

Tillbridge Solar

PEI Report Volume I Chapter 17: Cumulative Effects
April 2023

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17. Cumulative Effects

17.1 Introduction

17.1.1 This chapter addresses the potential for effect interactions and cumulative effects to occur as a result of the Scheme. Effect interactions and cumulative effects are defined as:

- Effect Interactions
 - The combined effect of several different impacts from a single development, which may collectively result in a new or different likely environmental effect of greater significance on a single receptor. Individually the effects resulting from these impacts may not be significant, but the accumulation of effects may collectively cause an overall significant effect. An example could be if the same receptor is subjected to noise, dust, and visual impacts associated with site works during construction
- Cumulative Effects
 - Where the environmental effects of a single development act together with those of other planned projects and developments within close enough proximity to lead to cumulative effects on the same receptor(s).

17.1.2 This assessment of potential effect interactions and cumulative effects is based on information available at the time of preparing the Preliminary Environmental Impact (PEI) Report. The assessment will be finalised in the Environmental Statement (ES) that will be submitted with the Development Consent Order (DCO) application for the Scheme, when the environmental effects of the Scheme and the cumulative developments have been confirmed. Conclusions in this assessment are therefore preliminary and potentially subject to change.

17.2 Consultation

17.2.1 A request for an EIA Scoping Opinion was sought from the Secretary of State through the Planning Inspectorate (PINS) in 2022 as part of the EIA Scoping Process. Consultation responses in relation to Cumulative Effects and Interactions, to date, are presented in Table 17-1.

17.2.2 A list of cumulative developments has been prepared and is presented in **PEI Report Volume II Appendix 17-1**.

Table 17-1 Consultation matters raised and responses for cumulative effects and effect interactions

Consultee	Matter Raised	Response
PINS	In light of other proposed developments within the area, the ES must demonstrate that the thresholds for further assessment are not exceeded cumulatively on relevant [transport] links.	This has been assessed within Section 17.16.1 as part of the Transport and Access Cumulative Effects Assessment.
PINS	The ES must provide information on the cumulative nature of traffic movements during the operational phases and confirm these projections fall below the relevant thresholds set out in guidance.	Cumulative operational phase traffic numbers have not been assessed. However, this will be considered during preparation of the ES that will accompany the DCO application.
PINS	The ES should also show regard to the quantity and quality of land that will be permanently and temporarily lost to the Scheme and the potential for cumulative impacts at a regional scale with other plans and projects that result in a reduction of available Best and Most Versatile (BMV) land.	This has been assessed within Section 17.16 as part of the Socio-economics and Land Use Cumulative Effects Assessment.
PINS	For the avoidance of doubt the ES should assess the cumulative impact of construction traffic on the Strategic Road Network (SRN) associated with other nearby solar developments as well as committed developments and highway improvements schemes.	Construction traffic numbers for the Scheme are not confirmed yet, so this has not been covered in this PEI Report. However, this will be considered during preparation of the ES that will accompany the DCO application.
PINS	If off-site [waste] disposal is required, an assessment of likely significant effects including intra-cumulative effects should be included within the ES.	Construction traffic numbers for the Scheme are not confirmed yet, so this has not been covered in this PEI Report. However, this will be considered during preparation of the ES that will accompany the DCO application.
PINS	The ES should also consider the requirement for cumulative [waste] impacts to be assessed at decommissioning due to a number of solar farms in the local area also likely to be decommissioned at a similar timescale.	Construction (and therefore potential decommissioning) traffic numbers for the Scheme are not confirmed yet, so this has not been covered in this PEI Report. However, this will be considered during preparation of the ES that will accompany the DCO application.

Consultee	Matter Raised	Response
Bassetlaw Council	District Council It is considered that [Agricultural Circumstances] is an important issue for the District, especially when considering these proposals cumulatively with other similar proposals.	This has been assessed within Section 17.16 as part of the Socio-economics and Land Use Cumulative Effects Assessment.
Lincolnshire County Council (LCC)	It is essential that the ES for Tillbridge Solar considers cumulative effects of these known Nationally Significant Infrastructure Projects (NSIPs) specifically with regard to impact and loss of agricultural land	This has been assessed within Section 17.16 as part of the Socio-economics and Land Use Cumulative Effects Assessment.
LCC	Cumulative Landscape and Visual effects should be assessed, particularly in regard to the Cottam Solar Project, West Burton Solar Project and Gate Burton Energy Park, which are in close proximity.	This has been assessed within Section 17.14 as part of the Landscape and Visual Amenity Cumulative Effects Assessment.
North Kesteven District Council	The Council is satisfied that given the significant separation distance between the proposed Tillbridge Solar Scheme and the Heckington Fen Solar Park that there will be no other cumulative effects with Heckington Fen Solar Park which need to be factored into the ES; other than cumulative agricultural land use/BMV impacts	This has been assessed within Section 17.16 as part of the Socio-economics and Land Use Cumulative Effects Assessment.
UK Health Security Agency (UKHSA)	The cumulative effects assessment will need to consider this [housing affordability and availability] across the wider study area given the number of other NSIPs, but also identify the potential for any local effects.	This has been assessed within Section 17.16 as part of the Socio-economics and Land Use Cumulative Effects Assessment.
UKHSA	Any cumulative effect assessment should consider the impact on demand for housing by construction workers and the likely numbers of non-home-based workers required across all schemes.	This has been assessed within Section 17.16 as part of the Socio-economics and Land Use Cumulative Effects Assessment.
West Lindsey District Council (WLDC)	Along with the proposed development, cumulatively, the four proposed solar projects would amount to over 4,150ha of mainly agricultural land, broadly between Gainsborough and Lincoln, being used for solar PV arrays and battery storage, along with associated infrastructure such as sub stations. The ES will need to be clear in each chapter, the individual environmental effects, but also the cumulative effects with the other solar projects.	This has been assessed within Section 17.16 as part of the Socio-economics and Land Use Cumulative Effects Assessment.
WLDC	The Heritage chapter also needs to consider the potential for cumulative harm to heritage assets, from other committed developments. This should include the three other solar project NSIPS proposed within West Lindsey.	This has been assessed within Section 17.10 as part of the Cultural Heritage Cumulative Effects Assessment.

Consultee	Matter Raised	Response
WLDC	As with every chapter, the ES will need to consider the cumulative impact on Ecology, alongside the other three solar project NSIPs.	This has been assessed within Section 17.11 as part of the Ecology and Nature Conservation Cumulative Effects Assessment.
WLDC	This section should consider the cumulative effects with the other 3 solar project NSIPs (and the effects arising from the loss of over 4000Ha of land to this form of development upon the local population).	This has been assessed within Section 17.16 as part of the Socio-economics and Land Use Cumulative Effects Assessment.
WLDC	Furthermore, it is critical that the LVIA addresses the cumulative landscape and visual impacts that will arise with the other 3 solar project NSIPs.	This has been assessed within Section 17.14 as part of the Landscape and Visual Amenity Cumulative Effects Assessment.
WLDC	<p>It is noted that “Cumulative Effects” are proposed to be considered as a separate chapter.</p> <p>The development would, considered cumulatively with Island Green Power’s Cottam & West Burton Solar Projects, and Low Carbon’s Gate Burton Project – result in a potential cumulative impact of over 4000 hectares of land between Gainsborough and Lincoln, given over to solar and battery storage projects. It is considered therefore that each and every topic within the ES, must explicitly address the cumulative effects with other developments, including the other four nationally significant solar projects proposed within the District. This should be set out on a chapter-by-chapter basis.</p>	This has been presented where applicable within each technical section, Sections 17.8 to 17.18 of this chapter.

17.3 Legislation and Planning Policy

Legislation

- 17.3.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref. 17-1) make explicit reference to the requirement for an assessment of the effect interactions between types of effect, and states that:

“The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors- ...(e) the interaction between the factors referred to in sub-paragraphs (a) to (d).”

- 17.3.2 No further guidance or requirement beyond the need for an assessment of the interrelationships between types of effect is provided.

- 17.3.3 In terms of cumulative effects, Schedule 4 Part 5 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 requires an ES to include:

“A description of the likely significant effects of the development on the environment resulting from, inter alia: ...(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources...

The description of the likely significant effects on the factors specified in regulation 5(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development”.

National Planning Policy

Overarching National Policy Status for Energy (EN-1)

- 17.3.4 Paragraph 4.1.3 of the Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref. 17-2) states that: *“In considering any proposed development, and in particular when weighing its adverse impacts against its benefits, the Infrastructure Planning Commission [now the Planning Inspectorate] should take into account:*

- *Its potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits; and*
- *Its potential adverse impacts, including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts”.*

- 17.3.5 Paragraph 4.2.5 of NPS EN-1 goes on to state that when considering cumulative effects, *“the Environmental Statement (ES) should provide information on how the effects of the applicant’s proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence).*

The IPC [now Secretary of State for Energy Security and Net Zero following a recommendation by Planning Inspectorate] may also have other evidence before it, for example from appraisals of sustainability of relevant NPSs or development plans, on such effects and potential interactions. [...]”; and

17.3.6 Paragraph 4.2.6 of NPS EN-1 states that consideration should be given to *“how the accumulation of, and interrelationship between, effects might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place.”*

17.3.7 There is no guidance relevant to cumulative effects or effect interactions assessment presented within NPS for Renewable Energy Infrastructure EN-3.

Draft Overarching National Policy Statement for Energy (EN-1)

17.3.8 Paragraph 4.1.5 of Draft NPS EN-1 (Ref. 17-3) states that consideration of the secretary of state should be given to a project’s assessment of *“In considering any proposed development, in particular when weighing its [...] potential adverse impacts, including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce, mitigate or compensate for any adverse impacts, following the mitigation hierarchy.”*

17.3.9 In respect to the assessment content paragraph 4.2.3 states *“The Regulations require an assessment of the likely significant effects of the proposed project on the environment, covering the direct effects and any indirect, secondary, cumulative... positive and negative effects at all stages of the project, and also of the measures envisaged for avoiding or mitigating significant adverse effects.”*

17.3.10 In respect to health impacts, paragraph 4.3.5 states *“The impacts of more than one development may affect people simultaneously, so the applicant should consider the cumulative impact on health in the ES where appropriate.”*

17.3.11 Regarding socio-economic impacts paragraph 5.13.3 states *“The applicant’s assessment should consider all relevant socio-economic impacts, which may include: [...] cumulative effects - if development consent were to be granted to for a number of projects within a region and these were developed in a similar timeframe, there could be some short-term negative effects, for example a potential shortage of construction workers to meet the needs of other industries and major projects within the region.”*

Draft National Policy Status for Renewable Energy Infrastructure (EN-3)

17.3.12 Paragraph 3.10.82 of Draft NPS EN-3 (Ref. 17-4) states *“The approach to assessing cumulative landscape and visual impact of largescale solar farms is likely to be the same as assessing other onshore energy infrastructure. Solar farms are likely to be in low lying areas of good exposure and as such may have a wider zone of visual influence than other types of onshore energy infrastructure. However, whilst it may be the case that the development covers a significant surface area, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be zero.”*

- 17.3.13 Paragraph 3.10.113 of Draft NPS EN-3 states *“Where a cumulative impact is likely because multiple energy infrastructure developments are proposing to use a common port and/or access route and pass through the same towns- and villages, applicants should include a cumulative transport assessment as part of the ES. This should consider the impacts of abnormal traffic movements relating to the project in question in combination with those from any other relevant development. Consultation with the relevant local highways authorities is likely to be necessary.”*

National Guidance

National Planning Policy Framework

- 17.3.14 Although the National Planning Policy Framework (NPPF) (Ref. 17-5) does not contain specific policies for Nationally Significant Infrastructure Projects (NSIPs), it can still be a material consideration. The following statements are relevant to this assessment.
- 17.3.15 Paragraph 49 of the NPPF states *“However, in the context of the Framework – and in particular the presumption in favour of sustainable development – arguments that an application is premature are unlikely to justify a refusal of planning permission other than in the limited circumstances where both:*
- a) the development proposed is so substantial, or its cumulative effect would be so significant, that to grant permission would undermine the plan-making process by predetermining decisions about the scale, location or phasing of new development that are central to an emerging plan; and...”*
- 17.3.16 Paragraph 111 states *“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.”*
- 17.3.17 Paragraph 155 states *“To help increase the use and supply of renewable and low carbon energy and heat, plans should:*
- a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);...”*

Advice Note 17: Cumulative effects assessment relevant to nationally significant infrastructure projects

- 17.3.18 In the absence of a single agreed industry standard method for cumulative effects assessment, PINS issued this guidance document (Ref. 17-6) outlining a suitable methodology for NSIP projects. This methodology is presented in Section 17.5.

