

Tween Bridge Solar Farm

Environmental Statement

Appendix 1.0: Environmental Statement Non-Technical Summary

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

APFP Regulation 5(2)(a)

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1. INTRODUCTION

This document provides a Non-Technical Summary (NTS) of the Environmental Statement (ES), prepared on behalf of RWE Renewables UK Solar and Storage Ltd (the Applicant) and forms part of a suite of documents supporting an application under the Planning Act 2008 to the Secretary of State (SoS) for the Department for Energy Security and Net Zero (DESNZ) for a Development Consent Order (DCO) for the Tween Bridge Solar Farm, (hereafter referred to as the Scheme).

The Environmental Impact Assessment (EIA) presents the findings of the Scheme for the construction, operation, and decommissioning of a ground mounted solar photovoltaic (PV) electricity generation station with a capacity of over 50 Megawatts (MW) and associated development comprising of energy storage located on land approximately 10 kilometres to the northeast of Doncaster and 14 kilometres to the west of Scunthorpe (hereafter, the Order Limits). The EIA is produced in accordance with The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as the EIA Regulations) and the Planning Act 2008.

The Scheme constitutes a Nationally Significant Infrastructure Project (NSIP) as it comprises the construction of a generating station in England that does not generate electricity from wind, is not an offshore generating station and has a capacity of more than 50 Megawatts (MW). Therefore, instead of applying to the local authority for planning permission, the application must be made to the Planning Inspectorate that will appoint an Examining Authority to examine the application and make a recommendation on the same to the SoS of DESNZ, who will then determine the application (the Examining Authority).

The Scheme is located within the Yorkshire and Humber regions. The Scheme straddles the administrative boundaries of Doncaster Council and North Lincolnshire Council. The land within the Order Limits that forms the subject of the ES, extends to approximately 1,831 hectares (ha) (4,524 acres). The Order Limits is shown on [Figure 1](#).

THE APPLICANT

The Applicant is RWE Renewables UK Solar and Storage Limited, a leading solar and battery energy storage developer with one of the largest development pipelines in the UK. RWE Renewables UK Solar and Storage Limited is a subsidiary of RWE AG, which has more than 125 years of energy expertise, through design, construction, and operation. It is RWE AG's ambition to have a carbon neutral energy portfolio by 2040, providing clean, secure, and affordable energy to millions of households.

Legend
 Order Limits

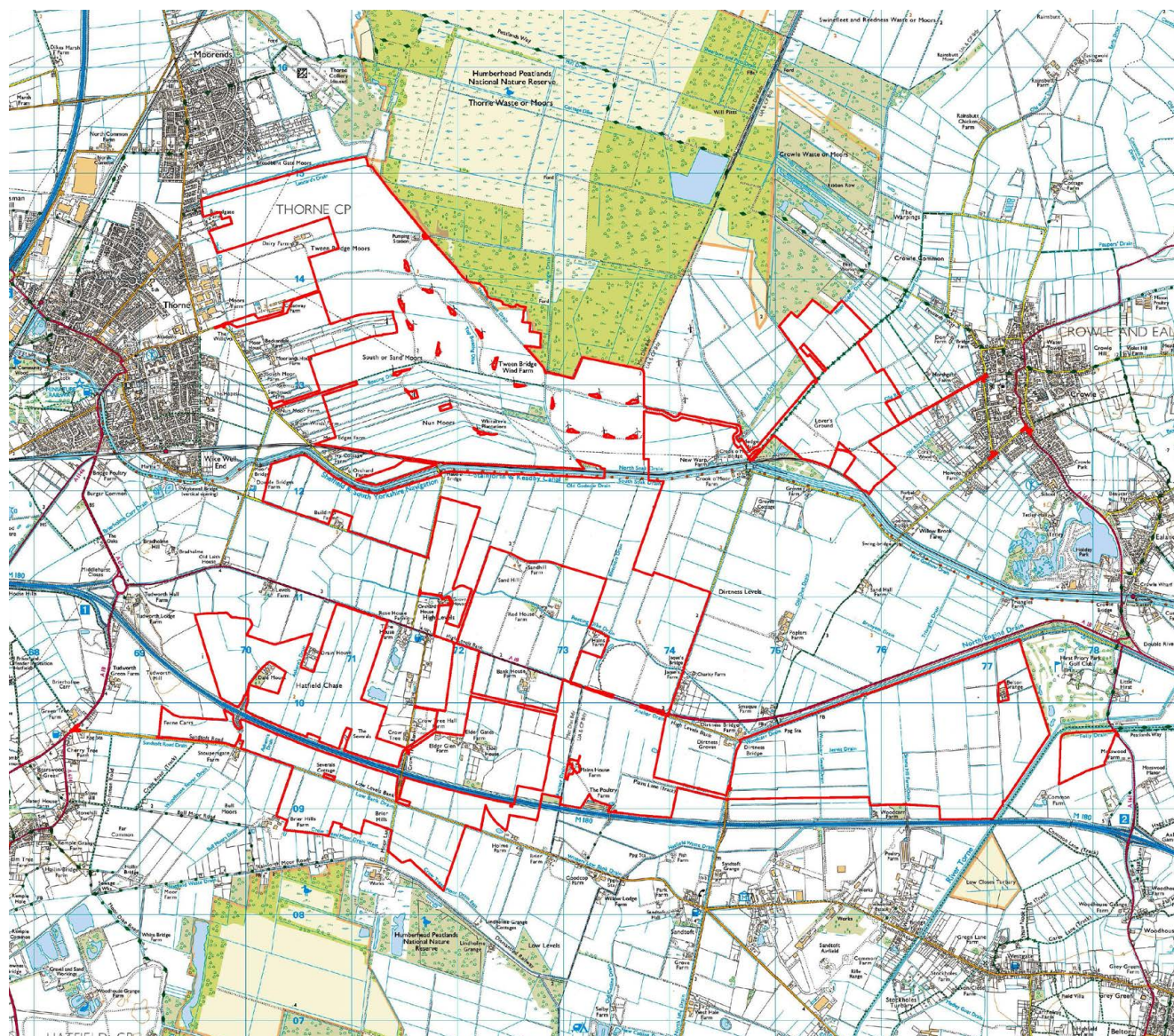


FIGURE 1: ORDER LIMITS PLAN



2. SCHEME DESCRIPTION

The main element of the Scheme is the construction, operation, maintenance and decommissioning of a ground mounted solar park with an intended design capacity of over 50MW and a battery energy storage facility (BESS) with an export/import connection. Once fully operational, the Scheme will export up to 800MW of electricity to the National Electricity Transmission System (NETS). Flexibility in panel layout design would be required to accommodate expected future technology developments as technology continues to evolve and become more efficient.

Fully operational, the solar farm would have the potential to provide enough low-carbon energy to meet the equivalent annual needs of over 388,889 homes¹.

