold have been screened out and have not been further included in this assessment.
- 13.4.17 In addition to this, a 100 movement rule has been applied to the baseline hourly flows to downgrade the magnitude by one category if the receptor is assigned as High or Medium magnitude, where the baseline flows during that period (total vehicles and/or HGVs) are below 100 vehicles, since very low baseline flows could result in misleading percentage impacts being identified as a result of the Proposed Development.
- 13.4.18 The type of traffic which is anticipated to be generated by the Proposed Development has been categorised as follows: primarily general traffic, LGVs, HGVs and Abnormal Indivisible Loads (AILs). The vehicle routing and movements associated with the Proposed Development construction have been considered and discussed through consultation with LCC and National Highways.
- 13.4.19 The receptors which may be impacted upon have been identified based on the locations and volumes of the proposed construction traffic i.e. the forecast increase in vehicle movements. This has been completed by identifying the percentage increases in vehicular activity along the identified construction routes when compared to recent traffic count data (factored up to the future baseline year of 2032) for road links and junctions within the transport and access Study Area.

- 13.4.20 Typically, when assessing the impacts of traffic effects, there are a range of particular groups and locations which may be sensitive to changes in traffic conditions compliant with the criteria previously outlined.
- 13.4.21 These are outlined in the 2023 IEMA Guidance (Ref 13-7) as 'Affected Parties', as follows:
- People at home;
 - People at work;
 - Sensitive and/or vulnerable groups (including young age, older age, income, health status, social disadvantage and access and geographic factors);
 - Locations with concentrations of vulnerable users (e.g. hospitals, places of worship and schools);
 - Retail areas;
 - Recreational areas;
 - Tourist attractions;
 - Collisions clusters and routes with road safety concerns; and
 - Junctions and highway links at (or over) capacity.
- 13.4.22 As a general rule, the forecast changes to baseline (magnitude of change), the relative value/sensitivity/importance of the affected receptor and the scale, nature and significance of the effect (consequence) should be considered. In addition, the anticipated effect should be classified as short-term, medium-term or long-term, as well as permanent or temporary.
- 13.4.23 To calculate the trip distribution of workers travelling to and from the proposed construction compounds each day, a simple gravity model has been developed based on 2021 Census data (representing the latest information currently available) for construction workers living within a 60-minute catchment area of the site. This has then been reviewed against journey to work data from the 2011 Census, based on workers travelling to the site (North Kesteven MSOA 003) as a car driver. Construction traffic associated with the Proposed Development has been distributed onto the local highway network to calculate the resultant percentage increases on each link.
- 13.4.24 Baseline traffic flows have been factored up to the identified peak year of construction (2032) by adopting growth factors derived from TEMPro v8.1 (Ref 13-16) for the relevant areas impacted by the Proposed Development.

Sensitivity

- 13.4.25 The general criteria for defining the importance or sensitivity of receptors are set out in **Table 13-1**, which applies to the assessment of Severance, Pedestrian Delay, Non-Motorised User Amenity, and Fear and Intimidation. Key factors influencing this include:
- The value of the receptor or resource based upon empirical and/or intrinsic factors, for example considering any legal or policy protection

afforded which is indicative of the receptor or resources' value internationally, nationally or locally; and

- b. The sensitivity of the receptor or resource to change, for example is the receptor likely to acclimatise to the change. This will consider legal and policy thresholds which are indicative of the ability of the resources to absorb change.

Table 13-1: Sensitivity / Value Criteria for Severance, Pedestrian Delay, Non-Motorised User Amenity, and Fear and Intimidation

Sensitivity / Value Sensitivity / Value Criteria

High	Road Links and Junctions: More than two sensitive users present (e.g. schools, play areas, care/retirement homes, disabled parking bays, hospitals, places of worship, historic buildings) Walk/Cycle Links including PRoW: Heavily trafficked highway with on-road pedestrian/cycle route
Medium	Road Links and Junctions: Two sensitive users present (e.g. schools, play areas, care/retirement homes, disabled parking bays, hospitals, places of worship, historic buildings) Walk/Cycle Links including PRoW: Lightly trafficked highway with on-road pedestrian/cycle route
Low	Road Links and Junctions (at least one of the following): • One sensitive user present (e.g. schools, play areas, care/retirement homes, disabled parking bays, hospitals, places of worship, historic buildings) • Many residential properties with direct frontage to highway link being used as construction route • Pedestrians using footways, PRoW and/or crossings on highway link • Cyclists using on-road designated cycle routes along highway link Walk/Cycle Links including PRoW: Heavily trafficked highway with off-road pedestrian/cycle route
Very Low	Road Links and Junctions: No sensitive users or receptors along link, or at least one of the following: • Few residential properties with direct frontage to the highway link being used as a construction traffic route • Workplaces with direct frontage to highway link being used as construction route • Cyclists using off-road designated cycle routes along highway link Walk/Cycle Links including PRoW: Pedestrian/cycle route not running alongside highway, or lightly trafficked highway with off-road pedestrian/cycle route

13.4.26 The general criteria for defining the importance or sensitivity of receptors for the assessment of Driver Delay are set out in **Table 13-2**.

Table 13-2: Sensitivity / Value Criteria for Driver Delay

Sensitivity / Value Sensitivity / Value Criteria

High	Road Links: Not applicable Road Junctions: Roundabout or signalised junction (at least four arms) within a built-up area. Significant queuing (10+ vehicles) on 2+ arms.
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Sensitivity / Value Criteria

Medium	Road Links: Key local route within a built-up area Road Junctions: Roundabout or signalised junction (at least four arms) outside of a built-up area. Significant queuing (10+ vehicles) on 1-2 arms and/ or moderate queuing (5-9 vehicles) on 3-4 arms.
Low	Road Links: Strategic route within a built-up area OR a local route outside of a built-up area Road Junctions: Roundabout or signalised junction (fewer than four arms) outside of a built-up area OR a priority junction within a built-up area. Moderate queuing (5-9 vehicles) on 1-2 arms and/ or low queuing (3-4 vehicles) on 3-4 arms.
Very Low	Road Links: Strategic route outside of a built-up area OR a minor/ local no-through route Road Junctions: Priority junction outside of a built-up area. Low queuing (3-4 vehicles) on 1-2 arms and/ or no queuing at the junction.

13.4.27 The preliminary criteria for defining the importance or sensitivity of road link and road junction receptors for the assessment of Road Safety and Large Loads are set out in **Table 13-3**.

Table 13-3: Sensitivity / Value Criteria for Road Safety and Large Loads

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

13.4.28 The collision rate for road links has also been calculated and compared with national road safety statistics provided within Road Casualties for Great Britain (Ref 13-17). Receptors which recorded collision rates much higher than the national average have been subjected to a manual review to determine whether their sensitivity value requires adjustment.

13.4.29 The levels of sensitivity which have been attributed to the receptors identified in Section 13.7 based on the information presented above are summarised in Section 13.7 and within **PEI Report Volume 3, Appendix 13-D: Receptor Traffic Flow Tables**.

Magnitude

- 13.4.30 As identified within the 2023 IEMA guidelines (Ref 13-7), the magnitude of each impact represents the level of change from the baseline conditions.
- 13.4.31 This assessment considers a range of potential effects that could be experienced during the construction stage of the Proposed Development and this section identifies how magnitude will be considered for each.
- 13.4.32 **Severance** is defined in the IEMA Guidelines (Ref 13-7) as the “*perceived division that can occur within a community when it becomes separated by major traffic infrastructure. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by infrastructure*”. The guidelines state that changes in traffic flow of 30%, 60% and 90% are regarded as producing ‘slight’, ‘moderate’ and ‘substantial’ changes in severance respectively. However, caution should be observed when applying these thresholds to very low baseline flows which are unlikely to experience severance impacts even with high percentage changes in traffic.
- 13.4.33 **Pedestrian Delay** (incorporating delay to all non-motorised users) is considered to be affected by the changes in volume, composition or speed of traffic, in terms of their respective impacts on the ability of pedestrians to cross roads. The assessment of pedestrian delay serves as a proxy for the delay that other modes of non-motorised users may experience when crossing roads. In general, increases in traffic levels and/or traffic speeds are likely to lead to greater increases in pedestrian delay.
- 13.4.34 **Non-Motorised User Amenity** is broadly defined as “*the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic*”. The guidance suggests that a tentative threshold for judging the significance of changes in non-motorised user amenity would be where the traffic flow (or HGV component) is halved or doubled.
- 13.4.35 **Fear and Intimidation** occurs through a combination of traffic flow, speed, proportion of HGVs and the proximity of traffic to people. These indicators are often heightened by a perceived lack of protection or buffers from the highway or through narrow or non-existent footways. The assessment considers each road on a case-by-case basis, however there are thresholds provided in the 2023 IEMA Guidelines (Ref 13-7) which are presented in **Table 13-5**.
- 13.4.36 **Driver Delay** is an effect cited in the 2023 IEMA Guidelines (Ref 13-7) and relates to incremental increases in traffic (as outlined in **Table 13-4**). However, traffic delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system. As a further consideration, where any temporary road closures or traffic management is likely to be in place to enable the construction of the Proposed Development, any additional potential delay caused by these resultant diversion routes has been reported.

- 13.4.37 **Road Safety** considers Personal Injury Collision (PIC) data obtained for the most recent five-year period available at identified junctions and links along the proposed construction traffic routes in the Study Area. The sensitivity of discrete areas of the highway network can then be determined following a detailed review of the baseline characteristics including the collision rate and any collision clusters. This has been used to assess whether the additional traffic during construction of the Proposed Development would be likely to have a detrimental effect on road safety.
- 13.4.38 With regard to **Large Loads**, the guidance states that appropriate routes for abnormal load movements should be considered, with mitigation strategies to secure safe passage. As part of the Proposed Development, there will be the requirement for abnormal loads which are categorised as Large Loads.
- 13.4.39 In view of the above, the impacts of Large Loads have been considered, in the form of a qualitative risk assessment to establish the likelihood and extent of such effects. The projected impacts of the Proposed Development have been measured separately, dependent upon the receptor, for the construction period. The Framework CTMP, which will be prepared at ES stage, will include details of measures that will be employed to ensure the safe vehicular transport of components to and from the Proposed Development.
- 13.4.40 **Table 13-4** and **Table 13-5** summarise the criteria that have been used to assess the magnitude of effect (based on increases i.e. 'adverse' effects), along with the thresholds that have been used to determine whether effects are considered high, medium, low or very low. Depending on the baseline information available, the various thresholds identified for the proportional increases in traffic flow relate to peak hour flows and daily flows (whichever is highest). Within these tables, neither the sensitivity of receptors, nor the duration of effects, is taken into consideration. These tables are formed using 2023 IEMA Guidelines (Ref 13-7) and professional experience in order to build on the information presented by the guidelines to allow a more thorough assessment to be carried out.
- 13.4.41 In terms of magnitude of change for receptors, a very low magnitude of change has been assigned where there is expected to be fewer than 30 additional vehicle trips per hour during each of the development peak hours in the construction phase as a result of the Proposed Development, irrespective of the proportional increase in traffic flows. This is designed to avoid over-reporting impacts in areas where baseline traffic flows are very low and is in line with the IEMA Guidelines (Ref 13-7) which states that caution should be observed when applying thresholds to very low baseline flows given that these are unlikely to experience impacts even with high percentage changes in traffic.

Table 13-4: Magnitude Criteria for Transport and Access (All Assessment Criteria)

Impact	Very Low	Low	Medium	High
Severance	Increase in total traffic flows of below 30% (or increase in HGV flows of below 10%).	Increase in total traffic flows of 30-59% (or increase in HGV flows of 10-39%).	Increase in total traffic flows of 60-89% (or increase in HGV flows of 40-89%).	Increase in total traffic flows or HGV flows of 90% and above.
Pedestrian Delay	The severity of the impact will be determined based on the thresholds identified above for severance.			
Non-Motorised User Amenity	Increase in total traffic flows of below 50%.	Increase in total traffic flows of 50-69%.	Increase in total traffic flows of 70-99%.	Increase in total traffic flows of 100% or above.
Fear and Intimidation	No change in degree of hazard level for daily traffic flows, HGV flows and vehicle speeds (see Table 13-5 below).	One step change in degree of hazard level (see Table 13-5 below), but with <400 daily vehicle increase or <500 daily HGV increase.	One step change in degree of hazard level (see Table 13-5 below), but with >400 daily vehicle increase or >500 daily HGV increase.	Two step changes in degree of hazard level based on the degree of hazard scores for daily traffic flows, HGV flows and vehicle speeds (see Table 13-5 below).
Driver Delay	Increase in total traffic flows of below 30%.	Increase in total traffic flows of 30-59%.	Increase in total traffic flows of 60-89%.	Increase in total traffic flows of 90% and above.
Road Safety	Increase in total traffic flows of below 30% (or increase in HGV flows of below 10%).	All links estimated to experience increases in total traffic flows of at least 30% or increases in HGV flows of at least 10% are analysed further on a case-by-case basis.		
Large Loads	Based on the probability of a personal injury accident, categorised as fatal or serious, involving a large load, occurring.			

13.4.42 Further details relating to Fear and Intimidation, in terms of calculating magnitude of impact based on the 2023 IEMA Guidelines (Ref 13-7), are provided in **Table 13-5** below.

Table 13-5: Additional Magnitude Criteria for Fear and Intimidation

Criteria	Degree of Hazard (Level)			
	Small	Moderate	Great	Extreme
A) Average Hourly Traffic Flow	<600 (0)	600-1,200 (10)	1,200-1,800 (20)	>1,800 (30)
B) Daily HGV Flow	<1,000 (0)	1,000-2,000 (10)	2,000-3,000 (20)	>3,000 (30)

Criteria	Degree of Hazard (Level)			
	Small	Moderate	Great	Extreme
C) Average Speed	<20mph (0)	20-30mph (10)	30-40mph (20)	>40mph (30)
Total Score (A+B+C)	0-20	21-40	41-70	71+

13.4.43 **Table 13-4** and **Table 13-5** above set out the proposed magnitude thresholds for the respective environmental effects that are considered in this assessment. All effects have a proposed magnitude that does not, initially, consider the duration over which an effect is likely to be experienced.

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

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

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

Significance of Effects

13.4.46 As set out in **PEI Report Volume 1 Chapter 5: EIA Methodology**, the significance of effect is determined through the consideration of two elements: the magnitude of the impact and the sensitivity of the receptor as outlined above. **Table 13-6** below shows the matrix that has been used to determine the effect category. Effects which are classified as major or moderate are considered to be significant (shown in bold).