Local Planning Policy

- 17.3.19 There is no local planning policy concerning cumulative effects.

17.4 Assessment Assumptions and Limitations

- 17.4.1 This chapter forms a preliminary assessment, which has been based on available information at the time of preparing this PEI Report. A final assessment will be undertaken as part of the EIA and will be reported in the ES that will be submitted with the DCO application.

17.5 Assessment Methodology

Effect Interactions

- 17.5.1 The assessment of effect interactions is based on the methodology described in **PEI Report Volume I Chapter 5: EIA Methodology** and considers the potential for several direct or indirect effects arising from the Scheme to give rise to an effect on a single receptor.
- 17.5.2 There is no established EIA methodology for assessing and quantifying the combined effects of individual impacts on sensitive receptors; however, the European Commission has produced guidelines (Ref. 17-7) for assessing impact interactions which *“are not intended to be formal or prescriptive, but are designed to assist EIA practitioners in developing an approach which is appropriate to a project (...)”*.
- 17.5.3 AECOM has reviewed these guidelines and developed an approach that uses the identified residual impacts of the Scheme to determine the potential for impact interactions, and so the potential for combined effect of individual impacts.
- 17.5.4 The EIA predicts beneficial and adverse effects during construction, operation and decommissioning of the Scheme, which are classified as negligible, minor, moderate or major. Several effects on one receptor or receptor group could theoretically interact or combine to produce a combined significant overall effect.
- 17.5.5 An exercise which outlines the effects on receptors or receptor groups will be undertaken to determine the potential for effect interactions and therefore any combined effects. Only adverse or beneficial residual effects classified as minor, moderate, or major will be considered in relation to potential effect interactions. Residual effects classified as negligible are excluded from the assessment of the effect interactions as, by virtue of their definition, they are considered to be imperceptible effects on an environmental / socio-economic resource or receptor.
- 17.5.6 The receptors or resources which may experience effects are identified in Table 17-2 below.
- 17.5.7 Where more than one effect (of minor significance or above) on a particular receptor/resource has been identified, the potential for combined effects has been assessed in Section 17.6.

Table 17-2: List of Sensitive Receptors and the potential Effect Interactions

Category	Description of receptors or resource	Potential effects	Potential for Effect Interaction
Construction and decommissioning workers	Workers employed for the construction and decommissioning phases of the Scheme.	Air quality, noise and vibration effects, and transport and access effects.	Yes
Future maintenance workers	Future maintenance workers who will access the Site, buildings, BESS structures and Solar PV Arrays and land they are situated on.	Socio-economics and land use, transport and access effects	Yes
Neighbouring community facilities	Users of community facilities.	Air quality, noise and vibration, socio-economics and land use, transport and access, landscape and visual amenity effects.	Yes
Neighbouring residential properties	Existing neighbouring residential properties within the immediate vicinity of the Scheme.	Air quality, noise and vibration, socio-economics and land use, transport and access, landscape and visual amenity effects.	Yes
Neighbouring businesses	Neighbouring businesses and their workers.	Air quality, noise and vibration, socio-economics and land use, transport and access, landscape and visual amenity effects.	Yes

Category	Description of receptors or resource	Potential effects	Potential for Effect Interaction
Local highway network	Road users surrounding the Site.	Transport and access effects and landscape and visual amenity effects.	No. Road users subject to traffic and transport impacts are not expected to experience any worse effect through exposure to other environmental and social impacts.
Public transport network	Users of local public transport network (i.e., buses, rail).	Transport and access effects, and landscape and visual amenity effects.	No. Public transport users will be subject to negligible effects and are not expected to experience any worse effect through exposure to other environmental and social impacts.
Non-motorised user routes	Users of footways, public rights of way and bridleways.	Air quality effects, noise and vibration effects, transport and access effects, and landscape and visual amenity effects.	Yes
Air quality	Local air quality within Bassetlaw District and West Lindsey District council areas.	Air quality effects.	No. Air quality is not affected by any other environmental or social parameters.
Ecology	Ecological receptors and habitats in the local and regional area including protected species and designated habitats.	Air quality effects, noise and vibration effects, ecology and nature conservation effects, and water environment effects	Yes (although noting that ecology assessments inherently cover combined effects of dust, noise, pollution on individual ecological receptors)

Category	Description of receptors or resource	Potential effects	Potential for Effect Interaction
Built heritage assets	Heritage assets, such as Conservation Areas, Scheduled Monuments, listed buildings and locally listed buildings.	Cultural heritage effects.	No. Landscape and visual effects on the setting of built heritage assets is inherently considered within the cultural heritage chapter.
Landscape character areas	Geographical areas which have readily identifiable characteristics	Air quality effects, noise and vibration effects, transport and access effects, and landscape and visual amenity effects.	Yes
Surface water features and surface water bodies	The quality of water and hydromorphology of features such as rivers, streams, ditches and catchments.	Ecology and nature conservation effects, and water environment effects	Yes
Groundwater resources	Water contained within the soils beneath the Site and in the local area, including Secondary A and Secondary (undifferentiated) aquifers.	Water environment effects.	No. Groundwater is not affected by any other environmental or social parameters.
Climate	Global climate and the UK Carbon Budget	Climate change effects.	No. Climate is not affected by any other environmental or social parameters.
The economy	The economy in the local and regional context	Socio-economic effects.	No. The economic impacts are beneficial or negligible and are not affected by any other environmental or social parameters.

Category	Description of receptors or resource	Potential effects	Potential for Effect Interaction
Below ground archaeological assets	Materials and structures which may be present in the soils beneath the Site	Cultural Heritage effects.	No. Archaeology is not affected by any other environmental or social parameters.

Cumulative Effects

17.5.8 The assessment of cumulative effects arising from the Scheme in combination with other proposed schemes (inter-project effects) is based upon a review of current submitted planning applications as well as a study of planning policy documents.

17.5.9 The cumulative effects assessment methodology is based on The Planning Inspectorate’s Advice Note 17 (Ref. 17-6) on the assessment of cumulative effects, which identifies a four-stage approach, which has been adopted for this assessment, as follows:

- Stage 1 – Establish the study area and identify a long list of ‘other development’ (the ‘development schedule’);
- Stage 2 – Identify a shortlist of ‘other development’ for the cumulative impact assessment;
- Stage 3 – Information gathering; and
- Stage 4 – Assessment.

Stage 1: Establishing the Long List of Other Developments

17.5.10 Given the scope and scale of the Scheme, the Stage 1 activities focus on establishing the Scheme’s likely Zone of Influence (Zol) associated with each of the environmental topic areas being assessed within the EIA. Table 17-3 sets out the Zol identified within each environmental topic, which is in line with industry guidance and standards for assessment.

Table 17-3: Zol extents for assessment of cumulative effects

Environmental Topic	Zone of Influence (Zol) for cumulative effects
Air Quality (Construction Dust)	350m
Cultural Heritage (Designated Assets)	3km
Cultural Heritage (Non-designated Assets)	1km
Aquatic and Terrestrial Ecology	2km
Aquatic and Terrestrial Ecology (International and National Nature Conservation Designations)	10km
Water Resources	2km
Landscape and Visual (Cable Route Corridor)	2km
Landscape and Visual (Scheme Boundary/ Principal Site)	10km
Noise – Construction and Operation	500m
Noise – Construction Vibration	50m
Socioeconomics and Land Use (local communities)	1km
Socioeconomics and Land Use (PRoW, residential properties, agricultural land, local businesses, visitor	500m

Environmental Topic	Zone of Influence (Zoi) for cumulative effects
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attractions, community facilities, open space and development land)	
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Transport and Access	5km
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17.5.11 A 10km search area (i.e. the furthest Zoi reference above) was used to establish the Long List of Other Developments. A search for the following types of development was completed by reviewing relevant planning databases held by the Planning Inspectorate, West Lindsey District Council, Lincolnshire County Council, Bassetlaw District Council and Nottinghamshire County Council:

- DCO applications for NSIPs in England, contained in the Register of Applications on the National Infrastructure Planning website (Ref. 17-8);
- Local authority planning applications that represent ‘major developments’, the definitions and thresholds for which are set out in The Town and Country Planning (Development Management Procedure) (England) Order 2015;
- Any major development projects being progressed through other statutory procedures;
- Allocations identified in the adopted and emerging development plans of the local planning authorities; and
- Other relevant development plans and projects.

17.5.12 Each development within the Long List of Other Developments was reviewed to determine its status at the time of undertaking the assessment (January 2023) and was assigned a final status and tier, as described in Table 17-4, informed by the guidance and levels presented within Advice Note 17.

Table 17-4: Tier Status Criteria

Tier	Stage	Decreasing level of information likely to be available
	Under Construction	
Tier 1	Permitted application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented;	
	Submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined.	
Tier 2	Projects in the Planning Inspectorate's Programme of Projects where a scoping report has been submitted.	
Tier 3	Projects in the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted.	
	Identified in the relevant development plan (and emerging Development Plans—with appropriate weight being given as they move closer to adoption) recognising that there will be limited information on the relevant proposals.	
	Identified in other plans and programmes (as appropriate) which set the framework for future developments consents/approvals, where such a development is likely to come forward.	

17.5.13 The Cumulative Developments Long List is presented in **PEI Report Volume II Appendix 17-1**.

Stage 2: Establishing a Short List of Other Developments

17.5.14 This stage involves reviewing the Long List of Other Developments to identify those to be taken forward (shortlisted) into the cumulative assessment.

17.5.15 The shortlisting process involves the application of inclusion/exclusion criteria and is informed by the professional judgement of the environmental specialists undertaking the EIA and through engagement with the relevant local authorities.

17.5.16 Developments and projects that are already in existence, i.e. those which are completed and operational, will be considered to form part of the environmental baseline conditions within which the Scheme will be implemented (and will be treated as such within the EIA).

17.5.17 Similarly, where other developments are expected to be completed prior to Scheme construction, and where the effects of those projects are fully determined, these will also be considered within the environmental baseline adopted in the EIA.

17.5.18 In determining which of the developments should be shortlisted, a minimum level of information is necessary. In accordance with the Planning

Inspectorate's Advice Note 17, generally only developments with at least an EIA Scoping Report or ES available shall be considered for shortlisting.

17.5.19 However, exceptions to this may be made. For example, if any non-EIA development is identified in close proximity, large in scale and/or particularly sensitive, this will also be considered for shortlisting. With particular reference to solar development, given the presence of the Scheme and other solar DCOs in close proximity, if any further non-EIA solar development is identified in a Zol, then this will also be shortlisted.

17.5.20 The Cumulative Developments Long List is presented in **PEI Report Volume II Appendix 17-1**. This will be refined over the course of the EIA and will be finalised in the ES that will be submitted with the DCO application. Comments on this Short List of Other Developments are invited from local authorities to ensure this captures the appropriate cumulative schemes.

Stage 3: Gathering Information

17.5.21 This stage will involve reviewing the available information relating to the shortlisted developments to establish the details of their likely environmental effects.

17.5.22 This will consider factors including: the Zol of environmental topics assessed; the planned timescales for construction, operation and (where relevant) decommissioning; and details of their potential or likely significant effects.

Stage 4: Assessment

17.5.23 Those developments which meet the criteria set out in the above stages shall be incorporated into the cumulative assessment. This will involve identifying where effects are likely to occur and assessing the significance of those effects on environmental receptors and resources, taking into account any mitigation measures.