The main components of the Scheme include:

- Solar PV panels, which will be mounted on metal mounting structures with a maximum height of 3.6m and capture solar radiation, converting it to electrical current. Both fixed and tracking systems are proposed, with flexibility of either a layout with just fixed solar PV modules across the Order Limits brought forward or a layout with the majority of the solar panel PV modules fixed and an area in the northern part of the Order Limits as tracking solar PV modules. Both layout options are assessed in the ES, with only one layout option to be constructed;

- On-site supporting equipment including inverters, transformers and switchgear. The supporting equipment enables the electricity generated by the solar panels to be exported to the national grid. By converting the Direct Current (DC) into Alternating Current (AC);
- A BESS is proposed and is indicatively split into 4 separate compounds. Each compound would be located next to one of the seven on-site 132kV substations. Each BESS contains a number of batteries, power conversion units and transformers to store and discharge energy when required. The BESS enclosures (containers) will be located together in a BESS compound, spaced apart. The BESS containers would have a maximum height of 3.6m, a maximum length of 6.5m and a maximum width of 2.5m;
- Seven on-site 132kV substation compounds are proposed and the Solar PV panel and BESS would be connected to these. These are necessary to step up the voltage of the electricity delivered by the Solar PV from 33kV to 132kV for onward transmission to the main on-site 400kV RWE substation;
- Low and medium voltage cabling will be required to connect the solar PV panels to the solar conversion units and the on site substations;
- Underground 400kV interconnecting cabling from the RWE on-site 400kV substation to edge of Order Limits;
- Directional drilling is proposed for cable works for various crossings including: drainage ditches, canal, railway, and the M180;

¹ Calculation based on 2021 generation, and assuming average (mean) annual household consumption of 3,509 kWh, based on latest statistics from Department of Energy Security and Net Zero (Subnational Electricity and Gas Consumption Statistics Regional and Local Authority, Great Britain, 2021, Mean domestic electricity consumption (kWh per meter) by country/region, Great Britain, 2021)

- A pole-mounted Closed Circuit Television (CCTV) system will be mounted around the perimeter of the operational Scheme and will be inward facing. The CCTV cameras will comprise a maximum height of 3m;
- Extensive areas of habitat enhancement are included within the design of the Scheme, this includes the planting of new hedgerows and enhancing existing field boundaries and to improve the connectivity of hedgerow and woodland networks across and beyond the Order Limits;
- Temporary diversion of sections of Public Rights of Way (PRoWs) Thorne 19 and CROW 21, which traverse the Order Limits, may be required during the construction and decommissioning periods in order to separate and keep apart members of the public from the construction / decommissioning vehicles and machinery;
- There are 27 access points proposed for the Scheme, the majority of these will utilise existing agricultural access points and will upgrade these for the purposes of the Scheme;
- Internal access tracks will connect solar panelled areas to one another. Existing farm access tracks will be used where possible;
- Security Fencing is proposed across the Scheme and will comprise 2.4m palisade fencing enclosed by a 1.2m high stock fence around the substations with perimeter fencing up to 1.8m in height around the Solar PV arrays;
- Temporary development during the construction phase of the Scheme including construction compounds, parking and temporary access roadways to facilitate access to all parts of the site;
- Proposed culvert and upgrades to existing culvert; and
- Provision of permissive pathways through the Scheme and a bird viewing gallery.

TIMESCALES OF THE SCHEME

The construction phase assumes the Scheme is built out up to a 54 month-period in either a single, consecutive approach (development of land parcels completed one after another with the potential for breaks between development of land parcels) or through multiple stages (development of land parcels concurrently). For the multiple stage construction option, no more than two land parcels (within land parcels A-E) would be built out at the same time.

If the Scheme is to be constructed in single continuous phase, then an operational period of 40 years would be sought and the entire Scheme would be decommissioned after an operational lifespan of 40 years. If the Scheme is to be constructed in phases, then each phase would be decommissioned after achieving its 40 year operational lifespan. The exception to this would be the 400kV RWE Substation and its associated infrastructure whereby it would be built as part of the first phase of works and its decommissioning would be linked to the decommissioning of the final phase of the Scheme.

Subject to obtaining the necessary consents, construction of the Scheme is anticipated to commence at the earliest in 2028, and to be completed and the Scheme fully operational in 2032.

OPERATIONAL PHASE

During operation of the Scheme, activities on site would amount to servicing and maintenance of plant and equipment associated with the Scheme, including solar panels, inverters, transformers, substation compound and vegetation and biodiversity management. Landscape, ecological and biodiversity benefits could include the installation of barn owl boxes, bird nesting boxes, bee hives, log piles and other hibernacula such as small buried rubble piles suitable for reptile species, amphibians and insect life. Land between and beneath the panels would be used for biodiversity enhancements and potentially for sheep grazing. Tree planting would be introduced along field boundaries where required.

DECOMMISSIONING PHASE

The Scheme will be decommissioned at the end of its approved operational phase (i.e. 40 years), all above ground infrastructure and cabling above 1m below ground will be removed. Any cabling 1m+ below ground may not be removed at decommissioning. These items would be recycled or disposed of in accordance with good practice and market conditions at the time. A Decommissioning Environmental Management Plan, to include timescales and transportation methods will be agreed in advance with the Local Planning Authority.

The effects of decommissioning are often similar to, or to a lesser extent than, the construction effects and have been considered where possible in the ES. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Scheme.

3. SITE DESCRIPTION, SITE SELECTION AND ITERATIVE DESIGN PROCESS

THE SITE

The Order Limits for the Scheme extends to approximately 1,831 hectares of land, shown on [Figure 1](#), of which comprises the maximum area of land potentially required for the construction, operation and decommissioning of the Scheme. The Order Limits is made up of five Land Parcels (described as Land Parcels A to E) and shown on [Figure 2](#).

The Order Limits broadly lies between the settlements of Thorne and Crowle, occupying separate parcels of land within a relatively flat agricultural landscape predominantly in arable use. Many of the field boundaries are subdivided into rectilinear parcels by long linear drainage ditches, some with partial or sporadic hedgerows. The Order Limits is dissected by several major roads and routes, including the M180 motorway, the A18, the South Humberside Main Line railway route and Stainforth and Keadby Canal.

Numerous other minor roads cross the landscape connecting scattered residential properties and farmsteads, many of which lie adjacent or in proximity to the Order Limits. Tween Bridge Wind Farm and substation is situated in the northern part of the Order Limits. Overhead power lines and lattice pylons runs across the northern part of the Order Limits. There are wooden pole lines and masts within the Order Limits.

There are two areas of woodland to the north and south of the Order Limits associated with former peat extraction at Hatfield Moors and Thorn Moors. The remainder of the landscape contains relatively limited areas of vegetation, largely limited to field boundaries in the form of hedgerows and occasional scattered trees or groups of trees and some small woodland copses.

There are a number of PRoW that are located within or close to the Order Limits. Public Footpath FP19 (Thorne) lies in the central northern part of the Order Limits. Public Footpath FP15 (Thorne) lies just beyond the most north western boundary of the Order Limits. Public Right of Way (Footpath 17) lies beyond the north eastern part of the Order Limits forming a continuation of an unnamed north-east/south west Byway. Footpath 18 runs from the unnamed Byway south eastwards into the western side of Crowe.

Landform within the Order Limits is predominantly flat and open in nature. The topography of the wider area surrounding the Order Limits is generally low lying and displays similar characteristics to that found within the Order Limits.

The land within the Order Limits is not covered by any designation at a national, regional or local level that recognises it as having specific landscape importance.

The Order Limits are situated outside of any statutory designated sites for nature conservation with the exception of a small 0.53ha area of Thorne & Hatfield Moors Special Protection Area (SPA), Thorne Moor Special Area of Conservation (SAC), Thorne, Crowle and Goole Moors Site of Special Scientific Interest (SSSI) and Hatfield Chase Ditches SSSI. Whilst the Moors SPA/ SAC/SSSI lies within the Order Limit (Parcel A), they are outside the development footprint.

