4 TRAFFIC AND TRANSPORT

4.1 Introduction

ADL Traffic and Highways Engineering Ltd (ADL) are commissioned by Green Energy International Ltd (the Applicant) to prepare 'Chapter 4 – Traffic and Transport' in support a planning application to provide a 49.9 MW solar farm at Caudwell Farm, Eastern Road, Holbeach CP, South Holland, PE12 8ES. This Chapter forms part of the Environmental Impact Assessment (EIA) prepared by RPS.

This Chapter provides an assessment of the transport implications of the Proposed Development and provides details in relation to access arrangements and the construction management, and ongoing maintenance.

The Chapter sets out the predicted construction traffic movements, and analysis of the impact on the local highway network.

This Chapter concludes that the Proposed Development would have imperceptible traffic impact at operation stage of development, and this Chapter addresses the development's impact at construction and decommission stages.

This Chapter has been prepared by Andy Miles, Principal Transport Planner at ADL Traffic and Highways Ltd. Andy has 15 years' experience in transport planning and is a member of the Chartered Institution of Highways & Transportation (CIHT). He has significant experience and offers a diverse range of services to support planning applications including design and feasibility, technical reports (Transport Assessments / Statements), and addressing issues which may arise during Planning Consultation.

A contribution to this Chapter has been made by Tom Ponting, Transport Planner at ADL Traffic and Highways Ltd. Tom has 2 years' experience in transport planning, working towards CIHT membership, and has assisted with projects with a focus on sustainability for BREEAM Accreditation purposes. He has experience preparing technical reports to support planning applications including Transport Assessments and Travel Plans.

4.1.1 Methodology

This assessment has been prepared in accordance with the Institute of Environmental Management and Assessment (IEMA) document 'Guidelines for the Environmental Impact of Road Traffic'.

The IEMA guidelines set out a list of environmental parameters to consider as potentially significant when a new development is likely to give rise to changes in traffic flows, relevant variables (specific to transport) are summarised below:

- Driver severance and delay
- Accidents and safety
- Hazardous and dangerous loads
- Dust and dirt.

The study area which has been considered encompasses the local road network including Roman Bank (leading to Eastern Road), the B1359, and the strategic road network (A17). The baseline traffic conditions (based on DfT data) is outlined in Section 4.2.

In terms of accidents and safety, ADL have consulted the Crashmap database over the latest available 5-year period (2017 – 2021) on the surrounding highway network as discussed in Section 4.2.

Construction vehicle routing and traffic is discussed in Section 4.4, the potential trip generation associated with the development on the surrounding highway network is discussed in Section 4.4.

The construction of the proposed solar array does not involve major earthworks which would generate dust and dirt, although measures would be in place (such as damping down) during dry and windy weather conditions.

The site is fairly remote, with no footway network on surrounding roads including Eastern Road and therefore pedestrian severance, delay, and amenity are not considered to be relevant factors when considering the environmental impact of the development.

4.1.2 Planning Context

A pre-application enquiry was submitted to the Local Planning Authority (South Holland District Council) by the Applicant. With regard to transport and highways, the following comments were raised by as part of their pre-application response:

> ***"3. The operational vehicle movements associated with solar farm developments are typically very few in number. Rather it is the construction phase and the decommissioning phase that have the greatest impact upon the local highway network. It is therefore suggested that any application for the Proposed Development should include a Construction Traffic Management Plan which describes how delivery vehicle movements will be programmed so as to manage their frequency and the routing of movements to minimise the disruption to other road users. Delivery vehicles must not be queuing on the public highway whilst waiting to be unloaded so the Construction Traffic Management Plan should also cover the measures for unloading and storage within the site prior to the arrays and hardware being transported to their eventual mounting position. It is expected that there will be several delivery points. Corresponding arrangements will need to be made for the removal of components upon decommissioning of the facility. The Highways Authority have been consulted and have raised no objections subject to an appropriate Construction Traffic Management Plan."***

A Construction Traffic Management Plan (CTMP) accompanies this Chapter (ES, Volume 2, Appendix 4.1) and has been produced for the benefit of the Highways Authority (Lincolnshire County Council).

It is also noteworthy that an application is currently pending for another solar farm (namely 'Boston Solar Farm') which is situated off Eastern Road, north of Roman Bank.