17.5.24 The assessment of traffic-related construction air quality and noise impacts are based on traffic data that includes traffic from other committed developments¹ and are therefore inherently cumulative.

Significance Criteria

17.5.25 A combination of professional judgement and established guidance have been used to confirm the scope of the cumulative effects assessment, and to aid the identification and (where necessary) mitigation of likely significant effects.

17.5.26 The significance criteria builds upon the policy and guidance documents outlined in above, and the general EIA approach methods presented in **PEI Report Volume I Chapter 5: EIA Methodology**. The terminology for significance of effect differs from the general assessment methodology, so that the significance of cumulative effects can be differentiated (refer to Table 17-5).

¹ Committed developments are those that have received full or outline planning permission, or which are allocated in an adopted development plan. Other developments as listed in the Long List of Other Developments may not have received planning permission or be allocated.

Table 17-5: Effect Interactions and Cumulative Effects Significance Criteria

Significance Category	Typical Descriptors of Effect
Very large (typically adverse only)	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be very highly significant (positive or negative). Effects would be permanent for receptors of very high value.
Large (adverse or beneficial)	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be highly significant (positive or negative). Effects would be: <ul style="list-style-type: none"> - Widespread/largescale for a receptors of high value; - Permanent for a receptor or receptors of high value; - Localised for a receptor or receptors of very high value; or - Temporary for a receptor or receptors of very high value.
Moderate (adverse or beneficial)	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be significant (positive or negative). Effects would be: <ul style="list-style-type: none"> - Permanent for a receptor or receptors of medium value; - Localised for a receptor or receptors of high value; or - Temporary for a receptor or receptors of high value.
Slight (adverse or beneficial)	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be noteworthy but not significant (positive or negative). Effects would be: <ul style="list-style-type: none"> - Permanent for a receptor or receptors of low value; - Localised for a receptor or receptors of medium value; or - Temporary for a receptor or receptors of medium value.
Neutral	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be negligible and not significant (positive or negative).

- 17.5.27 Combined and cumulative effects that are of moderate, large or very large significance will be considered significant effects in relation to the EIA Regulations.
- 17.5.28 Once further information has been gathered about the construction effects and programmes of the developments for inclusion in the cumulative effects assessment, a worst case year of construction will be defined by determining when there is the greatest overlap of construction with the Scheme.
- 17.5.29 The cumulative operational assessment will consider the total effects of the Scheme and the other identified developments operating concurrently.
- 17.5.30 As the Scheme has an estimated design life of 40-60 years, with no predetermined date for decommissioning, it is not possible to predict what developments would be being constructed or decommissioned at the same time as the Scheme is being decommissioned. A high level statement about the potential for cumulative effects during decommissioning has been provided.

17.6 Assessment of Effect Interactions

- 17.6.1 The interaction of two or more predicted environmental effects resulting from the Scheme may collectively cause a greater (or lesser) effect than each effect in isolation. A detailed matrix of the sensitive receptors/ receptor groups and which effects they may experience is provided in Table 17-2.
- 17.6.2 This section assesses significant residual effects which have been identified in each technical chapter of this PEI Report and discusses how potential effect interactions could arise from the individual impacts through the construction, operation and decommissioning phases. This is presented in Table 17-6 and Table 17-7. Where sensitive receptors/receptor groups are not likely to experience effect interactions, they have been omitted from the assessment.

Table 17-6: Potential effect interactions during construction and decommissioning

Sensitive receptors/ Receptor group (refer to Table 17-2)	Technical topic	Description of effect	Significance of Effect	Effect Interactions
Construction and decommission workers	Air Quality	There are no residual effects for Air Quality.		There are no residual effects to interact. The workers are employed by the Scheme, less sensitive, and in greater control of impacts.
	Noise and Vibration	There are no residual effects for Noise and Vibration.		
	Transport and Access	There are no residual effects for Transport and Access.		
Future maintenance workers	This receptor group will not be impacted by the construction phase of the Scheme.			
Neighbouring community facilities	Air Quality	There are no residual effects for Air Quality.		There are no effects for the residual Landscape and Visual effects to interact with.
	Noise and Vibration	There are no residual effects for Noise and Vibration.		
Neighbouring residential properties	Socio-economics and Land Use	There are no residual effects for Socio-economics and Land Use.		
Neighbouring business		Transport and Access	There are no residual effects for Transport and Access.	
	Landscape and Visual Amenity	Temporary impact on the setting of Local Landscape Character Areas (LLCAs) during construction period at the Principal Site.	Moderate to Major Adverse	
		Temporary impact on Representative Viewpoints (VPs) during the construction period at the Principal Site.		

Sensitive receptors/ Receptor group (refer to Table 17-2)	Technical topic	Description of effect	Significance of Effect	Effect Interactions
Local highway network	Transport and Access	There are no residual effects for Transport and Access.		There are no effects for the residual Landscape and Visual effects to interact with.
	Landscape and Visual Amenity	Temporary impact on the setting of LLCAs during construction period at the Principal Site.	Moderate to Major Adverse	
Public transport network	Landscape and Visual Amenity	Temporary impact on the setting of LLCAs during construction period at the Principal Site.	Moderate to Major Adverse	There are no effects for the residual Landscape and Visual effects to interact with.
		Temporary impact on VPs during the construction period at the Principal Site.		
Non-motorised user routes	Air Quality	There are no residual effects for Air Quality.		There are no effects for the residual Landscape and Visual effects to interact with.
	Noise and Vibration	There are no residual effects for Noise and Vibration.		
	Transport and Access	There are no residual effects for Transport and Access.		
	Landscape and Visual Amenity	Temporary impact on the setting of LLCAs during construction period at the Principal Site.	Moderate to Major Adverse	
Ecology	Air Quality	There are no residual effects for Air Quality.		The Flood Risk, Drainage and Surface Water effects relate to hydromorphology, and the Ecology and Nature Conservation effect relates to a temporary
	Noise and Vibration	There are no residual effects for Noise and Vibration.		
	Ecology and Nature Conservation	Temporary loss of hedgerow habitat through construction of the Scheme.	Moderate Adverse	

Sensitive receptors/ Receptor group (refer to Table 17-2)	Technical topic	Description of effect	Significance of Effect	Effect Interactions
	Flood Risk, Drainage and Surface Water	<p>There will be temporary impacts on the hydromorphology of watercourses from open-cut watercourse crossings or temporary vehicle access as may be required.</p> <p>The watercourses potentially impacted by the Principal Site are the Eau, Fillingham Beck and River Till.</p> <p>The watercourses potentially impacted by the Cable Route Corridor are WFD channel features (Seymour Drain, Marton Drain, Skellingthorpe Main Drain, Trib of Till, Till (Witham)) and Fillingham Beck.</p>	Moderate Adverse	loss of hedgerow. These effects are not likely to interact with each other.
Surface water features and surface water bodies	Ecology and Nature Conservation	Temporary loss of hedgerow habitat through construction of the Scheme.	Moderate Adverse	The Flood Risk, Drainage and Surface Water effects relate to hydromorphology, and the Ecology and Nature Conservation effect relates to a temporary loss of hedgerow. These effects are not likely to interact with each other.
	Flood Risk, Drainage and Surface Water	<p>There will be temporary impacts on the hydromorphology of watercourses from open-cut watercourse crossings or temporary vehicle access as may be required.</p> <p>The watercourses potentially impacted by the Principal Site are the Eau, Fillingham Beck and River Till.</p> <p>The watercourses potentially impacted by the Cable Route Corridor are WFD channel features (Seymour Drain, Marton Drain, Skellingthorpe Main Drain, Trib of Till, Till (Witham)) and Fillingham Beck.</p>	Moderate Adverse	

Table 17-7: Potential effect interactions during operation

Sensitive receptors/ Receptor group (refer to Table 17-2)	Technical topic	Description of effect	Significance of Effect	Effect Interactions
Construction and decommission workers		This receptor group will not be impacted by the construction phase of the Scheme.		
Future maintenance workers	Socio-economics and Land Use	There are no residual effects for Socio-economics and Land Use.		There are no residual effects to interact.
	Transport and Access	There are no residual effects for Transport and Access		
Neighbouring community facilities	Air Quality	There are no residual effects for Air Quality.		There are no effects for the residual Landscape and Visual effects to interact with.
	Noise and Vibration	There are no residual effects for Noise and Vibration.		
Neighbouring residential properties	Socio-economics and Land Use	There are no residual effects for Socio-economics and Land Use.		
Neighbouring business	Transport and Access	There are no residual effects for Transport and Access.		
	Landscape and Visual Amenity	Temporary impact on the setting of LLCAs during the operation period at the Principal Site. Temporary impact on VPs during the operation period at the Principal Site. Long term impact on visual amenity during the operation period at the Cable Route Corridor. Effects on recreational receptors on Cottam Road and Floss Lane, Cottam.	Moderate to Major Adverse	

Sensitive receptors/ Receptor group (refer to Table 17-2)	Technical topic	Description of effect	Significance of Effect	Effect Interactions
Local highway network	Transport and Access	There are no residual effects for Transport and Access.		There are no effects for the residual Landscape and Visual effects to interact with.
Public transport network	Landscape and Visual Amenity	Long term impact on the setting of LLCAs during the operation period at the Principal Site. Long term impact on VPs during the operation period at the Principal Site. Long term impact on visual amenity during the operation period at the Cable Route Corridor. Effects on recreational receptors on Cottam Road and Floss Lane, Cottam.	Moderate to Major Adverse	
Non-motorised user routes	Air Quality	There are no residual effects for Air Quality.		There are no effects for the residual Landscape and Visual effects to interact with.
	Noise and Vibration	There are no residual effects for Noise and Vibration.		
	Transport and Access	There are no residual effects for Transport and Access.		
	Landscape and Visual Amenity	Temporary impact on the setting of LLCAs during the operation period at the Principal Site. Temporary impact on VPs during the operation period at the Principal Site.	Moderate to Major Adverse	

Sensitive receptors/ Receptor group (refer to Table 17-2)	Technical topic	Description of effect	Significance of Effect	Effect Interactions
		Long term impact on visual amenity during the operation period at the Cable Route Corridor. Effects on recreational receptors on Cottam Road and Floss Lane, Cottam.		
Ecology	Air Quality	There are no residual effects for Air Quality.		There are no residual effects to interact with the Flood Risk, Drainage and Surface Water effects.
	Noise and Vibration	There are no residual effects for Noise and Vibration.		
	Ecology and Nature Conservation	There are no residual effects for Ecology and Nature Conservation.		
	Flood Risk, Drainage and Surface Water	<p>The Eau, Fillingham Beck and River Til are watercourses where water quality could be potentially impacted by site run-off. These watercourses could also experience potential impacts on hydrology, this may also influence aquatic habitats and water-dependent conservation sites. These watercourses also have the potential for permanent physical impacts from permanent culverted crossings.</p> <p>The Mercia Mudstone Group, Penarth Mudstone Group, Scunthorpe Mudstone Formation, Charmouth Mudstone Formation Secondary undifferentiated aquifers, and Alluvial de Potential could experience impacts on groundwater quality resources, groundwater flow and level impacts and there is a potential for impact</p>	Minor Adverse (Not Significant) to Minor Beneficial (Not Significant), including neutral and negligible effects.	

Sensitive receptors/ Receptor group (refer to Table 17-2)	Technical topic	Description of effect	Significance of Effect	Effect Interactions
		as a result of the use of firewater in the battery storage areas.		
Surface water features and surface water bodies	Ecology and Nature Conservation	There are no residual effects for Ecology and Nature Conservation.		There are no residual effects to interact with the Flood Risk, Drainage and Surface Water effects.
	Flood Risk, Drainage and Surface Water	The Eau, Fillingham Beck and River Til are watercourses where water quality could be potentially impacted by site run-off. These watercourses could also experience potential impacts on hydrology, this may also influence aquatic habitats and water-dependent conservation sites. These watercourses also have the potential for permanent physical impacts from permanent culverted crossings.	Minor Adverse (Not Significant) to Minor Beneficial (Not Significant), including neutral and negligible effects.	