A further four international statutory designated sites occur within 10km of the Order Limits boundary and eight national statutory designated sites occur within 5km of the Order Limits, including Local Nature Reserves (LNR) and SSSI's The Humberhead Peatlands National Nature Reserve (NNR) is also located directly adjacent to the Order Limits boundary.

Ten non-statutory designated Local Wildlife Sites (LWS) fall within the Order Limits and four candidate non-statutory Local Wildlife Sites (CLWS) fall within the Order Limits. These are all associated with 'drain' watercourses within the Order Limit, except for Whittaker's Plantation CLWS which related to plantation woodland.

There are no Scheduled Monuments or Conservation Areas located within the Order Limits. The nearest Scheduled Monument is the Peel Hill motte and bailey castle located circa 1.3km west of the Order Limits. There are 23 Grade II Listed Buildings located within close proximity to the Order Limits.

The majority of the Order Limits is located within Flood Zone 3, at high risk of flooding. The risk of flooding from surface water shows that the majority of the Order Limits is not predicted to be impacted by a 1 in 1000 year rainfall event and has a Very Low Risk likelihood of surface water flooding.

The Order limits and surrounding context are shown on the Environmental Designations Plan at [Figure 3](#).

SITE SELECTION

As part of the iterative EIA and design process, the design of the Scheme has evolved to take account of various environmental constraints. In this respect, environmental desktop and onsite reviews, interim assessments of the emerging Scheme and relevant knowledge gained from environmental baseline surveys and extensive consultation with consultees, have influenced the evolution of the Scheme. Adopting this iterative design process has enabled the early identification of mitigation measures which have then become inherent in the design.

The site was selected by the Applicant for a number of reasons, including the following:

- Connections to Northern Power Grid for projects below 50MW would not be available in the area, so the proposals would need to be of sufficient scale to justify the cost of a connection to the National Electricity Transmission System (NETS);
- It was not possible to extend the existing Tween Bridge Wind Farm due to the effects this would have on the operational needs of Doncaster Sheffield Airport;
- A solar farm would be capable of utilizing the existing land between the wind turbines most efficiently in order to generate the required amount of electricity;
- Previous knowledge and experience of the Order Limits demonstrated that a solar farm could be developed while avoiding sensitive landscapes and environments;
- Access for construction and operation would be readily available; and
- Existing landowner relationships meant that land could be acquired voluntarily.

An iterative design process has continued throughout the EIA process, with the design responding to consultee comments and has also been influenced by the key environmental constraints identified for the Order Limits.

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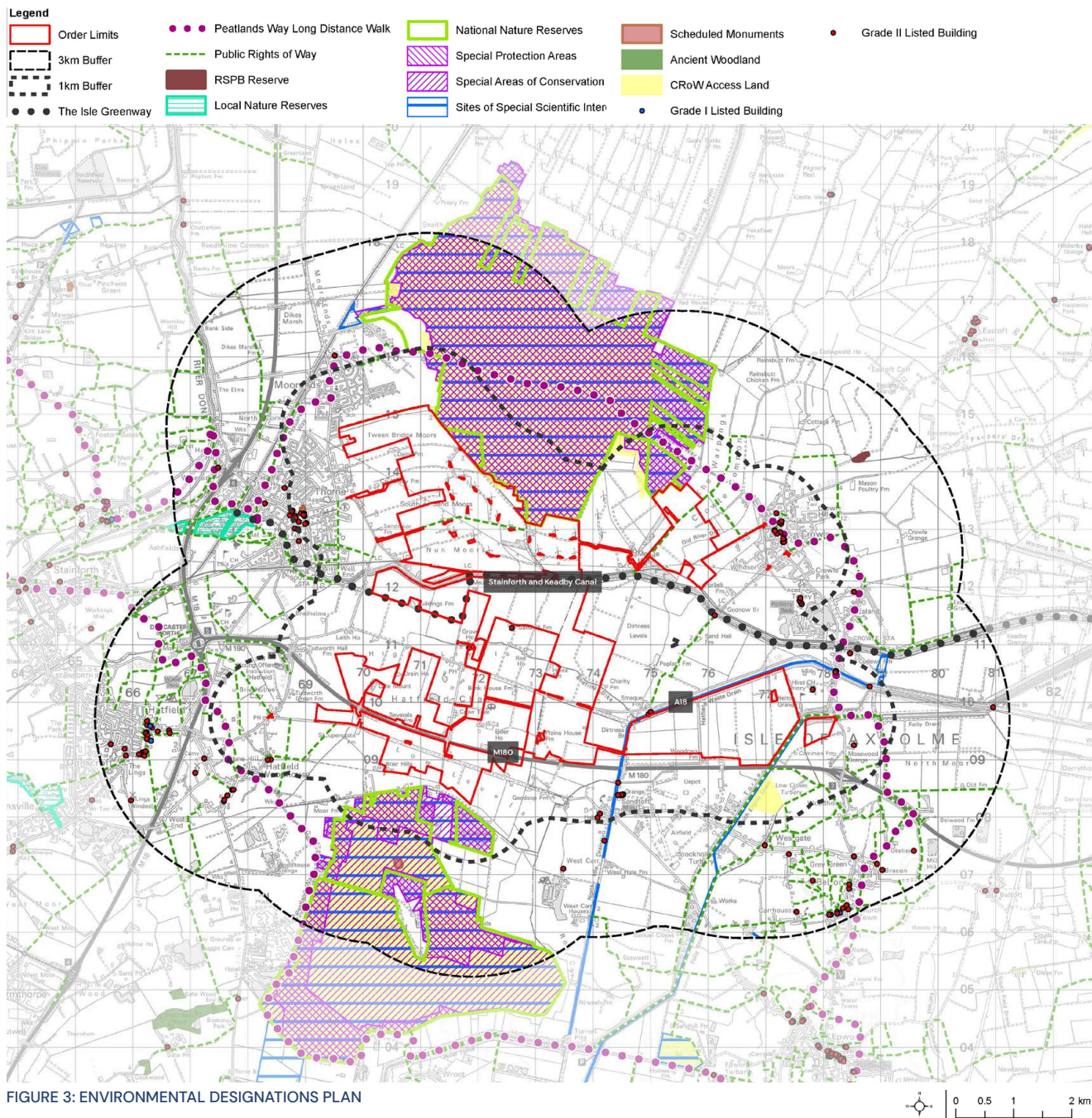
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4. APPROACH TO EIA

An EIA is a process for identifying the likely significance of environmental effects (beneficial or adverse) arising from a proposed development, by comparing the existing environmental conditions prior to development (the baseline) with the environmental conditions during/following the construction, operational and decommissioning phases of a development.

The EIA process considers measures to avoid, reduce, or mitigate any significant adverse effects on the environment and, where possible, enhance the environment. In this way, the assessment process feeds back to inform the final design.

The EIA is carried out prior to the submission of a DCO application, during the development of a project. Reporting these effects enables the Consenting Authority, the Examining Authority, statutory consultees, and wider public to consider the environmental effects of an application.

The ES is the document that sets out the findings of an EIA and summarised using non-technical language in an accompanying NTS document. This document is the Tween Bridge Solar Farm NTS and meets the requirements of the EIA Regulations.

SCOPING

In order to determine the content of the EIA, the EIA Regulations make provision for, but do not statutorily require, an applicant to request that the Planning Inspectorate (on behalf of the SoS) provide a written opinion as to the information to be provided (i.e. 'scoped') within the ES – this is referred to as a Scoping Opinion.

A request for a Scoping Opinion, which included information regarding the proposed scope and

methodology of the technical studies to be included within the ES, was submitted on behalf of the Applicant on the 31 January 2023 to the Planning Inspectorate. The Planning Inspectorate provided a Scoping Opinion on the 13 March 2023. The Scoping Opinion confirmed that the topics proposed were generally acceptable and appropriate.

STATUTORY CONSULTATION AND PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

Prior to the completion of the ES, a Preliminary Environmental Information Report (PEIR) was prepared to support statutory consultation. The PEIR was published in March 2025 to inform the public and stakeholders of the Applicant's preliminary assessment of the likely significant environmental effects of the Scheme at the point of writing.

The Applicant sought the views of consultees on the information contained within the PEIR, and there was an opportunity within the process up to submission of the DCO application for both the EIA and the project design to have regard to comments received. All issues raised during consultation on the PEIR have been considered during the EIA process and used to inform the final impact assessment for the ES, which this NTS summarises

ES SCOPE

This ES comprises studies on each of the aspects of the environment identified as likely to be significantly affected by the Scheme (the 'Environmental Aspect Chapters'), which are supported with figures and technical appendices where appropriate.

The ES is divided into four volumes as follows:

- Environmental Statement Volume 1 Main Report –
Comprises the introductory chapters of the ES that describe the EIA context, the Site, the Scheme, and set out the scope of the ES;
- Environmental Statement Volume 2 Main Report –
This comprises the Environmental Aspect Chapters for each environmental discipline relevant to the proposals. The volume concludes with a summary chapter;
- Environmental Statement Volume 3: Appendices –
Comprises the associated technical appendices which support each environmental topic within Volume 1 and 2; and
- Environmental Statement Volume 4: Figures –
Comprises the associated figures, maps and plans which support each environmental topic within Volume 1 and 2.

The following technical chapters are included:

- Landscape and Visual Impact;
- Ecology and Nature Conservation;
- Cultural Heritage and Archaeology;
- Ground Conditions;
- Water Resource;
- Socio Economics;
- Transport and Access;
- Noise and Vibration;
- Air Quality and Greenhouse Gases;
- Agricultural Circumstances;

- Other Environmental Topics (none of these topics require individual chapters in the ES, either due to the brevity of the assessment, or the small impacts associated with the Scheme):
 - Major Accidents and Disasters;
 - Waste;
 - Electric and Electromagnetic Field;
 - Climate Change Resilience and Adaptation; and
 - Glint and Glare.
- Cumulative Impacts

Baseline conditions, that is the existing conditions of the Order Limits, are discussed in each Environmental Aspect Chapter describing the key elements and baseline receptor(s) as it relates to each technical discipline. Often baseline survey work has been undertaken to understand the baseline conditions of the Order Limits and surrounding context.

Each chapter includes an 'Assessment of Likely Significant Effects' section to identify, evaluate and assess the degree of significance of the potential effect (if any). Effects will be assessed only for the construction, operational and decommissioning phases of the Scheme. Effects will be stated before additional mitigation in the first instance.

Where necessary, mitigation measures have been proposed to ameliorate effects specific to an environmental theme, many of which are purposely incorporated into the design of the proposals and are highlighted as 'embedded mitigation' and generally considered in the initial 'Assessment of Likely Significant Effects'. 'Additional mitigation' measures may also be proposed that are not included within the design.

With additional mitigation measures in place, a secondary assessment of likely significant effects is completed to identify the 'residual effects;' these are defined as the effects that remain on receptors following the implementation of mitigation measures. They could be beneficial or adverse and are rated on a sliding scale from major to negligible/neutral with a conclusion on whether the effect is 'Significant' or 'Not Significant.' Generally, effects assessed as being of 'major' or 'moderate' significance are considered to be significant effects in the context of the EIA Regulations, unless otherwise stated in technical chapter methodologies. Significant effects must be taken into account by the relevant decision makers.

CUMULATIVE AND IN COMBINATION EFFECTS

Within EIA, cumulative effects are generally considered to arise from the Scheme and from 'other developments' in the vicinity acting together to generate elevated levels of effects. This is known as 'cumulative effects.' Twenty three other developments have been identified within the surrounding area and are considered within the cumulative effects assessment of the Scheme their locations are shown on [Figure 4](#). Each Environmental Aspect Chapter has undertaken an assessment of the likely significant effects with the relevant committed developments to their discipline.

No significant adverse cumulative effects have been identified. **Significant beneficial** cumulative effects have been identified for construction phase employment, contribution to economic output, construction and decommissioning accommodation demand on local tourism, operational employment, operational business rates and decommissioning employment and contribution to economic output.

Additionally, within EIA 'In-combination effects' arise where a single receptor (e.g., residential dwellings) are affected by multiple environmental impacts stemming from the Scheme. This differs from cumulative effects.

The following receptor groups were identified as part of the in-combination assessment:

- Residential receptors;
- Users of PRoW;
- User of transport networks;
- Soils; and
- Ecological Receptors.

No significant adverse in-combination effects have been identified as part of the assessment.

Legend

- Order Limits
- Local Authority Boundary
- Cumulative Sites

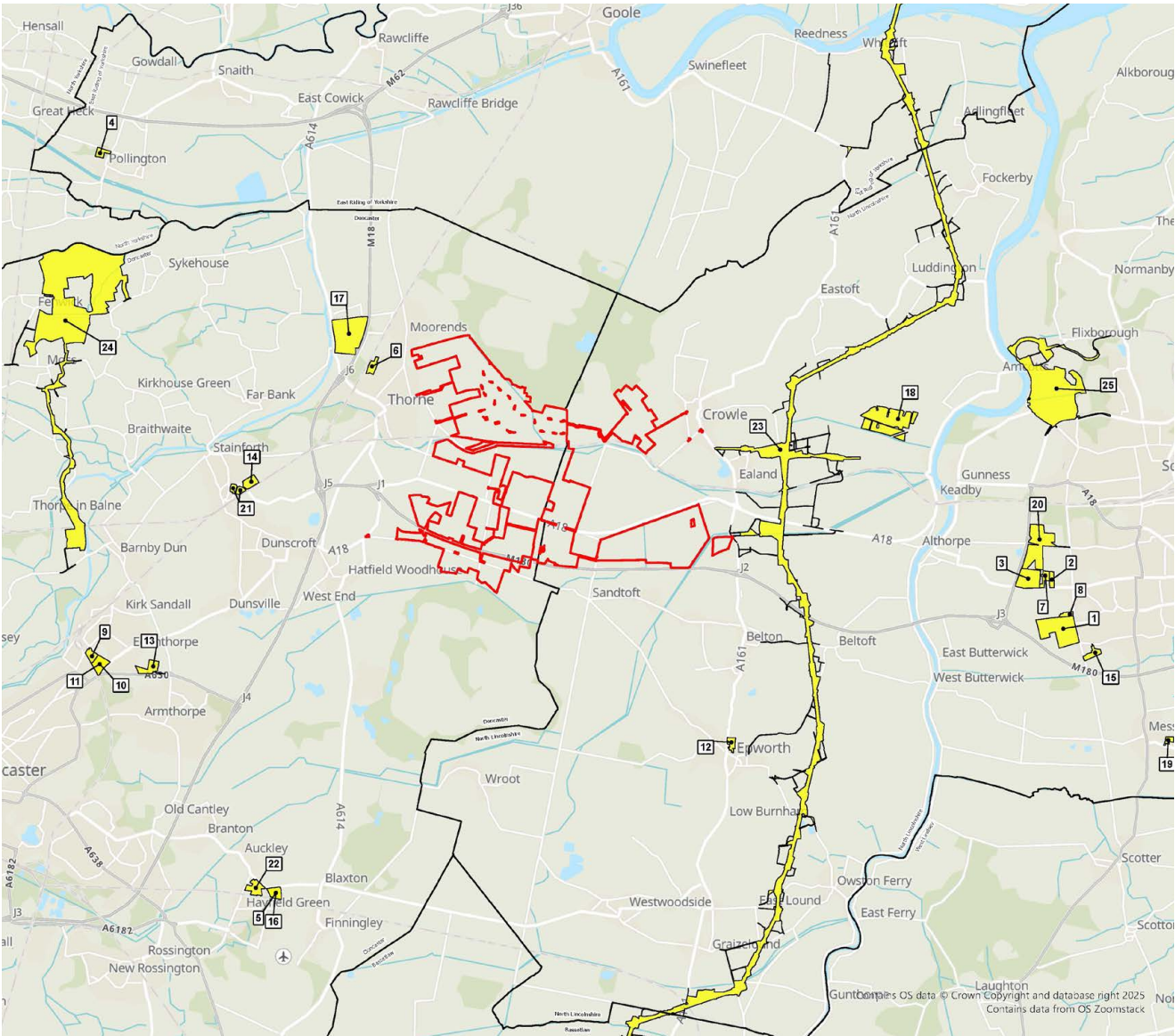


FIGURE 4: CUMULATIVE SITES PLAN

5. LANDSCAPE AND VISUAL IMPACT ASSESSMENT

INTRODUCTION

This chapter of the ES has sought to determine the landscape and visual effects of the Scheme and whether such effects would be significant or not. The assessment has been undertaken by Chartered Landscape Architects at Pegasus Group who are experienced in the assessment of landscape and visual effects of energy developments and are familiar with the local landscape.

It is acknowledged from the outset that, in common with almost all commercial energy development proposals, some landscape and visual effects would occur as a result of the Scheme.

BASELINE CONDITIONS

The Scheme comprises of an area of predominantly agricultural land between the settlements of Thorne and Crowle. Tween Bridge Wind Farm is located within the northern part of the Order Limits. The Stainforth and Keaby Canal crosses the Order Limits from west to east.

The landscape is predominantly flat and low lying. Vegetation consists of eroded hedgerows which are often gappy in parts. There are occasional hedgerow trees and isolated trees often along field boundaries which follow drainage ditches. There are occasional small blocks of woodland in the northern part of the Order Limits.

The M180 and A18 cross through part of the Order Limits from west to east. There is a network of minor roads which are within the Order Limits or adjacent to the Order Limits. There are a network of footpaths and recreational routes that are within the Order Limits or lie close to the Order Limits. The Stainforth and Keadby Canal provides recreational use for both walkers, cyclists and boat users along the canal.

There are several settlements which vary in size that are situated close to the Scheme, with a number of individual or clusters of properties situated close to the Scheme.

With regard to visual receptors, computer modelling known as 'screened zone of theoretical visibility' (see [Figure 5](#)) illustrates the theoretical extent of where the Scheme would be visible from which includes the 'screening' effect from existing vegetation and buildings. This tool has been used to identify 30 potential viewpoint locations which are considered to provide representative views towards and in some cases from within the Order Limits. These include public rights of way, residential receptors, and points along the local transport network including road users and rail users, and users of recreational sites.

LIKELY SIGNIFICANT EFFECTS

With regard to effects on landscape features, the construction of the Scheme would result in notable short-term impacts from the construction activity, including the movement of vehicles and plant, temporary compounds and the construction of the Scheme itself. However, with regard to the trees, woodland and hedgerows within the Order Limits, all vegetation would be retained bar limited removals of hedgerows to facilitate access tracks, with existing gaps utilised for access where possible. This therefore would not result in any **significant adverse effects** on the most sensitive landscape features at the Order Limits.

Once construction is completed there would be no further adverse effects on the landscape features within the Order Limits. Indeed, the Scheme includes for notable planting of new trees, woodland and hedgerows, as well as the establishment of neutral species rich grassland across the majority of the Order Limits.

With regard to effects on landscape character, the construction phase would cause notable, but temporary effects upon the Landscape Character of the land within the Order Limits, due to the extent and size of the Scheme. Such effects would be **significant** given the duration and nature of the construction work.

The operational phase would also cause notable effects upon the Landscape Character of the land within the Order Limits, due to the extent and size of the Scheme along with localised effects as much of the Scheme would occupy the character areas and types. Such effects would be **significant**.

In terms of visual receptors, there would be **significant** visual effects on several individual properties, which lie outside of the closest settlements within the agricultural landscape. This applies to those properties which have clear, open views across part of the Scheme, which are not blocked by other properties or vegetation. For the majority of residential properties however the magnitude of impact would be no greater than low, resulting in **moderate to minor effects (not significant)**. Mitigation has been included as part of the final layout proposals, which includes further offsetting and new vegetation planting to help minimise impacts, which is demonstrated on [Figure 5](#).

At the early design stages of the Scheme, it was determined that users of the Stainforth and Keadby Canal would be sensitive receptors and appropriate offsets from the Canal Corridor would be required that have been designed into the final layout. Nonetheless it is acknowledged that there would be **significant** visual effects on users of some sections of the canal as they approach and pass through the scheme either in boats or using the towpath, plus several other Public Rights of Way which pass through or close to the Scheme, and for road users for a number of roads which pass through or are within close proximity to the Scheme. This would apply to those sections which have clear, open views across parts of the Scheme, which are not blocked by existing hedgerows or other vegetation. Mitigation has been included as part of the final layout proposals, which includes further offsetting and new vegetation planting to help minimise impacts, demonstrated on [Figure 6](#).

Legend

 Order Limits	 OS Local Woodland	 BESS - 3.6m height
 5km Buffer	● Viewpoint Location	 Substations - 15m height
 OS Local Buildings	● Photomontage Viewpoint Location	 Screened Zone of Theoretical Visibility
 OS Local Woodland	 PVcase PV Modules (full frames) - 3.6m height	

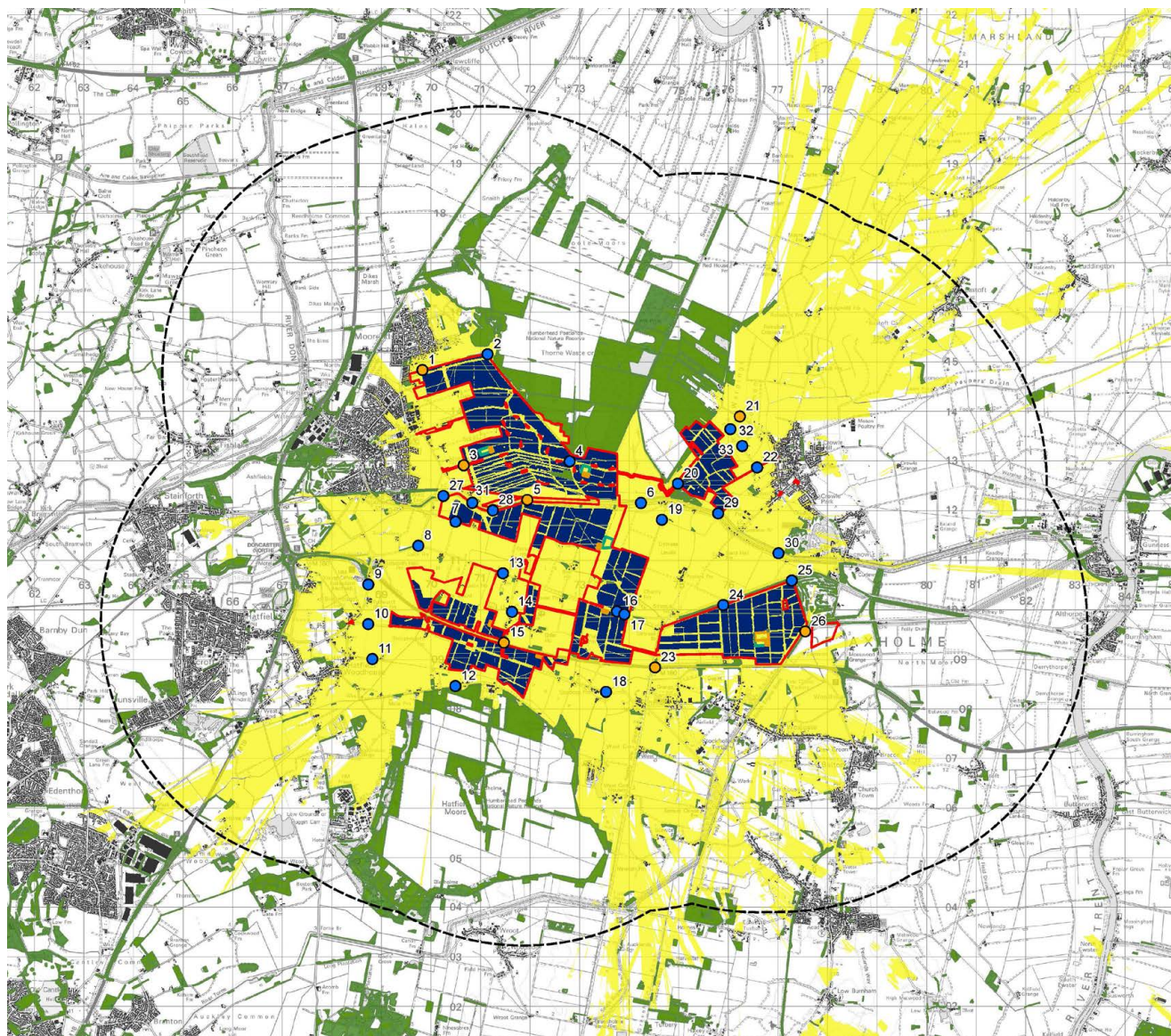
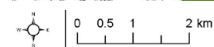
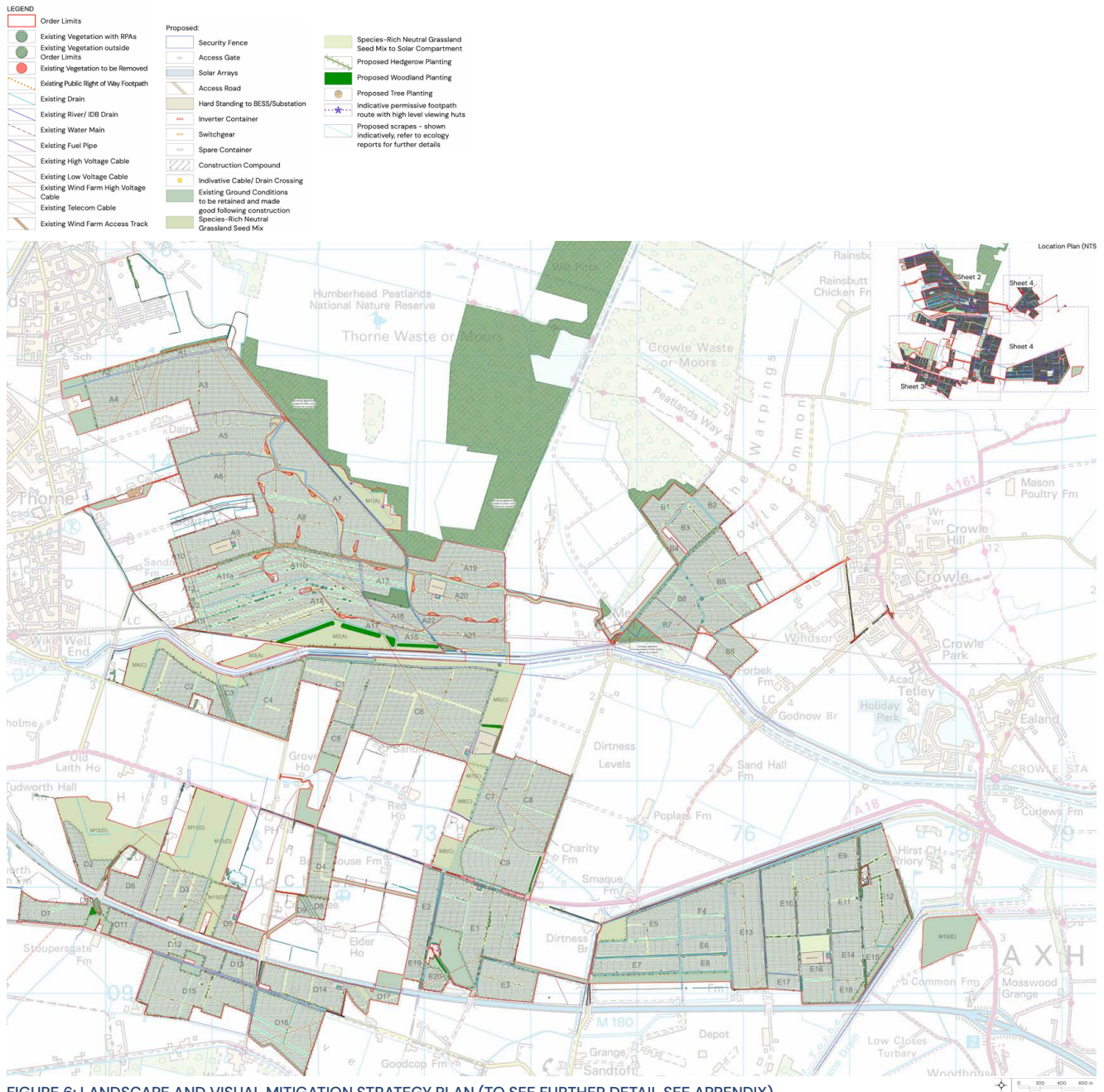


FIGURE 5: SCREENED ZONE OF THEORETICAL VISIBILITY PLAN





MITIGATION AND ENHANCEMENT

The primary mitigation adopted in relation to landscape and visual matters is that which has been embedded within the design of the Scheme and comprises the consideration given to avoiding and minimising landscape and visual effects during the evolution of the Scheme layout. This is sometimes referred to as 'mitigation by design'. In addition, a series of landscape mitigation and enhancement measures are proposed to be included as part of the Scheme, and these are illustrated on **Figure 5**. These include planting of new hedgerows, trees, woodland and the establishment of neutral species rich grassland.

CONCLUSION

Some significant adverse effects are identified (to ground cover and the landscape character of the Order Limits and immediate surroundings during construction and at operation to the landscape character of the Order Limits and immediate surroundings, some residential receptors, some users of the public rights of way network and canal corridor and some users of the transport network), but these are highly localised and limited in nature, with many of the effects reduced by Year 15 following implementation of the landscape mitigation planting. Indeed, this planting would result in **significant beneficial effects** in terms of the hedgerow network within the Scheme.

6. ECOLOGY AND NATURE CONSERVATION

INTRODUCTION

This chapter of the ES addresses the potential effects on ecological features during construction, operation and decommissioning of the Scheme. Effects have been assessed in accordance with guidance set out in Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1

BASELINE CONDITIONS

The Scheme comprises an area of predominantly agricultural land between the towns of Thorne and Crowle. The Tween Bridge Wind Farm is located within the Order Limits, and consists of twenty-two operational wind turbines. The Stainforth and Keadby Canal crosses the Order Limits from west to east. The River Torne is present adjacent to the south west of the Order Limits.

Habitats within the Order Limits are dominated by arable farmland, associated with species-poor hedgerow systems and watercourses with ponds and a parcel of plantation broad-leaved woodland. The Order Limits comprise of open fields of limited biodiversity value, and subject to intensive farmland management.

There are eleven international statutory designated sites for ecology and nature conservation within 30km of the Order Limits boundary. The Order Limits lie outside designated sites with the exception of Thorne & Hatfield Moors SPA, Thorne Moor SAC, Thorne, Crowle and Goole Moors SSSI and Hatfield Chase Ditches SSSI. Whilst the Moors SPA/SAC/SSSI lies within the Order Limit, they are outside the development footprint (see [Figure 3](#)).

Eight national statutory designated sites occur within 5km of the Order Limits, including Local Nature Reserves (LNR) and SSSI's The Humberhead Peatlands National Nature Reserve (NNR) is also located directly adjacent to the Order Limits boundary.

Ten non-statutory designated Local Wildlife Sites (LWS) fall within the Order Limits and four candidate non-statutory Local Wildlife Sites (CLWS) fall within the Order Limits.. These are all associated with 'drain' watercourses within the Order Limit, except for Whittaker's Plantation CLWS which related to plantation woodland.

Comprehensive ecological surveys have been undertaken since 2022 to inform this assessment. With the aim of providing the required information regarding habitats along with protected species, such as breeding and non-breeding birds, badger, otter, water voles, amphibians and invertebrates. These surveys were used to inform the iterative design of The Scheme and avoidance of ecological features of value, such as hedgerows, woodland and watercourses, has been a core design principle.

LIKELY SIGNIFICANT EFFECTS

Higher value habitats including woodlands, watercourses, trees and hedgerows are retained and protected, with construction phase effects largely confined to arable land of low ecological value, but which is noted to support both significant assemblages of both breeding and non-breeding birds.

The Scheme also includes embedded habitat enhancement provisions; which will be managed for the benefit of wildlife over the long term and will provide biodiversity gains for a wide variety of species including invertebrates and bats.

The proposed creation of diverse grasslands and hedgerow planting will also deliver a quantifiable Biodiversity Net Gain (BNG) and will ensure that the Scheme will deliver a substantial ecological benefit.

No significant adverse effects have been identified in relation to non-statutory designated sites, habitats and species during the construction phase.

This assessment has concluded that potential impact pathways are present for a number of qualifying features of the nearby statutory sites. Mitigation measures in terms of buffer zones and sensitive working methodologies are detailed within the Ecological Construction Management Plan (ECMP) and are considered to adequately mitigate for most effects on the statutory designated sites identified.

However, the mitigation is not considered sufficient to mitigate for all effects on all qualifying features. Impacts on a number of qualifying bird species of the Humber Estuary SPA/Ramsar are expected through habitat loss and disturbance where these species are present in the Order Limits or adjacent land. Additional mitigation in the form of large areas of permanent pasture managed and also arable, both of which will be sensitively managed for the target species is proposed, with further details provided within a Landscape and Ecological Management Plan (LEMP).

Additional scrapes (a shallow depression in the ground that holds water seasonally) are to be created within the grassland areas to provide further habitat opportunities to bird species, which are not currently present.

A significant population of ground nesting species was recorded within the Order Limits. Ground-nesting bird mitigation will utilise on-site mitigation measures, comprising the provision of large areas of open, permanent pasture managed sensitively for skylark and skylark plots, further details are provided within a LEMP.

Once operational, solar farms function with little intervention or disturbance required. This is limited to occasional maintenance visits and ongoing management of grassland and other habitats around the Order Limits, including cutting or grazing the grassland and periodic hedgerow cutting. Habitat creation, which forms part of the operational design, includes extensive areas of grassland attractive to a range of species which maintains habitat connectivity within and around the Order Limits and provides enhanced opportunities for wildlife.

MITIGATION

Measures are set out to avoid or mitigate against potentially adverse effects during both the construction, operation and decommissioning periods of the Scheme and these measures will be secured by adoption of agreed Outline and Detailed ECMP, LEMP and Decommissioning Environmental Management Plan (DEMP).

Additional measures have been identified where required to ensure legislative compliance and the protection of wildlife, including pre-commencement/construction surveys and, where necessary, mitigation licences issued by Natural England which will ensure that the favourable conservation status of relevant species will be maintained.

Enhancement measures are also proposed as part of the Scheme which include:

- BNG for habitats, combined with other measures, will provide new and enhanced features that can be used for breeding, foraging, overwintering and refuge by a range of species, from birds and bats to amphibians, reptiles and invertebrates. The cessation of the use of agricultural chemicals across the Order Limits (following removal from farming use) will provide further benefit, in particular for invertebrate populations;
- Habitat enhancements across the Order Limits will provide benefits by increasing opportunities for many of the species associated with designated sites and increase and improve ecological connectivity; and

- A number of boxes will be installed for birds, bats and hedgehogs as well as insect hotels, beetle banks, hibernacula and bee hives across the Order Limits, the principles of which are provided in the accompanying Outline LEMP.

CONCLUSION

With embedded design measures and mitigation in place as described, the Scheme will not result in any **significant adverse effects** during the construction, operation or decommissioning phases.

Major beneficial effects are anticipated as a result of habitat creation and diversification accompanied by long-term habitat management for the benefit of biodiversity.

7. CULTURAL HERITAGE AND ARCHAEOLOGY

INTRODUCTION

This chapter of the ES has considered the likely significant effects of the Scheme upon the cultural heritage resource, including buried archaeological remains within the Order Limits and heritage assets (including Scheduled Monuments and Listed Buildings) located within the wider Study Area. It has been established that subject to appropriate mitigation being implemented, the Scheme would not result in any significant adverse effects upon the cultural heritage resource within the Order Limits and in its surroundings.

BASELINE CONDITIONS

The heritage resource which has been considered includes the known and potential buried archaeological remains which may be affected as part of the construction stage and heritage assets, located within the Order Limits and the Study Area, which could potentially be affected as a result of change within the settings of these assets introduced as a result of the construction, operation and decommissioning of the Scheme.

Figure 7 shows the locations of designated heritage assets within the area surrounding the Order Limits, which includes:

- A Scheduled Monument;
- A Grade 1 Listed Building;
- 33 Grade II Listed Buildings; and
- A Conservation Area.

Figure 8 shows the locations of non designated heritage assets which have been included in the assessment.

LIKELY RESIDUAL SIGNIFICANT EFFECTS

Construction Phase

It has been established that the construction phase of the Scheme has the potential to affect known, non-designated, archaeological remains associated with possible prehistoric Romano-British, post-medieval and modern archaeological remains as well as potential previously unrecorded archaeological remains. The groundworks associated with the construction of the below ground cable routes, directional drilling access pits, temporary compounds, BESS and substations within the Scheme have the potential to truncate or totally remove the archaeological remains within their footprint. Such effects would result in harm to or total loss of the heritage significance of these buried archaeological features. An appropriate programme of mitigation by design and additional mitigation (as required) will allow the magnitude of effect to be Moderate harm (**not significant**). The installation of the solar arrays has the potential to result in localised adverse effects upon archaeological deposits lying beneath the push pin foundations. An appropriate programme of mitigation by design and additional mitigation (as required) will allow the magnitude of effect to be Minor harm (**not significant**).

The construction phase of the Scheme has the potential to affect the settings of 5No. designated heritage assets and 3No. non-designated built heritage assets. Such effects would result in harm to the heritage significance of these assets, leading to Less than Substantial Residual Harm at the lower end of the spectrum in relation to the designated assets and Minor Residual Harm in relation to the non-designated assets (**not significant**).

Operational Phase

The operational phase of the Scheme has the potential to affect the settings of five designated heritage assets and three non-designated built heritage assets and one Area of Special Historic Landscape Interest. Such effects would result in harm to the heritage significance of these assets, leading to Less than Substantial Residual Harm at the lower end of the spectrum in relation to the designated assets and Minor Residual Harm in relation to the non-designated assets (**not significant**).

Decommissioning Phase

The decommissioning phase of the Scheme has the potential to affect the settings of four designated heritage assets and three non-designated built heritage assets and one Area of Special Historic Landscape Interest. Such effects would result in harm to the significance of these assets, leading to Less than Substantial Residual Harm at the lower end of the spectrum in relation to the designated assets and Minor Residual Harm in relation to the non-designated assets (**not significant**).

MITIGATION AND ENHANCEMENT

Designed mitigation in relation to built heritage assets has been agreed and will entail a combination of screening through appropriate boundary treatments and offsets to retain suitable margins around/or views from the assets to minimise the adverse effects upon their settings.

Opportunities to minimise adverse effects upon the buried archaeological resource have also been considered. Site investigation work has determined that some areas of the Order Limits will have no intrusive

construction to enable in situ preservation of the archaeological remains in this area. It is envisaged that buried remains may be able to be preserved in situ in some parts of the Order Limits through the use of ballast foundations.

A proportionate programme of archaeological survey and mitigation, by means of field investigation and recording, will be followed by an appropriate and proportionate mitigation strategy that will ensure that they are subject to preservation by record at an appropriate stage in the development process. The appropriate and proportionate additional mitigation, to be determined in consultation with the archaeological advisors. This will partially offset their loss through the knowledge gained through the investigations. For the archaeological remains the mitigation may include, as appropriate, excavation, strip map and sample investigation, or archaeological monitoring of ground works during construction (known as a watching brief), with appropriate post-excavation analysis and dissemination of results.

CONCLUSION

If appropriate mitigation measures, as discussed above, are implemented, the Scheme is considered acceptable and there would be **no adverse significant residual effects** in relation to non-designated archaeological remains.

- Legend
- Order Limits
 - 1km Buffer
 - ZTV
 - Listed Building
 - ▲ Listed Building

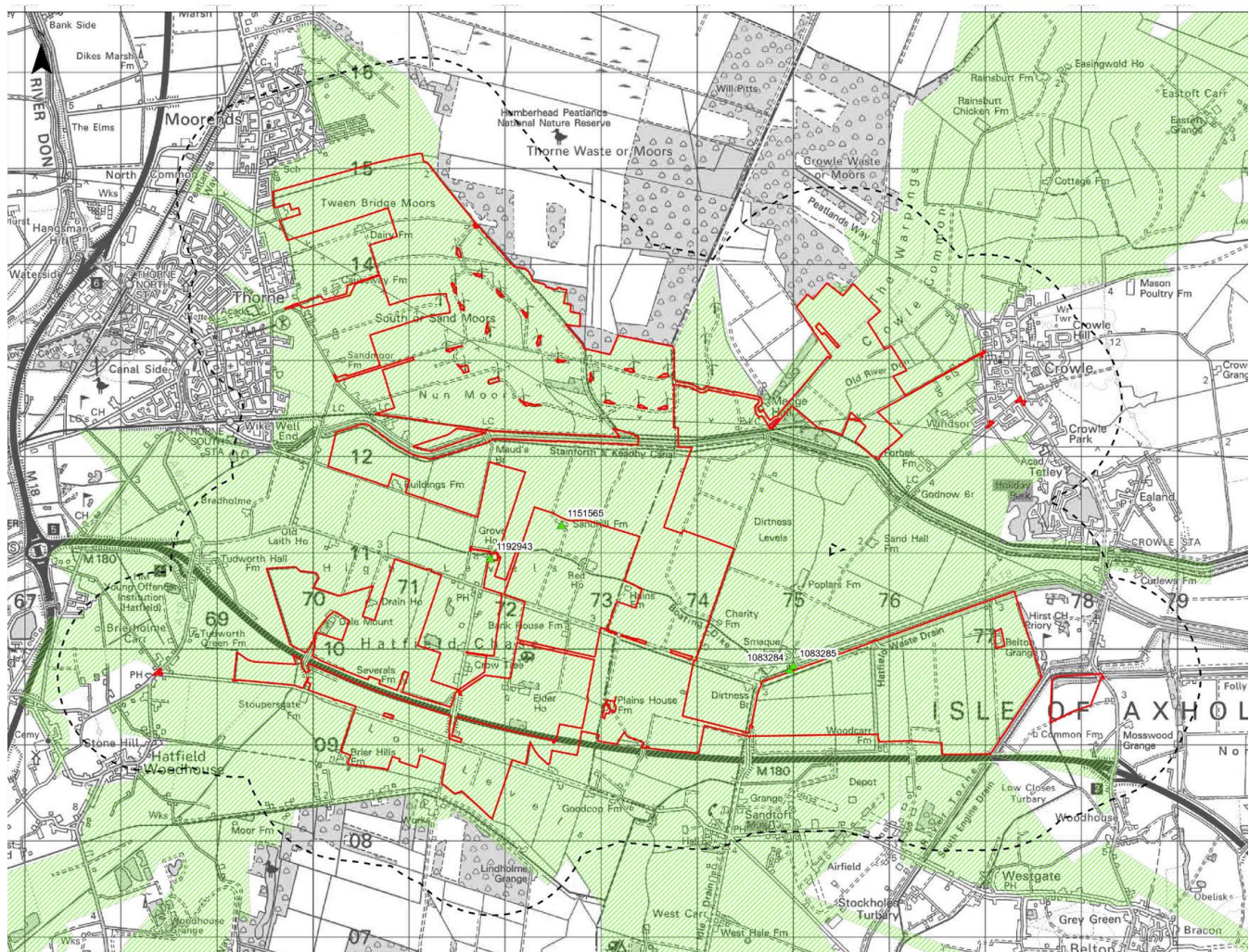


FIGURE 7: DESIGNATED HERITAGE ASSETS PLAN (TO SEE FURTHER DETAIL SEE APPENDIX)

Legend

- