Gate Burton
ENERGY PARK

# Gate Burton Energy Park Environmental Statement

Volume 1, Chapter 15: Other Environmental Topics
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APFP Regulation 5(2)(a)
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# 15. Other Environmental Topics

## 15.1 Introduction

15.1.1 The purpose of this chapter is to present the assessment of environmental topics which are not addressed in individual chapters. These topics are not scoped out of the environmental assessment; rather they are included within this single chapter either due to the brevity of the assessment or the limited nature of their effects.

15.1.2 This chapter describes and assesses the potential effects of the Scheme on:

- Air Quality (Section 15.3);
- Glint and Glare (Section 15.4);
- Ground Conditions (Section 15.5);
- Major Accidents and Disasters (Section 15.6);
- Telecommunications, Television Reception and Utilities (Section 15.7); and
- Waste (Section 15.8).

15.1.3 The legislation and guidance, baseline conditions, assessment methodology and mitigation measures, as relevant, are provided for each topic.

15.1.4 This chapter is supported by the following technical appendices provided in **Volume 3** of this ES:

- **Appendix 15-A**: Dust Risk Assessment;
- **Appendix 15-B:** Air Quality Summary of Non-significant Effects;
- **Appendix 15-C:** Unplanned Atmospheric Emissions from Battery Energy Storage Systems Plan
- **Appendix 15-D:** Glint and Glare Assessment;
- **Appendix 15-E:** Phase 1 Preliminary Risk Assessment; and
- **Appendix 15-F:** Desk Study – Grid Connection Corridor.

15.1.5 This chapter is further supported by the following technical documents:

- Framework Construction Environmental Management Plan (CEMP) **[EN010131/APP/7.3]**;
- Framework Operational Environmental Management Plan (OEMP) **[EN010131/APP/7.4]**;
- Framework Decommissioning Environmental Management Plan (DEMP) **[EN010131/APP/7.5]**;
- Outline Landscape and Ecological Management Plan (OLEMP **[EN010131/APP/7.10]**); and

15.1.6 A glossary and list of abbreviations are provided in **Chapter 0: Contents, Glossary and Abbreviations** of the ES [**EN010131/APP/3.1**].

## 15.2 Development Parameters Assessed

15.2.1 **Chapter 2: The Scheme [EN010131/APP/3.1]** presents a description of the Scheme. This description forms the basis of the assessments within this chapter. The assessment has been based on likely worst-case parameters using the Rochdale Envelope approach. The peak construction year for the purpose of the Environmental Impact Assessment (EIA) is anticipated to be 2026; this assumes commencement of construction in Q1 2025 and that the Scheme, including both the Solar and Energy Storage Park and Grid Connection Corridor, is built out over a 24 to 36 month period. 24 months can be considered a worst case because it compresses the onsite activity into a shorter duration and represents the greatest impact. This is the case with respect to Air Quality; the other issues dealt with in this chapter are not influenced to the same extent by the construction duration.

# 15.3 Air Quality

## Introduction

15.3.1 This section of the ES presents the findings of an assessment of the likely effects from Air Quality as a result of the Scheme. Measures to address potential impacts and effects of the Scheme on Air Quality during construction, operation, and decommissioning phases are identified.

15.3.2 This section is supported by the following figures in **Volume 2** of the ES **[EN010131/APP/3.2]**:

- **Figure 15-1:** Dust Risk Assessment Zones.

15.3.3 This section is supported by the following appendices in **Volume 3** of the ES **[EN010131/APP/3.3]**:

- **Appendix 15-A** Dust Risk Assessment; and
- **Appendix 15-B** Air quality table of non-significant effects.

## Consultation

15.3.4 A request for an EIA Scoping Opinion was sought from the Secretary of State as part of the EIA Scoping Process. Consultation responses in relation to Air Quality are presented in **ES Volume 3: Appendix 1-C [EN010131/APP/3.3]**.

## Legislation and Planning Policy

15.3.5 Legislation, planning policy, and guidance relating to Air Quality pertinent to the Scheme, is presented below.

### Legislation

#### UK Air Quality Strategy

15.3.6 The UK Air Quality Strategy (AQS) (Ref 15-1) identifies nine ambient air pollutants that have the potential to cause harm to human health and two for the protection of vegetation and ecosystems. The AQS defines objectives for these pollutants that aim to reduce the impacts of these pollutants to negligible levels. The objectives are not mandatory but rather targets that local authorities should try to achieve.

## European Air Quality Directives

15.3.7 The UK is no longer a member of the European Union. EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation, under the control of the UK Parliament and devolved administrations, although the future status of EU law in the UK is uncertain since the Government introduced the Retained EU Law (Revocation and Reform) Bill (Ref 15-33). The Bill will allow ministers to replace retained EU law with new domestic legislation more easily and will see large parts of retained EU law 'sunsetted' in 2023 – repealed automatically unless ministers decide to preserve or replace them beforehand.

15.3.8 The Clean Air for Europe (CAFE) programme consolidated and replaced (with the exception of the 4$^{th}$ Daughter Directive) preceding directives, through the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC (hereafter referred to as the 'EU Air Quality Framework Directive') (Ref 15-4). This directive is transcribed into legislation in England by the Air Quality Standards Regulations 2010 (the "2010 Regulations") which came into force on 11 June 2010 (Ref 15-2). The 2010 Regulations were amended by the Air Quality Standards (Amendment) Regulations 2016 (Ref 15-3), which came into force on 31 December 2016. The $PM_{2.5}$ annual mean objective value has subsequently been amended by The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (Ref 15-24), which came into force on 1 January 2020. The limit values defined within the 2010 Regulations are legally-binding and are considered to apply everywhere in England, with the exception of the carriageway and central reservation of roads (where the public do not normally have access), on factory premises or at industrial locations (subject to health and safety at work) and any locations where the public do not have access and there is no fixed habitation.

15.3.9 The 2010 Regulations set legally binding limits for concentrations of certain air pollutants in outdoor air ("Limit Values"), with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole. Where the concentrations exceed Limit Values, the Secretary of State is required to develop an air quality plan that set out measures in order to attain compliance with the Limit Values. The Court of Justice of the European Union (CJEU) ruled in March 2021 that the UK has 'systematically and persistently' exceeded legal limits for nitrogen dioxide ($NO_{2)}$ since 2010 (Ref 15-5).

15.3.10 For the purposes of this assessment, the pollutants considered are particulate matter ($PM_{10}$ and $PM_{2.5}$) and $NO_2$.

15.3.11 The UK's national air quality objective values for the pollutants of relevance to this assessment are summarised in Table 15-1.

**Table 15-1 Key Air Quality Strategy Objectives**

| Pollutant | Objective | Averaging Period | Maximum Permitted Exceedances |
|---|---|---|---|
| **Nitrogen Dioxide ($NO_2$)** | 200 µg/m$^3$ | 1 hour | 18 times per year (i.e. 99.79$^{th}$ percentile) |

| Pollutant | Objective | Averaging Period | Maximum Permitted Exceedances |
|---|---|---|---|
| | 40 µg/m$^3$ | Annual | - |
| **Particulate Matter ($PM_{10}$)** | 40 µg/m$^3$ | Annual | - |
| | 50 µg/m$^3$ | 24-hour | 35 times per year (i.e. 90.4$^{th}$ percentile) |
| **Particulate Matter ($PM_{2.5}$)** | 20 µg/m$^3$ | Annual | - |

## Assessment Assumptions and Limitations

15.3.12 This assessment is based on baseline environmental conditions and Scheme design information available at the time of writing this ES.

15.3.13 The traffic flows and non-road mobile machinery are based on a worst-case scenario of all infrastructure being built to its maximum parameters (associated with the **Outline Design Principles [EN010131/APP/2.3]**), which may in reality overestimate the number of vehicles and equipment. The dust assessment is based on the area of construction and types of activity and is not reliant on a specific design. It has been assumed for the purpose of the assessment that the Scheme will be built out in a single phase, which is considered the worst-case in terms of road traffic numbers and exposure of sensitive receptors to elevated levels of dust.

## Study Area

15.3.14 The study area includes receptors that may be at risk from direct and indirect impacts that might arise from the Scheme, termed the Zone of Influence (ZoI). The potential ZoI for Air Quality includes sensitive human receptors within 350m of the Site; and within 50m of the roads expected to be used by the construction phase traffic, and up to 500m from the Site access points, will be considered, following the Institute of Air Quality Management (IAQM) Guidance (Ref 15-6). The potential ZoI for ecological receptors is 50m from the boundary of the site; or 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). The closest nationally designated sensitive ecological receptor is Ashton's Meadow Site of Special Scientific Interest (SSSI), which is approximately 1.5km to the west from the Site. The nearest Ancient Woodland site is Burton Wood, within the Order limits, but approximately 700m from a road. Stag Wood is approximately 100m from the nearest road. As such, ecological impacts from dust generation are considered within the Dust Risk Assessment, however ecological impacts from road traffic emissions are scoped out of the ambient air quality assessment, as there are no sensitive ecological receptors close enough to a road to have any risk of being affected by the Scheme.

15.3.15 The assessment relates to dust generation, and additional road traffic and plant emissions during the construction and decommissioning phases. The potential for operational impacts is also addressed.

15.3.16 The potential impact of the Scheme on local air quality has been determined at representative sensitive receptors (human) which have been identified in the ZoI.

## Assessment Methodology

15.3.17 There is currently no statutory guidance on the methodology for air quality impact assessments. Several non-statutory bodies have published their own guidance relating to air quality and development control, such as that by Environmental Protection UK and the IAQM (Ref 15-5). This assessment has been undertaken based on this guidance. The IAQM is the professional body for air quality professionals. They act as the voice of air quality in the UK by producing useful and timely guidance on matters affecting air quality professionals and by responding to Government consultations. The mission of the IAQM is to be the authoritative voice for air quality by maintaining, enhancing and promoting the highest standards of working practices in the field and for the professional development of those who undertake this work.

15.3.18 This section details the methods used to assess the potential effects on air quality during the construction, operational and decommissioning phases of the Scheme.

15.3.19 The potential for fugitive emissions of particulate matter from construction and decommissioning-phase activities has been qualitatively assessed via a dust risk assessment (see **ES Volume 3: Appendix 15-A [EN010131/APP/3.3]**). Construction phase road traffic volumes are not expected to meet thresholds above which detailed modelling is required (see section 15.1). As set out in **Chapter 13: Transport and Access [EN010131/APP/3.1]**, a significant change to traffic flows is not anticipated once the Scheme is complete and operational and there are no other likely significant air quality impacts predicted during operation. A detailed assessment of emissions from operational road traffic and the subsequent impact upon local air quality is therefore not required and has not been considered further within this assessment.

### Methodology for Assessment of Fugitive Emissions of Particulate Matter during Construction Phase

15.3.20 A qualitative risk-based assessment has been undertaken to assess the significance of any effects on sensitive receptors associated with the construction phase. The assessment is based on IAQM guidance (Ref 15-6) and considers potential sources of emissions on the basis of the four main activity groupings:

- Demolition (not required in this assessment);
- Earthworks;
- Construction; and
- Trackout.

15.3.21 The emphasis within the guidance is on clarifying the risk of dust impacts from the Scheme, which will allow mitigation measures commensurate with that risk to be identified.

15.3.22 For each activity group, the following steps are applied with respect to identifying the potential effects, before coming to an overall conclusion in relation to the significance of the effects predicted:

- Identify the nature, duration and the location of activities being undertaken;
- Establish the risk of significant effects occurring as a result of these activities;
- Review embedded mitigation against good site practice;
- Identify additional mitigation measures, if necessary, to reduce the risk of a significant adverse effect occurring at receptors; and
- Summarise the overall effect of the works with respect to fugitive emissions of particulate matter and report the significance of the effects.