17.7 Assessment of Cumulative Effects

17.7.1 Based on a preliminary review, a number of other developments are currently considered to have potential to generate cumulative effects with the Scheme based on their temporal scope, location and/or scale and nature. This includes the following three solar schemes that are also classified as NSIPs and will require a DCO, which are hereafter collectively referred to as 'the solar DCOs'.

- Cottam Solar Project;
- Gate Burton Energy Park;
- West Burton Solar Project.

17.7.2 For the purposes of the preliminary assessment of potential cumulative effects presented in this PEI Report, the PEI Reports for each of the solar DCOs have been reviewed and considered, and the relevant figures and conclusions assessed against those reached in respect of the Scheme. The PEI Reports provided the most up to date information at the time the relevant assessments were undertaken.

17.7.3 These solar DCOs, including any changes to the relevant reports and assessments through their respective examination processes, will continue to be particularly reviewed during the course of cumulative assessments for the Scheme undertaken as part of the EIA. The Applicant is aware, for example, that the ESs for the solar DCOs have since been published. The updated assessments provided in the three ESs are currently being reviewed, and an assessment of potential cumulative effects across the solar DCOs and the Scheme, based on these updated reports, will be provided at the ES stage.

17.7.4 In addition to the solar DCOs, other developments that have been identified within the Cumulative Developments Long List (**PEI Report Volume II Appendix 17-1**) for each technical discipline are listed below and considered further for their potential to generate cumulative effects.

17.8 Air Quality

Introduction

17.8.1 The ZoI for air quality is 350m from Scheme Boundary and is presented in **PEI Report Volume III Figure 17-1**. This ZoI is in place to cover the cumulative effects of dust generated during the construction and decommissioning phases. In addition to the solar DCOs, the other developments within the ZoI with potential to generate cumulative effects on air quality are:

- ID 16. Application Reference: 1/22/01031/CDM. Construction of an underground foul water rising main at Cottam Power Station;
- ID 47. Application Reference: 19/00167/SCR. Demolition of Cottam Power Station; and
- ID 135. Application Reference: PL/0135/22. Construction of a hydrocarbon wellsite, Northlands Road, Glentworth.

Cumulative Effects During Construction

- 17.8.2 There is the potential for cumulative effects during construction from fugitive emissions from construction activities, and from the movement of construction vehicles on the road network.
- 17.8.3 Mitigation measures for managing dust emissions during construction would be documented within the Framework Construction Environmental Management Plan (Framework CEMP), which will ensure that off-site impacts are not significant. It is assumed that nearby construction sites, including the solar DCOs, will operate to a similar level of good practice in accordance with their own CEMPs. The cumulative effects of dust generation during construction would therefore be **neutral (not significant)**.
- 17.8.4 If other developments, particularly the solar DCOs, are being constructed at the same time as the Scheme, there is the potential for the total number of Heavy Goods Vehicles (HGVs) on the road network to cause a cumulative impact on air quality. An assessment of this has not been completed as part of the PEI Report as construction traffic and plant numbers for the Scheme still need to be confirmed. If potentially significant cumulative effects were anticipated, then it is likely that contractors for the Scheme and solar DCOs would look to co-ordinate and consolidate deliveries to each site, such that significant cumulative effects were mitigated. This will be considered further in the ES that will accompany the DCO application.

Cumulative Effects During Operation

- 17.8.5 There are not anticipated to be any cumulative effects on air quality during operation of the Scheme. This is because the solar farm components (i.e. solar panels, cable infrastructure) will not emit atmospheric pollutants. In addition, the number of staff working during operation is relatively small (10-12 people) and HGV and transit van deliveries to site will be between 10-20 per year. An operational assessment of air quality has therefore been scoped out of the EIA for the Scheme and there is no potential for significant cumulative effects.

Cumulative Effects During Decommissioning

- 17.8.6 As the Scheme has an estimated design life of 40-60 years, it is not possible to predict what developments would be being constructed or decommissioned at the same time as the Scheme is being decommissioned. Broadly, however, the effects of decommissioning are likely to be similar to those during construction. Mitigation measures for managing dust emissions during decommissioning would be documented within the Framework Decommissioning Environmental Management Plan (DEMP) and it assumed that any nearby construction/decommissioning sites would operate to a similar level of good practice in accordance with their own CEMPs/DEMPs. The cumulative effects of dust generation during decommissioning would therefore be **neutral (not significant)**.

17.9 Climate Change

- 17.9.1 There is no Zol for climate change as the receptor for the Greenhouse Gas (GHG) Assessment is the climate, which is global and not geographically restrained, and the receptor for the Climate Resilience Review is the Scheme itself and its workers. The potential for cumulative effects on climate change is therefore already inherently considered within **PEI Report Volume I Chapter 7: Climate Change**.

17.10 Cultural Heritage

Introduction

- 17.10.1 The Zols for Cultural Heritage are 1km and 3km, as presented in **PEI Report Volume III Figure 17-2**. The 1km Zol is in place for the effect of the Scheme on non-designated heritage assets and the 3km Zol is in place for the effect of the Scheme on designated heritage assets. In addition to the solar DCOs, the other developments within the 1km and 3km Zols with potential to generate cumulative effects on cultural heritage are:

- ID 16. Application Reference: 1/22/01031/CDM. Construction of an underground foul water rising main at Cottam Power Station;
- ID 47. Application Reference: 19/00167/SCR. Demolition of Cottam Power Station; and
- ID 135. Application Reference: PL/0135/22. Construction of a hydrocarbon wellsite, Northlands Road, Glentworth.

- 17.10.2 Cumulative heritage impacts can be either physical or a result of changes to setting. Cumulative physical impacts are where an asset may be physically changed by two or more developments, thus increasing the loss of historic and/ or archaeological material. Impacts on setting result from where the observer is able to see two or more developments from one key view, or sequential where two or more views are affected.

- 17.10.3 Significant effects result where the cumulative change results in an erosion to, or total loss of, the ability to understand and appreciate the heritage value of an asset as a result of multiple impacts.

Cumulative Effects During Construction

- 17.10.4 In terms of buried archaeology, physical works associated with the construction of the other developments have the potential to physically impact archaeological assets also impacted by the Scheme. Where these assets fall within the boundary of more than one development, there is potential for a greater loss of archaeological remains.

- 17.10.5 With reference to the other developments, there is potential for cumulative impacts to non-designated archaeological remains. This is particularly the case for the solar DCOs where there is overlap of Cable Route Corridors, where there is potential for the same heritage asset to be affected by more than one scheme. In the majority of cases, given the low significance of these assets and the proposed mitigation through field evaluation, the cumulative

effects on archaeology during construction are not anticipated to be significant. However, where sites of greater importance are present (such as the Winter Camp of the Viking Great Army at Torksey) this may result in significant cumulative effects. Once the Cable Route Corridor for the Scheme has been refined further, potential overlap with other schemes will be considered further in the ES that will accompany the DCO application.

17.10.6 In terms of built heritage, an assessment of how temporary construction activity may affect the setting of heritage assets has not been completed as part of the PEI Report as construction information for the Scheme remains to be confirmed. An initial review of the solar DCOs suggests it is possible that cumulative effects during construction may arise on the following designated heritage assets due to the increased solar viewshed:

- listed buildings within the settlement of Corringham;
- Harpswell Conservation Area and associated listed; and
- listed buildings within the settlement of Upton.

17.10.7 Aside from the solar DCOs, the hydrocarbon wellsite in Glentworth (ID 135) may also give rise to cumulative effects on heritage assets, particularly for assets within Glentworth.

17.10.8 At this stage, it is not possible to confirm whether cumulative effects would be significant or not. This will be considered further in the ES that will accompany the DCO application, along with any proposed mitigation or enhancement.

Cumulative Effects During Operation

17.10.9 In terms of buried archaeology, impacts are limited to the construction phase, therefore there is no potential for significant cumulative effects during operation.

17.10.10 In terms of built heritage, an initial review of the solar DCOs suggests it is possible that cumulative effects during operation may arise on the following designated heritage assets due to the increased solar viewshed:

- Listed buildings within the settlement of Corringham;
- Harpswell Conservation Area and associated listed buildings; and
- Listed buildings within the settlement of Upton.

17.10.11 Aside from the solar DCOs, no additional significant effects are considered likely during the operation of the Scheme. Built heritage and the potential for cumulative effects will be considered further in the ES that will accompany the DCO application.

Cumulative Effects During Decommissioning

17.10.12 As the Scheme has an estimated design life of 40-60 years, it is not possible to predict what developments would be being constructed or decommissioned at the same time as the Scheme is being decommissioned. Broadly, however, the effects of decommissioning are likely to be similar to those during construction.

- 17.10.13 In terms of buried archaeology, it is not anticipated that decommissioning would have any impact beyond the already-disturbed footprint of the Scheme. Any mitigation measures to manage the residual risk to buried archaeology would be documented in the Framework DEMP. It is also assumed that any nearby construction/decommissioning sites will manage archaeological effects to a similar level of good practice in accordance with their own CEMPs/DEMPs. The cumulative effects on buried archaeology during decommissioning would therefore be **neutral (not significant)**.
- 17.10.14 In terms of built heritage, there is the potential for temporary setting impacts during the removal of the solar infrastructure, although it is not possible to confirm what construction or decommissioning activities for other schemes may happen at the same time. Once decommissioning of the Scheme is complete, the long-term adverse effects from the Scheme will have been reversed and will no longer exist due to the removal of solar infrastructure and retention of landscaping, which would likely represent an improvement and may even mitigate any adverse effects caused by other developments that are being constructed or are operational at that point in time. It is therefore anticipated that the cumulative effects on built heritage during decommissioning would be **neutral (not significant)**.

17.11 Ecology and Nature Conservation

Introduction

- 17.11.1 The Zol for Ecology and Nature Conservation are presented in **PEI Report Volume III Figure 17-3**.
- 17.11.2 The Zol is up to 10km for the potential effects of the Scheme on international nature conservation designations, such as Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites. The Zol would be extended to 30km where bats are a qualifying or cited interest feature, however, no such sites are located within 30km of the Scheme.
- 17.11.3 For the remainder of nature conservation designations, e.g., Sites of Special Scientific Interest (SSSIs), Local Nature Reserves (LNR) and County Wildlife Sites (CWS), as well as protected and notable habitats and species, the Zol is 2km.
- 17.11.4 As such, in addition to the solar DCOs, a review of other developments within both the 2km Zol identified the following with the potential to generate cumulative effects:
- ID 16. Application Reference: 1/22/01031/CDM. Construction of an underground foul water rising main at Cottam Power Station;
 - ID 47. Application Reference: 19/00167/SCR. Demolition of Cottam Power Station; and
 - ID 135. Application Reference: PL/0135/22. Construction of a hydrocarbon wellsite, Northlands Road, Glentworth.
- 17.11.5 Other developments within the 10km Zol with the potential to generate cumulative effects are:

- ID 4. Application Reference: EN010088. Construction of a gas fired power station (NSIP), known as 'West Burton C Power Station'.
- ID 20. Application Reference: 20/01405/FUL. A solar farm and associated infrastructure at Tiln Farm, Retford;
- ID 42. Application Reference: 21/00737/SCR. Request for a screening opinion for a solar farm development on land at Sturton Road;
- ID 43. Application Reference: 22/00/358/FUL. A solar farm and battery storage at Bumble Bee Farm, Saundby;
ID 83. Application Reference: 145239. A multi-use development comprising 2046 residential units and various community facilities on Foxby Lane, Gainsborough; and
- ID 95. Application Reference: 136937. A residential development comprising 750 units at land north east of Highfields roundabout, Corringham.

17.11.6 As set out in **PEI Report Volume I Chapter 9: Ecology and Nature Conservation** the characterisation of the ecological baseline is still being undertaken, informed by ongoing ecological field surveys. As such, at this stage it not possible to confirm the significance of cumulative impacts. A full assessment of cumulative effects will be presented in the ES. This will review the above projects for potential overlapping spatial and temporal interactions with the Scheme. Where there is the potential for overlapping interactions of important ecological features to occur, the relevant important ecological features will be identified and where they are considered to be sensitive, the overlapping development will be taken forward for cumulative assessment. There is no potential for cumulative effects where the Scheme has a negligible effect, so this assessment will only consider those reported as minor adverse effects or of greater significance.

Cumulative Effects During Construction

17.11.7 At this stage it not possible to confirm the significance of any potential cumulative impacts and these will be explored in the ES once the ecological baseline characterisation has been completed. However, it is possible that cumulative effects with the solar DCOs may arise on the following:

- Ground-nesting birds, including Skylark.
 - There is the potential for cumulative effects with the Scheme, where the overall loss of arable farmland has the potential to reduce nesting and foraging habitat for ground-nesting birds, including Skylark.
- Shared or similar routes for the Cable Route Corridor.
 - There is the potential for fragmentation of linear habitats, e.g., hedgerows and drainage ditches, for a sustained period, i.e., greater than the two-year construction programme predicted for the Scheme in isolation. Given, that each project is likely to require its own working corridor with associated trench, that in isolation disturbance to, or loss of habitats will only be temporary, e.g.,

species poor hedgerows and dry agricultural drainage ditches, with habitats re-instated once construction is complete. However, cumulatively, there is the potential for successive disturbance to habitats, along with designated sites (such as Cow Pasture Lane Drains LWS), areas of priority habitat (such as the Coastal and Floodplain Grazing Marsh) and areas supporting protected and notable species (such as Badger and Great Crested Newt).

- 17.11.8 Aside from the solar DCOs, it is considered unlikely that the other developments, even if constructed simultaneously, would have potential to generate significant cumulative ecological effects due to the nature of those schemes and their spatial distribution. It is assumed that for all other developments, they would follow good industry practice in terms of the management of construction works and pollution and dust control, and that any construction related impacts would be mitigated on site to avoid residual effects on important ecological features. This will be explored further in the ES, once the characterisation of the ecological baseline for the Scheme has been completed.

Cumulative Effects During Operation

- 17.11.9 It is anticipated that the Scheme will deliver at least 10% biodiversity net gain (BNG), and once the Scheme is operational there will be extensive green infrastructure and ecological enhancements. Therefore, the potential for adverse operational impacts on important ecological features is likely to be minimal. It is assumed that the other nearby solar DCOs will also achieve BNG. If this is the case, then cumulative effects on ecology could be beneficial. This will be explored further in the ES once the scope of BNG to be delivered is understood.
- 17.11.10 It is also assumed that all other developments would follow good industry practice in terms of operational management and maintenance works, and that any operation related impacts would be mitigated on site to avoid residual effects on ecological features. This will be explored further in the ES once the characterisation of the ecological baseline for the Scheme has been completed.

Cumulative Effects During Decommissioning

- 17.11.11 As the Scheme has an estimated design life of 40-60 years, it is not possible to predict what developments would be being constructed or decommissioned at the same time as the Scheme is being decommissioned. Broadly, however, the effects of decommissioning are likely to be similar to those during construction. Mitigation measures for managing ecological impacts during decommissioning will be documented within the Framework DEMP and it is assumed that any nearby construction/decommissioning sites would manage their ecological impacts to a similar level of good practice in accordance with their own CEMPs/DEMPs. Therefore, it is not predicted at this stage that there would be any significant cumulative effects on important ecological features, but this will be explored further in the ES.

17.12 Flood Risk, Drainage and Surface Water

17.12.1 The Zol for Flood Risk, Drainage and Surface Water is 2km and is presented in **PEI Report Volume III Figure 17-4**. This Zol is in place to cover the cumulative effects on water resource receptors, including surface water and groundwater quality. In addition to the solar DCOs, the other developments within the Zol with potential to generate cumulative effects are:

Principal Site

- ID 135. Application Reference: PL/0135/22. Construction of a hydrocarbon wellsite, Northlands Road, Glentworth. Within catchment of the Fillingham Beck, within the Principal Site; and

Cable Route Corridor

- ID 16. Application Reference: 1/22/01031/CDM. Construction of an underground foul water rising main at Cottam Power Station. Within catchment of Seymour Drain, crosses the Cable Route Corridor; and
- ID 47. Application Reference: 19/00167/SCR. Demolition of Cottam Power Station. Within catchment of Seymour Drain, crosses the Cable Route Corridor.

Cumulative Effects During Construction

17.12.2 It is assumed that all other developments, including the nearby solar DCOs, will follow good industry practice during construction, such as management of construction works and surface water runoff (and risk to groundwater of minor chemical leaks from static and mobile equipment). The mitigation measures for the Scheme are documented within the Framework CEMP and it is assumed that the other developments will operate to a similar level of good practice in accordance with their own CEMPs. The cumulative effects on surface water and groundwater during construction are therefore likely to be **neutral (not significant)**.

17.12.3 At this stage, the Cable Route Corridor for the Scheme and its construction methodology is still being developed. It is anticipated that the Cable Route Corridor will be refined prior to submission of the DCO application. It is the Applicant's intention that the Cable Route Corridor will be refined to align as closely as possible with the Cable Route Corridors of the solar DCOs in order to reduce the overall working area and potential impacts. Once the Cable Route Corridor has been refined in this way, further assessment will be included in the ES to confirm the cumulative effects with regards to watercourse crossings.

Cumulative Effects During Operation

17.12.4 It is assumed that all other developments, including the solar DCOs, will include an appropriate drainage design/strategy to manage and treat surface water runoff and ensure there is no increase in flood risk, as would be required by planning policy and the Lead Local Flood Authority. It is therefore considered that the cumulative effects on surface water during operation would be **neutral (not significant)**.

Cumulative Effects During Decommissioning

- 17.12.5 As the Scheme has an estimated design life of 40-60 years, it is not possible to predict what developments would be being constructed or decommissioned at the same time as the Scheme is being decommissioned. Broadly, however, the effects of decommissioning are likely to be similar to those during construction. Mitigation measures for managing impacts to surface water and groundwater during decommissioning will be documented within the Framework DEMP and it is assumed that any nearby construction/decommissioning sites would operate to a similar level of good practice in accordance with their own CEMPs/DEMPs. The cumulative effects on surface water and groundwater during decommissioning would therefore be **neutral (not significant)**.

17.13 Human Health

- 17.13.1 The cumulative effects associated with human health are covered in the air quality; climate change; noise and vibration; socio-economics and land use; and transport and access sections of this chapter and not duplicated here.

17.14 Landscape and Visual Amenity

Introduction

- 17.14.1 The Zols for landscape and visual amenity are 10km and 2km and are presented in **PEI Report Volume III Figure 17-5**. There is a 10km Zol in place for effects on receptors around the Principal Site and a 2km Zol in place for effects on receptors along the Cable Route Corridor. In addition to the solar DCOs, the other developments within the 2km and 10km Zols with potential to generate cumulative effects are:

- ID 16. Application Reference: 1/22/01031/CDM. Construction of an underground foul water rising main at Cottam Power Station;
- ID 47. Application Reference: 19/00167/SCR. Demolition of Cottam Power Station; and
- ID 135. Application Reference: PL/0135/22. Construction of a hydrocarbon wellsite, Northlands Road, Glentworth.

- 17.14.2 The other developments within the 10km Zol are:

- ID 4. Application Reference: EN010088. Construction of a gas fired power station (NSIP), known as 'West Burton C Power Station'.
- ID 20. Application Reference: 20/01405/FUL. A solar farm and associated infrastructure at Tiln Farm, Retford;
- ID 42. Application Reference: 21/00737/SCR. Request for a screening opinion for a solar farm development on land at Sturton Road;
- ID 43. Application Reference: 22/00/358/FUL. A solar farm and battery storage at Bumble Bee Farm, Saundby;

ID 83. Application Reference: 145239. A multi-use development comprising 2046 residential units and various community facilities on Foxby Lane, Gainsborough; and

- ID 95. Application Reference: 136937. A residential development comprising 750 units at land northeast of Highfields roundabout, Corringham Road.

17.14.3 Cumulative landscape impacts can change either the physical fabric or character of the landscape, or any special values attached to it. For example:

- Cumulative impacts on the physical fabric of the landscape arise when two or more developments affect landscape components such as arable land, hedgerows; or perceptual qualities such as tranquillity.
- Cumulative impacts on landscape character arise when two or more developments introduce new features into the landscape. In this way, they can change the landscape character to such an extent that they create a different landscape character type.

17.14.4 Cumulative impacts on visual amenity can be caused by 'combined visibility' and/or 'sequential impacts':

- Combined visibility occurs where the observer is able to see two or more developments from one viewpoint, either in combination (where several developments are within the observer's arc of vision at the same time) or in succession (where the observer has to turn to see the various developments).
- Sequential impacts occur when the observer has to move to another viewpoint to see different developments, such as roads, railways or recreational routes including long-distance trails. The magnitude of sequential effects will be affected by speed of travel and distance between viewpoints.

Cumulative Effects During Construction

17.14.5 The extent of any potential significant cumulative landscape and visual effect will be confirmed once information relating to other developments is further defined. At the time of writing, and based on current available information, the following landscape and visual receptors may experience significant cumulative effects during construction:

- Significant cumulative effects on landscape character at a local level (e.g. for the Till Vale, as identified by the Applicant) or potentially at a wider (National Character Area) level, where the Scheme, the Cottam Solar Project and Gate Burton Energy Park are under construction at the same time. These may arise where the spatial extent of two or more schemes significantly changes the landscape character of an identified area; or where perceptual qualities are affected by elements such as traffic movement and construction noise at a more intensive level and/or across a more extensive area.
- Significant cumulative visual effects may arise for receptors that experience views of construction of the Principal Site in combination with

the Cottam Solar Project. This is most likely for receptors along the scarp of Lincoln Cliff where the latter will extend the influence of solar development in the wider view; or where isolated residential properties experience views of both the Scheme and the Cottam Solar Project in different directions and where mitigation planting is not yet established.

- Significant cumulative visual effects may arise where sequential views of the Scheme occur for sensitive receptors, most likely for informal recreational users of quiet rural roads and PRow where both the Scheme and the Cottam Solar Project will be visible and where mitigation planting is not yet established.
- Significant cumulative visual effects may arise where construction of the hydrocarbon wellsite north of Kexby Road (ref. ID 135) takes place at the same time as the Scheme, most likely for residents to the south and where mitigation planting is not yet established.

Cumulative Effects During Operation

17.14.6 With reference to the summary above, the following landscape and visual receptors are more likely to experience significant cumulative effects during operation:

- Significant cumulative effects on landscape character at a local level (e.g. for the Till Vale, as identified by the Applicant) or potentially at a wider (National Character Area) level, where the Scheme, the Cottam Solar Project and the Gate Burton Energy Park represent an appreciable change in land use and/or the presence of incongruous infrastructure within a traditionally agricultural landscape.
- Significant cumulative visual effects may arise for receptors that experience views of the Principal Site during operation in combination with the Cottam Solar Project. This is most likely for receptors along the scarp of Lincoln Cliff where the latter scheme will extend the influence of solar development in the wider view; or where isolated residential properties experience views of both the Scheme and Cottam in different directions and where mitigation planting is not yet mature.
- Significant cumulative visual effects may arise where construction of the hydrocarbon wellsite north of Kexby Road (ref. ID 135) is visible in combination with the Scheme, most likely for residents to the south and where proposed mitigation planting is not yet mature.

Cumulative Effects During Decommissioning

17.14.7 As the Scheme has an estimated design life of 40-60 years. As it is not possible to predict what developments would be being constructed or decommissioned at the same time as the Scheme is being decommissioned. Broadly, however, the effects of decommissioning are likely to be similar to those during construction.

17.15 Noise and Vibration

Introduction

17.15.1 The Zols for noise and vibration are 2km and 50m respectively, which are presented in **PEI Report Volume III Figure 17-6**. The 50m Zol is in place for the effect of construction vibration and the 2km Zol is for the effect of construction noise (as well as operational noise from the Principal Site). In addition to the solar DCOs, the other developments within the 2km and 50m Zols with potential to generate cumulative effects are:

- ID 16. Application Reference: 1/22/01031/CDM. Construction of an underground foul water rising main at Cottam Power Station;
- ID 47. Application Reference: 19/00167/SCR. Demolition of Cottam Power Station; and
- ID 135. Application Reference: PL/0135/22. Construction of a hydrocarbon wellsite, Northlands Road, Glentworth.

Cumulative Effects During Construction

17.15.2 The precise scale of additional noise and vibration effects within the Principal Site will depend on the exact works taking place at each location at any one time. However, compliance with the mitigation measures detailed within the Framework CEMP will reduce these effects as far as reasonably practicable. It has been assumed that the other developments, including the solar DCOs, will also be required to adopt Best Practicable Means (BPM) as industry-standard working practices during their construction phase and these mitigation measures would be documented within their own CEMPs. It is also assumed that noise and vibration levels will comply with set limits in accordance with the applicable guidance. The cumulative effects of construction noise and vibration within the Principal Site would therefore be **neutral (not significant)**.

17.15.3 The assessment of noise due to construction of the Cable Route Corridor was based on a worst-case scenario where works were assumed to be undertaken at the closest boundary to residential receptors. Even if other solar DCOs construct their Cable Route Corridor at the same time as the Scheme, it is unlikely that the worst-case scenario would be exceeded. However, the duration of these works is likely to be extended and, hence, the duration that receptors may be exposed to noisy works out of core hours. This extended exposure may affect the level of mitigation required for out-of-hours HDD activities in which case the Section 61 process will be followed. The cumulative effects of construction noise and vibration along the Cable Route Corridor would therefore be **neutral (not significant)**.

Cumulative Effects During Operation

17.15.4 The operational noise effects will be dependent on the exact arrangement of fixed installations of the Scheme and other developments such as the solar DCOs. The siting of fixed installations within the Scheme Boundary will be made with reference to the outcomes of noise modelling and ensuring that

receptors do not experience significant noise and vibration effects. This reduces the risk of cumulative noise and vibration effects with other developments. Based on the likely distances from the Scheme's fixed installations to other developments, and that the predicted operational noise effects of the Scheme are below the Lowest Observed Adverse Effect Level (LOAEL), the cumulative effects of operational noise and vibration would be **neutral (not significant)**.

Cumulative Effects During Decommissioning

- 17.15.5 As the Scheme has an estimated design life of 40-60 years, it is not possible to predict what developments would be being constructed or decommissioned at the same time as the Scheme is being decommissioned. Broadly, however, the effects of decommissioning are likely to be similar to those during construction. Mitigation measures for managing noise and vibration during decommissioning would be documented within the Framework DEMP and it assumed that any nearby construction/decommissioning sites would operate to a similar level of good practice in accordance with their own CEMPs/DEMPs. The cumulative effects of noise and vibration during decommissioning would therefore be **neutral (not significant)**.

17.16 Socio-economics and Land Use

- 17.16.1 The relevant study area for socio-economics and land use effects varies depending on the type of effect being assessed. As set out in **PEI Report Volume I Chapter 14: Socio-Economics and Land Use** and presented in **PEI Report Volume III Figure 17-7**:

- Local economic and employment effects are considered across West Lindsey and Bassetlaw districts; and the East Midlands region;
- For community severance effects, relevant communities fall within 1km of the Scheme;
- For effects on users of recreational routes and PRoW, relevant routes fall within 500m of the Scheme;
- For impacts on BMV agricultural land and agricultural land use effects, the study area is the Principal Site Boundary; and,
- For local land use and amenity effects, the relevant residential properties, local businesses, open space, community facilities, visitor attractions and development land are within 500m of the Scheme.

- 17.16.2 In addition to the solar DCOs, other developments within the study area with potential to generate cumulative socio-economic and land use effects are:

- ID 16. Application Reference: 1/22/01031/CDM. Construction of an underground foul water rising main at Cottam Power Station;
- ID 47. Application Reference: 19/00167/SCR. Demolition of Cottam Power Station; and
- ID 135. Application Reference: PL/0135/22. Construction of a hydrocarbon wellsite, Northlands Road, Glentworth.

Cumulative Effects During Construction

Net Construction Employment

- 17.16.3 Should they go ahead, all the approved and submitted cumulative schemes listed above are anticipated to generate construction related employment in the local economy and employment study area (West Lindsey and Bassetlaw districts and East Midlands region).
- 17.16.4 The scale of the construction employment generated cannot be readily quantified as this information is commercially sensitive and not publicly available. This will be assessed at ES stage as information relating to the other schemes will be available. However, the combined effect of the construction of the cumulative developments and the Scheme is likely to bring considerable additional employment to the study area. Therefore, the overall effect from the generation of construction employment at the West Lindsey and Bassetlaw scale is likely to increase from a temporary minor beneficial (not significant) effect to a temporary cumulative moderate beneficial (significant) effect. Given the scale of the regional economy and its construction workforce within the East Midlands as a whole, the cumulative effect is likely to remain negligible (not significant). This is considered to result in a **neutral (not significant) cumulative effect**.

Gross Value Added

- 17.16.5 The combined effect from the generation of Gross Value Added (GVA) arising from the construction of the cumulative schemes in combination with the Scheme at the West Lindsey and Bassetlaw scale is likely to remain a temporary minor beneficial (not significant) effect. At the regional level, the impact would remain as negligible (not significant). This would therefore be **neutral (not significant)**.

Local Community and PRow

- 17.16.6 The cumulative schemes could potentially generate transport and traffic impacts, which, in combination with the Scheme, could generate cumulative community severance effects, should impacts occur at the same time. The effect of the Scheme on community severance is assessed as no effect. While no specific community severance impacts are reported arising from the cumulative schemes, given the proximity of the cumulative schemes to the Scheme and the potential for cumulative transport impacts, there is potential for cumulative adverse effects on community severance, should scheme impacts occur at the same time. This will be considered further in the ES that will accompany the DCO application.

Agricultural Land

- 17.16.7 In terms of loss of agricultural land, all solar schemes are temporary and will eventually be decommissioned. The permanent loss of agricultural land will be restricted to small areas where sub-stations and BESS are required.
- 17.16.8 In addition, at a regional scale, the Department of Food and Rural Affairs (DEFRA) published "Agricultural land use in England" (Ref. 17-9) on 29 September 2022, which gives estimates of land use, crop areas and land ownership for England from the Survey of Agriculture and Horticulture run by the DEFRA in June 2022. This sets out that the utilised agricultural area for

England (UAA) is 8.9 million hectares in 2022 and accounts for 69% of the total area of England. The DEFRA “Structure of the agricultural industry in England and the UK at June” (last updated in February 2023; Ref. 17-10) sets out that there are 1,177,690 hectares of agricultural land in the East Midlands and that the total amount of agricultural land in each local authority area in England. This shows that the total amount of agricultural land in Lincolnshire is 488,915 hectares.

17.16.9 The area of the Principal Site is approximately 1,400ha and combined with the other solar DCOs is approximately 4,380ha. Based on the above, this equates to approximately:

- 0.05% of agricultural land in England.
- 0.37% of agricultural land in the East Midlands
- 0.90% of agricultural land in Lincolnshire.

17.16.10 Further cumulative assessment of the effects of the Scheme on agricultural land and BMV will be considered in the ES, in consultation with Lincolnshire County Council and Natural England. Based on the above assessment, the reversible impacts on agricultural land represent a tiny proportion of the agricultural land in England, therefore the cumulative effect on agricultural land would be **neutral (not significant)**.

Local Land Use and Amenity

17.16.11 The cumulative schemes have potential to generate adverse amenity effects on local land uses including residential properties, local businesses, open space, community facilities, visitor attractions and development land. However due to the limited scale of effects on nearby receptors, negligible in regard to the Scheme; the construction phase effect of the cumulative schemes and the Scheme on local land use and amenity effects on receptors including residential properties, business premises and community facilities will be **neutral (not significant)**.

17.16.12 A number of PRoW diversions would be required during the construction, operation and decommissioning phases of the solar DCOs, and potential short-term closures could be required associated with the demolition of Cottam Power Station. No effects on PRoW users are anticipated arising from the Scheme. However, given the closures and diversions associated with the solar DCOs, there could be a cumulative adverse impact on users of PRoW in the local area, should impacts occur at the same time. A full assessment will be carried out at ES stage.

17.16.13 The overall cumulative construction effects on agricultural land use will be reported in the ES once the effects arising from the Scheme have been assessed.

Cumulative Effects During Operation

Net Operational Employment

17.16.14 If all the cumulative schemes come forward, there will be additional employment generation in the study area during operation. Given the nature of the cumulative schemes, and the Scheme, the direct number of jobs

expected to be generated will be small in the context of the wider local economy. Therefore, the overall combined cumulative effect from the generation of workers during operation is likely to remain negligible.

Local Community and PRow

- 17.16.15 The operational phase effect of the cumulative schemes and the Scheme on local community severance is expected to be **neutral (not significant)**, as the Scheme and available cumulative developments' traffic analyses show the schemes are unlikely to lead to community severance.

Agricultural Land

- 17.16.16 As above, the cumulative effect on agricultural land during operation of the Scheme would be **neutral (not significant)** because the land can still be used for some forms of farming, which does not change the ALC category during operation.
- 17.16.17 The overall cumulative operation effects on agricultural land use will be reported in the ES once the effects arising from the Scheme have been assessed.

Local Land Use and Amenity

- 17.16.18 The operational phase effect of the cumulative schemes and the Scheme on local land use and amenity effects on receptors including residential properties, business premises and community facilities is likely to be negligible.

Cumulative Effects During Decommissioning

- 17.16.19 As the Scheme has an estimated design life of 40-60 years, it is not possible to predict what developments would be being constructed or decommissioned at the same time as the Scheme is being decommissioned. Broadly, however, the effects of decommissioning are likely to be similar to those during construction and would be expected to be beneficial.
- 17.16.20 There is potential for adverse cumulative socio-economic and land use effects during decommissioning of other solar DCOs and the Scheme, with respect to community severance, PRow users, land use and amenity, should impacts occur at the same time. However, these effects will not be significant.

17.17 Transport and Access

Introduction

- 17.17.1 The Zol for transport and access is 5km and is presented in **PEI Report Volume III Figure 17-8**. In addition to the solar DCOs, the other developments within the Zol with potential to generate cumulative effects are:
- ID 16. Application Reference: 1/22/01031/CDM. Construction of an underground foul water rising main at Cottam Power Station;
 - ID 47. Application Reference: 19/00167/SCR. Demolition of Cottam Power Station;

- ID 83. Application Reference: 145239. A multi-use development comprising 2046 residential units and various community facilities on Foxby Lane, Gainsborough;
- ID 95. Application Reference: 136937. A residential development comprising 750 units at land northeast of Highfields roundabout, Corringham; and
- ID 135. Application Reference: PL/0135/22. Construction of a hydrocarbon wellsite, Northlands Road, Glentworth.

Cumulative Effects During Construction

- 17.17.2 As set out in **PEI Report Volume I Chapter 15: Transport and Access**, TEMPro growth factors have been applied to 2022 traffic surveys to reflect local housing and employment growth and derive future baseline traffic flows for the peak construction year of 2026.
- 17.17.3 In addition, once the Short List of Other Developments has been agreed with the Local Highways Authorities (LHAs), the ES will present an assessment of cumulative effects between the Scheme and nearby developments. However, at this stage of the Scheme, no housing or employment schemes are expected to be required to be included within the cumulative effects for the Transport and Access chapter given the application of TEMPro growth factors. However, this will be discussed and agreed with the LHAs.
- 17.17.4 The other developments identified have been screened for spatial and temporal overlaps with the Scheme for inclusion within the ES. For Transport and Access, this relates to the roads in the vicinity of the Scheme that are expected to be used to access each of the relevant schemes during the peak construction period in 2026.
- 17.17.5 Based on the list set out in section 17.17.1, an initial review has been carried out for the West Burton Solar Farm Project and the Cottam Solar Farm Project, which are being developed by Island Green Power (IGP), and Gate Burton Solar Farm, which is being developed by Low Carbon. Discussions will be held with the relevant stakeholders to allow a 'joined up' approach to be identified and presented to the LHAs for agreement on the cumulative assessment methodology within the ES. Further details are set out below based on the PEI Reports (Ref. 17-11, Ref. 17-12, Ref. 17-13) that were submitted to the LHAs for these three schemes in June 2022. Further details will be available as part of the ES chapters anticipated to be available in Q1 of 2023 on the PINS website.
- West Burton Solar Farm**
- 17.17.6 West Burton Solar Farm consists of three land parcels and is expected to be constructed over a two-year period (starting in 2024 at the earliest), with a planned grid connection date of 2029. Therefore, whilst West Burton Solar Farm may be complete prior to the peak construction phase of the Scheme (2026), there is likely to be an overlap with the Scheme, which has been considered below.

17.17.7 West Burton Solar Farm parcels WB1, WB2 and WB3 are all located to the south of the A1500 Till Bridge Lane, towards Sturton-by-Stow. The cumulative assessment therefore focusses on the following parcels. A summary of each parcel is set out below and further details relating to the proposed access point(s) for each parcel are provided within the West Burton Solar Farm PEI Report (June 2022).

Parcel WB1

17.17.8 Parcel WB1 is located to the south of the A1500 and is the smallest of the three parcels. It is currently expected that during construction, the parcel would be accessed via two junctions on the unclassified road to the east of Broxholme which connects to the A1500.

17.17.9 At this stage, the HGV routing for WB1 is proposed via the A15 and the A1500 (from the east), therefore HGV trips related to WB1 would be expected to utilise parts of the highway network located within the Scheme's study area.

Parcel WB2

17.17.10 Parcel WB2 is located to the west of WB1 and to the south of the A1500. It is currently expected that during construction, the parcel would be accessed via four junctions, two from B1241 Sturton Road (as the road bisects the parcel) and two additional junctions on Broxholme Lane which connects to the A1500.

17.17.11 At this stage, the HGV routing for WB2 is proposed via the A46, A57 and B1241, therefore HGV trips related to WB2 would not be expected to utilise parts of the highway network located within the Scheme's study area.

Parcel WB3

17.17.12 Parcel WB3 is located to the north-west of WB2, and to the south of the A1500. The Sheffield to Lincoln railway line runs through the land parcel in a south-east to north-west alignment. It is currently expected that during construction, the parcel would be accessed via two junctions, both on the A1500.

17.17.13 At this stage, the HGV routing for WB3 is proposed via the A15 and A1500 (from the east), therefore HGV trips related to WB3 would be expected to utilise parts of the highway network located within the Scheme's study area.

Construction Trips

17.17.14 Based on the PEI Report dated June 2022 for West Burton Solar Farm, the construction phase is expected to require 400 workers across all three parcels, with the assumption of 200 vehicle arrivals and 200 vehicle departures each day associated with the construction staff.

17.17.15 It is also envisaged that non-local workers would stay at local accommodation and be transported to the parcels by minibus to minimise the impact on the surrounding highway network.

17.17.16 The proposed number of average daily HGVs and Light Goods Vehicles (LGVs) for each parcel envisaged at this stage is summarised in Table 17-8 below. It is unclear whether there would be any overlap between the construction phases of each of the three parcels at this stage, however the figures below have been based on a 78-week construction phase.

Table 17-8: West Burton Solar Farm – Forecast HGVs and LGVs

Parcel	Average (Vehicles)*	Daily	HGVs	Average (Vehicles)*	Daily	LGVs
WB1	2			21		
WB2	7			54		
WB3	8			67		
WB4 (excluded from the scheme)	7			58		

*the average daily HGVs and LGVs are identified in the West Burton Solar Farm documents, rather than peak daily activity

17.17.17 It should be noted, the trips in the table above could be outdated as when the PEI Report was submitted, it was assumed there would be four parcels. Since then, one of the parcels has been removed (circa October 2022) and therefore the above LGV numbers no longer add up to 200. At this stage, it is unknown if the remaining number of workers who would have travelled to parcel WB4 would be redistributed across the other three parcels or if the West Burton scheme will now utilise a smaller workforce as per the table figures stated above. The above information will be updated as part of the ES once it is known.

Additional Considerations

17.17.18 There is likely to be some temporal and geographical overlap between West Burton Solar Farm and the Scheme. Therefore, discussions have been held with IGP to review how both projects could potentially work together to minimise any cumulative effects (where viable). It is considered that a joint Construction Traffic Management Plan (CTMP) could be prepared between the Scheme and West Burton Solar Farm post-consent to manage and mitigate cumulative effects if necessary. Cumulative effects may relate to any of the following:

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian and cyclist amenity;
- Fear and intimidation; and
- Accidents and safety.

17.17.19 Proposed mitigation measures for West Burton Solar Farm are set out within the West Burton PEI Report and include:

- Avoiding HGV movements during the typical AM peak hour (08:00-09:00) and PM peak hour (17:00-18:00);

- Construction staff travel outside of the peak hours, working hours 07:00 to 18:00 during the weekday and 08:00 to 13:30 on Saturdays;
- Commitment to seek to coordinate deliveries with other developments in the area; and
- Banksmen to be provided at site access points and PRow to ensure the safe movement of all construction vehicles.

Cottam Solar Farm

17.17.20 Cottam Solar Farm consists of three land parcel sites and is expected to be constructed over a two-year period (starting in 2024 at the earliest), with a planned grid connection date of 2028. Therefore, whilst Cottam Solar Farm may be complete prior to the peak construction phase of the Scheme (2026), there is likely to be some overlap, which has been considered below.

17.17.21 Cottam Solar Farm parcels C1, C2 and C3 are all located to the west of the A15 between Lincoln and Scunthorpe. It is not anticipated that any construction trips relating to parcels C2 (located to the north of A631) and C3 (to the east of A159) would pass through the study area for the Scheme and the cumulative assessment therefore focusses on the trips relating to parcel C1 (to the east of B1241). A summary of each parcel is set out below and further details relating to the proposed access point(s) for each parcel are provided within the Cottam Solar Farm PEI Report (June 2022).

Parcel C1

17.17.22 Parcel C1 is located to the north of the A1500 and is the largest of the three parcels. It is currently expected that during construction, the parcel could potentially be accessed via 11 junctions; one from Thorpe Lane, one from Stow Lane, one from Ingham Road, two from Fleet Lane, one from South Lane, three from Willingham Road and two via an existing farm track to the west of Coates.

17.17.23 At this stage, the construction vehicle routing for C1 is proposed via either the A1500 or Ingham Lane/Stow Lane, accessing the parcel via the A15, from either the M180 to the north or the A46 from the south. Therefore, HGV trips related to C1 would be expected to utilise parts of the highway network located within the Scheme's study area.

Parcel C2

17.17.24 Parcel C2 is located to the north of C1 and to the east of the village of Corringham, to the north of the A631. It is currently expected that during construction, the parcel would be accessed via a junction on the A361 to the east of Corringham.

17.17.25 At this stage, the construction vehicle routing for C2 is proposed via the A631, from the A15. Therefore, HGV trips related to C2 would be expected to utilise parts of the highway network located within the Scheme's study area.

Parcel C3

17.17.26 Parcel C3 is located to the north of C2 and is split into two distinct areas, C3a is located around the village of Blyton whilst C3b is located to the east of Pilham. It is currently expected that during construction, parcel C3a would be accessed via two junctions on the B1205, to the east of Blyton. For parcel C3b,

it is currently expected that access would be via a junction to the west of the parcel (the specific location of the access has not been defined at this stage).

17.17.27 At this stage, the construction vehicle routing for C3 is proposed via the B1205 from the A15, therefore HGV trips related to C3 would not be expected to utilise parts of the highway network located within the Scheme’s study area.

Construction Trips

17.17.28 Based on the PEI Report dated June 2022 for Cottam Solar Farm, the construction phase is expected to require 400 workers across all three parcels, with the assumption of 200 vehicle arrivals and 200 vehicle departures associated with the construction staff each day.

17.17.29 It is also envisaged that non-local workers would stay at local accommodation and be transported to the parcels by minibus to minimise the impact on the surrounding highway network.

17.17.30 The proposed number of average daily HGVs and LGVs for each parcel envisaged at this stage is summarised in Table 17-9. It is unclear whether there would be any overlap between the construction phases of each of the three parcels at this stage, however, the figures below have been based on a 78-week construction phase.

Table 17-9: Cottam Solar Farm - Forecast HGVs and LGVs

Parcel	Average Daily HGVs (Vehicles)*	Average Daily LGVs (Vehicles)*
C1	23	150
C2	3	22
C3	4	28

**the average daily HGVs and LGVs are identified in the Cottam Solar Farm documents, rather than peak daily activity*

Additional Considerations

17.17.31 There is likely to be some temporal overlap between Cottam Solar Farm and the Scheme, therefore discussions are being held with IGP to review how both projects could potentially work together to minimise any cumulative effects. It is considered that a joint CTMP could be prepared between the Scheme and Cottam Solar Farm post-consent to manage and mitigate cumulative effects if necessary. Cumulative effects could relate to any of the following:

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian and cyclist amenity;
- Fear and intimidation; and
- Accidents and safety.

17.17.32 Proposed mitigation measures for Cottam Solar Farm are set out within the PEI Report and include those set out above for West Burton Solar Farm.

Gate Burton Solar Farm

17.17.33 Gate Burton Solar Energy Park consists of one site to the south of Gainsborough and is expected to be constructed over a 24 to 36-month period, between 2025 and 2027, with operation commencing in 2028. There is likely to be some overlap which has been considered below as the proposed peak of construction phase is set to occur in 2026.

17.17.34 Gate Burton Solar Energy Park is proposed to be accessed from the A156 with smaller secondary access points located off Kexby Lane (north and south) and Marton Road. The cumulative assessment therefore focusses on the trips relating to the solar and energy park. A summary of the trips is set out below and further details relating to the proposed access point(s) are provided within the Gate Burton Solar Energy Park PEI Report (June 2022).

17.17.35 At this stage, the construction vehicle routing to/from the Solar and Energy Storage Park is proposed via the A156 (from the north and south). Therefore, HGV trips related to the site would be expected to utilise parts of the highway network located within the Scheme's study area.

Construction Trips

17.17.36 Based on the PEI Report dated June 2022 for Gate Burton Solar Energy Park, there is expected to be a daily peak of 400 construction staff, 30 LGVs and 60 HGVs associated with the Solar and Energy Storage Park. The associated vehicle trips will be split across the four access points.

17.17.37 In addition, there is expected to be a daily peak of 25 construction staff, 16 LGVs and 12 HGVs associated with the Grid Connection Route for Gate Burton. The associated trips are expected to be split across several access points including the A156 to the east of the River Trent (in Lincolnshire) and Cottam Road to the west of the River Trent (in Nottinghamshire).

Additional Considerations

17.17.38 There is likely to be some temporal overlap between Gate Burton Solar Energy Park and the Scheme, therefore discussions are being held with Low Carbon to review how both projects could potentially work together to minimise any cumulative effects.

17.17.39 Some of the proposed mitigation measures for Gate Burton Solar Energy Park are set out within the Gate Burton PEI Report and include:

- Reducing HGV movements 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;
- 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 for those car sharing within the compounds. 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;

- 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 shuttle services would travel to/from Gainsborough (north), Lincoln (south), Retford (west) and Newark on Trent (south) to collect/drop off construction staff from 'hubs' at each of these four locations. A total of eight shuttle buses will be provided, each with a capacity of 50 staff, to transfer the expected peak demand (220 construction staff) to/from the site. All shuttle services will utilise the main site access on the A156 Gainsborough Road;
- Implementing minibuses to transfer staff internally within the Solar and Energy Storage Park as required e.g. between the eastern and western parts of the site via the Clay Lane railway underpass, to minimise external trips on the surrounding highway network; and
- Banksmen to be provided at site access points and PRow to ensure the safe movement of all construction vehicles.

Summary

- 17.17.40 In summary, whilst a full cumulative assessment will be conducted within the ES, no significant cumulative effects are anticipated at this stage based on the details set out above with respect to the HGV numbers identified for the other DCO solar schemes. Any overlaps between the construction vehicle trips associated with the Scheme and the other solar schemes (West Burton Solar Farm, Cottam Solar Farm and Gate Burton Solar Energy Park) are likely to be primarily confined to wider strategic routes (i.e. the A15).

Other development outside of the Zol

- 17.17.41 West Burton Power Station comprises, West Burton A, B and C. West Burton A Power Station ceased operating in March 2023 and is to be demolished between 2024 and 2027. West Burton B is a gas-fired power station and will continue operating. West Burton C is subject to a DCO made in 2020 for the development of a gas fire power station. The DCO needs to come into force no later than 10 November 2027. The operators of West Burton (EDF) are not intending to implement the DCO; but are seeking to develop a BESS (battery storage energy system) on this part of the site instead. Planning permission (22/01713/FUL) has been sought for the BESS, but not yet determined. This has been scoped out of the Transport and Access as it is located outside of the Study Area.
- 17.17.42 West Burton C Power Station has been excluded from the cumulative assessment on the basis of it being located outside of the Zol for transport and access and no decommissioning traffic is expected to be on the network during the future baseline year of 2026 as the decommissioning of the Power Station is expected to be completed by 2024. The decommissioning trips associated with this scheme have therefore not been considered further.
- 17.17.43 Demolition of West Burton C Power Station (planning application 22/00831/SCR) – Planning consent awaiting decision for the demolition of the Power Station, located approximately 5km to the north-west of the Scheme

Boundary. The scheme has been excluded from the cumulative assessment on the basis of it being located outside of the Zol and the proposed demolition work is not expected to generate additional trips in comparison to those associated with existing operations at the Power Station. The trips associated with this demolition scheme have therefore not been considered further.

- 17.17.44 Planning consent has been granted for the Construction of an underground foul water rising main at Cottam Power Station, Cottam Sewage Scheme (planning application 1/22/01031/CDM). Based on the Transport Statement submitted to Nottinghamshire County Council (NCC) in August 2022, the planned works were expected to occur for a period of six months, commencing in September 2022. The scheme has not been considered further as it will be completed by 2026 and therefore have no impact on the construction (and operation) of the Scheme.
- 17.17.45 Planning consent has been granted for the demolition of the Cottam Power Station (planning application 19/00167/SCR), located adjacent to the Scheme at the southern section of the Cable Route Corridor. The scheme has been excluded from the cumulative assessment on the basis of it being completed by late 2025. In addition, there would be fewer demolition trips in comparison to those associated with existing operations at the Power Station. Therefore, the demolition trips associated with this scheme have not been considered further and therefore have no impact on the construction (and operation) of the Scheme.
- 17.17.46 Planning consent has been partially granted to date for a multi-use development comprising of up to 2,046 residential units and various community facilities accessed off Foxby Lane, Gainsborough, located approximately 7km to the west of the Scheme (planning application 145239). The proposed scheme is set out to be built out in four phases between 2022 to 2032. Based on the Transport Assessment produced in June 2022, the scheme is expected to be built out at a rate of approximately of 200 dwellings per year. As the scheme will be expected to be partially operational by the future baseline year (2026), it is assumed that any trips related to the scheme will have been incorporated as part of the background traffic growth that has been applied to the network using TEMPRO. Any trips associated with the construction of scheme will be considered as part of the ES and if deemed as significant will be considered as part of the cumulative impact during the construction (and operation if deemed appropriate) of the Scheme.
- 17.17.47 Planning consent has been granted for a new residential development comprising of 750 units at land northeast of Highfields roundabout, Corringham, west of the Scheme, east of Gainsborough, to be accessed via the B1433 and A631 (planning application 136937). The proposed scheme is set to be built out in two phases; the first phase is expected to provide 130 units and is set to be completed by 2022/2023 and phase two is set to begin on the completion of the first phase and to comprise up to 620 units, with the expected completion year of 2036. The proposed development is expected to be built out with an average of 45 units per year, with approximately 40% of units expected to be completed by the future baseline year (2026). Based on the Transport Assessment, there is expected to be limited additional trips on the section of the A631 within the study area, which should already be

captured by the background traffic growth that has been applied to the network using TEMPRO. In addition, there are expected to be limited construction trips associated with the construction of 45 units per year. As such, no additional trips have been included on the network in association with this Scheme and therefore have no impact on the construction (and operation) of the Scheme.

- 17.17.48 Planning consent has been granted in April 2018 for an agricultural slurry store to the west of the Scheme (planning application 137464), the scheme has been scoped out of the cumulative assessment on the basis it is expected to be operational by 2026 and therefore not have a significant impact on the Scheme. As such, no additional trips have been included on the network in association with this scheme and therefore have no impact on the construction (and operation) of the Scheme.
- 17.17.49 Planning consent is to be determined in April 2023 for construction of a hydrocarbon wellsite, Northlands Road, Glentworth. Based on the Transport Statement produced in November 2022, the scheme is proposed to be scoped in within the cumulative assessment as the site is located within the Scheme boundary. The proposed development will be carried out in 7 phases over a maximum of 21 years, the proposed years of construction and the overlap with the Scheme will be included as part of the ES cumulative assessment.

Cumulative Effects During Operation

- 17.17.50 A cumulative assessment during the operational phase of the Scheme will be assessed at ES stage, as the operational phase information relating to traffic movements will be available for other schemes. However, the number of trips associated with the Scheme is minimal, so there is not potential for significant cumulative effects.

Cumulative Effects During Decommissioning

- 17.17.51 As the Scheme has an estimated design life of 40-60 years, it is not possible to predict what developments would be being constructed or decommissioned at the same time as the Scheme is being decommissioned. Broadly, however, the effects of decommissioning are likely to be similar to those during construction.

17.18 Other Environmental Topics

- 17.18.1 Given the high-level nature of these assessments, the cumulative effects for each topic have been concluded to be not significant.

Glint and Glare

- 17.18.2 The assessment presented in **PEI Report Volume I Chapter 16: Other Environmental Topics** identified that there will be no receptors which will experience significant effects as a result of the Scheme. Additionally, it is anticipated that the cumulative solar developments will be designed to ensure that there will be effective screening to prevent glint and glare effects from the individual proposed developments. Other cumulative schemes are not deemed to introduce glint and glare effects. Therefore, cumulative effects

would be unlikely and are not considered to arise for glint and glare. Therefore, the overall impact of the Scheme is considered not significant.

Ground Conditions

- 17.18.3 The assessment presented in **PEI Report Volume I Chapter 16: Other Environmental Topics** identified that there will be no significant effects in relation to Ground Conditions as a result of the Scheme. Provided that the requirements of relevant policy and legislation relating to land contamination and remediation are integrated within the design and appropriate mitigation measures are applied during the demolition and construction phases of each and every cumulative scheme, it is considered that the cumulative effect on ground conditions will be not significant.

Major Accidents and Disasters

- 17.18.4 The assessment presented in **PEI Report Volume I Chapter 16: Other Environmental Topics** identified that the risk derived from flooding, fire, road accidents, aircraft disasters and plant disease is considered cumulatively in the assessment of number of topics and management plans presented in the PEI Report and its appendices.
- 17.18.5 The shortlisted cumulative schemes located in close proximity to the Scheme Boundary are residential developments, solar farms and battery storage around Cottam National Grid sub-station.
- 17.18.6 Increased traffic during construction and decommissioning phases of the Scheme in combination with other developments could result in a greater risk of road accidents. This is assessed in **PEI Report Volume I Chapter 15: Transport and Access**, with appropriate mitigation presented where applicable.
- 17.18.7 With mitigation listed above to reduce the risk of fire, no significant effects are expected from the Scheme.
- 17.18.8 In addition to the above, the possibility of a major accident or disaster occurring is low, and any such disaster (in the unlikely event that one did occur) would be short term and infrequent. As such, the likelihood for concurrent events on other cumulative schemes is very low. For these reasons, it is concluded that no significant cumulative effects would arise from the Scheme in terms of increased risk of a major accident or disaster occurring.

Telecommunications, Television Reception and Utilities

- 17.18.9 The Scheme has been assessed to have no effect on telecommunication, television or utilities, as presented in **PEI Report Volume I Chapter 16: Other Environmental Topics**. It is expected that the other developments included within the cumulative schemes shortlist would also have no effect on telecommunications and television reception and would adhere to the same mitigation as set out above to reduce the risk of damaging utilities. All developments will need to be managed through a CEMP and would include mitigation measures to reduce the risk of damaging utilities during

construction. Therefore, no cumulative effects are expected on telecommunications, television reception, or utilities

Waste

- 17.18.10 The assessment presented in **PEI Report Volume I Chapter 16: Other Environmental Topics** identified that there will be no significant effects in relation to Waste as a result of the Scheme.
- 17.18.11 If the construction or decommissioning phases of the Scheme happen at the same time as the construction phase of another significant scheme within the local area, there may be some cumulative effects associated with waste.
- 17.18.12 There are a number of potential schemes that, depending on construction dates, may have cumulative effects with the Scheme. These include a number of solar schemes.
- 17.18.13 Cumulative volumes of waste may put pressure on the capacity of local recycling plants or landfill sites. This would be managed through a Construction Resource Management Plan (CRMP) and consultation with waste providers.
- 17.18.14 It is likely that the waste generated by the Scheme during Operation and Decommissioning would be managed by specialist regional or national facilities, and that such facilities would be developed over the operational period in response to demand generated by the UK-wide PV industry. The capacity of such facilities is not expected to be influenced by other non-solar energy projects in the surrounding area. Therefore, effects from cumulative volumes are not expected to be significant.

17.19 Next Steps

- 17.19.1 The Short List of Other Developments will be further refined, aided by consultation with the relevant local planning authorities, to ensure that all developments with the potential to result in potentially significant cumulative effects when considered together with the Scheme are taken into account by each of the environmental topic specialists.
- 17.19.2 Where noted in this chapter, the ES will include further assessment to refine the conclusions of this cumulative assessment.

17.20 References

- Ref. 17-1. Her Majesty's Stationary Office (HMSO) (2017) The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
- Ref. 17-2. DECC (2012). Overarching National Policy Statement (NPS) for Energy (EN-1).
- Ref. 17-3. Department for Energy and Net Zero (2023). Draft Overarching National Policy Statement (NPS) for Energy (EN-1).
- Ref. 17-4. Department for Energy and Net Zero (2023). Draft National Policy Statement (NPS) for Renewable Energy (EN-3).
- Ref. 17-5. MHCLG (2021). National Planning Policy Framework.
- Ref. 17-6. The Planning Inspectorate (2015), Advice Note 17: Cumulative effects assessment relevant to nationally significant infrastructure projects.
- Ref. 17-7. Directive 2011/92/EU of the European Parliament and of the Council (2011) on the assessment of the effects of certain public and private projects on the environment.
- Ref. 17-8. PINS (n.d.). National Infrastructure Planning Database. Available at <https://infrastructure.planninginspectorate.gov.uk/projects/>
- Ref. 17-9. DEFRA (2022). Agricultural Land Use in England at 1 June 2022. Available at <https://www.gov.uk/government/statistics/agricultural-land-use-in-england>
- Ref. 17-10. DEFRA (2023). Structure of the Agricultural Industry in England and the UK at June. Available at <https://www.gov.uk/government/statistical-data-sets/structure-of-the-agricultural-industry-in-england-and-the-uk-at-june#full-publication-update-history>
- Ref. 17-11. West Burton Solar Project Limited (2022) West Burton Solar Farm Preliminary Environmental Information Report
- Ref. 17-12. Cottam Solar Project Limited (2022) Cottam Solar Farm Preliminary Environmental Information Report
- Ref. 17-13. Gate Burton Energy Park Limited (2022) Gate Burton Energy Park Preliminary Environmental Information Report