4.1.1.1 Planning Policy

This Chapter is prepared with consideration to Planning Practice Guidance (PPG), National Planning Policy Framework (NPPF) and Local Policy which includes the South-East Lincolnshire Local Plan and Lincolnshire Local Transport Plan 4.

4.1.1.2 Planning Practice Guidance

PPG provides advice on when Transport Assessments and Transport Statements are required, as well as the information they should contain.

Paragraph 15 of 'Planning Practice Guidance on Travel Plans, Transport Assessments and Statements' presents the level of detail that a Transport Assessment must go to and what must be included. The following criteria are necessary:

- *Information about the Proposed Development, site layout (particularly proposed transport access and layout across all modes of transport);*
- *Information about neighbouring uses, amenity and character, existing functional classification of the nearby road network;*
- *Data about existing public transport provision, including provision/frequency of services and proposed public transport changes;*
- *A qualitative and quantitative description of the travel characteristics of the Proposed Development, including movements across all modes of transport that would result from the development and near the site;*
- *An assessment of trips from all directly relevant committed development in the area (i.e. development that there is a reasonable degree of certainty will proceed within the next three years);*
- *Data about current traffic flows on links and at junctions (including different modes of transport and the volume and type of vehicles) within the study area and identification of critical links and junctions on the highway network;*

- *An analysis of the injury accident records on the public highway near the site access for the most recent three-year period, or five-year period if the proposed site has been identified as being within a high accident area;*
- *An assessment of the likely environmental impacts of transport related to the development, particularly in relation to proximity to environmentally sensitive areas (such as air quality management areas or noise sensitive areas);*
- *Measures to improve the accessibility of the location (such as provision/enhancement of nearby footpath and cycle linkages) where these are necessary to make the development acceptable in planning terms;*
- *A description of parking facilities in the area and the parking strategy of the development;*
- *Ways of encouraging environmental sustainability by reducing the need to travel; and*
- *Measures to mitigate the residual impacts of the development (such as improvements to the public transport network, introducing walking and cycling facilities, physical improvements to existing roads).*

Given that the site will be accessed by vehicles during the construction period, and then only require access by maintenance vehicles intermittently through the year, it is not considered appropriate to review the accessibility of the site by walking, cycling or public transport however the TS (accompanied by the CTMP) seek to address all other items as you would expect. Existing tracks within and/or nearby to the site will not be detrimentally impacted by the proposals.

4.1.1.3 National Planning Policy Framework

The revised NPPF was published in July 2021, and replaces the previous versions of NPPF published in 2012, 2018 and 2019.

Paragraph 104 of the NPPF states that transport should be considered from the earliest stages of plan making so that:

> ***"• The potential impacts of development on transport networks can be addressed;***
>
> ***• Opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;***
>
> ***• Opportunities to promote walking, cycling and public transport use are identified and pursued;***
>
> ***• The environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and***
>
> ***• Patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places."***

Paragraph 105 goes on to state that:

> ***"Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help reduce congestion and emissions and improve air quality and public health".***

Paragraph 110 of NPPF provides information on the transport considerations that should be given in determining applications for development. These are as follows:

> ***"•Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the development type and its location;***
>
> ***• Safe and suitable access to the site can be achieved for all users;***
>
> ***• The design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National design Guide and the National Model Design Code; and***
>
> ***• Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."***

Paragraph 111 states that:

> ***"development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."***

Paragraph 113 states that:

> ***"all developments which will generate significant amounts of movement must be supported by a Travel Plan and a Transport Statement / Transport Assessment so that the cumulative impacts of the proposal can be assessed."***

4.1.1.4 South-East Lincolnshire Local Plan

The South-East Lincolnshire Local Plan (SEALP) as adopted in 2019. The Plan acts as a guide for future development in the county and is prepared in accordance with NPPF and PPG.

A series of objectives and policies are contained within the local plan which will guide development in South-East Lincolnshire. Policy 31 is titled 'Climate Change and Renewable and Low Carbon Energy' and states the following:

> ***"All development proposals will be required to demonstrate that the consequences of current climate change has been addressed, minimised and mitigated"***

A sustainable transport network is set out in policy 33, which is titled 'Delivering a More Sustainable Transport Network', this policy states the following:

> ***"The Local Planning Authorities will work with partners to make the best use of, and seek improvements to, existing transport infrastructure and services within, and connecting to South-East Lincolnshire, having considered first solutions that are based on better promotion and management of the existing network and the provision of sustainable forms of travel."***

4.1.1.5 Lincolnshire Local Transport Plan 4

LCC published their fourth Local Transport Plan (LTP4) in 2013, which covers 2013 to 2022/23. The plan acknowledges that the location of a new development plays a key role in future travel patterns and encouraging sustainable transport.

There are no specific objectives the refer to renewable energy in the plan but there are refences to in minimising carbons emissions across the transport network. Section 4 of the LTP4 'Transport Visions & Objectives' one of the objectives states as following:

> ***"To minimise carbon emissions from transport across the county"***

4.1.3 Scope of Study

Section 4.2 of this Chapter describes the site and surrounding area, including the local highway network, road traffic collision situation and existing traffic information, where available.

Section 4.3 describes the Proposed Development, including access arrangements.

Section 4.4 sets out the traffic impact associated with the construction and other vehicular activity associated with the proposal.

Section 4.5 summarises and concludes the findings of the study.

A Construction Traffic Management Plan (CTMP) accompanies the TS as a separate standalone document, as requested within the pre-application advice.

4.2 Existing Site Situation

4.2.1 Site and Surrounding Area

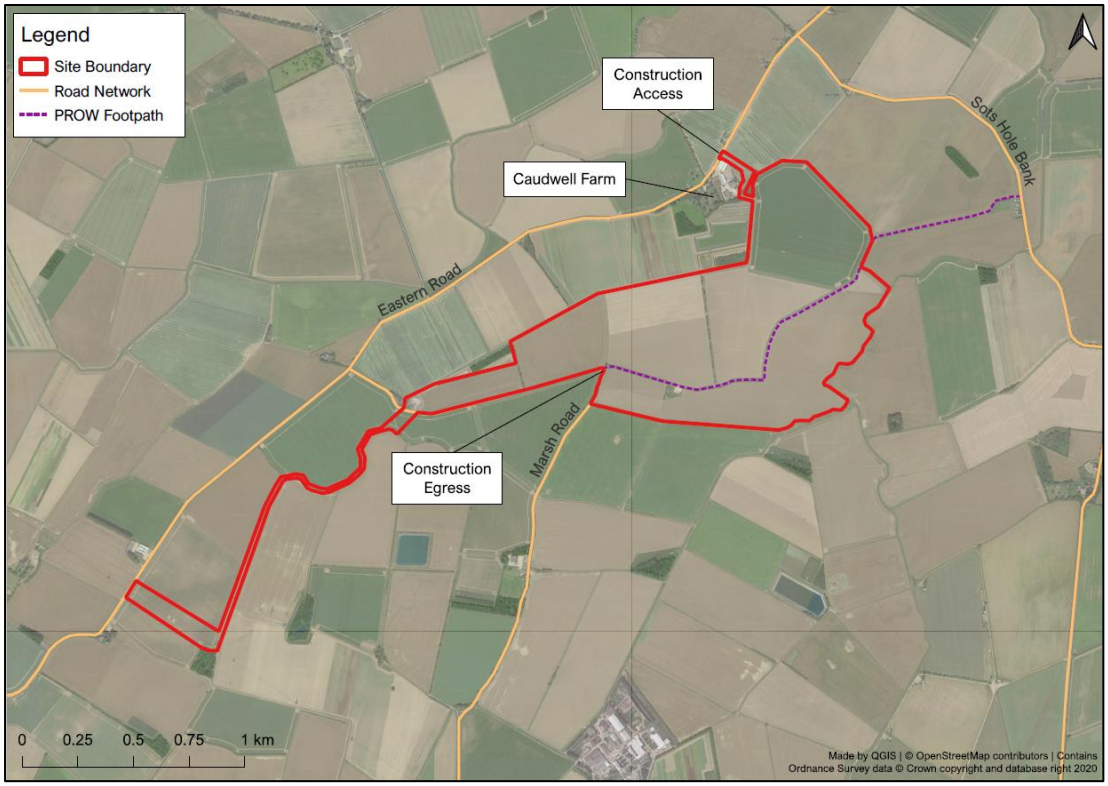
The site is located at Caudwell Farm, which is accessed via Eastern Road, approximately 10km northeast of Holbeach and 21km northeast of Spalding.

The site area is approximately 111 ha, comprising agricultural land. The site is encompassed by neighbouring agricultural land. Marsh Road forms the site's southwest boundary, where there is an access point to the internal farm road.

There is a public right of way (footpath) which runs through the site between Sot's Hole Bank to the east and Marsh Road to the west.

A site context plan showing the site boundary, local roads and public right of way is shown in Figure 4.1 below.

Figure 4.1 Site Context Plan



4.2.1.1 Local Highway Network

The site is accessed via Eastern Road which is an unclassified rural road which is single carriageway and approximately 5.0m wide. Eastern Road is approximately 7km length of road between the junction with Roman Bank/Peartree House Road to the southwest and Holbeach St Matthew to the northeast.

Marsh Road is an unclassified rural road which runs between Eastern Road to the west, along the site boundary, and then southwards the village of Holbeach Hurn. Marsh Road is a single carriageway road, approximately 4.5m wide. There is an access point to the farm's internal track, which would be the egress for construction vehicles.

Sot's Hole Bank is also an unclassified rural road, which meets Eastern Road approximately 700m northeast of the site access. Sot's Hole Bank is single carriageway road, approximately 4.5m wide and leads to the B1359.

The B1359 is a single carriageway B classified road, approximately 7.0m wide and connects the village of Gedney Drove End to the northeast and Chapelgate to the south. The B1359 is subject to 40mph speed limit approximately 1.2km south of the junction with Dawsmere Road (which becomes Sot's Hole Bank).

The local rural roads in the vicinity of the site are subject to the national speed limit.

Given the nature of the site as a farm, the local road network (and its users) would be accustomed to Heavy Goods Vehicles (HGVs) in all directions.

The site can be accessed from the Strategic Road Network, i.e., the A17, to the south via Eastern Road or Sot's Hole Bank. The A17 is predominantly a single carriageway road, approximately 8.0m wide, but widening in sections, such as either side of the roundabout with the B1359 and Station Road.

The A17 leads to the Kings Lynn to the east and Sleaford to the northwest. The site is therefore considered to be well served by the local and strategic road network.

4.2.1.2 Accident Data Analysis

A review of https://www.crashmap.co.uk over the latest available 5-year period (i.e., 2017 – 2021 inclusive) shows a total of 4 collisions near to the site of which 3 are classified as 'slight' severity. The search extent and location of collisions are shown in Figure 4.2.

Figure 4.2 Crashmap Search

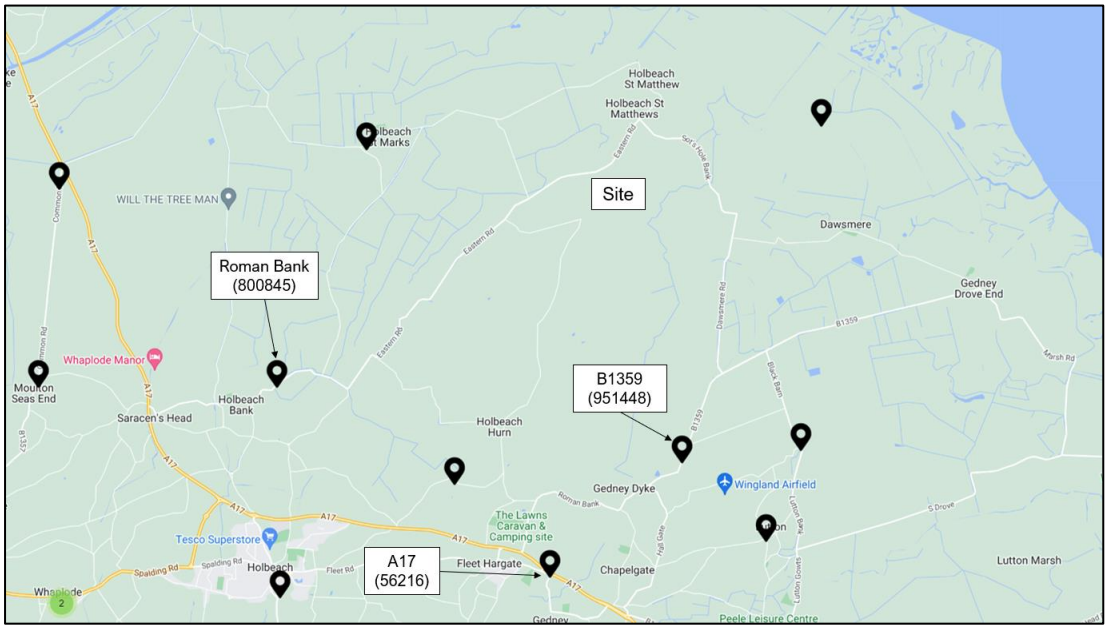
No accidents occurred on Eastern Road proximal to the site access and egress.

There are not any apparent trends or cluster locations which suggest a highway safety concern that would otherwise require mitigation as a result of this planning application.

4.2.1.3 Traffic Data

The Department for Transport (DfT) provides road traffic statistics at manual count points. This data can be used to understand the existing traffic situation in the vicinity of the site. Figure 4.3 shows manual count points on Roman Bank (leading to Eastern Road), B1359, and A17.

Figure 4.3 DfT Manual Count Points



The Annual Average Daily Traffic (AADT) flows on Roman Bank (manual count point 800845) and B1359 (manual count point 951448) are summarised in Table 4.1.

Table 4.1 DfT Manual Count Data (2-Way) – Local Roads

Hour	Roman Bank – 2021 Data		B1359 – 2019 Data	
	All Vehicles	HGVs	All Vehicles	HGVs
07:00 – 08:00	29	1	95	14
08:00 – 09:00	31	1	101	20
09:00 – 10:00	23	2	69	9
10:00 – 11:00	17	0	60	13
11:00 – 12:00	16	2	59	6
12:00 – 13:00	29	3	58	5
13:00 – 14:00	23	0	74	13
14:00 – 15:00	15	1	64	8
15:00 – 16:00	28	2	81	10
16:00 – 17:00	27	1	91	8
17:00 – 18:00	35	1	89	9
18:00 – 19:00	27	0	74	2

Annual Average Daily Flow	**302**	**12**	**983**	**102**

Table 4A shows that the traffic flows on the local roads in the vicinity of the site are very low. Given the nature of the road network toward the site, i.e., serving only a few residential and agricultural uses beyond the site, the traffic flows on Eastern Road, Marsh Road and Sot's Hole Bank are expected to be lower still.

In a network peak hour, there is a maximum of 35 two-way vehicles on Roman Bank, which equates to a vehicle movement every 2 minutes. There is a maximum of 101 two-way vehicle movements on the B1359, which is a movement every 30 – 40 seconds. In both instances, this is considered to be very low in traffic engineering terms.

The two-way vehicle flows on the A17 (manual count point 56216) are summarised in Table 4.2.

Table 4.2 DfT Manual Count Data (2-Way) – Strategic Road Network

Hour	**A17 – 2018 Data**	
	All Vehicles	**HGVs**
07:00 – 08:00	1,749	221
08:00 – 09:00	1,726	237
09:00 – 10:00	1,498	282
10:00 – 11:00	1,386	238
11:00 – 12:00	1,501	264
12:00 – 13:00	1,367	207
13:00 – 14:00	1,522	235
14:00 – 15:00	1,446	215
15:00 – 16:00	1,672	209
16:00 – 17:00	1,851	175
17:00 – 18:00	1,801	166
18:00 – 19:00	1,437	102
Annual Average Daily Flow	**21,337**	**2,463**

Table 4B shows that the A17 has an annual average daily flow of 21,337, which includes 2,463 HGV movements. All construction vehicles associated with the site would use the A17 to access the site, which considered a suitable link.

The predicted construction vehicle movements are provided in Section 4.4 and based on the existing traffic data, the Proposed Development would result in no severe traffic impact during the construction phase of development.

4.3 DEVELOPMENT PROPOSALS

4.3.1 Proposal Summary

The purpose of the Proposed Development is to provide a large-scale renewable electricity source that will be connected to the National Grid via a newly proposed 132KV substation which connects into the existing overhead 132kV Power lines through a POC mast. The development description is provided below:

> ***"Erection of a 49.9MW Ground Mounted Solar Array with Associated Underground Cable Route, Substation with POC Mast, Battery Storage and Ancillary Equipment & Structures at Caudwell Farm."***

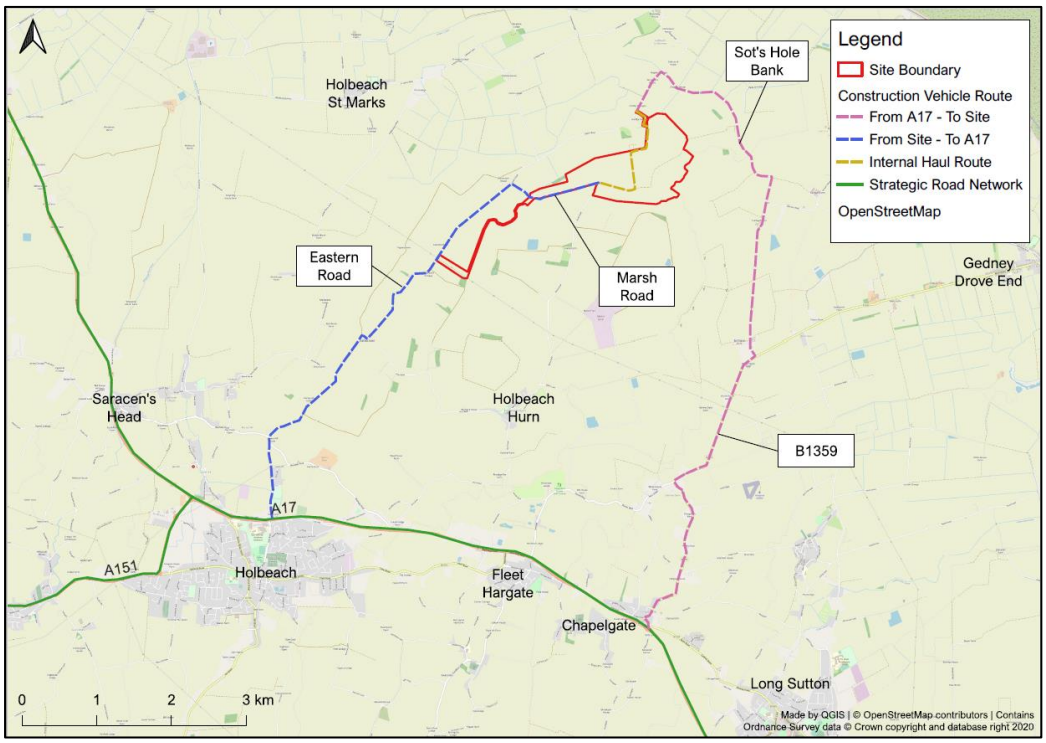
The proposals will include perimeter security fencing (with CCTV) and use of existing accesses and tracks bolstered by temporary construction using permeable stone material.

4.3.1.1 Access Arrangements

The site would be accessed via Caudwell Farm off Eastern Road and Marsh Road and traverse the site to each of the construction compound exiting the site via Marsh Road back to Eastern Road.

As noted previously, the vehicle route through the site will be served by access tracks and hard standings typically consisting of a sub-base of compacted crushed stone and surface layer of gravel, crushed stone or recycled materials to create a durable and permeable surface suitable for vehicle access and parking. The construction make-up will be dependent on the anticipated traffic load and site-specific conditions (such as soil conditions).

Figure 4.4 Access Routes



As noted previously, the existing PROW / track which runs through the site will be suitably managed to ensure they are not detrimentally impacted and remain accessible at all times.

Access to the site would via the Eastern Road. The secondary farm access would be used, approximately 70m northeast of the primary farm access.

This access occurs on a straight section of road with good forward visibility, as shown in Figure 4.5.

Figure 4.5 Eastern Road – Access

This is an existing access for operation farm vehicles and therefore considered to be appropriate for the construction vehicles associated with the proposal. The primary Caudwell Farm access would not be used to prevent conflict between the construction vehicles and existing farm vehicles and other vehicles associated with the farm.

This access would serve vehicles into the site only. A one-way arrangement with separate egress onto Marsh Road would be used to prevent any need for two articulated vehicles needing to pass one another. The vehicles would initially exit the site to Marsh Road via the existing access at the southwest of the site, as shown in Figure 4.6 below. The exiting vehicle will have good visibility in both directions due to the geometry of the road being on a bend.

Figure 4.6 Marsh Road - Egress

The Marsh Road egress is an existing access/egress point for the existing farm use and therefore used by larger farm vehicles. With the egress to Marsh Road occurring at the bend, there is very good visibility in both directions looking south and to the west. Marsh Road meets Eastern Road approximately 1.2km to the west, and this junction benefits from very good visibility in both directions as shown in Figure 4.7 below.

Figure 4.7 Marsh Road / Eastern Road – Visibility

A plan of the site access arrangements, including Vehicle Tracking of a 16.5m articulated lorry, is provided within the CTMP.

4.4 CONSTRUCTION VEHICLE ROUTING AND TRAFFIC

4.4.1 Construction Vehicle Routing

As detailed within the CTMP, all construction vehicle journeys would originate from further afield and reach the site via the A17.

From the A17, construction vehicles would access the site via Eastern Road from the north. Constructions vehicles would traverse the site using the internal haul road, where the temporary construction compound is located. To return to the A17, construction vehicles would egress the site via Marsh Road, turning onto Eastern Road and then Peartree House Road/Penny Hill Road.

The route can be summarised as follows:

- Access: A17 → B1359 → Dawsmere Road → Sot's Hole Bank → Eastern Road
- Internal: Eastern Road → Haul Road → Marsh Road
- Egress: Marsh Road → Eastern Road → Peartree House Road → Penny Hill Road → A17

The construction phase of the development will benefit from two separate access and egress points. This prevents the two-way movement of construction vehicles on the internal haul road or local road network.

The proposed routing minimises the distance construction vehicles travel along unclassified rural roads, maximising the use of the B1359 to reach the site from the A17, and negates any conflict of construction vehicles for the benefit of existing road users.

4.4.1.1 Predicted Vehicle Trip Generation

The indicative programme for construction of the solar farm will be broadly as set out below.

Table 4.3 Construction Programme

Stage	Activity	Time
Stage 1	Enabling Works • Compound	2 weeks
Stage 2	Site Set-up • Site security • Fencing • Enabling works • Delivery of plant + equipment	2 weeks
Stage 3	Solar Array Construction • Erection of frames • Solar panels • Electrical Connections	14 weeks
Stage 4	Site Clearance • Commissioning + testing • Removal of offices/welfare • Removal of compounds	2 weeks

The maximum daily traffic flows that will access the site (i.e., HGV trips for deliveries + staff/visitor trips) as detailed within the CTMP are forecast to be:

- Stage 1: 16 trips
- Stage 2: 14 trips
- Stage 3: 38 trips
- Stage 4: 14 trips

4.4.1.2 Operational Stage (Post-Construction)

During the life of the solar array the only traffic movements will be from routine maintenance and repair vehicles which would amount to 3-4 trips a year. There would be no staff based on the site itself.

4.4.1.3 Decommissioning

When the site reaches the end of its design life after about 40 years the solar array will be decommissioned and removed. The operation to decommission the equipment will be similar to the delivery and construction processes in Stage 2 and Stage 3.

4.4.1.4 Traffic Impact

As set out in Section 4.2, the traffic flows on the local road network are very low and as such, the increase in vehicle trips during the construction and decommissioning phases of development would have no severe impact.

On the basis that the construction period would be less than 5 months, it can be concluded that the traffic impact whilst temporary will not result in a severe residual impact on the local highway network and the existing roads can accommodate the predicted peak and daily traffic flows.

On the Strategic Road Network, a maximum increase of 38 daily two-way trips equates to <1% increase in traffic (38 ÷ 21,337 [A17 AADF] x 100 = 0.18%). This is therefore imperceptible in traffic engineering terms.

4.5 CONCLUSIONS

ADL Traffic and Highways Engineering Ltd (ADL) are commissioned by Green Energy International Ltd (the Applicant) to prepare 'Chapter 4 – Traffic and Transport' in support a planning application to provide a 49.9 MW solar farm at Caudwell Farm, Eastern Road, Holbeach CP, South Holland, PE12 8ES. This Chapter forms part of the Environmental Impact Assessment (EIA) prepared by RPS.

Pre-application advise has been received and the Highway Authority have concluded they have no objection to the proposals subject to the provision of a Construction Traffic Management Plan (CTMP). The CTMP is provided separately and accompanies this Chapter.

A review of the existing site determines that there are not any apparent highway safety concerns which require mitigation as a result of this planning application and the prevailing traffic flows on the local road network are very low.

The proposal is for erection of a 49.9MW Ground Mounted Solar Array with Associated Underground Cable Route, Substation with POC Mast, Battery Storage and Ancillary Equipment & Structures at Caudwell Farm.

Access and egress will be via existing farm access / egress points which benefit from very good visibility splays in both directions. Access will be served via Eastern Road, with egress back to Eastern Road via Marsh Road.

The traffic impact has been assessed with consideration to the prevailing traffic flows and determined the impact will not be severe, and upon completion of the construction phase will be imperceptible.

It can accordingly be concluded that the development proposals would not have a severe residual impact on the network and the development therefore complies with the test of NPPF paragraph 111.