15.3.23 A Dust Risk Assessment (DRA) has been undertaken based on the IAQM Guidance (Ref 15-6) and the findings are presented within **ES Volume 3: Appendix 15-A [EN010131/APP/3.3]**. Construction of the Scheme will likely take place over a number of phases (not all potentially dust generating activities taking place at the same time) and as such potential fugitive emissions may be lower than expected compared to the size of the Site, when considering the Site in reference to the IAQM Guidance (Ref 15-6). However, the assessment has assumed all activity occurs at once, providing a worst-case assessment.

### NRMM Emissions

15.3.24 Emissions from NRMM will have the potential to increase $NO_2$ and $PM_{10}$ concentrations locally when in use during construction. Experience of assessing the exhaust emissions from on-site plant and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed (Ref 15-6).

15.3.25 Emissions from NRMM will be temporary and localised and will be controlled through best-practice mitigation measures such as ensuring all vehicles switch off engines when stationary i.e. no idling vehicles. For that reason, construction phase NRMM emissions would not be significant and, therefore, these emissions have not been modelled nor are required to be considered any further in this assessment.

15.3.26 IAQM guidelines recommend to:

*Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.*

15.3.27 100-200 kVA generators will be located at the three temporary compounds (Willingham and Kexby Lane) and at the mobile compounds. There would also be generators at the main compound until a mains connection is established. Mitigation measures are included in the **Framework CEMP [EN010131/APP/7.3]** to ensure that the plant used is maintained in good condition, and used for the required periods only, in order to minimise emissions as far as practicable. Given the temporary nature of the generators, good practice will ensure no adverse impacts from their use.

15.3.28 Non-road mobile machinery (NRMM) emissions have been scoped out of the air quality assessment in accordance with the **ES Volume 3, Appendix**

**1-B: EIA Scoping Opinion** and **Appendix 1-C: Scoping Opinion Responses [EN010131/APP/3.3]**.

### Construction Phase Road Traffic Emissions

15.3.29 The construction phase of the Scheme will lead to an increase in the number of vehicles on the local highway network for the duration of the construction works (refer to **Chapter 13: Transport and Access [EN010131/APP/3.1]**). IAQM (Ref 15-5) set out criteria to establish the need for an air quality assessment for the construction phase of a development as being a change of HGV flows of more than 100 Annual Average Daily Traffic (AADT) outside an Air Quality Management Area (AQMA).

15.3.30 Data provided for the construction phase shows that the highest number of construction HGVs on the road network is 92. This is below the IAQM screening criteria and as such no detailed dispersion modelling has been undertaken, and construction phase road traffic emissions are considered to be not significant.

15.3.31 Construction phase road traffic emissions have been scoped out of the air quality assessment in accordance with the **ES Volume 3, Appendix 1-B: EIA Scoping Opinion** and **Appendix 1-C: Scoping Opinion Responses [EN010131/APP/3.3]**.

## Sources of Information

15.3.32 The following sources of information that define the Scheme have been reviewed and form the basis of the assessment of likely significant effects on air quality:

- Indicative Site Layout Plan (see **ES Volume 3: Figure 2-4 [EN010131/APP/3.3]**);
- Review of Defra Air Quality Background Concentration Maps (Ref 15-8); and
- Examination of Local Authority Review and Assessment Reports (Ref 15-9 and Ref 15-10).

## Impact Assessment Methodology

15.3.33 Sensitive receptors that have the potential to be affected by the Scheme have been considered for the construction phase. The methodology for determining sensitive receptors is described below.

### Construction Phase Sensitive Receptors

15.3.34 For the purposes of the DRA, potentially affected air quality sensitive receptors have been identified for the assessment through a review of Ordnance Survey (OS) mapping and aerial photography.

15.3.35 Based upon guidance for qualitatively assessing the risk of dust impacts from demolition and construction (Ref 15-6), a number of high sensitivity residential properties are to be included with regards to construction phase dust soiling and $PM_{10}$ receptors.

15.3.36 The presence of sensitive ecological receptors holding a statutory (National or European) designation within 50m of the Site, or within 50m from a route used by construction vehicles on the public highway (up to 500m from the Site access point) has also been established. Sites with the following designations have been explicitly considered within the DRA:

- Sites of Special Scientific Interest (SSSI);
- Special Protection Areas (SPA);
- Special Areas of Conservation (SAC);
- Ramsar Sites;
- National Nature Reserves (NNR); and
- Local Nature Reserves (LNR).

15.3.37 Sites possessing the following non-statutory designations have also been reviewed; however, explicit consideration as part of the DRA is not required in accordance with the IAQM guidance (Ref 15-6):

- Ancient Woodland (AW); and
- Local Wildlife Sites (LWS).

15.3.38 Due to the presence of Burton Wood AW within the Order limits, AW within the ZoI has been considered as a high sensitivity habitat for the purposes of the DRA. However, this is not considered mandatory per the IAQM Guidance.

15.3.39 Ammonia-emitting developments, such as intensive livestock and poultry units, in close proximity to AW sites can cause a greater abundance of nitrogen tolerant plant species which out-compete and impact on many characteristic ancient woodland plants. Ammonia can be released in small quantities from engine exhausts; however, because of the low numbers of construction traffic, the Scheme will not be a significant emitter of ammonia, and therefore this impact has been scoped out as significant effects are not anticipated.

15.3.40 For the Gate Burton Energy Park, there are no ecological sites bearing statutory designations that are likely to be affected by emissions to air, due to their distance from the site, so the effect on ecological designated ecological receptors is **not significant** (see **ES Volume 3, Appendix 15-B:** Air Quality non-significant effects table **[EN010131/APP/3.3]**) with the embedded avoidance and mitigation below.

15.3.41 The potential for dust effects on Ancient Woodland within the Order limits, and in the immediate vicinity of the Site, will be managed by the **Framework Construction Environmental Management Plan (CEMP) [EN010131/APP/7.3]**. This will detail and formalise the measures that will be implemented during construction of the Scheme to mitigate construction-related effects on biodiversity associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration.

15.3.42 The design of the Scheme will comply with industry good practice and environmental protection legislation during both construction and operation e.g. prevention of surface and ground water pollution, fugitive dust management, noise prevention or amelioration. Ancient Woodland will be avoided with buffers of greater than 20m during both construction and operation. Buffers will include either grassland or naturally regenerating scrub or woodland.

15.3.43 Designated ecological sites in the study area and the presence of sensitive species within these ecological sites is discussed in **Chapter 8: Ecology and Nature Conservation [EN010131/APP/3.3]**.

### Significance Criteria

15.3.44 When assessing the significance of dust impacts during the construction phase, the IAQM recommends that significance is only assigned to an effect after considering the construction activity with mitigation (Ref 15-6).

15.3.45 During the construction phase, the IAQM sets out that the aim is to prevent likely significant effects on receptors through the implementation of effective mitigation, thereby resulting in a residual effect that can be considered 'not significant'. Where this is not possible, it is important to consider the specific characteristics of the Site and the surrounding area to determine whether construction-phase dust impacts are likely to be significant in the context of the Scheme (Ref 15-6).

## Baseline Conditions

15.3.46 This section describes the baseline environmental characteristics for the Scheme and surrounding areas with specific reference to Air Quality.

### Existing Baseline

15.3.47 West Lindsey District Council (WLDC) undertakes routine ongoing monitoring of ambient air quality monitoring as part of their Local Air Quality Management (LAQM) at 12 locations in the District.

15.3.48 There are no Air Quality Management Areas (AQMA) declared in WLDC. Concentrations of $NO_2$ and $PM_{10}$ are considered to be very good across the District, which is rural with no large conurbations.

15.3.49 All existing $NO_2$ diffusion tube monitoring sites operated by WLDC recorded concentrations below the relevant annual mean objective value of 40 micrograms per cubic metre ($\mu g/m^3$) since monitoring began. Monitoring locations are in Gainsborough and Market Rasen. There are none in Gate Burton or otherwise near the Site.

#### Background Pollutant Concentrations

15.3.50 The total concentration of a pollutant comprises those contributions from explicit local emission sources such as roads, chimney-stacks, etc, and those that are transported into an area from indeterminate sources by wind from further away. If all the explicit local sources were removed, all that would remain is that which comes from indeterminate sources; it is this component that is called 'background'. A good understanding of background concentrations is important when completing air quality assessments as it allows for a better understanding of local pollutant sources.

15.3.51 Background data for the relevant 1km x 1km grid squares (related to the study area) was sourced from Defra's 2018-based Background Maps for the assessment year of 2026; this data is presented in Table 15-2. It is noted that the projections in the 2018 LAQM background maps are based on assumptions which were current before the Covid-19 pandemic in the UK. In consequence

these maps do not reflect short or long-term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns (Ref 15-7). The pandemic has been shown to have reduced pollutant concentrations during the lockdowns, but the long-term impact is highly uncertain, as it is unknown how many people will continue to work from home. The pandemic may also affect the assumptions made in the background maps about future fleet breakdown, as a financial downturn may result in fewer new cars being purchased. However, at present the published maps are the best estimate of future conditions available.

**Table 15-2 Background Pollutant Concentrations 2026, µg/m$^3$**

| X coordinate | Y coordinate | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| 482500 | 383500 | 6.2 | 14.8 | 7.9 |
| 481500 | 382500 | 6.3 | 14.7 | 7.9 |
| 481500 | 381500 | 6.4 | 15.0 | 8.0 |
| 481500 | 380500 | 6.8 | 15.0 | 8.0 |
| 482500 | 380500 | 6.8 | 14.8 | 8.0 |
| 480500 | 379500 | 6.6 | 15.0 | 8.0 |
| 480500 | 378500 | 6.5 | 15.1 | 8.1 |
| 484500 | 384500 | 6.2 | 14.8 | 7.9 |
| 483500 | 383500 | 6.4 | 15.0 | 8.0 |
| 484500 | 383500 | 6.2 | 14.8 | 7.9 |
| 485500 | 383500 | 6.3 | 14.9 | 7.9 |
| 486500 | 383500 | 6.2 | 14.9 | 7.9 |
| 484500 | 382500 | 6.3 | 14.9 | 7.9 |
| 484500 | 381500 | 6.5 | 14.9 | 8.0 |
| 483500 | 380500 | 6.5 | 15.1 | 8.0 |
| MAX | | 6.8 | 15.1 | 8.1 |
| MIN | | 6.2 | 14.7 | 7.9 |
| MEAN | | 6.4 | 14.9 | 8.0 |

## Baseline Dust Climate

15.3.52 A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can be affected by long range transport of dust from distant sources into the local vicinity.

15.3.53 This baseline rate of soiling is considered normal and varies dependent on prevailing climatic conditions. The tolerance of individuals to deposited dust is therefore shaped by their experience of baseline conditions.

15.3.54 Existing local sources of particulate matter includes wind-blown dust from exhaust emissions from energy plant and road vehicles, brake and tyre

wear from road vehicles and the long-range transport of material from outside the study area.

### Future Baseline

15.3.55 The future baseline scenarios are set out in **Chapter 5: EIA Methodology [EN010131/APP/3.1]**.

15.3.56 In the absence of the Scheme, traffic flows on the surrounding highway network would be expected to increase as a result of housing and employment growth. Therefore, projected background traffic growth has been applied to the traffic flows derived from the traffic surveys (March / April 2022) to represent conditions during the future baseline (and construction peak assessment year) of 2026. Considering the predicted background concentrations for 2026 presented in Table 15-2, are lower than current backgrounds, the air quality across the study area is anticipated to remain largely unchanged from baseline conditions.

## Potential Impacts

15.3.57 Mitigation measures being incorporated in the design and construction of the proposed Scheme are set out below. Prior to the implementation of the mitigation, the proposed Scheme has the potential to affect sensitive receptors (positively or negatively), during construction, and during decommissioning, in the following ways:

- Dust deposition and subsequent soiling of surfaces;
- Visible dust plumes; and
- Elevated $PM_{10}$ concentrations as a result of dust generating activities on-site.

15.3.58 Prior to mitigation, the proposed scheme has the potential to affect sensitive receptors (positively or negatively) during operation in the following ways:

- Impact from unplanned emissions resulting from battery fire.

## Mitigation Measures

15.3.59 The adoption of good site practice will be implemented through measures to control dust as outlined within the IAQM's 'Guidance on the assessment of Dust from Demolition and Construction' document that are commensurate with the level of risk identified in the assessment and the construction phase activities (Ref 15-6).

15.3.60 The mitigation measures to be incorporated into the **Framework CEMP [EN010131/APP/7.3]**, for the Scheme are summarised in Table 15-3 and Table 15-4 based on any mitigation that is 'highly recommended' in the IAQM dust guidance.

15.3.61 For the operation phase, mitigation measures to reduce the likelihood of fire will be designed into the BESS, following the Outline Battery Safety Management Plan.

**Table 15-3 Air Quality Mitigation Measures**

| Category | Activity | Mitigation Measure |
|---|---|---|
| Additional | Communications | Develop and implement a stakeholder communications plan that includes community engagement before work commences on-site. |
| | | Display the name and contact details of person(s) accountable for air quality and dust issues on the Site. This may be the environment manager/engineer or the site manager. |
| | | Display the head or regional office contact information. |
| | | Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP will need to include monitoring of dust deposition, dust flux, real-time $PM_{10}$ continuous monitoring and/or visual inspections. |
| | Site Management | Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. |
| | | Make the complaints log available to the local authority when asked. |
| | | Record any exceptional incidents that cause dust and/or air emissions, either on-site or offsite, and the action taken to resolve the situation in the logbook. |
| | | Hold regular liaison meetings with other high-risk construction sites within 500m of the Site (if applicable), to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes. |
| | | Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked. |
| | | Increase the frequency of site inspections by the person accountable for air quality and dust issues on-site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. |
| | | Agree dust deposition, dust flux, or real-time $PM_{10}$ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on-site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction. |
| | | Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. |

| Category | Activity | Mitigation Measure |
|---|---|---|
| | Preparing and Maintaining the Site | Erect solid screens or barriers around dusty activities that are at least as high as any stockpiles on-site where stockpiles (if required) are within 100m of receptors. |
| | | Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period where operations are within 100m of receptors. |
| | | Avoid site runoff of water or mud. |
| | | Keep site fencing, barriers and scaffolding clean using wet methods. |
| | | Remove materials that have a potential to produce dust from the Site as soon as possible, unless being re-used on-site. If they are being re-used on-site cover as described below. |
| | | Cover, seed or fence stockpiles to prevent wind whipping. |
| | Operating Vehicles / Machinery and Sustainable Travel | Ensure all vehicles switch off engines when stationary - no idling vehicles. |
| | | Ensure all diesel- or petrol-powered generators are fully maintained and used for the minimum periods only. Transition to mains electricity or battery powered equipment where practicable. |
| | | Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate) |
| | | Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials |
| | | Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing) |
| | Operations | Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g.: suitable local exhaust ventilation systems. |
| | | Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. |
| | | Ensure equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. |
| | Waste Management | Avoid bonfires and burning of waste materials. |

**Table 15-4 Activity-Specific Mitigation Measures**

| Activity | Mitigation Measure |
|---|---|
| **Earthworks** | Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. |
| | Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. |
| | Only remove the cover in small areas during work and not all at once. |
| **Construction** | Avoid scabbling (roughening of concrete surfaces) if possible. |
| | Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. |
| | Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. |
| | For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust. |
| **Trackout** | Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. |
| | Avoid dry sweeping of large areas. |
| | Ensure vehicles entering and leaving site are covered to prevent escape of materials during transport |
| | Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. |
| | Record all inspections of haul routes and any subsequent action in a site logbook. |
| | Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. |
| | Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). |
| | Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. |
| | Access gates to be located at least 10m from receptors where possible. |

## Assessment of Likely Impacts and Effects

15.3.62 Taking into account the mitigation measures as detailed in the Mitigation section above (15.3.57), the potential for the Scheme to generate effects was assessed using the methodology as detailed in section 15.1.

15.3.63 Dust generation during construction and decommissioning will be short-term and temporary and is not anticipated to induce significant effects on local air quality providing the adequate implementation of mitigation measures as outlined above. Air quality impacts during the construction and decommissioning phases are therefore expected to be negligible. Effects of this magnitude are **not considered to be significant** (see **ES Volume 3: Appendix 15-B [EN010131/APP/3.3]**).

15.3.64 Potential impacts on local air quality arising during the operation of the Scheme are anticipated to be less, so are also considered to be negligible. Effects of this magnitude are **not considered to be significant** (see **ES Volume 3: Appendix 15-B [EN010131/APP/3.3]**).

### Dust Risk Assessment

15.3.65 The DRA considers the potential dust emissions magnitude at each stage of the works in conjunction with the sensitivity of the surrounding area. Based on the magnitude and sensitivity parameters, the site will be classified as low, medium or high risk, and mitigation measures corresponding to the perceived level of risk can then be proposed. The DRA is provided in **ES Volume 3: Appendix 15-A [EN010131/APP/3.3]**.

15.3.66 The assessment considers the potential dust risk across a set of pre-defined zones, up to 350m from the Site. These zones are presented in **ES Volume 2**: **Figure 15-1**: Dust Risk Assessment Zones **[EN010131/APP/3.2]**.

### Demolition

15.3.67 The development of the Site will not require any demolition, and there are no residential, community or commercial receptors within the Site that will require relocation. Demolition phase impacts have therefore been scoped out of the DRA and will not be considered further.

### Earthworks

15.3.68 The Scheme area is approximately 817 hectares (ha) including the Grid Connection Corridor.

15.3.69 Construction activities are described in **Chapter 2: The Scheme [EN010131/APP/3.1]** and will include localised site levelling and earthwork including for the onsite substation and Battery Energy Storage System (BESS); trenching for the 400kV grid connection, construction of the internal access roads; construction of the grid corridor haul route, establishment of compounds and laydown areas, establishment of the perimeter fence; location mark-up for Scheme infrastructure; and import of construction materials, plant and equipment.

15.3.70 Due to the size of the Site, and the potential for having more than 10 heavy earth-moving vehicles active on-site at any one time, the potential dust emissions magnitude associated with earthworks is considered to be large.

15.3.71 The sensitivity of the area to dust soiling during the ground-enabling and earthworks phase is defined as high based on the IAQM category of between 10 to 100 sensitive receptors within 20m of the Site. The Site has consequently been determined to pose a high risk of dust soiling.

15.3.72 The sensitivity of the area is defined as low for human health impacts due to low background particulate matter concentrations, and the presence of 10-100 sensitive receptors (IAQM category) within 20m of the Site. Therefore, the risk of dust impact for earthworks activities is classified as a low risk to human health.

15.3.73 Sensitivity of ecological sites bearing statutory designations within the study area to dust-related impacts is low due to their distance to the Site, and therefore a low risk to ecology has been predicted for those sites bearing statutory designations. As noted in paragraph 15.3.38, the presence of Ancient Woodland within the Order limits and ZoI has been considered within the DRA, and has therefore been assessed as a high sensitivity receptor. Due to the location of Burton Wood within the Order limits, a high risk of dust effects has been determined. However, providing the implementation of adequate and appropriate mitigation, such as the anticipated minimum 20m buffer during both construction and operation, the effects of dust generation during the construction and operation of the Scheme are expected to be negligible.

### Construction

15.3.74 Dust generation during the construction phase is anticipated to occur for the duration of the works.

15.3.75 Trenching will be undertaken to allow for the installation of electric cabling. Piling will be undertaken on-site for the erection of module mounting structures, with foundations to a depth of 2m below ground. A worst-case scenario for the size and location of trenches has been assumed based on Table 2-1 in **Chapter 2: The Scheme [EN010131/APP/3.1]**.

15.3.76 The sensitivity of the area to dust soiling during the construction phase is high due to the proximity of sensitive receptors therefore, the risk of dust impact for construction activities is classified as high risk to dust soiling.

15.3.77 The sensitivity of the area is low for human health impacts due to low background particulate matter concentrations (less than 24 µg/m$^3$). Therefore, the risk of dust impact for construction activities is classified as posing a low risk to human health.

15.3.78 Sensitivity of ecological sites bearing statutory designations within the study area to dust-related impacts is low due to their distance to the Site. For those Ancient Woodland sites situated within the Order limits and ZoI, a high risk of dust-related impacts has been conservatively determined. However, providing adequate and appropriate mitigation is implemented, such as the anticipated minimum 20m buffer during both construction and operation, the effects of dust generation during the construction and operation of the Scheme

are expected to be negligible and therefore a low risk to ecology has been predicted.

### Trackout

15.3.79 There are anticipated to be a maximum of 66 HGV movements per day during the peak construction phase (as a weekly average, including weekends) (refer to **Chapter 13: Transport and Access [EN010131/APP/3.1]**), which is below the AADT criteria for detailed assessment of ambient air quality impacts.

15.3.80 Considering the size of the Site in conjunction with the anticipated HGV movements, the potential dust emissions magnitude for the trackout of materials is considered to be large.

15.3.81 The sensitivity of the area to dust soiling is high due to the presence of high-sensitivity receptors within 50m of the Site, and within 50m of the routes used by construction traffic, up to 500m from the Site access point.

15.3.82 Due to low background particulate matter concentrations, the sensitivity of the area to impacts on human health is considered to be low.

15.3.83 Sensitivity of ecological sites bearing statutory designations within the study area to dust-related impacts is low due to their distance to the Site. For those Ancient Woodland sites situated within the Order limits and ZoI, a high risk of dust-related impacts has been conservatively determined. However, providing , adequate and appropriate mitigation is implemented, such as the anticipated minimum 20m buffer during both construction and operation, the effects of dust generation during the construction and operation of the Scheme are expected to be negligible and therefore a low risk to ecology has been predicted as a result of trackout of materials.

## Summary

**A summary of the magnitude of emissions, sensitivity of receptor and the significance of effect is provided in Table 15-5, Table 15-6 and**

15.3.84 Table 15-7.

**Table 15-5 Summary of Potential Dust Emission Magnitudes for Construction Phase Activities**

| Activity | Potential Dust Emission Magnitude |
|---|---|
| **Demolition** | N/A |
| **Earthworks** | Large |
| **Construction** | Large |
| **Trackout** | Large |

**Table 15-6 Summary of Area Sensitivity to Construction Phase Activities**

| Activity | Sensitivity of the Surrounding Area | | | |
|---|---|---|---|---|
| | **Demolition** | **Earthworks** | **Construction** | **Trackout** |
| **Dust Soiling** | N/A | High | High | High |
| **Human Health ($PM_{10}$ effects)** | N/A | Low | Low | Low |

| | | | | |
|---|---|---|---|---|
| **Ecology*** | N/A | High | High | High |

***Whilst not typical within a DRA per the IAQM guidance, Ancient Woodland has been considered due to the presence within the Order limits. This consideration has been extended to AW within the ZoI.***

**Table 15-7 Summary of Risk of Dust Effects for Construction Phase Activities (Without Mitigation)**

| Activity | Summary of Dust Risk | | | |
|---|---|---|---|---|
| | **Demolition** | **Earthworks** | **Construction** | **Trackout** |
| **Dust Soiling** | N/A | High | High | High |
| **Human Health ($PM_{10}$ effects)** | N/A | Low | Low | Low |
| **Ecology*** | N/A | High | High | High |

** Whilst not typical within a DRA per the IAQM guidance, Ancient Woodland has been considered due to the presence within the Order limits. This consideration has been extended to AW within the ZoI.*

15.3.85 The IAQM Guidance (Ref 15-6) recommends that mitigation measures be commensurate to the highest risk category identified during the DRA. The Site is therefore classified as 'High-Risk', and mitigation measures for a high-risk site will therefore be proposed for implementation as set out in Table 15-3 and Table 15-4.

15.3.86 The implementation of the mitigation measures in Table 15-4 is expected to prevent the occurrence of significant impacts arising from dust generation during the construction phase. Minimising emissions of dust and/or suppressing dust at the source will reduce the potential for transport of dust off-site, therefore reducing the potential exposure of sensitive receptors to dust related impacts. Residual effects are therefore **not expected to be significant**.

## Operation (assumed to be 2028)

15.3.87 The Scheme will be operated by a maximum of 14 full time equivalent (FTE) staff per day, predominantly undertaking maintenance tasks. In addition, a maximum of three to four visitors per week (equating to one visitor per day) are assessed for the purpose of deliveries, and replacement of components. Staff vehicles and those used for maintenance will primarily be four wheeled drive vehicles and vans, with HGVs accessing the site during this phase on an occasional basis. The effect of operation of the Scheme on local air quality is therefore **not significant**.

## Decommissioning (assumed to be 2088)

15.3.88 Decommissioning is assumed to generate similar effects to those anticipated during the construction phase, and therefore the mitigation measures proposed for implementation during the construction phase will be appropriate for application to decommissioning. A **Framework Decommissioning Environmental Management Plan** (DEMP) **[EN010131/APP/7.5]** has been prepared for the Scheme.

15.3.89 Removal of equipment and reinstatement of ground is anticipated to span a duration of 24-48 months. Impacts on local air quality as a result of dust generation are expected to be confined to this timeframe, and therefore be short-term and temporary. Effects are **not considered to be significant** assuming the appropriate mitigation measures are implemented, as set out in relation to construction above.

## Residual Effects and Conclusions

15.3.90 This section summarises the residual significant effects of the Scheme on Air Quality following the implementation of mitigation.

15.3.91 The DRA (**ES Volume 3: Appendix 15-A [EN010131/APP/3.3]**) has concluded that, in the absence of mitigation, the construction phase (and therefore the decommissioning phase) of the Scheme will likely pose a high risk of adverse effects. Following the implementation of the **Framework CEMP [EN010131/APP/7.3]**, which will incorporate the mitigation measures outlined above, the effect on ecology, dust deposition, and human health is not anticipated to be significant. It is anticipated that the residual effects will be at worst minor adverse (**not significant**).

15.3.92 Given the relatively good air quality conditions at the Site and surrounding area, in addition to the below-threshold traffic generation, it is not expected that the additional road traffic will lead to any exceedances of the national air quality strategy objectives. The effect is expected to be negligible and no worse than **minor adverse**.

## Cumulative Effects

### Introduction

15.3.93 This section presents an assessment of cumulative effects between the Scheme and other proposed and committed plans and projects including other developments.

### Cumulative Assessment Methodology

15.3.94 This assessment has been made with reference to the methodology and guidance set out in **Chapter 5: EIA Methodology [EN010131/APP/3.1]** and shortlist of cumulative schemes identified in **ES Volume 3: Appendix 16-A [EN010131/APP/3.3]**. In particular, West Burton and Cottam Solar Preliminary Environmental Information (PEI) Reports have been reviewed. Although considered, there is limited information on Tillbridge Solar as the project is still in its early stages.

### Potential Cumulative Effects

15.3.95 No construction dust effects additional to those reported for the Scheme are identified, as each project will implement dust mitigation measures to ensure no off-site impacts.

15.3.96 There is the potential for cumulative impact of roads emissions from construction vehicles. The Cottam and West Burton Solar projects have similarly scoped out the impact of construction vehicle emissions, but assuming each of those schemes have a similar number of vehicles as Gate Burton, there

could potentially be a peak weekly average of 198 vehicle movements on local roads.

15.3.97 To mitigate any potential effects, a joint CTMP will be produced in order to manage the construction traffic appropriately. If, once contractors are appointed there are likely to be more than 100 construction HDV movements per day, which is the IAQM (Ref 15-5) criteria for further assessment, then a detailed air quality assessment will be undertaken and appropriate mitigation identified.

15.3.98 No other plans or projects identified in **ES Volume 3, Appendix 16-A**: **Shortlist of Cumulative Schemes [EN010131/APP/3.3]** are considered to impact air quality receptors identified in this assessment. Therefore, the main potential for air quality impacts during construction, operation and decommissioning of the Scheme is considered to be within the Scheme boundary itself. Other schemes are not likely to contribute to the effects on air quality receptors identified in this chapter and therefore the effects are **not significant**.

# 15.4 Glint and Glare

## Introduction

15.4.0 This section summarises the potential effects of the Scheme on glint and glare for surrounding receptors.

15.4.1 The definition of glint and glare can vary; however the definition used within this assessment is as follows (Ref 15-35):

- 'Glint' refers to a momentary flash of light; and
- 'Glare' refers to a continuous source of bright light.

15.4.2 The full study on glint and glare, undertaken for the Scheme by Neo Environmental, is available in **Appendix 15-D** of the ES **[EN010131/APP/3.3].** The Glint and Glare assessment assumes a PV Table angle of between 5 and 45 degrees from horizontal in a fixed tilt arrangement, with a maximum height of 3.5m. Further information on Scheme components, including the PV Mounting Structures, is presented in **Chapter 2: The Scheme** of this ES **[EN010131/APP/3.1].**

15.4.3 The glint and glare assessment has been based on the Indicative Site Layout Plan (**ES Volume 2: Figure 2-4 [EN010131/APP/3.2])** so that a specific solar PV setup can be modelled. The conclusions of the glint and glare assessment therefore remain valid for any scheme that could be constructed within the **Outline Design Principles [EN010131/APP/2.3]**.

## Consultation

15.4.4 A request for an EIA Scoping Opinion was sought from the Secretary of State as part of the EIA Scoping Process. Consultation responses in relation to Glint and Glare are presented in **ES Volume 3: Appendix 1-C [EN010131/APP/3.3]**.

## Legislation and Planning Policy

### National Policy and Guidance

15.4.5 UK National Planning Practice Guidance (NPPG), Paragraph 013 (Reference ID: 5-013-20150327) dictates that in some instances, a glint and glare assessment is required (Ref 15-36); however, there is no specific guidance with respect to the methodology for assessing the impact of glint and glare.

15.4.6 Paragraph 2.52 of the Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) states:

"*In some instances, it may be necessary to seek a glint and glare assessment as part of the application…The potential for solar PV panels, frames and supports to have a combined reflective quality should be assessed. This assessment needs to consider the likely reflective capacity of all of the materials used in the construction of the solar PV farm*".

15.4.7 NPPG from the Ministry of Housing, Communities and Local Government on 'Renewable and Low Carbon Energy (UK)' (Ref 15-37) emphasises the need

to consider the landscape effects as well as neighbouring uses and aircraft safety with regard to glint and glare assessments.

## Assessment Methodology

15.4.8 The glint and glare assessment methodology is desk-based and has been defined following review of available guidance and studies. The approach has been informed by the legislation and guidance presented in **Appendix 15-D** of the ES **[EN010131/APP/3.3].** The approach is to determine whether a reflection from the Scheme is geometrically possible and then to compare the results against the relevant guidance and studies to determine whether the reflection is significant.

15.4.9 In summary, the assessment methodology is a multi-step process of elimination to determine which receptors have the potential to experience the effects of glint and glare, which includes the following:

- Identifying receptors in a study area surrounding the Order limits. The study area varies on the type of receptor:
    - Ground-based receptors, including residential, road and railway, within 1km of the Order limits; and
    - Aviation receptors within 30km, with detailed assessment for large international aerodromes within 20km, military aerodromes within 10km and 5km for small aerodromes;
- Considering direct solar reflections from the Scheme towards the identified receptors by undertaking geometric calculations;
- Considering the visibility of the panels from the receptor's location. If the panels are not visible from the receptor, then no reflection can occur;
- Based on the results of the geometric calculations, determining whether a reflection can occur, and if so, at what time will it occur;
- Considering both the solar reflection from the Scheme and the location of the direct sunlight with respect to the receptor's position;
- Considering the solar reflection with respect to published studies and guidance – including intensity calculations where appropriate;
- Determining whether a significant detrimental effect is expected in line with the significance criteria set out in section 15.4.10.

### Static Receptors

15.4.10 Although there is no specific guidance set out to identify the magnitude of impact from solar reflections, the following criteria has been set out for the purposes of this report:

- **High** – Solar reflections impacts of over 30 hours per year or over 30 minutes per day;
- **Medium** – Solar reflections impacts above 20 hours but below 30 hours per year or above 20 minutes but below 30 minutes per day;
- **Low** – Solar reflections impacts up to and including 20 hours per year or up to 20 minutes per day; and
- **None** – Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening.

## Baseline Conditions

15.4.11 The agricultural land use within the study area results in a generally 'open' character to the landscape, interspersed with individual trees, hedgerows, tree belts, small woodland blocks and farm access tracks. These vegetation patterns are varied across the Order limits and provide existing screening for surrounding receptors.

15.4.12 Full details of the baseline conditions, and future baseline can be found in **Chapter 10: Landscape and Visual Amenity** of the ES **[EN010131/APP/3.1]**.

### Receptors

#### Residential Receptors

15.4.13 Residential receptors located within 1km of the Order limits have been considered in the assessment. Glint was assumed to be possible if the receptor is located within the ground-based receptor zones outlined in **ES Volume 3: Appendix 15-D [EN010131/APP/3.3]**.

15.4.14 Where there are a number of residential receptors within close proximity, a representative dwelling or dwellings is/are chosen for detailed analysis as the impacts will not vary to any significant degree. Where small groups of receptors are evident, the receptors on either end of the group have been assessed in detail. A total of 107 dwelling receptors have been assessed.

#### Road and Railway Receptors

15.4.15 Roads that are within 1km of the Order limits and have potential views of the panels are considered in the assessment. Nine roads within the study area require a detailed assessment and these include: the A156, B1241, Willingham Road, Kexby Lane, Upton Road, Gainsborough Road, Marton Road, High Street, and Stow Park Road. The assessment of these includes 95 receptor points along the nine assessed roads within the study area, these points are 200m apart to ensure that each road is sufficiently covered within the assessment.

15.4.16 There are some minor roads which serve dwellings that have been screened out as the densities on these roads/access tracks will be very low and likely to get used to get to and from houses at the end of these tracks. Therefore, there is a negligible risk of safety impacts resulting from glint and glare of the Scheme.

15.4.17 There is one railway line that dissects the Scheme which will require assessment, this includes 24 rail receptor points for assessment.

#### Aviation Receptors

15.4.18 There are 15 aerodromes within 30km of the Scheme, however, only Gamston Airfield and Sturgate Airfield require a detailed assessment as the Scheme is located within their safeguarding buffer zones.

### River Trent

15.4.19 The impacts along the A156 (Road Receptors 31 – 54) have been classified as **None** once a visibility assessment has been undertaken (see below for Assessment of Likely Impacts and Effects). Therefore, it can be concluded that there will be no impacts upon the users of the River Trent as the same vegetation and topography screening the A156, will screen views from the River Trent into the Scheme where glint and glare is possible.

## Embedded Mitigation Measures

15.4.20 The embedded design mitigation for screening the Scheme from view of receptors to glint and glare, as well as landscape and visual impacts, is described in detail in **Chapter 10: Landscape and Visual Amenity [EN010131/APP/3.1]** of the ES. These measures will be secured through the **Outline Landscape and Ecological Management Plan (LEMP) [EN010131/APP/7.10]**.

15.4.21 The embedded mitigation measures include:

- Careful siting of the Scheme in the landscape with offsets from existing residential areas, vegetation patterns and road networks;
- Conserving existing vegetation patterns; and
- Creating new Green Infrastructure (i.e., vegetation planting) within the Order limits with extensive planting proposals.

## Assessment of Likely Impacts and Effects

15.4.22 Solar reflections are possible at 79 of the 107 residential receptors. The initial bald-earth scenario, with no consideration of local vegetation, other obstacles, and cloud cover, identified potential impacts as **High** at 18 receptors, **Medium** at 10 receptors, **Low** at 51 receptors, and **None** at the remaining 28 receptors. Upon reviewing the actual visibility of receptors, glint and glare impacts remain **High** for one receptor, **Medium** for one receptor, **Low** for four receptors, and reduced to **None** for all remaining receptors. Once mitigation was implemented, overall impacts remained **Low** for four receptors, but reduced to **None** for all remaining receptors. Therefore, overall impacts on residential receptors are considered **Not Significant** and therefore **acceptable**.

15.4.23 Solar reflections are possible at 92 of the 95 road receptor points assessed in the 1km study area. Upon reviewing the actual visibility of the receptors, glint and glare impacts remain **High** for 16 receptor points and reduce to **None** for the remaining 79 receptors. Once mitigation was implemented, overall impacts at all road receptors reduce to **None** and are therefore **Not Significant.**

15.4.24 Solar reflections are possible at 22 of the 24 rail receptor points assessed within the 1km study area. Upon reviewing the actual visibility of the receptors, glint and glare impacts reduce to **None** for all receptors and are therefore **Not Significant.** Mitigation is therefore not required for the rail receptor points.

15.4.25 Six runways and one Air Traffic Control Tower (ATCT) were assessed in detail at Gamston Airfield and Sturgate Airfield. There are no glare impacts at the Gamston Airfield runways, however there is Green Glare potential for a runway at Sturgate Airfield and the ATCT at Gamston Airfield, this is an **acceptable impact** upon runways, but an **unacceptable impact** upon the ATCT, according to Federal Aviation Authority (FAA) guidance. Upon reviewing the actual visibility of the receptors, including ground elevation, the glare impacts are reduced to **None** and **Not Significant.** Overall impacts on Aviation receptors are **Low** and **Not Significant.**

## Mitigation Measures

15.4.26 Mitigation measures are required to be put in place due to the **High** and **Medium** impacts that found during the visibility analysis at two residential receptors and 16 road receptors.

15.4.27 These mitigation measures include hedgerows to be implemented along the boundaries highlighted in **ES Volume 3, Appendix 10-D: Figure 5 [EN010131/APP/3.3]**. These hedgerows will be infilled and maintained to a height of at least 3 metres and will screen all views of the Scheme where glint and glare is possible at the identified receptors. Further information is presented in **Appendix 10-D** of the ES **[EN010131/APP/3.3].** These measures will be secured through the **Outline LEMP [EN010131/APP/7.10]**.

## Residual Effects and Conclusions

15.4.28 With the proposed embedded design mitigation, **no significant residual effects** are anticipated as a result of the Scheme.

15.4.29 The effects of glint and glare and their impact on local receptors is predicted to be **Low** at four residential receptors, whilst the remaining ground-based receptors are expected to have **No Impacts** once mitigation measures have been considered. Impacts upon aviation receptors are predicted to be **Low.** Therefore, overall impacts are **Negligible**.

## Cumulative Assessment

15.4.30 The short-list of cumulative schemes is presented in **Appendix 16-A** of the ES **[EN010131/APP/3.3].** The assessment summarised above identified that with the introduction of the additional mitigation, receptors will not experience significant effects as a result of the Scheme, which are judged to be **Negligible**. Additionally, it is anticipated that the developments listed within **ES Volume 3: Appendix 16-A [EN010131/APP/3.3]** will be designed to ensure that there will be effective screening to prevent glint and glare effects from other individually planned solar farms. Therefore, cumulative effects would be unlikely and are not considered to arise for glint and glare. The overall impact of the Scheme is considered **Not Significant**.

# 15.5Ground Conditions

## Phase 1 Preliminary Risk Assessment

### Solar and Energy Storage Park

15.5.1 A Phase 1 Preliminary Risk Assessment (PRA) is equivalent to a Stage 1 Tier 1 level of assessment, as defined by the Environment Agency's Land Contamination Risk Management (LC:RM) (2020) guidance (Ref 15-33). The objective of the PRA is to identify and evaluate potential land quality risks and development constraints associated with the Scheme and to construct an initial Conceptual Site Model (CSM) that can be used to inform future decision making and the design of future ground investigation which may be required. A Phase 1 PRA report has been prepared, covering land within the Solar and Energy Storage Park boundary, and is available in **ES Volume 3: Appendix 15-E [EN010131/APP/3.3]**.

15.5.2 The Phase 1 PRA for the Solar and Energy Storage Park includes the following:

- Details of land within the Solar and Energy Storage Park boundary and surrounding land including development history, geology, hydrogeology, hydrology, soil and groundwater quality and environmental setting;
- A review of the environmental data in an Envirocheck Report;
- Details of land designated for Mineral Safeguarding;
- Details of any available site investigation reports for land within the Order limits;
- Details from a site walkover from publicly accessible locations documenting:
    - The existing layout, current operations, and condition of land within the Order limits, the property boundaries and immediately surrounding land;
    - A visual inspection of any potential indicators of any land contamination, for example, spillages, disturbed ground;
    - The visual inspection of any geohazards or ground conditions constraints;
    - An initial CSM and an evaluation of potential contamination linkages; and
    - Conclusions and recommendations based on the findings.

### Grid Connection Corridor

15.5.3 The Grid Connection Corridor Desk Study Report available in **ES Volume 3: Appendix 15-F [EN010131/APP/3.3]** is an addendum to **ES Volume 3, Appendix 15-E**: Phase 1 PRA Report, and relates to the portion of land within the Order limits known as the Grid Connection Corridor.

15.5.4 The Grid Connection Corridor Desk Study Report is a high-level overview of the geological, hydrological and hydrogeological setting, and public domain geo-environmental information covering the land within the Grid Connection Corridor.

15.5.5 The report included an overview of:

- Historical land uses for the Site and immediate surrounds with a particular emphasis on identifying potential on-site and off-site contamination sources;
- A site conceptual model with a view to identifying any significant source-pathway-receptor linkages followed by a qualitative preliminary risk assessment; and
- Conclusions and recommendations based on the findings.

15.5.6 A detailed review of published records, information provided by the Client, statutory records, historical mapping supplied within a Landmark Envirocheck Report, published geological and hydrogeological mapping and historical borehole records was not undertaken given only a general overview was required by the scope of the Report. Unless otherwise stated, only features located within the Grid Connection Corridor boundary were considered.

## Consultation

15.5.7 A request for an EIA Scoping Opinion was sought from the Secretary of State through the Planning Inspectorate in 2021 as part of the EIA Scoping Process. Consultation responses in relation to Ground Conditions, to date, are presented in **ES Volume 3: Appendix 1-C [EN010131/APP/3.3]**.

## Preliminary Risk Assessment Findings- Solar and Energy Storage Park

15.5.8 The principle of risk assessment for land contamination is outlined in the Statutory Guidance to Part 2A (2012) and LC:RM (Ref 15-21). The risk assessment process for environmental contaminants is based on a source-pathway-receptor analysis. These terms can be defined as follows:

- **Source**: hazardous substance that has the potential to cause adverse impacts;
- **Pathway**: route whereby a hazardous substance may come into contact with the receptor: examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses; and
- **Receptor**: target that may be affected by contamination: examples include human occupants/ users of site, water resources (surface waters or groundwater), or structures.

15.5.9 For a risk to be present, there must be a relevant/viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

15.5.10 The following sources, pathways and receptors for the Solar and Energy Storage Park boundary have been identified in Table 15-8.

**Table 15-8 Source, Pathways and Receptors – Solar and Energy Storage Park Boundary.**

| Sources | Pathway | Receptor |
|---|---|---|
| S1: On site - Agricultural land and associated facilities | P1: Direct contact, dermal absorption or ingestion of soil / water. | R1: Human Health (Future users) |

| Sources | Pathway | Receptor |
|---|---|---|
| S2: On site - Railway and sidings<br><br>S3: On site - Potentially infilled land associated with historic quarries and pits<br><br>S4: On site - Potential Made Ground associated with utilities infrastructure (Antennae, drainage, roadways)<br><br>S5 – Off site<br>Agricultural land and associated facilities<br>Railway and sidings<br>Potentially infilled land associated with historic quarries and pits<br>Potential Made Ground associated with utilities (gas) infrastructure<br>Former Sewage works<br>Former Brick Yard | P2: Inhalation of soil particulates or soil vapour derived from soils.<br><br>P3: Migration of hazardous gases/vapours via permeable strata into confined spaces (asphyxiation/explosion).<br><br>P4: Spillage/loss/run off from surface direct to receiving water.<br><br>P5: Lateral migration of impacted shallow groundwater towards surface water receptors.<br><br>P6: Leaching of chemicals and vertical migration via permeable unsaturated strata to shallow and/ or deep groundwater.<br><br>P7: Vertical migration of impacted shallow groundwater to the deeper aquifer.<br><br>P8: Direct contact of buried concrete with contaminated soils (i.e. hydrocarbons) and aggressive ground conditions (pH and sulphate).<br><br>P9: Direct contact of services and supply pipes with contaminated soils.<br><br>P10: Migration of hazardous gases/vapours via permeable strata into enclosed spaces and service/utility trenches. | R2: Human Health (off site – commercial/residential properties)<br><br>R3: Water Environment: Superficial Aquifers<br><br>R4: Water Environment: Surface waters<br><br>R5: Water Environment: Bedrock Aquifers<br><br>R6: Buildings & Infrastructure: Concrete foundations associated with buildings, solar PV, utilities services. |

15.5.11 Using criteria broadly based on those presented in the National House Building Council/Environment Agency/Chartered Institute of Environmental Health publication R&D 66 (NHBC/EA/CIEH, 2008) (Ref 15-34), the magnitude of the risk associated with potential contamination at the Solar and Energy Storage Park was assessed. To do this an estimate was made of:

- The magnitude of the potential consequence (i.e. severity); and
- The magnitude of probability (i.e. likelihood).

- The classifications of severity and likelihood and the risk rating based on the comparison severity and likelihood are presented in the Phase 1 PRA report.

15.5.12 The key findings of the risk assessment are detailed below. Full details outlining all the source-pathway-receptor linkages for all of the sources, pathways and receptors detailed above are provided in **ES Volume 3, Appendix 15-E: Phase 1 PRA [EN010131/APP/3.3]** report for the Solar and Energy Storage Park.

15.5.13 Given the proposed Scheme, the likely low levels of contamination anticipated from the sources identified or isolated sources identified together with the nature of the likely exposure (transient, infrequent) to existing human health receptors and future users of the Solar and Energy Storage Park (maintenance workers), the risk to human health is considered to be low.

15.5.14 Risks to controlled waters has been identified to be low to moderate/low based on the Phase 1 PRA. The severity has been assessed to be “mild”. This is because of the presence of numerous on site drains as receptors. These may also provide potential pathways to the River Trent and due to the lack of protection to the underlying aquifers, the likelihood an event could occur has to be deemed as “likely”.