Table 13-6: Significance Criteria

Sensitivity or Value of Resource / Receptor	Magnitude of Change			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

Assessment Assumptions and Limitations

- 13.4.47 The preliminary assessment is based on baseline data and Proposed Development design information (see **PEI Report Volume 1 Chapter 3: The Proposed Development**) available at the time of writing this PEI Report. An initial assessment of the Proposed Development has been undertaken as part of this PEI Report based on a daily peak of 600 construction workers, which includes 575 workers for the Principal Site and 25 workers for the Cable Corridor. For the purposes of this PEI Report, it has been assumed that all 600 construction workers would travel to/ from the Principal Site to provide a worst-case assessment.
- 13.4.48 This chapter has been informed by the consultation responses to the EIA Scoping Opinion (see **PEI Report Volume 3, Appendix 1-C**), as well as the Transport Scoping Meeting which was held with the local authorities on 13 December 2023 with the associated scoping presentation and meeting minutes (see **PEI Report Volume 3, Appendix 13-B**). A Transport Note and Framework CTMP will be prepared as part of the DCO application.
- 13.4.49 The main construction phase for the Proposed Development is currently predicted to be a minimum (and target) 24 months or phased over 30 months between 2031 and 2033, with the construction peak in terms of activity and vehicle movements expected to take place in 2032. Whilst the construction programme may extend slightly beyond 24 months, the approach taken in this chapter based on 24 months offers a reasonable worst-case assessment, as this is based on a rapid and so shorter construction period that would generate the highest number of peak hour and daily road trips on the local network.
- 13.4.50 There is expected to be a daily peak of 575 construction workers, 25 LGVs and 50 HGVs associated with the Principal Site. The associated vehicle trips will be split across 12 access points (see **PEI Report Volume 3: Figure 13-4: Heavy Goods Vehicle (HGV) Routing**) including three accesses on Haddington Lane, two accesses on each of Fosse Lane, Basingham Road and Clay Lane, and one access on each of The Avenue, Stone Lane and Moor Lane. There will also be a vehicle crossover on Stone Lane. Further details of the forecast trip distribution are set out in Section 13.7.
- 13.4.51 There is expected to be a daily peak of 25 construction workers, 12 LGVs and 16 HGVs associated with the Cable Corridor works. The associated vehicle trips will mainly use various routes to the east of the Principal Site including the A15 and Broughton Lane, Grantham Road, B1202 Heath Lane, Green Man Road and Hill Rise depending on access point and crossover locations. A qualitative assessment has been carried out for the Cable Corridor, and a full, detailed assessment will be carried out at ES stage. However, trips associated with the Cable Corridor have been routed to/ from the Principal Site to allow these to be assessed as part of this PEI Report.
- 13.4.52 It is not considered likely that the conclusions of this PEI Report would change in the instance that the start of construction is delayed. For example, other cumulative Proposed Developments may have been completed by the time the Proposed Development construction begins, which would elevate

the trips on the local road network in the future baseline. As the assessment criteria are based on a percentage change of vehicle numbers, a higher baseline flow would reduce the proportional impact that the Proposed Development has on the road network. This would reduce or maintain the levels of effect presented in this chapter. It is therefore considered that an assessment year of 2032 reflects a worst-case approach and the conclusions would remain valid should the peak be later than this.

13.4.53 Although the Proposed Development is located close to a number of villages/ settlements including Thorpe on the Hill, Haddington and Bassingham, only a small proportion of trips are expected to either originate from or pass through these villages during the construction, operation, or the decommissioning phases. For example, the Framework CTMP will restrict HGVs to routes which avoid these villages where practicable when travelling to/ from the construction compounds as illustrated by HGV routing plan shown in **PEI Report Volume 2, Figure 13-4**. Whilst some staff may originate from larger settlements nearby (e.g. Lincoln) and may travel by public transport or bicycle (the distance is considered too far to walk) these modes are not expected to constitute a significant proportion of trips to the Proposed Development.

13.4.54 Further details relating to the assumptions that have been adopted in support of the assessment work (e.g. relating to access points, working hours, trip generation) are set out within Section 13.7.

13.5 Baseline Conditions

Existing Baseline

13.5.1 This section describes the baseline environmental characteristics for the Proposed Development and surrounding areas with specific reference to Transport and Access.

Existing Local Highway Network

Principal Site

13.5.2 The Site encompasses a large area of predominantly agricultural land located to the north and south of the strategic trunk A-road; the A46, which runs in a northeast-southwest alignment through the Site. To the north-east, the A46 provides access to Lincoln as well as further connections with the A57, A15 and A158. To the south-west the A46 provides links to Newark-on-Trent as well as further connections with the A1, A17 and A617.

13.5.3 The roads surrounding the Principal Site are mostly local rural in nature, namely:

- a. Fosse Lane (north-east extent of the Site) – local route between Thorpe on the Hill in the north and the A46 in the south (as well as joining with Haddington Lane in the south);

- b. Haddington Lane (eastern extent of the Site) – local road between Haddington and Thurlby, connecting with Fosse Lane in the north and running along the A46 overbridge;
 - c. Moor Lane (running through the centre of the Site) – local highway to the west of Thurlby and south of Witham-St-Hughs. The road connects with an unnamed road in the west which connects with the A46 at the Halfway House Roundabout (in the north); and
 - d. Bassingham Road (running through the eastern edge of the Site) – local road split into two sections; the first of these is to the south of Thurlby, routing towards Bassingham in the south (west of the River Witham). The second section runs to the south of Aubourn, running towards Bassingham in the south (east of the River Witham). The two sections are connected by an approximately 1.2km section of Lincoln Road which is a two-way single carriageway highway within the Site boundary.
- 13.5.4 All of the mentioned rural routes are single carriageway roads with a single lane in each direction. Speed limits on the routes vary from between 60 miles per hour (mph) in rural areas to 30mph when they pass through settlements, often featuring footway provision and street lighting within the settlements.
- 13.5.5 Within the Study Area there are a number of other minor roads which run through or alongside the Principal Site. These include:
- a. The Avenue/ Morton Lane (western extent of the Site), a no-through single track road to the east of Morton, accessed from Halfway House Lane to the north of the Halfway House Roundabout;
 - b. Stone Lane (central extent of the Site), a no-through road (except for cycle movements) single lane track (with passing places) to the southeast of A46, accessed via Haddington Lane;
 - c. Clay Lane (south-west extent of the Site), a narrow single lane highway with passing places, to the west of Bassingham, connecting with Bassingham Road to the south of Thurlby and running towards Norton Disney in the west; and,
 - d. Fen Lane (south-east extent of the Site), a no-through single lane track to the northwest of Bassingham, west of River Brant, accessed via Lincoln Road.
- 13.5.6 At this PEI Report stage, the details related to the sourcing and origin of the relevant materials for the Principal Site (such as solar PV panels) have not yet been confirmed. However, it is likely that these would be transported from one of the nearer ports. The potential access routes for delivering these components to the Principal Site via the Strategic Road Network (SRN) and local roads is detailed in Section 13.7.
- 13.5.7 It is acknowledged that due to the rural nature of the surrounding area, a number of the local roads are subject to restrictions (such as weight restrictions of below 7.5 tonnes). These factors have been considered when reviewing potential routes to minimise the impact of the Proposed Development on local roads.

Cable Corridor

- 13.5.8 The Cable Corridor impacts have not been fully assessed in the PEI report chapter, however it will be assessed at the ES stage, and a qualitative assessment has been included in this PEI report.
- 13.5.9 The Cable Corridor is broadly planned to run in a southeast direction from the Principal Site, crossing the River Brant, Broughton Lane and the A607, proceeding across agricultural land to a new National Grid Substation which is proposed to be located in the Navenby area. The Cable Corridor will also cross Hill Rise, High Dyke, B1202 Heath Lane and Green Man Road. The proposed Navenby Substation is subject to a separate application and does not form part of the Proposed Development.
- 13.5.10 The majority of the roads identified above are narrow, single-track, lightly trafficked roads with no pedestrian facilities or street lighting.
- 13.5.11 The eastern extent of the Cable Corridor is located a short distance to the west of the A15 which is expected to provide a key route for construction vehicles travelling to/ from the Cable Corridor.

Baseline Traffic Flows

- 13.5.12 The following time periods have been reviewed in order to provide a robust assessment given that while the development peak hours will occur outside the peak hours, they will be in the 'shoulders' to the traditional network peak hours:
- a. 07:00 to 08:00 – construction staff AM peak hour;
 - b. 08:00 to 09:00 – typical AM network peak hour;
 - c. 17:00 to 18:00 – typical PM network peak hour;
 - d. 18:00 to 19:00 – construction staff PM peak hour;
 - e. Weekday (07:00 to 19:00, 12 hours); and
 - f. Daily (24 hours).
- 13.5.13 However, for the purposes of the Preliminary Assessment of Effects outlined in Section 13.7, magnitudes have been assessed using AM and PM Development Peaks, 12-hour and 24-hour traffic flows, since development traffic is unlikely to produce significant changes to traffic flows in the network peak hours.
- 13.5.14 A summary of the baseline traffic data within the Study Area is set out in **Table 13-7** and
- 13.5.15 **Table 13-8** below, based on the traffic surveys carried out in November 2023 and the DfT data (2022). The results have been presented for the development peak hours and average daily (24 hours) and include rounded values.

Table 13-7: Existing Baseline Traffic Flows – Total Vehicles – Link Automatic Traffic Counts (ATCs)

Ref	Link	AM Development Peak (07:00-08:00)			PM Development Peak (18:00-19:00)			24hr Daily		
		Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)
ATC1	Fosse Lane (North)	249	7	3%	112	4	3%	2,532	79	3.1%
ATC2	Haddington Lane (North)	539	29	5%	290	8	3%	5,390	371	6.9%
ATC3	Haddington Lane (South)	202	9	4%	231	17	7%	1,799	68	3.8%
ATC4	Bassingham Road	100	5	5%	97	1	1%	1,332	45	3.4%
ATC5	Moor Lane	224	15	7%	270	20	7%	2,035	130	6.4%
ATC6	Clay Lane	12	1	7%	7	0	0%	108	6	5.3%
ATC7	Broughton Lane	226	10	4%	115	1	1%	1,993	87	4.4%
ATC8	Grantham Road	638	27	4%	339	9	3%	5,854	259	4.4%
ATC9	B1202 Heath Lane	239	14	6%	117	3	3%	2,188	149	6.8%
ATC10	Green Man Road	235	11	5%	108	1	1%	1,781	91	5.1%
ATC11	A15 Sleaford Road	1,426	102	7%	720	42	6%	13,310	1,243	9.3%
ATC12	The Avenue	7	0	0%	4	0	11%	108	6	6.0%
ATC13	Fosse Lane (South)	249	9	4%	110	5	4%	2,496	84	3.4%
ATC14	Hill Rise	20	0	1%	8	0	0%	159	6	3.9%
DfT 80797	A46 West	2,996	271	9%	2,145	178	8%	37,171	3,276	8.8%

Ref	Link	AM Development Peak (07:00-08:00)			PM Development Peak (18:00-19:00)			24hr Daily		
		Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)
DfT 58113	A46 East	2,658	189	7%	1,994	160	8%	35,230	2,763	7.8%
DfT 808542	South Hykeham Road	508	22	4%	298	7	2%	4,951	200	4.0%

Table 13-8: Existing Baseline Traffic Flows – Total Vehicles – Junction Manually Classified Counts (MCCs)

Ref	Junction	AM Development Peak (07:00-08:00)			PM Development Peak (18:00-19:00)			24hr Daily		
		Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)
MCC1	Halfway House Roundabout (Halfway House Lane / A46(E) / Unnamed Road/A46(W))	3,872	351	9.1%	1,895	167	8.8%	41,397	3,469	8.4%
MCC2	A46 EB On-Slip and Off-Slip (Fosse Lane(N) / Fosse Lane(E) / Haddington Lane)	486	15	3.1%	158	1	0.6%	4,284	174	4.1%
MCC3	A46 WB On-Slip and Off- Slip (Haddington Lane(W) / Old Haddington Lane / Haddington Lane)	674	28	4.2%	265	4	1.5%	6,842	308	4.5%

Ref	Junction	AM Development Peak (07:00-08:00)			PM Development Peak (18:00-19:00)			24hr Daily		
		Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)
MCC4	Haddington Lane(N) / Butts Lane / Haddington Lane(S) / Stone Lane	676	29	4.3%	954	76	8.0%	6,272	284	4.5%
MCC5	Bridge Road / Church Road / Bassingham Road	684	36	5.3%	388	5	1.3%	6,307	232	3.7%
MCC6	Haddington Lane / Bassingham Road/Moor Lane	304	11	3.6%	902	67	7.4%	3,515	145	4.1%
MCC7	Unnamed Road/Moor Lane / Norton Lane	252	8	3.2%	913	65	7.1%	3,069	124	4.1%
MCC8	North Hykeham Roundabout (A46(N) / Newark Road / A46(S) / Middle Lane)*	3,435	245	7.1%	1,762	150	8.5%	39,236	2,926	7.5%

*estimated based on A46 East (DfT 58113) and MCC1

Collision Data Review

- 13.5.16 This section provides a summary of Personal Injury Collision (PIC) data obtained from LCC for the highway network within the extent of the Study Area of the Proposed Development as shown within **PEI Report Volume 2, Figure 13-1**. The PIC data covers the most recent five-year period available between 1 June 2019 and 31 May 2024.
- 13.5.17 A total of 70 collisions have occurred within the Study Area for the most recent five-year period. A summary of these collisions by location (for those locations where collisions were recorded) and severity is set out in **Table 13-9** below.
- 13.5.18 Out of the 28 links and junctions assessed, only five recorded more than five Personal Injury Accidents (PIAs) within the analysed five-year period, which may suggest that these locations are more sensitive to an increase in traffic from a highway perspective. There are also several locations which appear to have a good safety record with two or fewer PIAs within the five-year period, which suggest that these locations may be less sensitive to an increase in traffic from a highway safety perspective.
- 13.5.19 Following on from the above, collision rates have been calculated in billion vehicle miles for road links to provide a comparison with national road safety statistics provided within Road Casualties Great Britain (Ref 13-17). The following formula has been used to calculate the collision rate, where 1,826 reflects the number of days over which the collision data has been sourced (between 1 June 2019 to 31 May 2024).
- $$\text{Collision Rate} = \frac{\text{Number of recorded PIAs (per road link)} \times 1 \text{ billion}}{1826 \times \text{AADT (2023)} \times \text{length of road (miles)}}$$
- 13.5.20 The national average collision rate has been calculated between 2017 and 2022 using dataset RAS0302: Urban and rural roads, for the appropriate road type. A summary of the comparison is presented in **Table 13-10** further below.

Table 13-9: Collision Data Summary

Ref	Receptor Type	Receptor	Total Collisions			Collisions involving a goods vehicle (>3.5 tonnes)		
			Slight	Serious	Fatal	Slight	Serious	Fatal
RL1	Road Link	A46 west of Halfway House Roundabout	1	0	0	0	0	0
RL2	Road Link	Halfway House Lane	1	0	0	0	0	0
RL3	Road Link	The Avenue	0	0	0	0	0	0
RL4	Road Link	A46 east of Halfway House Roundabout	7	0	0	0	0	0
RL5	Road Link	Haddington Lane (North of Old Haddington Lane)	0	1	0	0	0	0
RL6	Road Link	Fosse Lane (north of Haddington Lane)	1	0	0	0	0	0
RL7	Road Link	Old Haddington Lane (between Haddington Lane and A46)	0	0	0	0	0	0
RL8	Road Link	A46 west of Hykeham Roundabout	13	4	0	4	3	0
RL9	Road Link	Haddington Lane (South of Old Haddington Lane)	0	0	0	0	0	0
RL10	Road Link	Stone Lane	0	0	0	0	0	0
RL11	Road Link	Butts Lane	0	1	0	0	0	0
RL12	Road Link	Church Road (between Bridge Road and Royal Oak Lane)	0	0	0	0	0	0
RL13	Road Link	Bassingham Road (northeast)	1	1	0	0	0	0
RL14	Road Link	Haddington Lane (south of Stone Lane)	4	1	0	0	0	0
RL15	Road Link	Norton Lane	1	0	0	0	0	0
RL16	Road Link	Moor Lane	0	0	0	0	0	0
RL17	Road Link	Bassingham Road (southwest)	2	1	0	0	0	0
RL18	Road Link	Clay Lane	0	0	0	0	0	0

Ref	Receptor Type	Receptor	Total Collisions			Collisions involving a goods vehicle (>3.5 tonnes)		
			Slight	Serious	Fatal	Slight	Serious	Fatal
RL19	Road Link	Unnamed Road (south of Halfway House roundabout)	0	0	0	0	0	0
RL20	Road Link	Fosse Lane (between A46 and Haddington Lane)	0	0	0	0	0	0
RJ1	Road Junction	Halfway House Roundabout (Halfway House Lane(N)/A46(E)/Unnamed Road(S)/A46(W))	8	3	0	0	0	0
RJ2	Road Junction	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane(S))	1	1	0	0	0	0
RJ3	Road Junction	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane(N)/Haddington Lane (E))	1	0	0	0	0	0
RJ4	Road Junction	Haddington Lane(N)/Butts Lane(E)/Haddington Lane(S)/Stone Lane(W)	2	2	0	0	0	0
RJ5	Road Junction	Bridge Road(N)/Church Road(E)/Bassingham Road(W)	0	0	0	0	0	0
RJ6	Road Junction	Haddington Lane(E)/Bassingham Road(S)/Moor Lane(W)	0	0	0	0	0	0
RJ7	Road Junction	Unnamed Road(N)/Moor Lane(E)/Norton Lane(W)	2	0	0	1	0	0
RJ8	Road Junction	North Hykeham Roundabout (A46(N)/ Newark Road/ A46(S)/ Middle Lane)	8	2	0	1	0	0
		Total	53	17	0	6	3	0

Table 13-10: Collision Rate Analysis

Receptor Ref.	Location	PIAs	AADT (2023)	Link Length	Collision rate	National average
RL1	A46 west of Halfway House Roundabout	1	37,171	1.68	9	181
RL2	Halfway House Lane	1	4,890	0.62	181	313
RL3	The Avenue	0	108	0.54	0	313
RL4	A46 east of Halfway House Roundabout	7	41,651	1.54	60	181
RL5	Haddington Lane (North of Old Haddington Lane)	1	3,746	0.32	461	313
RL6	Fosse Lane (north of Haddington Lane)	1	2,532	0.62	348	313
RL7	Old Haddington Lane (between Haddington Lane and A46)	0	4,186	0.16	0	313
RL8	A46 west of Hykeham Roundabout	17	35,230	0.87	304	181
RL9	Haddington Lane (South of Old Haddington Lane)	0	5,390	0.56	0	313
RL10	Stone Lane	0	60	0.44	0	313
RL11	Butts Lane	1	4,951	0.34	326	313
RL12	Church Road (between Bridge Road and Royal Oak Lane)	0	5,715	0.15	0	313
RL13	Bassingham Road (northeast)	2	1,192	0.73	1263	313
RL14	Haddington Lane (south of Stone Lane)	5	1,799	1.32	1155	313
RL15	Norton Lane	1	385	0.82	1731	313
RL16	Moor Lane	0	2,035	0.93	0	313
RL17	Bassingham Road (southwest)	3	1,781	0.60	1524	313
RL18	Clay Lane	0	108	1.50	0	313
RL19	Unnamed Road (south of Halfway House roundabout)	0	11,714	0.88	0	313
RL20	Fosse Lane (between A46 and Haddington Lane)	0	3,014	0.11	0	313

13.5.21 The collision rate formula indicates that the following receptors have collision rates which are over twice as high as the national average and are therefore considered abnormal:

- a. RL13 Bassingham Road (northeast);
- b. RL14 Haddington Lane (south of Stone Lane);
- c. RL15 Norton Lane; and
- d. RL17 Bassingham Road (southwest).

13.5.22 These abnormally high rates are mainly due to the very low baseline daily traffic flows, in particular on Norton Lane. Since the PIA figures for RL13 and RL15 are relatively low, the sensitivity of these receptors for Road Safety which is detailed in Section 13.7 have not been adjusted. Further analysis of RL14 has shown that 4 out of 5 recorded incidents were caused by a common factor (excess speed around a bend), and therefore despite the relatively low flows on this link, the sensitivity of this receptor has not been reduced as a result. Whilst there were no common factors identified for the PIAs which occurred at RL17, its sensitivity has been upgraded from low to medium due to the number of collisions. However, as shown in **Table 13-21**, RL17 was screened out for having less than 30 vehicles in the development peak hours, and therefore this sensitivity adjustment has not affected its impact significance.

Existing Walking Facilities

Principal Site

13.5.23 Due to the location of the Principal Site in rural Lincolnshire, there is limited footway provision in the surrounding area. Footways are limited to the settlements that surround the Principal Site, which include but are not limited to the following:

- a. Fosse Lane – footway provision alongside the northbound lane;
- b. Bassingham Road – footway provision alongside the southbound lane to the south of Thurlby; and
- c. Footway provision around Bassingham, to the southeast of the Principal Site including on Thurlby Road, Lincoln Road, Croft Lane, Linga Lane. This provision is largely within the extent of residential areas on these roads.

13.5.24 As shown in **PEI Report Volume 2, Figure 13-2**, there are a number of PRoW within, or in close proximity to, the Principal Site. These include the following:

- a. PRoW located within the Site boundary of the Principal Site, namely:
 - LL|TOTH|6/1 – Public Footpath
 - LL|TOTH|6A/1 – Public Footpath
 - LL|TOTH|6/2 – Public Footpath

- LL|TOTH|6/3 – Public Footpath
 - LL|TOTH|7/2 – Public Footpath
 - LL|TOTH|11/1 – Public Footpath
 - LL|TOTH|12/1 – Public Bridleway
 - LL|TOTH|12/3 – Public Bridleway
 - LL|TOTH|13/1 – Public Footpath
 - LL|TOTH|15/1 – Public Footpath
 - LL|TOTH|21/1 – Public Footpath
 - LL|Aubo|8/1 – Restricted Byway
 - LL|Aubo|10/1 – Public Footpath
 - LL|Aubo|11/2 – Public Footpath
 - LL|Aubo|12/2 – Public Footpath
 - LL|Aubo|13/1 – Restricted Byway
 - LL|Bass|23/1 – Public Footpath
 - LL|ThuN|1/1 – Public Footpath
 - LL|ThuN|2/1 – Public Footpath
 - LL|ThuN|5/1 – Public Footpath
- b. PRoW which run alongside the boundary or within close proximity to the Site boundary of the Principal Site are as follows:
- LL|TOTH|4/1 – Public Footpath
 - LL|TOTH|5/1 – Public Footpath
 - LL|TOTH|7/3 – Public Footpath
 - LL|TOTH|12/2 – Public Bridleway
 - LL|TOTH|13/2 – Public Footpath
 - LL|TOTH|16/2 – Public Bridleway
 - LL|TOTH|17/1 – Public Footpath
 - LL|TOTH|18/1 – Public Footpath
 - LL|TOTH|18/2 – Public Footpath
 - LL|TOTH|18/3 – Public Footpath
 - LL|TOTH|522/1 – Public Footpath
 - LL|Swdb|4/1 – Public Footpath
 - LL|Swdb|5/1 – Restricted Byway
 - LL|Swdb|6/2 – Public Footpath
 - LL|Aubo|3/1 – Public Footpath
 - LL|Aubo|9/1 – Public Footpath

- LL|Aubo|11/1 – Public Footpath
- LL|Aubo|12/1 – Public Footpath
- LL|Aubo|13/2 – Restricted Byway
- LL|Aubo|1210/1 – Public Bridleway
- LL|Bass|1/1 – Public Footpath
- LL|Bass|2/1 – Public Footpath
- LL|Bass|3/1 – Public Footpath
- LL|Bass|4/1 – Restricted Byway
- LL|Bass|5/1 – Restricted Byway
- LL|Bass|4/2 – Public Footpath
- LL|Bass|6/1 – Public Footpath
- LL|Bass|7/1 – Public Footpath
- LL|Bass|8/1 – Public Footpath
- LL|Bass|10/1 – Public Footpath
- LL|Bass|12/1 – Public Footpath
- LL|Bass|13/1 – Public Bridleway
- LL|Bass|17/4 – Restricted Byway
- LL|Bass|20/1 – Restricted Byway
- LL|Bass|21/1 – Restricted Byway
- LL|Bass|21/2 – Restricted Byway
- LL|Bass|22/1 – Public Footpath
- LL|Bass|766/1 – Byway Open to All Traffic
- LL|ThuN|3/1 – Public Footpath
- LL|ThuN|4/1 – Public Footpath
- LL|NoDi|1/2 – Public Footpath

13.5.25 There are also seven existing permissive paths within the Site boundary of the Principal Site: 15BCDE, 15BCD1, 17E42A, 15BCD0, 15BCCF, 15BC81 and 15BCC0.

13.5.26 These will be further discussed as part of the Framework CTMP and the Framework PRow Management Plan to be prepared for the DCO.

Cable Corridor

13.5.27 The western extent of the Cable Corridor route lies north of Bassingham, whilst the eastern extent lies east of Navenby.

13.5.28 Sections of footway exist in the vicinity of Harmston, Coleby, Navenby and Boothby Graffoe. Navenby and Boothby Graffoe are the two nearest local settlements situated circa 1km to the west of the proposed National Grid

substation location, however there are no other formal footway provisions in this part of the Study Area.

13.5.29 There are several PRow which could be impacted by construction of the Cable Corridor as shown on **PEI Report Volume 2, Figure 13-2**. These include:

- a. Within the Cable Corridor:
 - LL|Cole|1/2 – Public Footpath
 - LL|Cole|3/1 – Public Footpath
 - LL|Cole|4/1 – Public Footpath
 - LL|BooG|5/1 – Public Footpath
- b. Within close proximity of the Cable Corridor:
 - LL||Cole|1/1 – Public Footpath
 - LL|BooG|2/1 – Public Footpath
 - LL|BooG|2/2 – Public Footpath
 - LL|BooG|4/1 – Public Footpath
 - LL|BooG|6/1 – Public Footpath
 - LL|BooG|7/1 – Public Footpath

13.5.30 Additionally, there are several PRow located to the east of the A15; however, these have not been listed as these would not be impacted by the Cable Corridor.

13.5.31 All of the PRow potentially impacted by the Cable Corridor works will be reviewed at ES stage to identify whether they will need to be diverted (either temporarily or permanently) to ensure safe access for members of the public during all phases of the development (especially construction and decommissioning). These will be further discussed as part of the Framework CTMP and the Framework PRow Management Plan to be prepared for the DCO.

Existing Cycling Facilities

Principal Site

13.5.32 There are no on- or off-road dedicated / marked cycling facilities on the roads immediately surrounding the Principal Site, with the exception of a cycle track on Stone Lane which begins just east of High Walks Farm and joins a cycle facility that runs parallel to the A46 to the north. However, the surrounding rural local roads may be attractive to some cyclists as they are relatively lightly trafficked. The Principal Site could potentially be accessed by cyclists from local settlements within a 2.5km cycle distance, including Thorpe on the Hill, Haddington, Aubourn, Witham St Hughs, Norton Disney and Bassingham.

13.5.33 The nearest National Cycle Network (NCN) route to the Site is NCN Route 64 (between Harby and Lincoln) which is located approximately 3km to the

north of the Site boundary. An existing NCN link route also runs in the vicinity of the southern extents of the Site boundary, which runs between Bassingham and Carlton-le-Moorland. These are shown on **PEI Report Volume 2 Figure 13-2**.

Cable Corridor

- 13.5.34 There are no on- or off-road dedicated / marked cycling facilities within the immediate vicinity of the proposed Cable Corridor. However, a number of the minor roads in this area are relatively lightly trafficked and may therefore be attractive to some cyclists. These areas could be potentially accessed by cyclists from Harmston, Coleby, Boothby Graffoe, Navenby and Wellingore as they are all within a 2.5km cycle distance.

Existing Equestrian Facilities

Principal Site

- 13.5.35 There are some formal equestrian facilities (i.e. Bridleways) within the Principal Site, including The Avenue which will be used as an access route in the construction phase of the Proposed Development. There are a few Bridleways in the vicinity of Morton, within the northern extent of the Principal Site Boundary and a few Restricted Byways within the eastern extents of the Site Boundary. In addition, some of the surrounding roads are generally lightly trafficked which may encourage equestrian usage.

Cable Corridor

- 13.5.36 There are no formal equestrian facilities (i.e. Bridleways) within the vicinity of the potential Cable Corridor route options. However, the narrow single-track roads in the vicinity of the Cable Corridor may be appealing to equestrians given that these are relatively lightly trafficked.

Existing Public Transport Facilities

Principal Site

Bus

- 13.5.37 Within the Study Area of the proposed Principal Site boundary there are several bus routes which pass through surrounding local settlements. Details of these are outlined in **Table 13-11**.

Table 13-11: Existing Bus Services

Bus Service	Settlements Served	Frequency of Service in per day including first and last service
1	Bassingham, Haddington, Aubourn, Thorpe on the Hill and Witham St Hughs	School bus service
16	Bassingham and Witham St Hughs	First Service: 06:34 Last Service: 00:47 Services within a day: 37

Bus Service	Settlements Served	Frequency of Service in per day including first and last service
47	Bassingham, Haddington and Aubourn	One service between 08:00-09:00; Zero services between 17:00-18:00
48	Thorpe on the Hill and Witham St Hughs	One service between 08:00-09:00; One service between 17:00-18:00
49	Bassingham, Thorpe on the Hill and Witham St Hughs	Zero services between 08:00-09:00; One service between 17:00-18:00
B3	Witham St Hughs	Zero services between 08:00-09:00; One service between 17:00-18:00
SLE5	Bassingham	Zero services between 08:00-09:00; Zero services between 17:00-18:00
SLE9	Haddington, Aubourn, Witham St Hughs and Thurlby	Zero services between 08:00-09:00 Zero services between 17:00-18:00

13.5.38 The closest bus stops served by the 16 route within the Principal Site boundary are:

- a. Old Haddington Lane (WB only), located on the A46; and
- b. Thurlby Telephone Box, located on Bassingham Road.

Rail

13.5.39 Swinderby railway station is located approximately 2km to the west of the northern extent of the Site boundary and is managed by East Midlands Railway. This is the nearest station to the proposed Site and provides access to services between Nottingham and Lincoln, and Leicester and Grimsby, with one service per hour.

13.5.40 Collingham railway station is situated approximately 6km to the west of the Site boundary and Hykeham railway station is located approximately 6km to the east. Both stations are managed by East Midlands Railway and are served by the same lines and services as Swinderby railway station.

Cable Corridor

Bus

13.5.41 In the vicinity of the proposed Cable Corridor options and/ or Site boundary there are a number of bus routes which pass through surrounding local settlements, these include:

13.5.42 Bus Route 1 (Black Cat Travel) – running through the local settlements of Navenby, Coleby and Harmston.

13.5.43 Bus Route 1 (Interconnect) (Stagecoach East Midlands) – running between Grantham and Lincoln, and through the local settlements of Navenby, Wellingore, Coleby and Harmston.

13.5.44 Bus Route 644 (Stagecoach East Midlands) – running through the local settlements of Navenby, Wellingore and Harmston, with only one service each weekday commencing at 15:20pm.

13.5.45 Bus Route 6531 (PC Coaches) – running between Wellingore and North Hykeham, and through the local settlements of Navenby, Coleby and Harmston. This is a school bus service.

13.5.46 Bus Route SLE9 (Sleafordian Coaches) – running between Witham St Hughs and Sleaford, including through the local settlements of Navenby, Wellingore, Coleby and Harmston.

Rail

13.5.47 The nearest railway stations to the potential Cable Corridor options are the same stations as those previously mentioned for the Principal Site, albeit these are all situated further away from the Cable Corridor than the Principal Site.

Future Baseline

13.5.48 The future baseline scenarios are set out in **PEI Report Volume 1 Chapter 5: Methodology**.

13.5.49 In the absence of the Proposed Development, traffic flows on the surrounding highway network would be expected to increase as a result of housing and employment growth. Therefore, projected background traffic growth has been applied to the traffic flows derived from the traffic surveys (November 2023) and DfT data (2022) to represent conditions during the future baseline (and construction peak assessment year) of 2032. As previously mentioned, the decommissioning assessment year is assumed to be 2093 which is considered to be too far into the future to be able to accurately predict traffic flows at that time.

13.5.50 Traffic growth has been calculated using National Road Traffic Forecast (NRTF) growth factors, reflecting projected increases in annual vehicle mileage on roads within England and Wales. National Transport Model (NTM) adjustments have then been applied within the Tip Ends Model Programme (TEMPro) (Ref 13-16) using National Trip Ends Model (NTEM) dataset v8.1 and the NRTF 2022 Core dataset. These reflect local factors (i.e. North Kesteven) for the appropriate road types, to determine the forecast increases in baseline car driver/ passenger trips during each period.

13.5.51 A summary of the growth factors is set out in **Table 13-12** below.

Table 13-12: Traffic Growth Factors (Future Baseline)

Growth Period	Road Type	Traffic Growth Factor (North Kesteven)			
		AM Peak	PM Peak	Average Weekday	Average Day
2022 to 2032 (DfT Data)	Trunk	1.09457	1.09550	1.10172	1.10167
	A Road	1.05685	1.05775	1.06375	1.06370

Growth Period	Road Type	Traffic Growth Factor (North Kesteven)			
		AM Peak	PM Peak	Average Weekday	Average Day
2023 to 2032 (Traffic Counts)	Minor	1.05398	1.05488	1.06087	1.06082
	All	1.07242	1.07334	1.07943	1.07938
	Trunk	1.08910	1.09019	1.09575	1.09570
	A Road	1.05530	1.05636	1.06174	1.06169
	Minor	1.05252	1.05358	1.05895	1.05890
	All	1.06951	1.07058	1.07604	1.07598

13.5.52 The highest growth factors (trunk roads) have been applied to the DfT traffic flows for the A46 given its trunk road status. The growth factors for A roads and minor roads have been applied to the traffic flows for the remainder of the network, depending on road type.

13.5.53 The anticipated future baseline flows on the surrounding highway network are set out in **Table 13-13** and **Table 13-14**. Again, the results have been presented for the development peak hours and an average weekday (12 hours) for road links and include rounded values.

Table 13-13: Future Baseline Traffic Flows (2032) – Total Vehicles – Links

Ref	Link	AM Dev Peak (07:00-08:00)			PM Dev Peak (18:00-19:00)			24hr Daily		
		Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)
ATC1	Fosse Lane (North)	259	8	3%	118	4	3%	2,664	86	3.2%
ATC2	Haddington Lane (North)	566	30	5%	300	9	3%	5,658	407	7.2%
ATC3	Haddington Lane (South)	207	9	4%	248	17	7%	1,891	75	4.0%
ATC4	Bassingham Road	103	5	5%	102	1	1%	1,392	49	3.5%
ATC5	Moor Lane	230	15	7%	288	21	7%	2,132	142	6.7%
ATC6	Clay Lane	12	1	7%	8	0	0%	113	6	5.5%
ATC7	Broughton Lane	238	11	5%	120	2	1%	2,088	96	4.6%
ATC8	Grantham Road	667	30	4%	355	10	3%	6,132	284	4.6%
ATC9	B1202 Heath Lane	251	15	6%	122	4	3%	2,299	163	7.1%
ATC10	Green Man Road	244	12	5%	113	1	1%	1,863	100	5.4%

Ref	Link	AM Dev Peak (07:00-08:00)			PM Dev Peak (18:00-19:00)			24hr Daily		
		Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)
ATC11	A15 Sleaford Road	1,495	111	7%	752	46	6%	13,950	1,362	9.8%
ATC12	The Avenue	8	0	0%	4	0	11%	113	7	6.2%
ATC13	Fosse Lane (South)	259	9	4%	116	5	4%	2,619	92	3.5%
ATC14	Hill Rise	22	0	1%	8	0	0%	166	7	4.0%

Table 13-14: Future Baseline Traffic Flows (2032) – Total Vehicles – Junctions

Ref	Link	AM Dev Peak (07:00-08:00)			PM Dev Peak (18:00-19:00)		
		Total	HGVs (#)	HGVs (%)	Total	HGVs (#)	HGVs (%)
MCC1	Halfway House Roundabout (Halfway House Lane/A46/Unnamed Road/A46)	4,217	382	9%	2,066	182	9%
MCC2	A46 EB On-Slip and Off-Slip (Fosse Lane/Fosse Lane/Haddington Lane)	529	16	3%	172	1	1%
MCC3	A46 WB On-Slip and Off-Slip (Haddington Lane/Old Haddington Lane/Haddington Lane)	734	30	4%	289	4	2%
MCC4	Haddington Lane/Butts Lane/Haddington Lane/Stone Lane	736	32	4%	1,039	83	8%
MCC5	Bridge Road/Church Road/Bassingham Road	745	39	5%	423	5	1%
MCC6	Haddington Lane/Bassingham Road/Moor Lane	331	12	4%	982	73	7%

13.6 Embedded Mitigation Measures

Construction and Decommissioning

13.6.1 The Proposed Development will minimise construction impacts by:

- a. Implementation of the Framework CTMP and Framework Construction Environmental Management Plan (CEMP) that will detail and formalise the measures that will mitigate construction-related effects, as well as the Framework Decommissioning Environmental Management Plan (DEMP) that will detail and formalise the measures that will mitigate decommissioning-related effects;
- b. Providing suitable points of access for construction vehicles with adequate visibility, with any supporting improvements (e.g. vegetation clearance) to take place within the highway boundary and the Site Boundary if required;
- c. Delivering internal construction routes through the Principal Site, to allow vehicles to access all areas via the site access points;
- d. Maintaining access to and along PRoW and the existing permissive paths, or otherwise providing temporary or permanent PRoW and permissive path diversion routes where necessary to avoid any closures or potential conflicts with the Proposed Development where possible. The diversion routes will be agreed with the local authorities prior to construction, and a Framework PRoWMP will be prepared as part of the DCO application and will contain further measures for PRoW and permissive path management;
- e. Managing areas where the proposed construction route crosses any existing local access roads, including by maximising visibility between construction vehicles and other users (including pedestrians and road users), implementing traffic management e.g. advanced signage to advise other users of the works, as well as manned controls at each crossing point (marshals/ banksmen), with a default priority that construction traffic will give-way to other users;
- f. Restricting HGV movements to certain routes (see HGV routing plan in **PEI Report Volume 2, Figure 13-4**);
- g. Reducing HGV deliveries during certain times of the day (e.g. between 07:00 and 09:00, as well as between 17:00 and 19:00), to avoid increasing traffic levels on the surrounding highway network during the traditional weekday peak hours;
- h. Implementing a Delivery Management System to control the bookings of HGV deliveries from the start of the construction period. This will be used to regulate the arrival times of HGVs via timed delivery slots, as well as to monitor compliance of HGV routing;
- i. Implementing a monitoring system to record the route of all HGVs travelling to and from the Proposed Development, to record any non-compliance with the agreed routing plan/ delivery hours and to

communicate any issues to the relevant suppliers to ensure the correct routes are followed;

- j. Developing a communications strategy including regular meetings with contractors to review and address any issues associated with travel to/ from the Proposed Development, as well as to relay information including any restrictions and requirements which should be followed;
- k. Implementing Temporary Traffic Management (TTM) where required during the period when the Cable Cables are installed to connect the new Navenby Substation with the Principal Site. Further details with respect to any TTM arrangements and timeframes for installing the cables will be set out within the Framework CTMP and the ES;
- l. Encouraging local construction staff to car share to reduce single occupancy car trips, by promoting the benefits of car sharing such as reduced fuel costs and by providing dedicated parking spaces within the compounds for those car sharing. A Car Share scheme will be implemented to match potential sharers and to help staff identify any colleagues who could potentially be collected along their route to/ from site;
- m. Implementing a shuttle service to transfer staff to/ from nearby catchment areas to reduce vehicle trips on the surrounding highway network. At this stage it is expected that the majority of shuttle services would travel to/ from Lincoln (northeast), with the remainder travelling to/ from Newark on Trent (southwest), Grantham and Sleaford (south) and Retford and Worksop (northwest) to collect/ drop off construction staff from 'hubs' at each of these six locations. Up to eight shuttle buses will be provided, each with a capacity of 50 staff, to transfer the expected peak demand (330 construction workers) to the site compounds. The modal split for workers travelling to and from the site is shown in **Table 13-15**.
- n. Implementing minibuses to transfer staff internally within the Principal Site as required e.g. between/across the different land parcels (where possible) to minimise external trips on the surrounding highway network, where utilising trips on the surround highway network, consolidating the trips to minimise the number of trips undertaken by construction workers;
- o. In terms of construction compounds, the main construction compound for the Principal Site will be served by the proposed access on the western side of Haddington Lane, to the south of the A46. There are also expected to be five smaller secondary compounds across the Principal Site, served by alternative access points or the internal construction access routes;
- p. Providing sufficient on-site car parking within the construction compounds across the site to accommodate the expected peak parking demand of construction staff within the Principal Site;
- q. Providing limited on-site car parking within the smaller compounds to accommodate the required parking demand of construction staff within the Principal Site and Cable Corridor, but to encourage use of the main

compound on the western side of Haddington Lane, to the south of the A46 to minimise vehicle trips on the local highway network. Construction workers will also be able to access other areas of the Site using the internal minibus service if required;

- r. Positioning of suitably qualified banksmen at the proposed accesses for the Principal Site and Cable Corridor, to allow all vehicle arrivals and departures to be safely controlled during the construction period;
- s. Vegetation clearance at the proposed access points where required to achieve appropriate levels of visibility at these locations;
- t. Providing sufficient cycle parking spaces within the Principal Site to encourage construction staff to travel by bicycle where viable; and
- u. A specialised haulage service will be employed to allow abnormal loads to transport components with the necessary escort, permits and traffic management, with the contractor consulting with the relevant highways authorities to ensure the correct permits are obtained. The police will also be given advanced notification under the Road Vehicle Authorisation of Special Types Order 2003.

Operation and Maintenance

13.6.2 The Proposed Development will minimise operational impacts by:

- a. Providing suitable points of access for operational vehicles (**PEI Report Volume 2: Figure 3-2A: Indicative South Facing Fixed Site Layout Plan and Figure 3-2B: Indicative Single Axis Tracker Site Layout Plan**) including on Haddington Lane, Bassingham Road, Moor Lane, Clay Lane, The Avenue, Fosse Lane, Morton Lane and Fen Lane;
- b. Converting the internal construction routes to maintenance routes, to allow operational vehicles to access all areas of the Principal Site via the proposed access points during the operational phase;
- c. Maintaining access to all existing PRow within the Proposed Development, with suitable alternative routes provided for the three PRow sections that will be permanently diverted; and
- d. Controlling areas where the internal maintenance route crosses any existing PRow or local access roads (such as providing gates), permitting only operational traffic to utilise these internal routes within the Principal Site. Operational traffic will give-way to other users (including pedestrians and road users) when utilising the crossing points. Visibility will be maximised between operational vehicles and other users, with warning signage provided if required.

13.7 Preliminary Assessment of Effects

13.7.1 Taking into account the embedded mitigation measures as detailed in Section 0 above, the potential impacts and effects of the Proposed Development were assessed using the methodology as detailed in Section 13.4 of this chapter.

Construction (2031 to 2033) and Decommissioning (assumed from 2093)

Construction Programme, Working Hours and Assessment Parameters

13.7.2 The following assumptions have been adopted to provide a robust assessment of the Proposed Development:

- a. The shortest expected construction programme will be 24 months, which provides a worst-case in terms of monthly (and therefore daily) construction vehicle trips;
- b. The core construction working hours will be Monday to Friday (7am-7pm) and Saturday (7am-1pm) with no Sunday or Bank Holiday working;
- c. Following consultation with LCC Highways, a 'worst case' scenario for staff movements has been used to provide a robust weekday assessment. Accordingly, rather than adopting 6am-7am for staff arrivals and 7pm-8pm for staff departures, construction worker travel patterns have been based on the 'shoulder' peaks to the traditional network peak hours. Therefore, staff arrivals have been assumed to take place between 7am-8am and staff departures have been assumed to take place between 6pm-7pm (Monday to Friday), which represents a worst case assumption and may happen during winter time months;
- d. HGV movements have been distributed across a 12-hour window, arriving and departing between 7am-7pm. However, HGV movements will, in practice, be limited as far as possible so as not to travel during the traditional peak hours of 8am-9am and 5pm-6pm through the measures set out within paragraph 13.6.1;
- e. Light Goods Vehicle (LGV) movements have been distributed across a 12-hour window between 7am-7pm based on a flat profile; and
- f. A weekday assessment (Monday to Friday) has been carried out to provide a worst-case assessment of the peak construction phase based on the above, including both the shoulder and traditional network peaks.

Forecast Construction Staff Mode Share

13.7.3 The construction staff vehicle split has been based on the same assumptions used for a similar solar scheme that is of comparable size. This modal split is shown in **Table 13-15**.

Table 13-15: Construction Staff Vehicle Split

Mode	Staff Mode Share Percentage
Shuttle-bus (non-local staff)	55%
Car driver (local staff)	35%
Car passenger	10%

13.7.4 Using the trip generation figures outlined in paragraph 13.4.47, this assumed modal split has been used to estimate the staff trip generation figures shown in **Table 13-16** below.

Table 13-16: Construction Staff Trip Generation

Mode	Principal Site Staff Trips	Cable Corridor Staff Trips	Total
Shuttle-Bus Passengers	316	14	330
Car Driver / Vehicles	199	9	208
Car Passenger	60	3	62
Total	575	25	600

Forecast Trip Attraction

13.7.5 For the purposes of this assessment the peak daily number of HGVs, LGVs, shuttle buses, and construction staff required for the Principal Site in the Proposed Development are identified in **Table 13-17** below, during the peak construction phase (2032). It should be noted that the forecast numbers below include consideration of daily variation and peak daily movements to provide a robust assessment.

Table 13-17: Forecast Peak Daily and Hourly Construction Trips for Principal Site

Hour	HGVs			LGVs			Shuttle			Staff			Total		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
07:00-08:00	0	0	0	3	2	5	7	7	14	199	0	199	209	9	218
08:00-09:00	5	5	10	2	2	4	0	0	0	0	0	0	7	7	14
09:00-10:00	6	5	11	2	2	4	0	0	0	0	0	0	8	7	15
10:00-11:00	5	5	10	2	2	4	0	0	0	0	0	0	7	7	14
11:00-12:00	5	5	10	2	2	4	0	0	0	0	0	0	7	7	14
12:00-13:00	5	4	9	2	2	4	0	0	0	0	0	0	7	6	13
13:00-14:00	5	5	10	2	2	4	0	0	0	0	0	0	7	7	14
14:00-15:00	5	6	11	2	2	4	0	0	0	0	0	0	7	8	15
15:00-16:00	5	5	10	2	2	4	0	0	0	0	0	0	7	7	14
16:00-17:00	5	5	10	2	2	4	0	0	0	0	0	0	7	7	14
17:00-18:00	4	5	9	2	2	4	0	0	0	0	0	0	6	7	13

Hour	HGVs			LGVs			Shuttle			Staff			Total		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
18:00-19:00	0	0	0	2	3	5	7	7	14	0	199	199	9	209	218
Total	50	50	100	25	25	50	14	14	28	199	199	398	288	288	576

Arr – Arrival; Dep – Departure; Tot – Total

Forecast Trip Distribution

13.7.6 For the purposes of the assessment the following assignment of HGV and LGV trips have been made onto the local highway network:

- 50% of HGVs and LGVs to travel to/ from the A46 to the west; and
- 50% of HGVs and LGVs to travel to/ from the A46 to the east.

13.7.7 In terms of the forecast distribution of HGVs, LGVs and construction staff vehicles across the site accesses, the following in **Table 13-18** below has been assumed for the assessment.

13.7.8 The HGV profile percentages for the access points have been informed by the accesses which have a construction compound as well as the megawatts per access. Where there are accesses that do not have a compound, it is assumed that these will not directly receive HGV deliveries and therefore the HGV profile is 0%.

13.7.9 For staff and LGVs, the profile percentages for the access points have been informed by the following factors:

- Expected compound size;
- Avoidance of route constraints; and
- HGV profiles of the access points.

Table 13-18: Trip Distribution for each access point for the Principal Site

Access Point	Staff	LGV	HGV
C1 (The Avenue)	15%	15%	27%
C2 (Fosse Lane)	5%	5%	0%
C3 (Fosse Lane)	15%	15%	20%
C4 (Haddington Lane)	10%	10%	4%
C5 (Stone Lane)	5%	5%	0%
C6 (Haddington Lane)	10%	10%	10%
C7 (Haddington Lane)	5%	5%	0%
C8 (Bassingham Road)	5%	5%	0%
C9 (Bassingham Road)	10%	10%	17%
C10 (Moor Lane)	10%	10%	22%

Access Point	Staff	LGV	HGV
C11 (Clay Lane)	5%	5%	0%
C12 (Clay Lane)	5%	5%	0%
Total	100%	100%	100%

Forecast Construction Traffic Impact

13.7.10 The forecast increases in two-way vehicle movements during the proposed development weekday peak hours and across the day (24 hours, Monday–Friday), both in terms of actual increases and percentage increases relative to the future baseline traffic flows, are presented in **Table 13-19** and **Table 13-20** below. Full traffic flow tables showing the development peak flows, network peak flows, 12-hour and 24-hour flows can be found in **PEI Report Volume 3: Appendix 13-D**.

13.7.11 It should be noted that this assessment considers construction trips associated with the Principal Site only and focuses on the highway network in the vicinity, where the majority of trips associated with the Principal Site are expected. A full assessment including consideration of the Cable Corridor will be carried out as part of the ES.

Table 13-19: 2031 to 2033 Construction Traffic Impact – Principal Site – Development Peak Hours

Ref	Location	AM Development Peak (07:00-08:00)				PM Development Peak (18:00-19:00)			
		Base	Dev	Total	% Increase	Base	Dev	Total	% Increase
RL1	A46 west of Halfway House Roundabout	3,263	109	3,372	3.3%	2,338	109	2,447	4.7%
RL2	Halfway House Lane	382	34	417	9.0%	246	34	281	14.0%
RL3	The Avenue	8	34	42	438.5%	4	34	38	876.2%
RL4	A46 east of Halfway House Roundabout	3,731	109	3,840	2.9%	1,697	109	1,806	6.4%
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	472	80	552	17.0%	154	80	234	52.1%
RL6	Fosse Lane (north of Haddington Lane)	271	10	282	3.8%	122	10	133	8.3%
RL7	Old Haddington Lane (between Haddington Lane and A46)	330	80	410	24.3%	162	80	243	49.3%
RL8	A46 east of Fosse Lane	2,895	109	3,004	3.8%	2,173	109	2,282	5.0%

Ref	Location	AM Development Peak (07:00-08:00)				PM Development Peak (18:00-19:00)			
		Base	Dev	Total	% Increase	Base	Dev	Total	% Increase
RL9	Haddington Lane (south of Old Haddington Lane)	587	117	704	19.8%	316	117	432	36.9%
RL10	Stone Lane	5	0	5	0.0%	9	0	9	0.0%
RL11	South Hykeham Road	553	33	586	6.0%	325	33	358	10.1%
RL12	Church Road (east of Bassingham Road)	706	0	706	0.0%	311	0	311	0.0%
RL13	Bassingham Road (southwest of Bridge Road)	96	33	129	34.4%	168	33	201	19.7%
RL14	Haddington Lane (south of Stone Lane)	220	42	262	19.2%	251	42	294	16.8%
RL15	Norton Lane	36	0	36	0.0%	109	0	109	0.0%
RL16	Moor Lane	244	23	267	9.6%	294	23	318	8.0%
RL17	Bassingham Road (between Moor Lane and Clay Lane)	205	20	225	10.0%	166	20	186	12.3%
RL18	Clay Lane	13	20	33	156.1%	8	20	28	259.9%
RL19	Unnamed Road (south of Halfway House Roundabout)	1,064	23	1,088	2.2%	580	23	603	4.0%
RL20	Fosse Lane (between A46 and Haddington Lane)	310	80	390	25.8%	102	80	183	78.1%
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	4,217	138	4,355	3.3%	2,066	138	2,204	6.7%
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	529	102	631	19.3%	172	102	274	59.2%
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane)	734	138	872	18.8%	289	138	427	47.9%

Ref	Location	AM Development Peak (07:00-08:00)				PM Development Peak (18:00-19:00)			
		Base	Dev	Total	% Increase	Base	Dev	Total	% Increase
	Lane/Haddington Lane)								
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	736	85	822	11.6%	1,040	85	1,125	8.2%
RJ5	Bridge Road/Church Road/Bassingham Road	745	33	778	4.4%	423	33	456	7.8%
RJ6	Haddington Lane/Bassingham Road/Moor Lane	331	20	351	6.2%	983	20	1,004	2.1%
RJ7	Unnamed Road/Moor Lane/Norton Lane	274	23	298	8.5%	995	23	1,019	2.4%
RJ8	North Hykeham Roundabout (A46(N)/ Newark Road/ A46(S)/ Middle Lane)	3,741	138	3,879	3.7%	1,921	138	2,058	7.2%

Table 13-20: 2031 to 2033 Construction Traffic Impact – Principal Site – Daily (24 Hours)

Ref	Location	Daily (24 hours)			
		Base	Dev	Total	% Increase
RL1	A46 west of Halfway House Roundabout	40,728	288	41,016	0.7%
RL2	Halfway House Lane	4,733	102	4,835	2.2%
RL3	The Avenue	118	102	220	86.3%
RL4	A46 east of Halfway House Roundabout	40,289	288	40,577	0.7%
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	4,106	201	4,307	4.9%
RL6	Fosse Lane (north of Haddington Lane)	2,775	22	2,797	0.8%
RL7	Old Haddington Lane (between Haddington Lane and A46)	3,792	201	3,993	5.3%
RL8	A46 east of Fosse Lane	38,602	288	38,890	0.7%
RL9	Haddington Lane (south of Old Haddington Lane)	5,906	286	6,192	4.8%
RL10	Stone Lane	65	0	65	0.0%
RL11	South Hykeham Road	5,425	89	5,514	1.6%

Ref	Location	Daily (24 hours)			
		Base	Dev	Total	% Increase
RL12	Church Road (east of Bassingham Road)	6,190	0	6,190	0.0%
RL13	Bassingham Road (southwest of Bridge Road)	1,310	89	1,400	6.8%
RL14	Haddington Lane (south of Stone Lane)	1,971	102	2,073	5.2%
RL15	Norton Lane	423	0	423	0.0%
RL16	Moor Lane	2,230	73	2,303	3.3%
RL17	Bassingham Road (between Moor Lane and Clay Lane)	1,901	45	1,946	2.4%
RL18	Clay Lane	118	45	163	37.9%
RL19	Unnamed Road (south of Halfway House Roundabout)	11,334	73	11,406	0.6%
RL20	Fosse Lane (between A46 and Haddington Lane)	2,521	201	2,722	8.0%
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	45,359	375	45,734	0.8%
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	4,693	259	4,952	5.5%
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	7,496	344	7,840	4.6%
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	6,873	214	7,086	3.1%
RJ5	Bridge Road/Church Road/Bassingham Road	6,910	89	7,000	1.3%
RJ6	Haddington Lane/Bassingham Road/Moor Lane	3,851	45	3,896	1.2%
RJ7	Unnamed Road/Moor Lane/Norton Lane	3,363	73	3,436	2.2%
RJ8	North Hykeham Roundabout (A46(N)/ Newark Road/ A46(S)/ Middle Lane)	42,991	375	43,366	0.9%

13.7.12 The results shown in **Table 13-19** and **Table 13-20** indicate that the following parts of the network in **Table 13-21** below are expected to experience increases of at least 30 additional vehicle trips during the development peak hours, which is the screening process set out in Section 13.4 that has been adopted to identify which receptors have been further included in the assessment.

Table 13-21: List of receptors screened in for the assessment

Ref	Receptor	Receptor screened in (yes/ no)
RL1	A46 west of Halfway House Roundabout	Yes
RL2	Halfway House Lane	Yes

Ref	Receptor	Receptor screened in (yes/ no)
RL3	The Avenue	Yes
RL4	A46 east of Halfway House Roundabout	Yes
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	Yes
RL6	Fosse Lane (north of Haddington Lane)	No
RL7	Old Haddington Lane (between Haddington Lane and A46)	Yes
RL8	A46 east of Fosse Lane	Yes
RL9	Haddington Lane (south of Old Haddington Lane)	Yes
RL10	Stone Lane	No
RL11	South Hykeham Road	Yes
RL12	Church Road (east of Bassingham Road)	No
RL13	Bassingham Road (southwest of Bridge Road)	Yes
RL14	Haddington Lane (south of Stone Lane)	Yes
RL15	Norton Lane	No
RL16	Moor Lane	No
RL17	Bassingham Road (between Moor Lane and Clay Lane)	No
RL18	Clay Lane	No
RL19	Unnamed Road (south of Halfway House Roundabout)	No
RL20	Fosse Lane (between A46 and Haddington Lane)	Yes
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	Yes
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Yes
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Yes
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Yes
RJ5	Bridge Road/Church Road/Bassingham Road	Yes
RJ6	Haddington Lane/Bassingham Road/Moor Lane	No
RJ7	Unnamed Road/Moor Lane/Norton Lane	No
RJ8	North Hykeham Roundabout (A46(N)/ Newark Road/ A46(S)/ Middle Lane)	Yes

13.7.13 Following the above, the anticipated impacts for each of the assessment criteria is set out below.

13.7.14 Impacts on road link and road junction receptors during the construction and decommissioning of the Proposed Development have been determined for the following categories:

- a. Severance of communities;
- b. Pedestrian delay (incorporating delay to all non-motorised users);
- c. Non-motorised user amenity;
- d. Fear and Intimidation on and by road users;
- e. Road vehicle driver and passenger delay;
- f. Road user and pedestrian safety; and
- g. Large loads.

13.7.15 Impacts on PRow receptors during the construction and decommissioning of the Proposed Development have been determined for the following categories:

- a. Severance;
- b. Pedestrian delay;
- c. Pedestrian and cyclist amenity; and
- d. Fear and intimidation.

13.7.16 Magnitudes have been determined for each impact category, however in some cases low base traffic flows have resulted in abnormally high percentage increases between the base and development scenarios. Therefore, all receptors which have been screened in have been further assessed on the basis of whether traffic flows reach certain representative thresholds for assessed time periods, and consequently magnitudes for receptors which do not meet these thresholds have been manually adjusted to more accurately reflect the impact of development traffic. The thresholds used for this manual adjustment process are shown in **Table 13-22** below. Magnitudes which have been manually adjusted in this way are detailed in the sections on each impact category below.

Table 13-22: Manual Adjustment Flow Thresholds

Hourly Flow Threshold	12 Hour Flow Threshold	24 Hour Flow Threshold
100	600	1200

Sensitivity

13.7.17 Different criteria for sensitivity have been used for each assessment category as follow:

- a. Severance, Pedestrian Delay, Non-Motorised User Amenity, Fear and Intimidation;
- b. Driver Delay;
- c. Road Safety; and
- d. Large Loads.

13.7.18 Details of receptor sensitivity for Severance, Pedestrian Delay, Non-Motorised User Amenity and Fear and Intimidation are set out within **Table 13-23** below.

Table 13-23: Sensitivity of receptors for Severance, Pedestrian Delay, Non-Motorised User Amenity and Fear & Intimidation

Receptor Ref	Receptor	Sensitivity	Justification
RL1	A46 west of Halfway House Roundabout	Very Low	No sensitive users or receptors present
RL2	Halfway House Lane	Very Low	Rural setting with no pedestrian/ cycle facilities
RL3	The Avenue	Very Low	Rural setting with no pedestrian/ cycle facilities
RL4	A46 east of Halfway House Roundabout	Very Low	No sensitive users or receptors present
RL5	Haddington Lane (North of Old Haddington Lane)	Very Low	No sensitive users or receptors present
RL6	Fosse Lane (north of Haddington Lane)	Low	Rural setting with limited pedestrian/ cycle facilities
RL7	Old Haddington Lane (between Haddington Lane and A46)	Low	Rural setting with limited pedestrian/ cycle facilities
RL8	A46 west of Hykeham Roundabout	Low	Main road in a rural setting with limited pedestrian/ cycle facilities
RL9	Haddington Lane (South of Old Haddington Lane)	Very low	Rural setting with no pedestrian/ cycle facilities
RL10	Stone Lane	Very low	Rural setting with no pedestrian/ cycle facilities
RL11	Butts Lane	Low	Pedestrian footway on South Hykeham Road
RL12	Church Road (between Bridge Road and Royal Oak Lane)	Low	Pedestrian footway on Church Road
RL13	Bassingham Road (northeast)	Low	Rural setting but has a Church located on this road
RL14	Haddington Lane (south of Stone Lane)	Very Low	No sensitive users or receptors present
RL15	Norton Lane	Very Low	Rural setting with no pedestrian/ cycle facilities
RL16	Moor Lane	Very Low	Rural setting with no pedestrian/ cycle facilities
RL17	Bassingham Road (southwest)	Low	Rural setting with limited pedestrian/ cycle facilities
RL18	Clay Lane	Very Low	Rural setting with no pedestrian/ cycle facilities

Receptor Ref	Receptor	Sensitivity	Justification
RL19	Camp Road (south of Halfway House roundabout)	Low	Rural setting with limited pedestrian/ cycle facilities
RL20	Fosse Lane (between A46 and Haddington Lane)	Very Low	Rural setting with no pedestrian/ cycle facilities
RJ1	Halfway House Roundabout (Halfway House Lane(N)/A46(E)/Unnamed Road(S)/A46(W))	Low	Footway present around roundabout
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane(S))	Very Low	No pedestrian or cycle facilities here
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane(N)/Haddington Lane (E)	Very Low	No pedestrian or cycle facilities here
RJ4	Haddington Lane(N)/Butts Lane(E)/Haddington Lane(S)/Stone Lane(W)	Very Low	Four arm priority junction with no pedestrian/ cycle facilities
RJ5	Bridge Road(N)/Church Road(E)/Bassingham Road(W)	Low	Three arm priority junction with pedestrian/ cycle facilities
RJ6	Haddington Lane(E)/Bassingham Road(S)/Moor Lane(W)	Low	Three arm priority junction with pedestrian/ cycle facilities
RJ7	Unnamed Road(N)/Moor Lane(E)/Norton Lane(W)	Very Low	Three arm priority junction with no pedestrian/ cycle facilities
RJ8	North Hykeham Roundabout (A46(N)/ Newark Road/ A46(S)/ Middle Lane)	Very Low	Industrial/retail park not defined as sensitivity receptor, no ped or cycle facilities nearby
P1	PRoW LL TOTH 6/1	Very Low	Footpath (non-trafficked route)
P2	PRoW LL TOTH 7/2	Very Low	Pedestrian/cycle route not running alongside highway
P3	LL TOTH 15/1	Very Low	Pedestrian/cycle route not running alongside highway
P4	PRoW LL TOTH 7/3	Very Low	Footpath (non-trafficked route)
P5	PRoW LL TOTH 21/1	Very Low	Footpath (non-trafficked route)
P6	PRoW LL TOTH 6/2	Very Low	Pedestrian/cycle route not running alongside highway
P7	PRoW LL TOTH 6/3	Very Low	Footpath (non-trafficked route)
P8	PRoW LL TOTH 13/1	Very Low	Footpath (non-trafficked route)
P9	PRoW LL TOTH 6A/1	Very Low	Footpath (non-trafficked route)
P10	PRoW LL TOTH 11/1	Very Low	Pedestrian/cycle route not running alongside highway
P11	PRoW LL TOTH 12/1	Low	Public Bridleway (trafficked route)

Receptor Ref	Receptor	Sensitivity	Justification
P12	PRoW LL TOTH 12/3	Very Low	Public Bridleway (non-trafficked route)
P13	PRoW LL Aubo 12/2	Very Low	Pedestrian/cycle route not running alongside highway
P14	PRoW LL Aubo 11/2	Very Low	Pedestrian/cycle route not running alongside highway
P15	PRoW LL Aubo 13/1	Very Low	Restricted Byway (non-trafficked route)
P16	PRoW LL Aubo 10/1	Very Low	Footpath (non-trafficked route)
P17	PRoW LL Aubo 8/1	Very Low	Restricted Byway (non-trafficked route)
P18	PRoW LL Bass 23/1	Very Low	Lightly trafficked highway with off-road pedestrian/cycle route
P19	PRoW LL ThuN 1/1	Very Low	Footpath (non-trafficked route)
P20	PRoW LL ThuN 2/1	Very Low	Pedestrian/cycle route not running alongside highway
P21	PRoW LL ThuN 5/1	Very Low	Footpath (non-trafficked route)
P22	PRoW LL Cole 1/2	Very Low	Footpath (non-trafficked route)
P23	PRoW LL Cole 3/1	Very Low	Footpath (non-trafficked route)
P24	PRoW LL Cole 4/1	Very Low	Footpath (non-trafficked route)
P25	PRoW LL BooG 5/1	Very Low	Footpath (non-trafficked route)

13.7.19 Details of receptor sensitivity for Driver Delay are set out within **Table 13-24** below.

Table 13-24: Receptor Sensitivity for Driver Delay

Receptor Ref	Receptor	Sensitivity	Justification
RL1	A46 west of Halfway House Roundabout	Medium	On A46 and west of junction RJ1. Link less sensitive than junction so assessed as medium.
RL2	Halfway House Lane	Low	North of junction RJ1 but less busy road and located in rural setting
RL3	The Avenue	Very low	Not next to any junctions, very low hourly flows
RL4	A46 east of Halfway House Roundabout	Medium	On A46 east of RJ1 . Link less sensitive than junction so assessed at medium.
RL5	Haddington Lane (North of Old Haddington Lane)	Low	South of RJ2 which has low sensitivity

Receptor Ref	Receptor	Sensitivity	Justification
RL6	Fosse Lane (north of Haddington Lane)	Low	North of junction RJ2 which has low sensitivity
RL7	Old Haddington Lane (between Haddington Lane and A46)	Medium	East of RJ3 which has medium sensitivity
RL8	A46 west of Hykeham Roundabout	Medium	On A46 between RJ1 and RJ8. Link less sensitive than junction so assessed as medium.
RL9	Haddington Lane (South of Old Haddington Lane)	Low	South of RJ3. Minor road in rural setting.
RL10	Stone Lane	Low	West of RJ4 which has medium sensitivity but with extremely low hourly flows
RL11	Butts Lane	Low	East of RJ4. Minor road in rural setting.
RL12	Church Road (between Bridge Road and Royal Oak Lane)	Low	West of RJ5 which has low sensitivity
RL13	Bassingham Road (northeast)	Low	East of RJ5 which has low sensitivity
RL14	Haddington Lane (south of Stone Lane)	Low	South of RJ4. Minor road in rural setting.
RL15	Norton Lane	Very low	West of RJ7 which has very low sensitivity
RL16	Moor Lane	Very low	Between RJ6 and RJ7 which have low and very low sensitivity respectively
RL17	Bassingham Road (southwest)	Low	Southeast of RJ6 which has low sensitivity
RL18	Clay Lane	Very low	South of RJ6. Minor road in rural setting.
RL19	Camp Road (south of Halfway House roundabout)	Low	In between RJ1 and RJ7. Minor road in rural setting.
RL20	Fosse Lane (between A46 and Haddington Lane)	Low	East of RJ2 which has low sensitivity
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	Very low	Between RJ6 and RJ7 which have low and very low sensitivity respectively
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Low	Southeast of RJ6 which has low sensitivity
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Very low	South of RJ6 which has low sensitivity

Receptor Ref	Receptor	Sensitivity	Justification
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Low	In between RJ1 and RJ7 which have high and very low sensitivity respectively
RJ5	Bridge Road/Church Road/Bassingham Road	Low	East of RJ2 which has low sensitivity
RJ6	Haddington Lane/Bassingham Road/Moor Lane	High	Maximum queue of 15+ vehicles on 3 arms in both peak hours
RJ7	Unnamed Road/Moor Lane/Norton Lane	Low	Maximum queue of 7 vehicles in the PM peak hour on one arm, and 3 vehicles in the AM peak hour on one arm
RJ8	North Hykeham Roundabout (A46(N)/ Newark Road/ A46(S)/ Middle Lane)	Medium	Maximum queue of 11+ vehicles on arm in the PM peak hour, and 5 vehicles in the AM peak hour on one arm

A review of Personal Injury Collision (PIC) data obtained from Lincolnshire County Council (LCC) for the Study Area shown in **PEI Report Volume 2, Figure 13-1**, for the most recently available five-year period (1 June 2019 to 31 May 2024) has been undertaken. Figures from this data have been used to assess the road safety sensitivity of the link and junction receptors within the Proposed Development area. Details of receptor sensitivity for Road Safety are set out within **Table 13-25** below.

Table 13-25: Receptor Sensitivity for Road Safety

Receptor Ref	Receptor	Sensitivity	Justification
RL1	A46 west of Halfway House Roundabout	Very Low	1 collision in the past 5 years (no serious or fatal)
RL2	Halfway House Lane	Very Low	1 collision in the past 5 years (no serious or fatal)
RL3	The Avenue	Very Low	No collisions in the past 5 years
RL4	A46 east of Halfway House Roundabout	Medium	7 collisions in the past 5 years (all slight in severity)
RL5	Haddington Lane (North of Old Haddington Lane)	Low	1 serious collision in the past 5 years
RL6	Fosse Lane (north of Haddington Lane)	Very Low	1 collision in the past 5 years (no fatal or serious)
RL7	Old Haddington Lane (between Haddington Lane and A46)	Very Low	No collisions in the past 5 years
RL8	A46 west of Hykeham Roundabout	High	17 collisions in the past 5 years, 7 of which involved a Goods Vehicle (>3.5 tonnes)

Receptor Ref	Receptor	Sensitivity	Justification
RL9	Haddington Lane (South of Old Haddington Lane)	Very Low	No collisions in the past 5 years
RL10	Stone Lane	Very Low	No collisions in the past 5 years
RL11	Butts Lane	Low	1 serious collision in the past 5 years
RL12	Church Road (between Bridge Road and Royal Oak Lane)	Very Low	No collisions in the past 5 years
RL13	Bassingham Road (northeast)	Low	2 collisions including 1 serious collision in the past 5 years
RL14	Haddington Lane (south of Stone Lane)	Medium	5 collisions including 1 serious collision in the past 5 years
RL15	Norton Lane	Very Low	1 collision in the past 5 years (no serious or fatal)
RL16	Moor Lane	Very Low	No collisions in the past 5 years
RL17	Bassingham Road (southwest)	Low	3 collisions including 1 serious collision in the past 5 years
RL18	Clay Lane	Very Low	No collisions in the past 5 years
RL19	Camp Road (south of Halfway House roundabout)	Very Low	No collisions in the past 5 years
RL20	Fosse Lane (between A46 and Haddington Lane)	Very Low	No collisions in the past 5 years
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	High	11 collisions in the past 5 years
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Low	2 collisions including 1 serious collision in the past 5 years
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Very Low	1 collision in the past 5 years (no serious or fatal)
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Low	4 collisions including 2 serious collisions in the past 5 years
RJ5	Bridge Road/Church Road/Bassingham Road	Very Low	No collisions in the past 5 years
RJ6	Haddington Lane/Bassingham Road/Moor Lane	Very Low	No collisions in the past 5 years
RJ7	Unnamed Road/Moor Lane/Norton Lane	Very Low	2 collisions in the past 5 years including 1 involving a

Receptor Ref	Receptor	Sensitivity	Justification
			Goods Vehicle which was slight in severity
RJ8	North Hykeham Roundabout (A46(N)/ Newark Road/ A46(S)/ Middle Lane)	High	10 collisions in the past 5 years

13.7.20 Details of receptor sensitivity for Large Loads are set out within **Table 13-26** below.

Table 13-26: Receptor Sensitivity for Large Loads

Receptor Ref	Receptor	Sensitivity	Justification
RL1	A46 west of Halfway House Roundabout	Very Low	No serious or fatal accidents involving goods vehicles
RL2	Halfway House Lane	Very Low	No serious or fatal accidents involving goods vehicles
RL3	The Avenue	Very Low	No serious or fatal accidents involving goods vehicles
RL4	A46 east of Halfway House Roundabout	Very Low	No serious or fatal accidents involving goods vehicles
RL5	Haddington Lane (North of Old Haddington Lane)	Very Low	No serious or fatal accidents involving goods vehicles
RL6	Fosse Lane (north of Haddington Lane)	Very Low	No serious or fatal accidents involving goods vehicles
RL7	Old Haddington Lane (between Haddington Lane and A46)	Very Low	No serious or fatal accidents involving goods vehicles
RL8	A46 west of Hykeham Roundabout	Medium	3 serious accidents involving goods vehicles
RL9	Haddington Lane (South of Old Haddington Lane)	Very Low	No serious or fatal accidents involving goods vehicles
RL10	Stone Lane	Very Low	No serious or fatal accidents involving goods vehicles
RL11	Butts Lane	Very Low	No serious or fatal accidents involving goods vehicles
RL12	Church Road (between Bridge Road and Royal Oak Lane)	Very Low	No serious or fatal accidents involving goods vehicles
RL13	Bassingham Road (northeast)	Very Low	No serious or fatal accidents involving goods vehicles
RL14	Haddington Lane (south of Stone Lane)	Very Low	No serious or fatal accidents involving goods vehicles
RL15	Norton Lane	Very Low	No serious or fatal accidents involving goods vehicles
RL16	Moor Lane	Very Low	No serious or fatal accidents involving goods vehicles

Receptor Ref	Receptor	Sensitivity	Justification
RL17	Bassingham Road (southwest)	Very Low	No serious or fatal accidents involving goods vehicles
RL18	Clay Lane	Very Low	No serious or fatal accidents involving goods vehicles
RL19	Camp Road (south of Halfway House roundabout)	Very Low	No serious or fatal accidents involving goods vehicles
RL20	Fosse Lane (between A46 and Haddington Lane)	Very Low	No serious or fatal accidents involving goods vehicles
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	Very Low	No serious or fatal accidents involving goods vehicles
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Very Low	No serious or fatal accidents involving goods vehicles
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Very Low	No serious or fatal accidents involving goods vehicles
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Very Low	No serious or fatal accidents involving goods vehicles
RJ5	Bridge Road/Church Road/Bassingham Road	Very Low	No serious or fatal accidents involving goods vehicles
RJ6	Haddington Lane/Bassingham Road/Moor Lane	Very Low	No serious or fatal accidents involving goods vehicles
RJ7	Unnamed Road/Moor Lane/Norton Lane	Very Low	No serious or fatal accidents involving goods vehicles
RJ8	North Hykeham Roundabout (A46(N)/ Newark Road/ A46(S)/ Middle Lane)	Very Low	No serious or fatal accidents involving goods vehicles

Severance

13.7.21 IEMA Guidelines (Ref 13-7) state that 30%, 60% and 90% increases in total traffic flows or 10%, 40% and 90% increases in HGV traffic flows would result in slight, moderate and substantial changes in magnitude with respect to severance, respectively. Based on the initial construction traffic impact assessment summarised above for the Principal Site, all screened in road link and road junction receptors within the Study Area have been assessed to have negligible or minor levels of significance during the AM and PM Development peaks and across a 24-hour period as shown in **Table 13-27**.

Table 13-27: Receptor assessment for Severance

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Adjusted Magnitude	Significance
RL1	A46 west of Halfway House Roundabout	Very Low	Very Low	Very Low	Negligible

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Adjusted Magnitude	Significance
RL2	Halfway House Lane	Very Low	Medium	Medium	Negligible
RL3	The Avenue	Very Low	High	Medium	Negligible
RL4	A46 east of Halfway House Roundabout	Very Low	Very Low	Very Low	Negligible
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	Very Low	High	Medium	Negligible
RL7	Old Haddington Lane (between Haddington Lane and A46)	Low	Medium	Medium	Minor
RL8	A46 east of Fosse Lane	Low	Very Low	Very Low	Negligible
RL9	Haddington Lane (south of Old Haddington Lane)	Very low	Medium	Medium	Negligible
RL11	South Hykeham Road	Low	Low	Low	Negligible
RL13	Bassingham Road (southwest of Bridge Road)	Low	High	Medium	Minor
RL14	Haddington Lane (south of Stone Lane)	Very Low	Low	Low	Negligible
RL20	Fosse Lane (between A46 and Haddington Lane)	Very Low	High	Medium	Negligible
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	Low	Very Low	Very Low	Negligible
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Very Low	High	Medium	Negligible
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Very Low	High	Medium	Negligible
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Very Low	Low	Low	Negligible
RJ5	Bridge Road/Church Road/Bassingham Road	Low	Medium	Medium	Minor
RJ8	North Hykeham Roundabout (A46(N)/Newark Road/ A46(S)/Middle Lane)	Very Low	Very Low	Very Low	Negligible

13.7.22 Manual assessment of each of these receptors has determined that all 'High' magnitudes are a result of very low HGV flows in the base period. Therefore, these have been manually adjusted to 'Medium' for the purposes of this assessment.

13.7.23 The assessment of impacts on all of the PRow receptors has shown to be negligible for Severance. With the three permanent diversions of PRow sections (TOTH/13/1, AUBO/12/2 and AUBO/10/1) the magnitude of these have been assigned as Medium (from Negligible), as they are permanent diversions with an increase in journey length of less than 400m.

13.7.24 The magnitude of change with respect to Severance across these PRow receptors has been categorised as follows based on professional judgement and experience:

a. Very Low:

- Closures/ diversions: None required, or temporary (short-term, one to five days) closures are only required to install safety measures to retain PRow access throughout construction;

b. Low:

- Closures/ diversions: Temporary (short-term, one to four weeks) localised closures/ diversions are required;

c. Medium:

- Closures/ diversions: Temporary (long-term, more than four weeks in any 12-month period) or permanent closures/ diversions are required, with an increase in journey length of less than 400m.

d. Large:

- Closures/ diversions: A closure without a diversion route for more than five days, or temporary (long-term, more than four weeks in any 12-month period) or permanent closures/ diversions are required, with an increase in journey length of more than 400m.

13.7.25 As the three PRow to be permanently diverted are all classified as Very Low sensitivity, the significance remains as Negligible as per the matrix criteria in **Table 13-6**. Furthermore, the diversion of the PRow from routes between the solar panels to routes around the field margins will avoid a feeling of enclosure ‘tunnelling’ of users and will provide enhanced routes in this respect with relatively short changes in route length.

13.7.26 A summary of the results (non-significant effects) is set out within **PEI Report Volume 3: Appendix 13-C**.

Pedestrian Delay

13.7.27 IEMA Guidelines (Ref 13-7) suggest that 30%, 60% and 90% increases in total traffic flows or 10%, 40% and 90% increases in HGV traffic flows would result in slight, moderate and substantial changes in magnitude with respect to pedestrian delay, respectively. Based on the initial construction traffic impact assessment summarised above for the Principal Site, all screened in road link and road junction receptors within the Study Area have been assessed to have negligible or minor levels of significance as shown in **Table 13-28**.

Table 13-28: Receptor assessment for Pedestrian Delay

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Adjusted Magnitude	Significance
RL1	A46 west of Halfway House Roundabout	Very Low	Very Low	Very Low	Negligible
RL2	Halfway House Lane	Very Low	Medium	Medium	Negligible
RL3	The Avenue	Very Low	High	Medium	Negligible
RL4	A46 east of Halfway House Roundabout	Very Low	Very Low	Very Low	Negligible
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	Very Low	High	Medium	Negligible
RL7	Old Haddington Lane (between Haddington Lane and A46)	Low	Medium	Medium	Minor
RL8	A46 east of Fosse Lane	Low	Very Low	Very Low	Negligible
RL9	Haddington Lane (south of Old Haddington Lane)	Very low	Medium	Medium	Negligible
RL11	South Hykeham Road	Low	Low	Low	Negligible
RL13	Bassingham Road (southwest of Bridge Road)	Low	High	Medium	Minor
RL14	Haddington Lane (south of Stone Lane)	Very Low	Low	Low	Negligible
RL20	Fosse Lane (between A46 and Haddington Lane)	Very Low	High	Medium	Negligible
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	Low	Very Low	Very Low	Negligible
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Very Low	High	Medium	Negligible
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Very Low	High	Medium	Negligible
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Very Low	Low	Low	Negligible
RJ5	Bridge Road/Church Road/Bassingham Road	Low	Medium	Medium	Minor
RJ8	North Hykeham Roundabout (A46(N)/Newark Road/ A46(S)/Middle Lane)	Very Low	Very Low	Very Low	Negligible

13.7.28 Manual assessment of each of these receptors has determined that all 'High' magnitudes are a result of very low HGV flows in the base period. Therefore, these have been manually adjusted to 'Medium' for the purposes of this assessment.

13.7.29 The assessment of impacts on all of the PRow receptors has shown to be negligible for Pedestrian Delay. With the three permanent diversions of PRowS (TOTH/13/1, AUBO/12/2 and AUBO/10/1) the magnitude of these have been assigned as Medium (from Negligible), as they are permanent diversions with an increase in journey length of less than 400m.

13.7.30 The magnitude of change with respect to Pedestrian Delay across these PRow receptors has been categorised through the same methodology for the Severance assessment.

13.7.31 The three PRow sections permanently diverted are all classified as Very Low sensitivity, therefore the significance remains as Negligible as per the matrix criteria in **Table 13-6**.

13.7.32 A summary of the results (non-significant effects) is set out within **PEI Report Volume 3: Appendix 13-C**.

Driver Delay

13.7.33 IEMA Guidelines (Ref 13-7) suggest that 30%, 60% and 90% increases in total traffic flows would result in slight, moderate and substantial changes in magnitude with respect to driver delay, respectively. Based on the initial construction traffic impact assessment summarised above for the Principal Site, all screened in road link and road junction receptors within the Study Area have been assessed to have negligible or minor levels of significance, as shown in **Table 13-29** below.

Table 13-29: Receptor assessment for Driver Delay

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Adjusted Magnitude	Significance
RL1	A46 west of Halfway House Roundabout	Medium	Very Low	Very Low	Negligible
RL2	Halfway House Lane	Low	Very Low	Very Low	Negligible
RL3	The Avenue	Very low	High	Medium	Negligible
RL4	A46 east of Halfway House Roundabout	Medium	Very Low	Very Low	Negligible
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	Low	Low	Low	Negligible
RL7	Old Haddington Lane (between Haddington Lane and A46)	Medium	Low	Low	Minor
RL8	A46 east of Fosse Lane	Medium	Very Low	Very Low	Negligible
RL9	Haddington Lane (south of Old Haddington Lane)	Low	Low	Low	Negligible

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Adjusted Magnitude	Significance
RL11	South Hykeham Road	Low	Very Low	Very Low	Negligible
RL13	Bassingham Road (southwest of Bridge Road)	Low	Low	Low	Negligible
RL14	Haddington Lane (south of Stone Lane)	Low	Very Low	Very Low	Negligible
RL20	Fosse Lane (between A46 and Haddington Lane)	Low	Medium	Medium	Minor
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	High	Very Low	Very Low	Minor
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Low	Low	Low	Negligible
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Medium	Low	Low	Minor
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Medium	Very Low	Very Low	Negligible
RJ5	Bridge Road/Church Road/Bassingham Road	Low	Very Low	Very Low	Negligible
RJ8	North Hykeham Roundabout (A46(N)/Newark Road/ A46(S)/Middle Lane)	High	Very Low	Very Low	Minor

13.7.34 The assessment of 'High' magnitude for RL3 is caused by very low total traffic flows in the base AM and PM Development Peak periods and as such is not considered representative. Therefore, the magnitude for this receptor has been downgraded to 'Medium' for the purposes of this assessment. The 'Medium' magnitude for RL20 is considered representative and therefore has not been adjusted.

13.7.35 A summary of the results (non-significant effects) is set out within **PEI Report Volume 3: Appendix 13-C**.

Non-Motorised User Amenity

13.7.36 IEMA Guidelines (Ref 13-7) suggest that 50%, 70% and 100% increases in total traffic flows would result in slight, moderate and substantial changes in magnitude respectively. Based on the initial construction traffic impact assessment summarised above for the Principal Site, all road link and road junction receptors within the Study Area have been assessed to have negligible levels of significance, as shown in **Table 13-30** below.

Table 13-30: Receptor assessment for Non-Motorised User Amenity

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Adjusted Magnitude	Significance
RL1	A46 west of Halfway House Roundabout	Very Low	Very Low	Very Low	Negligible
RL2	Halfway House Lane	Very Low	Very Low	Very Low	Negligible
RL3	The Avenue	Very Low	High	Medium	Negligible
RL4	A46 east of Halfway House Roundabout	Very Low	Very Low	Very Low	Negligible
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	Very Low	Low	Low	Negligible
RL7	Old Haddington Lane (between Haddington Lane and A46)	Low	Very Low	Very Low	Minor
RL8	A46 east of Fosse Lane	Low	Very Low	Very Low	Negligible
RL9	Haddington Lane (south of Old Haddington Lane)	Very low	Very Low	Very Low	Negligible
RL11	South Hykeham Road	Low	Very Low	Very Low	Negligible
RL13	Bassingham Road (southwest of Bridge Road)	Low	Very Low	Very Low	Negligible
RL14	Haddington Lane (south of Stone Lane)	Very Low	Very Low	Very Low	Negligible
RL20	Fosse Lane (between A46 and Haddington Lane)	Very Low	Medium	Medium	Minor
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	Low	Very Low	Very Low	Minor
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Very Low	Low	Low	Negligible
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Very Low	Very Low	Very Low	Minor
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Very Low	Very Low	Very Low	Negligible
RJ5	Bridge Road/Church Road/Bassingham Road	Low	Very Low	Very Low	Negligible
RJ8	North Hykeham Roundabout (A46(N)/Newark Road/ A46(S)/Middle Lane)	Very Low	Very Low	Very Low	Minor

13.7.37 The assessment of 'High' magnitude for RL3 is caused by very low total traffic flows in the base AM and PM Development Peak periods and as such is not considered accurate. Therefore, the magnitude for this receptor has been downgraded to 'Medium' for the purposes of this assessment. The 'Medium' assessment for RL20 is considered representative and therefore has not been adjusted.

13.7.38 All assessed PRow routes within the Principal Site and the Cable Corridor were deemed to have negligible impacts for Non-motorised User Amenity.

13.7.39 A summary of the results (non-significant effects) is set out within **PEI Report Volume 3: Appendix 13-C**.

Fear and Intimidation

13.7.40 IEMA Guidelines (Ref 13-7) recommend that three factors need to be considered when assessing the impacts of a development on fear and intimidation caused by traffic, as shown in **Table 13-5**.

13.7.41 For the purpose of this assessment, average speed has not been evaluated, since existing average speed data was not available for all receptors, and it is furthermore considered unlikely that the development flows will have any significant impact on average vehicle speed within the Proposed Development Study Area given the relatively low associated traffic flows and off-peak free-flow conditions.

13.7.42 No receptors were observed to experience any step changes in Average Hourly Traffic Flow or Daily HGV Flow. Therefore, all receptors were judged to have very low magnitudes for Fear and Intimidation and the impact of fear and intimidation has been assessed as negligible for all links and junction receptors, as shown in **Table 13-31**.

Table 13-31: Receptor assessment for Fear and Intimidation

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Adjusted Magnitude	Significance
RL1	A46 west of Halfway House Roundabout	Very Low	Very Low	Very Low	Negligible
RL2	Halfway House Lane	Very Low	Very Low	Very Low	Negligible
RL3	The Avenue	Very Low	Very Low	Very Low	Negligible
RL4	A46 east of Halfway House Roundabout	Very Low	Very Low	Very Low	Negligible
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	Very Low	Very Low	Very Low	Negligible
RL7	Old Haddington Lane (between Haddington Lane and A46)	Low	Very Low	Very Low	Negligible
RL8	A46 east of Fosse Lane	Low	Very Low	Very Low	Negligible
RL9	Haddington Lane (south of Old Haddington Lane)	Very low	Very Low	Very Low	Negligible

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Adjusted Magnitude	Significance
RL11	South Hykeham Road	Low	Very Low	Very Low	Negligible
RL13	Bassingham Road (southwest of Bridge Road)	Low	Very Low	Very Low	Negligible
RL14	Haddington Lane (south of Stone Lane)	Very Low	Very Low	Very Low	Negligible
RL20	Fosse Lane (between A46 and Haddington Lane)	Very Low	Very Low	Very Low	Negligible
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	Low	Very Low	Very Low	Negligible
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Very Low	Very Low	Very Low	Negligible
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Very Low	Very Low	Very Low	Negligible
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Very Low	Very Low	Very Low	Negligible
RJ5	Bridge Road/Church Road/Bassingham Road	Low	Very Low	Very Low	Negligible
RJ8	North Hykeham Roundabout (A46(N)/Newark Road/ A46(S)/Middle Lane)	Very Low	Very Low	Very Low	Negligible

13.7.43 All assessed PRow routes within the Principal Site and the Cable Corridor were deemed to have negligible impacts for Fear and Intimidation.

13.7.44 A summary of the results (non-significant effects) is set out within **PEI Report Volume 3: Appendix 13-C**.

Road Safety

13.7.45 IEMA Guidelines (Ref 13-7) suggest that receptors which record an increase of 30% or above in total traffic flows or of 10% or above in HGV flows should be analysed on a case-by-case basis to determine whether their magnitude should be rated low, medium or high. For the purpose of this assessment, receptors which meet either of these thresholds have been evaluated using the same criteria used to evaluate Severance and Pedestrian Delay. All screened in road link and road junction receptors within the Study Area have been assessed to have negligible or minor levels of significance as shown in **Table 13-32**.

Table 13-32: Receptor assessment for Road Safety

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Adjusted Magnitude	Significance
RL1	A46 west of Halfway House Roundabout	Very Low	Very Low	Very Low	Negligible
RL2	Halfway House Lane	Very Low	Medium	Medium	Negligible
RL3	The Avenue	Very Low	High	Medium	Negligible
RL4	A46 east of Halfway House Roundabout	Medium	Very Low	Very Low	Negligible
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	Low	High	Medium	Minor
RL7	Old Haddington Lane (between Haddington Lane and A46)	Very Low	Medium	Medium	Negligible
RL8	A46 east of Fosse Lane	High	Very Low	Very Low	Minor
RL9	Haddington Lane (south of Old Haddington Lane)	Very Low	Medium	Medium	Negligible
RL11	South Hykeham Road	Low	Low	Low	Negligible
RL13	Bassingham Road (southwest of Bridge Road)	Low	High	Medium	Minor
RL14	Haddington Lane (south of Stone Lane)	Medium	Low	Low	Minor
RL20	Fosse Lane (between A46 and Haddington Lane)	Very Low	High	Medium	Negligible
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	High	Very Low	Very Low	Minor
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Low	High	Medium	Minor
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Very Low	High	Medium	Negligible
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Low	Low	Low	Negligible
RJ5	Bridge Road/Church Road/Bassingham Road	Very Low	Medium	Medium	Negligible
RJ8	North Hykeham Roundabout (A46(N)/Newark Road/ A46(S)/Middle Lane)	High	Very Low	Very Low	Minor

13.7.46 Manual assessment of each of these receptors has determined that all ‘High’ magnitudes are a result of very low HGV flows in the baseline period. Therefore, these have been manually adjusted to ‘Medium’ for the purposes of this assessment.

13.7.47 A summary of the results (non-significant effects) is set out within **PEI Report Volume 3: Appendix 13-C**.

Large Loads

13.7.48 Since all receptors which were screened in were judged to have limited large load usage, all receptors were assessed as having ‘Low’ magnitudes. As shown in **Table 13-33**, all screened in receptors were judged to have a negligible impact significance with the exception of RL8, which was judged to have minor significance.

Table 13-33: Receptor assessment for Large Loads

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Significance
RL1	A46 west of Halfway House Roundabout	Very Low	Low	Negligible
RL2	Halfway House Lane	Very Low	Low	Negligible
RL3	The Avenue	Very Low	Low	Negligible
RL4	A46 east of Halfway House Roundabout	Very Low	Low	Negligible
RL5	Haddington Lane (between Fosse Lane and Old Haddington Lane)	Very Low	Low	Negligible
RL7	Old Haddington Lane (between Haddington Lane and A46)	Very Low	Low	Negligible
RL8	A46 east of Fosse Lane	Medium	Low	Minor
RL9	Haddington Lane (south of Old Haddington Lane)	Very Low	Low	Negligible
RL11	South Hykeham Road	Very Low	Low	Negligible
RL13	Bassingham Road (southwest of Bridge Road)	Very Low	Low	Negligible
RL14	Haddington Lane (south of Stone Lane)	Very Low	Low	Negligible
RL20	Fosse Lane (between A46 and Haddington Lane)	Very Low	Low	Negligible
RJ1	Halfway House Roundabout (Halfway House Lane/A46(E)/Unnamed Road/A46(W))	Very Low	Low	Negligible
RJ2	A46 EB On-Slip and Off-Slip (Fosse Lane(N)/Fosse Lane(E)/Haddington Lane)	Very Low	Low	Negligible

Receptor ID	Receptor Name	Sensitivity	Initial Magnitude	Significance
RJ3	A46 WB On-Slip and Off-Slip (Haddington Lane(W)/Old Haddington Lane/Haddington Lane)	Very Low	Low	Negligible
RJ4	Haddington Lane(N)/Butts Lane/Haddington Lane(S)/Stone Lane	Very Low	Low	Negligible
RJ5	Bridge Road/Church Road/Bassingham Road	Very Low	Low	Negligible
RJ8	North Hykeham Roundabout (A46(N)/ Newark Road/ A46(S)/ Middle Lane)	Very Low	Low	Negligible

13.7.49 A summary of the results (non-significant effects) is set out within **PEI Report Volume 3: Appendix 13-C**.

Cable Corridor

13.7.50 **Table 13-34** below shows the total vehicle trip generation for the Cable Corridor in the peak construction and decommissioning phase of the Proposed Development.

Table 13-34: Cable Corridor Trip Generation

Hour	HGV total flows	LGV total flows	Shuttle/ Minibus total flows	Staff total flows	Total flows
07:00-08:00	0	2	2	9	13
08:00-09:00	3	2	2	0	7
09:00-10:00	4	2	0	0	6
10:00-11:00	3	2	0	0	5
11:00-12:00	3	2	0	0	5
12:00-13:00	3	2	0	0	5
13:00-14:00	3	2	0	0	5
14:00-15:00	4	2	0	0	6
15:00-16:00	3	2	0	0	5
16:00-17:00	3	2	0	0	5

Hour	HGV total flows	LGV total flows	Shuttle/ Minibus total flows	Staff total flows	Total flows
17:00-18:00	3	2	2	0	7
18:00-19:00	0	2	2	9	13
Total	32	24	8	18	82

13.7.51 The above shows that there would be less than 30 hourly vehicle trips across all hours distributed across the road network serving the Cable Corridor. In addition, the traffic movements will likely be distributed to the road network east of the River Brant to the A15 and consequently would not be likely to be coincidental with the Principal Site traffic. Therefore, no significant traffic flow impacts would be expected in line with the screening process outlined in paragraph 13.4.16. However, a full, detailed assessment of the Cable Corridor will be carried out ES stage.

Operation (and maintenance) (2033 to 2092)

13.7.52 During general operation and maintenance, the Proposed Development is expected to generate a low level of vehicle trips. As a reasonable worst-case scenario, the Proposed Development will be serviced by a nominal number of staff (up to four permanent staff per day), predominantly undertaking day-to-day maintenance tasks. In addition, there are expected to be around two visitors per week. Staff vehicles and those used for maintenance will primarily be four wheeled drive vehicles and vans, with HGVs rarely accessing the site during the majority of the operational phase.

13.7.53 During the proposed 60-year operational life of the Proposed Development, site-wide replacement of the solar PV panels, inverters, batteries and other equipment may be required in line with the design life of these components, as explained in **PEI Report Volume 1 Chapter 3: The Proposed Development**. Site-wide replacement of these components will be planned to occur in stages, which means that replacement activities will be of much lower intensity compared to the construction phase. The Framework OEMP to be submitted alongside the DCO application will stipulate that every 12 months from the date of final commissioning, the Applicant will submit a planned maintenance schedule for the year ahead to the relevant planning authorities (excluding unforeseen emergencies, breakages and malfunctions that require maintenance throughout the year).

13.7.54 Site-wide equipment replacement will be infrequent and of shorter duration than the construction period. Site-wide equipment replacement activities are expected to generate in the order of 20 HGVs (or 40 two-way HGV movements) per day and in the order of 20 staff car trips (40 two-way movements) per day. It is not anticipated that any AILs will be required. This is much lower than the vehicle trips generated during the peak construction

phase, representing approximately 40% of the HGV and approximately 10% of car/LGV movements generated during the peak construction of the Principal Site and Cable Corridor.

13.8 Additional Mitigation and Enhancement

Construction and Decommissioning Phase

- 13.8.1 No additional mitigation measures are proposed for the construction phase following the above embedded measures, given that there are not expected to be any significant effects as a result of the Principal Site (see Section 13.7). However, additional measures will be considered should these be needed, e.g. following the completion of the full assessment which includes the Cable Corridor.
- 13.8.2 The following mitigation measures are proposed for the construction and decommissioning phases to provide added benefits at either ES stage (as part of the DCO application) or post-submission:
- Conduct a Stage 1 Road Safety Audit (RSA) on the preliminary design of access points for example (to be secured as part of the Framework CTMP or detailed CTMPs). A Designer's Response will then be prepared so that any road safety concerns are addressed as part of the final design. The approach for the Stage 1 RSA will be reviewed at ES stage to determine whether this will form part of the DCO submission or will be conducted post-submission.

Operational Phase

- 13.8.3 No additional mitigation measures are currently proposed for the operational phase following the above embedded measures, given that there are not expected to be any significant effects as a result of the Proposed Development, however, additional measures will be considered should these be needed at ES stage.
- 13.8.4 No enhancement measures are currently proposed for the operational phase following the above embedded measures.

13.9 Residual Effects and Conclusions

- 13.9.1 As highlighted in Section 13.7 and **PEI Report Volume 3: Appendix 13-C**, there are no residual significant effects of the Proposed Development on any of the Traffic and Transport receptors in the construction and decommissioning phase.

13.10 Cumulative Assessment

- 13.10.1 Once the cumulative methodology has been agreed with the Local Highway Authorities (LHAs) this section in the ES will present an assessment of cumulative effects between the Proposed Development and nearby committed developments. The assessment will be made with reference to the methodology and guidance to be set out in Chapter 5: EIA Methodology of the ES.

- 13.10.2 The Proposed Developments identified in **PEI Report Volume 1 Chapter 15: Cumulative Effects and Interactions** will be screened for spatial and temporal overlaps with the Proposed Development. For Traffic and Transport this relates to the local vehicle routes which are expected to be used to access each Proposed Development during the peak construction period of 2032.
- 13.10.3 In addition to the above, the cumulative assessment will consider any other significant committed developments which are likely to overlap with the peak construction phase (2032) of the Proposed Development. As set out in Section 13.5, TEMPRO growth factors have been applied to 2022 and 2023 surveyed traffic flows to reflect local housing and employment growth and derive future baseline traffic flows for the peak construction year of 2032.
- 13.10.4 Given other potential schemes in the vicinity, there is potential for cumulative effects to be significant, therefore these will be fully considered in the ES cumulative assessment. This will identify, for each receptor, where the predicted effects of the Proposed Development could interact with effects arising from other committed developments on a spatial and/ or temporal basis.

13.11 References

- Ref 13-1 Department for Energy Security and Net Zero (2024). Overarching National Policy Statement for Energy (EN-1).
- Ref 13-2 Department for Energy Security and Net Zero (2024). National Policy Statement for renewable energy infrastructure (EN-3).
- Ref 13-3 Department for Energy Security and Net Zero (2024). National Policy Statement for Electricity Networks Infrastructure (EN-5).
- Ref 13-4 Ministry of Housing, Communities & Local Government (2023). National Planning Policy Framework.
- Ref 13-5 Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2023). National Planning Practice Guidance: Travel Plans, Transport Assessments and Statements.
- Ref 13-6 Department for Transport and National Highways (2022). Strategic road network and the delivery of sustainable development.
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