15.5.15 The Phase 1 PRA detailed recommendation for limited intrusive investigation to confirm the findings of the assessment which may be included as part of any geotechnical scope of works.

## Preliminary Risk Assessment Findings - Grid Connection Corridor

15.5.16 Based on the principles of risk assessment for land contamination (outlined in the Statutory Guidance to Part 2A (2012) and LC:RM (Ref 15-23)) Table 15-9 presents the sources, pathways and receptors for the Grid Connection Corridor.

**Table 15-9 Source, Pathways and Receptors – Grid Connection Corridor.**

| Sources | Pathway | Receptor |
|---|---|---|
| S1: On site – Cottam Power Station | P1: Direct contact, dermal absorption or ingestion of soil / water. | R1: Human Health (future users) |
| S2: On site – Agricultural land and associated facilities | P2: Inhalation of soil particulates or soil vapour derived from soils. | R2: Human Health (off site – commercial/residential properties) |
| S3: On site – Railway and sidings (current and historical) | P3: Inhalation of asbestos fibres. | R3: Water Environment: Superficial aquifers |
| S4: On site – Potential Made Ground associated with utilities infrastructure (drainage, roadways, utilities) | P4: Migration of hazardous gases/vapours via permeable strata into confined spaces (asphyxiation/explosion). | R4: Water Environment: Bedrock aquifers<br>R5: Water Environment: Surface waters |

| Sources | Pathway | Receptor |
|---|---|---|
| S5: On site – Sewage works<br><br>S6: Off site – Dredging lagoons, and landfill sites and pits associated with and in proximity of the power station.<br><br>S7: Off site – Other off-site sources: Cottam Power Station, agricultural land and associated facilities, railway and sidings (current and historical, potential Made Ground, cemetery. | P5: Spillage/loss/run off from surface direct to receiving water.<br><br>P6: Lateral migration of impacted shallow groundwater towards surface water receptors.<br><br>P7: Leaching of chemicals and vertical migration via permeable unsaturated strata to shallow and/ or deep groundwater.<br><br>P8: Vertical migration of impacted shallow groundwater to the deeper aquifer.<br><br>P9: Direct contact of buried concrete with contaminated soils (i.e. hydrocarbons) and aggressive ground conditions (pH and sulphate).<br><br>P10: Direct contact of services and supply pipes with contaminated soils.<br><br>P11: Migration of hazardous gases/vapours via permeable strata into enclosed spaces and service/utility trenches. | R6: Buildings & Infrastructure: Concrete foundations associated with buildings, cables, utilities services. |

15.5.17 The magnitude of the risk associated with potential contamination at the Grid Connection Corridor was assessed. This was undertaken using the aforementioned criteria in 15.5.8 to 15.5.15 (see 'Preliminary Risk Assessment Findings – Solar and Energy Storage Park' section).

15.5.18 The key findings of the risk assessment are detailed below.

15.5.19 Based on the proposed Scheme as described in **ES Volume 1, Chapter 2: The Scheme [EN010131/APP/3.1]**, the unlikely presence of contaminants at concentrations to cause harm, the limited likely presence of human health receptors, together with the nature of the likely exposure (transient, infrequent) to existing human health receptors and future users of the Grid Connection Corridor (maintenance workers), the risk to human health is considered to be low.

15.5.20 Risks to controlled waters has been identified to be low to moderate/low based on the Grid Connection Corridor Desk Study. This is because whilst there is the presence of Seymour and Marton Drains and the River Trent as

receptors, the likelihood of surface water being impacted by sources is generally considered low due to the low impact surface earthworks works taking place in the vicinity of these receptors. The crossing of the River Trent will be via trenchless techniques (horizontal directional drill). Construction works for the installation of the cables could temporarily mobilise contaminants within soil and potentially impact groundwater. However, this effect is considered to be temporary.

15.5.21 Risks to existing and future infrastructure is generally considered to be very low to low.

15.5.22 The only significant infrastructure on the site is the Cottam substation but no works (intrusive) works are planned in that area. Any future infrastructure (i.e. the grid connection cables) may come into contact / be impacted by localized contaminative ground conditions where they are located / pass through the identified sources we have identified (railway, dredging lagoons etc). Therefore, the impact to infrastructure is low.

## Conclusions

15.5.23 Despite the moderate/low rating for controlled waters, under LC:RM the risk to human health and controlled waters is considered acceptable. Therefore, the Scheme is not considered to pose an unacceptable risk to human health or the environment either during construction, during operation or decommissioning.

15.5.24 During construction the proposed development works will be undertaken in compliance with CDM 2015 regulations. Mitigation to prevent surface runoff, discharge into watercourses and dust generation will form part of the construction phase obligations and requirements.

## Cumulative effects

15.5.25 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 cumulative scheme, it is considered that the cumulative effect on ground conditions will be negligible.

# 15.6 Major Accidents and Disasters

## Introduction

15.6.1 This section summarises the potential effects of the Scheme on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project.

15.6.2 "Accidents" are an occurrence resulting from uncontrolled developments in the course of construction, operation and decommissioning (e.g. a major emission, fire or explosion).

15.6.3 "Disasters" are naturally occurring extreme weather events or ground related hazard events (e.g. subsidence, landslide, earthquake).

15.6.4 **ES Volume 1, Chapter 2: The Scheme [EN010131/APP/3.1]** and the **Outline Design Principles [EN010131/APP/2.3]** have been used to inform the major accidents and disasters assessment.

## Legislation and Planning Policy

15.6.5 The EIA Regulations (Ref 15-17) require consideration to be given to the risks of major accidents and disasters. The IEMA guidance document 'Major Accidents and Disasters in EIA' (Ref 15-11) has been taken into account in the assessment of major accidents or disasters.

## Consultation

15.6.6 Consultation to date in relation to major accidents and disasters is outlined in the **Consultation Report [EN010131/APP/4.1]** submitted with the DCO application, which presents the consultation responses and matters raised relating to major accidents and disasters, showing how and where these have been addressed in the ES. The responses have been taken into account and considered in the assessment below.

## Assessment Methodology

15.6.7 The following methodology has been adopted to assess major accidents or disasters; in general, major accidents or disasters, as they relate to the Scheme, fall into three categories:

- Events that could not realistically occur, due to the nature of the Scheme or its location;
- Events that could realistically occur, but for which the Scheme, and associated receptors, are no more vulnerable than any other development; and
- Events that could occur, and to which the Scheme is particularly vulnerable, or which the Scheme has a particular capacity to exacerbate.

15.6.8 An exercise was undertaken to identify all possible major accidents or disasters that could be relevant to the Scheme. This list was drawn from several sources, including the UK Government's National Risk Register 2020 (Ref 15-12). Major

accidents or disasters with little relevance in the UK were not included, such as volcanic eruptions.

15.6.9 The long list was screened to form a shortlist of events to be taken forward for further consideration. The shortlist of events and the list of relevant chapters and assessments in which they have been scoped in to are summarised in Table 15-10 below.

15.6.10 Although the majority of the major accidents or disasters on the long list are already considered under other legislative or design requirements, this is not considered to be sufficient reason to automatically eliminate the major accident or disaster from any further consideration. This is consistent with the approach for other topics, for example that the need to comply with nature conservation legislation does not mean that ecology and nature conservation do not need to be considered in EIA. However, where it is concluded that the need for compliance is so fundamental, and the risk of any receptors being affected differently so remote, major accidents or disasters on the long list are not included on the shortlist.

15.6.11 Likewise, it is considered reasonable and proportionate to exclude certain receptor groups from the outset. Construction workers, as a receptor, can be excluded from the assessment, because existing legal protection is considered to be sufficient to minimise any risk from major accidents or disasters to a reasonable level. Legislation in force to ensure the protection of workers in the workplace includes:

- Health and Safety at Work etc. Act 1974 (Ref 15-13);
- The Management of Health and Safety at Work Regulations 1999 (Ref 15-14);
- The Workplace (Health, Safety and Welfare) Regulations 1992 (Ref 15-15); and
- Construction (Design and Management) (CDM) 2015 Regulations (Ref 15-16).

**Table 15-10-Major accidents or disasters shortlisted for further consideration**

| Major Accident or Disaster | Potential Receptor | Comments |
|---|---|---|
| Floods | Property and people in areas of increased flood risk. | Both the vulnerability of the Site to flooding, and the potential for the Scheme to exacerbate flooding, are covered in **Chapter 6: Climate [EN010131/APP/3.1]** and within the Flood Risk Assessment (FRA) presented in **Appendix 9-C** of the ES **[EN010131/APP/3.3]** |
| Fire | Local residents, habitats and species | If there is a malfunction to one of the battery storage containers, there is a range of integrated controls that will activate depending on the extent and severity of the event. In case the malfunction progresses to a catastrophic fire event and so long as there are no lives under threat, the fire brigade would ensure surrounding elements and structures (intact battery arrays nearby, other electrical equipment, trees etc.) are kept |

| Major Accident or Disaster | Potential Receptor | Comments |
|---|---|---|
| | | adequately wet and cool to prevent the fire from expanding any further but the battery infrastructure may be allowed to burn within the controlled area. An **Outline Battery Safety Management Plan (BSMP)** has been prepared and is provided with the Application **[EN010131/APP/7.1]** |
| Road accidents | Aquatic environment<br>Road users | An assessment of accidents and safety is presented in **Chapter 13: Transport and Access** of the ES **[EN010131/APP/3.1].** With regard to Hazardous and Dangerous Loads, the analysis of the road network within the study area indicates that there are no particular features, such as a significant vertical drop immediately beyond the carriageway, which would suggest that the transfer of materials poses a particular risk beyond that which would be expected on the general highway network. It is concluded that no further assessment on hazardous loads is required in **Chapter 13: Transport and Access [EN010131/APP/3.1].**<br>The risk posed by chemical spillage during construction or decommissioning is considered in the **Chapter 9: Water Environment [EN010131/APP/3.1]**.<br>The Glint and Glare Assessment presented in **Appendix 15-D [EN010131/APP/3.3]** identifies that with the proposed embedded mitigation, no significant effects from glint and glare are anticipated as a result of the Scheme, including effects to road users and residential receptors. |
| Rail accidents | Rail users | The Glint and Glare Assessment presented in **Appendix 15-D** of the ES **[EN010131/APP/3.3]** identifies that with the proposed embedded design mitigation, **no significant residual effects** from glint and glare are anticipated as a result of the Scheme, including effects to rail users. The Sheffield to Lincoln rail line passes through the centre of the Solar and Energy Storage Park. **No Significant effects** from glint and glare are predicted on rail receptors. Glint and glare effects will be negligible on local road users and at residential dwellings and there **not significant**. |
| Aircraft disasters | Pilots and aircraft | Section 6 of the Glint and Glare Assessment presented in **Appendix 15-D [EN010131/APP/3.3]** of the ES identifies that the impact on aviation assets is **not significant**. |
| Flood Defence Failure | Employees | Mitigation is included within the Outline Surface Water Drainage Strategy [**EN010131/APP/3.3]** to ensure that flood risk |

| Major Accident or Disaster | Potential Receptor | Comments |
|---|---|---|
| | | is not increased to the development or elsewhere. This is considered in **Chapter 9: Water Environment [EN010131/APP/3.1]** and **Appendix 9-C: FRA** of the ES **[EN010131/APP/3.3]**. |
| Utilities failure (gas, electricity, water, sewage, oil, communications) | Employees and local residents | The Scheme has the potential to affect existing utility infrastructure above and below ground. To identify any existing infrastructure constraints, both consultation and a desk based study has been undertaken prior to construction. It is known that there are overhead electricity lines located within the Site. |
| Mining / Extractive Industry | Employees | The Preliminary Environmental Risk Assessment is presented in **Appendix 15-E [EN010131/APP/3.3]** of this ES.<br>There is the potential for current of past quarrying activity in the vicinity to lead to unstable ground conditions due to nearby active quarries. However, the risk will be considered as part of the geotechnical design, ensuring that the risk is designed out. |
| Plant disease | Habitats and species | New planting may be susceptible to biosecurity issues, such as the increased prevalence of pests and diseases, due to climate change. The planting design will take account of biosecurity risks through a wider mix of species including some non-natives. Further information on proposed planting is presented in **Chapter 10: Landscape and Visual Amenity [EN010131/APP/3.1].** |

15.6.12 Those major accidents and disasters listed in Table 15-10 that are not being considered within another technical assessment (fire) have been reviewed by the design team to ensure risks are addressed through the design as necessary. These events are assessed below.

15.6.13 Where there is potential for interaction between a major accident and disaster, receptor, and the Scheme, these have been shortlisted and a qualitative evaluation is provided below. An effect is considered significant based on the effect it would have on the environment, as a result of the assessed accident or disaster occurring. Details on appropriate prevention measures and mitigation for significant effects on the environment form such events are either provided in the sections below or within the referenced topic chapters.

## Baseline Conditions

15.6.14 A number of receptors are present in the vicinity of the Scheme which could be vulnerable to major accidents or disasters, either because of their proximity to the Scheme or their importance to the surrounding area. These include:

- Towns, villages, farms and residential homes;

- Commercial sites and buildings;
- Roads;
- Railways;
- Designated ecological sites, woodland, farmland, and waterbodies; and
- Underground infrastructure services including electricity, water, communications, and gas.

15.6.15 Details of specific receptors that fall into the above categories are provided in **Chapter 2: The Scheme [EN010131/APP/3.1]** of this ES. These receptors have been considered in this assessment. In the absence of the Scheme, the future baseline is anticipated to remain the same.

## Assessment of Potential Effects

### Construction and Decommissioning Phase

15.6.16 Risks of major accidents and disasters occurring during construction and decommissioning are assessed in the relevant chapters outlined in Table 15-10. All works will be subject to risk assessments as required by the **Framework CEMP [EN010131/APP/7.3]** and the **Framework DEMP [EN010131/APP/7.5]**. Mitigation measures to be implemented during construction and decommissioning are listed within the Framework CEMP and DEMP respectively, which will be secured by requirements in the DCO.

#### Utilities failure (gas, electricity, water, sewage, oil, communications)

15.6.17 Electrical cables are required to connect generating and storage components with electricity management infrastructure within the Solar PV Array Areas and BESS before connecting to the Gate Burton Substation. These works are subject to a risk assessment as set out in the Framework CEMP.

#### Fire

15.6.18 Health and Safety on site would be managed by the applicant during construction and decommissioning to mitigate the risk of fire, in line with legislative safety requirements. An **Outline Battery Safety Management Plan** (BSMP) **[EN010131/APP/7.1]** has been prepared and is provided with the application. The implementation of the BSMP will be secured by a requirement to the DCO. The **Framework CEMP [EN010131/APP/7.3]** and **DEMP [EN010131/APP/7.5]** will also include measures to reduce risk of fire during construction and decommissioning, secured by a requirement to the DCO. During construction and decommissioning, the Scheme is not expected to have an effect on the environment due to the risk of a major accident occurring as a result of fire during construction and decommissioning.

#### Plant Disease

15.6.19 The planting strategy for the Scheme has been developed to use native species as described in the **OLEMP [EN010131/APP/7.10]** of the ES. It is not proposed that planting is removed during decommissioning of the Scheme.

#### Criminal Damage

15.6.20 The Order limits would be managed by the contractor during construction and decommissioning to mitigate the risk of criminal activity. The design will include safety measures to protect the sites from criminal damage, including

fencing, CCTV cameras and lighting in critical areas. Therefore, the Scheme is not expected to have an effect on the environment due to the risk of a major accident occurring as a result of criminal damage during construction and decommissioning.

### Operational Phase

15.6.21 A **Framework Operational Environmental Management Plan** (OEMP) **[EN010131/APP/7.4]** has been prepared to manage environmental risks during operation. The approval and implementation of the Framework OEMP will be secured by a requirement to the DCO.

#### Fire

15.6.22 There is a potential fire risk associated with certain types of batteries such as lithium ion. An **Outline Battery Fire Safety Management Plan** (BSMP) **[EN010131/APP/7.1]** has been prepared and is provided with the DCO application. The Outline Battery Fire Safety Management Plan fully explores the risks associated with fires from BESS equipment and minimises the impact of an incident during construction, operation and decommissioning of the facility and includes the following:

- Details of the hazards associated with lithium-ion (li-ion) batteries;
- Isolation of electrical sources to enable firefighting activities;
- Measures to extinguish or cool batteries involved in fire;
- Minimise environmental impact of an incident;
- Containment of fire water run-off;
- Handling and responsibility for disposal of damaged batteries; and
- Establishment of regular onsite training exercises.

15.6.23 A summary of the anticipated site-wide safety provisions provided in the **Outline BSMP [EN010131/APP/7.1]** are as follows:

- Designed, selected and installed in accordance with international guidance, good practice, and related standards;
- Risk assessments will be carried out for the entire system and elements across the project lifestyle;
- The specific location of the BESS, as shown on the Indicative Site Layout Plan (**ES Volume 2: Figure 2-4 [EN010131/APP/3.2]** and specified within the **Outline Design Principles [EN010131/APP/2.3]**, has sought to minimise the proximity to receptors of any nuisance with the distance to properties maximised where possible, and as such the BESS is around 500m from any properties;
- Separation distances between components will be selected to minimise the chance of fire spread based on Best Practice, currently represented by NFPA 855;
- Equipment will, where possible, be selected to be fire limiting, such as selection of transformer oils with low flammability and the fire resistance of the BESS enclosure;
- In the case of the BESS, it will be designed with multiple layers of protection to minimise the chances of a fire or thermal runway;
- All equipment will be monitored, maintained and operated in accordance with manufacturer instructions;

- 24-hour monitoring of the BESS via a dedicated control room: the monitoring system will automatically alert Lincolnshire Fire and Rescue Service in the event of an incident;
- The BESS will include integrated fire detection with automated suppression systems to deal with electrical fires. Following Best Practice (e.g., NFPA 855 2023) and in line with the Safety Strategy, the build-up of explosive gases will be avoided by gas venting. Fires involving the batteries will be addressed in the Emergency Response Plan, based on best practice;
- The Applicant will have a dedicated emergency plan (ERP) in place, with consideration of credible plant failure scenarios. The ERP will include 24/7 availability of a Subject Matter Expert (SME); and
- Communication with Lincolnshire Fire and Rescue Service has already commenced and will continue across design and construction phases.

15.6.24 An Unplanned Atmospheric Emissions from BESS report (**ES Volume 3: Appendix 15-C [EN010131/APP/3.3]**) has been produced. This document provides an assessment of the potential consequences of unplanned emissions to air from the use of battery technology at Gate Burton Energy Park. The assessment has been based on a 500MW BESS, which forms the Concept Design. The design of the BESS may change at detailed design stage, when a decision is made to select a supplier, product and battery chemistry. Any selection made will be compliant with the Rochdale envelope principles within Work No. 2 of the **Outline Design Principles [EN010131/APP/2.3]**. The Applicant will update the Battery Safety Management Plan and Unplanned Atmospheric Emissions from BESS Report at detailed design stage to reflect the chosen technology, which would be shared with the council(s) and the local fire service for approval prior to construction of the BESS. The technology for this Scheme has not been confirmed but is likely to be based on lithium-ion as these are most widely used in BESS at this time.

15.6.25 A number of simplifications have been made to the model to ensure the assessment approach is precautionary and provides an upper estimate (worst-case) of the likely outcomes. These simplifications are the assumption of a volume source within no initial vertical momentum and ambient air temperature, these assumptions represent a very conservative approach in terms of dispersion modelling as they remove the vertical momentum of the emission and consequently the predicted near ground level concentrations from the model are considerably higher than would be experienced under real world conditions, as the plume has been modelled without the initial vertical momentum caused by the fire. In the unlikely event that a fire was to break out in a single cell or module, it is very unlikely that the fire would spread to the rest of the BESS, given the control measures in place. Even if all the systems fail, and a large-scale fire breaks out within enclosures, then the resultant hydrogen fluoride concentration at the closest receptors would not exceed the safe limits.

## Mitigation Measures

15.6.26 Minimising the risk of major accidents during construction, operation and decommissioning will be addressed through appropriate risk assessments as required in the **Framework CEMP [EN010131/APP/7.3]**, **OEMP [EN010131/APP/7.4]** and **DEMP [EN010131/APP/7.5]**. The implementation of those plans will be secured via a requirement to the DCO.

15.6.27 An **Outline BSMP [EN010131/APP/7.1]** has been produced for the Scheme and will be updated and maintained as a 'live document' throughout the operational phase of the Scheme. The implementation of the strategy will be secured via requirement to the DCO.

## Residual Effects

15.6.28 Given the nature of accidents and disasters, there is the potential for significant effects if an event does occur, however, the assessment has concluded that the risk of such events occurring is low for the Scheme and significant effects on the environment are therefore not anticipated. On the rare possibility that a major accident and disaster does occur, the significance of the effect would correlate to the scale of the major accident and disaster event. The focus is on prevention of major accidents and disasters, and mitigation if an event does occur. Taking into account the good industry practice and additional mitigation measures discussed above, the risk of accidents and disasters is considered low. The assessment has considered the likely effects resulting from an event, should one occur, and has concluded there would be no significant effects on the environment or people.

## Cumulative Effects

15.6.29 This section presents an assessment of cumulative effects between the Scheme and other proposed and committed plans and projects including other developments.

15.6.30 This assessment has been made with reference to the methodology and guidance set out in **Chapter 5: EIA Methodology [EN010131/APP/3.1]** and shortlist of cumulative schemes identified in **ES Volume 3: Appendix 16-A [EN010131/APP/3.3]**.

15.6.31 Increased traffic during construction and decommissioning phases of the Scheme in combination with other developments could result in a greater risk of road accidents in combination. This is assessed in **Chapter 13: Transport and Access [EN010131/APP/3.1]** of the ES.

15.6.32 With embedded mitigation and additional mitigation listed above to reduce the risk of fire and other shortlisted events included in Table 15-10, it is not expected that any cumulative schemes would increase the risk or severity of the residual effects associated with major accidents and disasters affecting the Scheme.

# 15.7 Telecommunications, Television Reception and Utilities

## Introduction

15.7.1 This section evaluates the effects of the Scheme on telecommunication, infrastructure, television reception and existing utilities.

## Consultation

15.7.2 Consultation undertaken to date in relation to telecommunications, television reception and existing utilities is outlined in the **Consultation Report [EN010131/APP/4.1]** submitted with the DCO application. The Consultation Report outlines the matters raised within the Scoping Opinion and the key themes raised during statutory consultation and how these have been addressed through the ES.

## Assessment Methodology

15.7.3 To identify any existing infrastructure constraints, both consultation and a desk-based study has been undertaken. Consultation with relevant telecommunication and utilities providers is a routine part of solar development.

15.7.4 Consultees include water, gas and electricity utilities providers and telecommunications providers. Telecommunications and television providers are unlikely to be affected by Electromagnetic Interference (EMI) unless transmitters are near electrical infrastructure associated with the solar PV array (Ref 15-18).

15.7.5 A desk-based search has been undertaken for the presence of telecommunications, television reception within the Site. A qualitative approach undertaken by competent experts is used to assess the likelihood of significant effects on telecommunications, television reception and.

15.7.6 The assessment of effects on telecommunications, television, and radio is based on the maximum parameters set out by the **Outline Design Principles [EN010131/APP/2.3]**. This includes the maximum depth of construction activities and infrastructure, the maximum area allowed to be disturbed during construction and developed by the Scheme, and the maximum heights and massing allowed by the application.

## Baseline Conditions

### Telecommunications

15.7.7 There are several mobile phone masts present within the Order limits.

### Television Reception

15.7.8 The area surrounding the Scheme receives television signals from the Belmont transmitter, located approximately 35km east.

## Assessment of Effects

### Telecommunications

15.7.9 The Scheme is unlikely to interfere with telecommunications infrastructure and therefore no effects are anticipated in the construction, operation and decommissioning phases. The DCO will include protective provisions for the protection of telecommunications.

### Television Reception

15.7.10 The Scheme consists of fixed low-lying infrastructure and is therefore unlikely to interfere with digital television signals. No effects are anticipated in the construction, operation and decommissioning phases.

### Utilities

15.7.11 Avoidance measures are included as part of the embedded mitigation for the Scheme. These include locating the Scheme outside of utilities protection zones; the use of ground penetrating radar before excavation to identify any unknown utilities; and consultation and agreement of construction/demobilisation methods prior to works commencing. These measures, along with those listed within the **Framework CEMP [EN010131/APP/7.3]**, would reduce the likelihood of effects on utilities during construction.

15.7.12 In advance of construction, Gate Burton Energy Park Limited will liaise with all utility providers with assets in the area with regard to construction timelines, construction activities, proximity to assets and the construction planning and management measures that will be in place to ensure no impact to utilities. Diversion of existing overhead 11kV lines may be required. No adverse effects are expected during construction.

## Mitigation Measures

15.7.13 The risk of damage to utilities during construction would be minimised through protective measures within the DCO and embedded mitigation, which would involve those measures listed above, close liaison with utility providers and mapping infrastructure that crosses the Scheme and avoiding it through the design. The draft DCO also includes protective provisions for the protection of electronic communication networks and utilities, and engagement with relevant statutory undertakers in this respect is ongoing. No further mitigation would be required.

## Cumulative Assessment

15.7.14 The Scheme has been assessed to have no effect on telecommunication, television, or utilities. It is expected that the other solar 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 be managed through a CEMP that will include mitigation measures to reduce the risk of damaging utilities during construction. Therefore, no cumulative effects are expected on telecommunications, television reception, or utilities.

# 15.8 Waste and Recycling

## Introduction

15.8.0 This section discusses the expected waste streams from the Scheme and how they will be managed. Design life, replacement frequency and recycling of key Scheme components is then considered.

15.8.1 The legal definition of waste is "*any substance or object which the holder discards or intends or is required to discard*" (Ref 15-20). The legal definition of waste covers substances or objects which fall outside of the commercial cycle or out of the chain facility. In particular, most items that are sold or taken off site for recycling are wastes, as they require treatment before they are reused or resold.

15.8.2 In practical terms, wastes include surplus spoil, scrap, recovered spills, unwanted surplus materials, packaging, office waste, wastewater, broken, worn-out, contaminated or otherwise spoiled plant, equipment, and materials.

## Legislation and Planning Policy

### Waste (England and Wales) Regulations 2011 (as amended)

15.8.3 The Waste (England and Wales) Regulations 2011 (Ref 15-23) (herein referred to as the 'Waste Regulations') transpose the requirements of the European Waste Framework Directive in England and Wales and require the Secretary of State to establish waste prevention programmes and waste management plans that apply the waste hierarchy.

15.8.4 The waste hierarchy prioritises waste prevention, followed by preparing for reuse, recycling, recovery and finally disposal as means of management of waste.

15.8.5 The Waste Regulations require businesses to apply the waste hierarchy when managing waste, and also require that measures are taken to ensure that, by the year 2020 and beyond, at least 70% by weight of non-hazardous construction and demolition waste is subjected to material recovery.

15.8.6 Other relevant legislation includes:

- The Environmental Permitting (England and Wales) Regulations 2016 (Ref 15-24);
- Hazardous Waste (England and Wales) Regulations 2005 (Ref 15-25);
- The Waste Electrical and Electronic Equipment Regulations 2013 (Ref 15-26);
- Environmental Protection Act 1990 (Ref 15-27); and
- Environment Act, 2021 (Ref 15-28).

### Waste Management Plan for England (2021)

15.8.7 The Waste Management Plan for England 2021 (Ref 15-29) fulfils the requirements of the Waste Regulations. The Plan provides an analysis of current waste management practices in England and evaluates the implementation of the objectives and provisions of the Waste Regulations.

### Our Waste, Our Resources: A Strategy for England (2018)

15.8.8 This strategy (Ref 15-30) "sets out how we will preserve our stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. At the same time we will minimise the damage caused to our natural environment by reducing and managing waste safely and carefully, and by tackling waste crime." The strategy combines actions to be taken now and commitments for the coming years.

## Methodology

15.8.9 The standard approach under the IEMA guide to Materials and Waste in Environmental Impact Assessment (Ref 15-31) is to compare waste generated by the development against available capacity. Since appreciable quantities of operational waste are not expected to be generated until major replacement occurs in approximately 25 years, this approach is not applicable. There is no realistic way of anticipating what waste management capacity will be available in 25 years' time, particularly for specialist waste such as those that may be generated by the Scheme.

15.8.10 An alternative approach under the IEMA guidance is to compare the expected landfill diversion rate against the following criteria.

**Table 15-11: Assessment of Impact Magnitude**

| Effect | Landfill Diversion Rate |
|---|---|
| No change | 100% landfill diversion. |
| Negligible | 90-99% landfill diversion. |
| Minor | 60-89% landfill diversion. |
| Moderate | 30-59% landfill diversion. |
| Major | <30% landfill diversion. |

## Assessment of Effects

### Construction

15.8.11 The type of waste generated during construction is likely to comprise:

- General waste from site offices and welfare facilities;
- Small quantities of waste from the maintenance of construction vehicles;
- Packaging waste from incoming materials; and
- Other waste from construction of fencing, access roads and other supporting infrastructure.

15.8.12 The PV modules, racks, inverters and other supporting equipment will be manufactured off-site to the specified sizes, and wastage during installation is expected to be minimal.

15.8.13 Large-scale earthworks are not expected, and therefore there is not expected to be either a large surplus or shortfall of fill material requiring either export or import. At this stage the potential for generation of some surplus excavated material cannot be ruled out: but the quantities involved would be very small in comparison with regional inert waste landfill capacity, and would

only be disposed of to landfill as a last resort, with reuse or deposit for recovery being preferred options.

15.8.14 A Site Waste Management Plan (SWMP) will be prepared by the applicant, which will set out:

- The waste streams that will be generated;
- How the waste hierarchy will be applied to these wastes;
- Good practice measures for managing waste; and
- Roles and responsibilities for waste management.

15.8.15 All management of waste will be in accordance with the relevant regulations and waste will be transported by licensed waste hauliers to waste management sites which hold the necessary regulatory authorisation and/or permits for those wastes consigned to them.

15.8.16 Considering the above, it is concluded that **significant waste impacts are not expected** during construction.

### Operation

15.8.17 During operation there are expected to be up to 14 FTE staff.

15.8.18 Waste arisings from this day-to-day operation would include:

- Welfare facility waste; and
- General waste (paper, cardboard, wood etc).

15.8.19 Waste arisings from these activities are expected to be small in quantity, and they would be managed by appropriately permitted commercial waste carriers and facilities.

### Replacement Frequency and Recycling

15.8.20 During the anticipated 60-year operational life of the Scheme, it is expected that there will be requirement for periodic replacement of some or all of the Solar and Storage Energy Park elements.

15.8.21 Table 15-12 below summarises the anticipated design life and replacement frequency for the main elements of the Scheme.

**Table 15-12: Expected Design Life & Replacement Frequency for Key Components**

| Component | Comment | Design life / Replacement Frequency | Recyclable |
|---|---|---|---|
| PV Modules | Repowering would be considered after approximately 30 years of operational life. | 30 years | Yes |
| PV Module Mounting Structure | Replacement is not anticipated during Scheme operation. | Entire Operational period | Yes |
| DC Cable (low voltage on-site cabling between modules and inverters) | It is not anticipated that the DC cables will need to be replaced during operation, although an allowance has been made for up to 20% of the DC cabling to be replaced during the Scheme operation due to damage or defects | Entire Operational period | Yes |

| Component | Comment | Design life / Replacement Frequency | Recyclable |
|---|---|---|---|
| Batteries and Inverters | Assumed design life of 15 years | 15 – 20 years | Yes |
| AC Cable (medium voltage on-site cabling) | Replacement is not anticipated during Scheme operation. | Entire Operational period | Yes |
| Transformers | Assumed design life of 20 years, although replacement will only be carried out if required for performance or health and safety reasons. | 20 + years | Yes |
| Switchgear | Assumed design life of 20 years, although replacement will only be carried out if required for performance or health and safety reasons. | 20 + years | Yes |
| HV Cabling (Grid Connection Cable) | Replacement is not anticipated during Scheme operation. | Entire Operational period | Yes |
| On-site Substation | Replacement of building is not anticipated during Scheme operation. | Entire Operational period. | Yes |

15.8.22 Recycling routes are generally available for these materials at present. When the time comes for these elements to be replaced, several decades into the future, it is likely that there will be even greater opportunities for recycling, not least because the market will have expanded to meet demand as PV installations increase.

15.8.23 The company “Recycle Solar”, based nearby in North Lincolnshire, reports that 90% of the glass and 95% of the semiconductor materials in end-of-life PV panels can be extracted for use in new PV panels[1].

15.8.24 The UK market for Li-ion battery recycling is under development, as the fleet of electric vehicles and other Li-ion battery users rapidly increases. A number of new investments have been announced[2][3] and an 80% recovery rate is reported.

15.8.25 The overall recovery rate is therefore expected to be greater than 60% (and potentially greater than 90%), and hence effects are assessed to be **Minor/Negligible**.

### Decommissioning

15.8.26 At the end of the Scheme’s operational life, it will be decommissioned. A **Framework Decommissioning Environmental Management Plan** (DEMP) **[EN010131/APP/7.5]** has been prepared as part of the EIA, that will set out the general principles to be followed in the Detailed Decommissioning Plan that will

[1] https://www.recyclesolar.co.uk/
[2] https://www.recyclemetals.org/newsandarticles/johnson-matthey-emr-lithium-ion-battery-recycling.html
[3] https://www.rsbruce.com/battery-recycling

be prepared prior to decommissioning occurring. Recycling of key components would follow the approach set out in paragraphs 15.8.22 to 15.8.26 above.

## Residual Effects and Conclusions

15.8.27 Significant residual effects are defined as moderate or major. No such effects are expected for waste.

## Cumulative Assessment

15.8.28 This section presents an assessment of cumulative effects between the Scheme and other proposed and committed plans and projects including other developments.

### Cumulative Assessment Methodology

15.8.29 This assessment has been made with reference to the methodology and guidance set out in **Chapter 5: EIA Methodology [EN010131/APP/3.1]** and shortlist of cumulative schemes identified in **ES Volume 3: Appendix 16-A [EN010131/APP/3.3]**.

### Potential Cumulative Effects

15.8.30 Because the quantities of construction waste are expected to be very small in the context of regional construction waste arisings, no cumulative waste impacts during Construction are expected.

15.8.31 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. These specialist facilities would treat waste from PV projects, and as such their capacity is expected to i) develop to match the requirement from other PV projects both regionally and nationally; and ii) not influenced by other non-solar energy projects in the surrounding area. Therefore, no cumulative waste impacts have been identified for the Scheme.

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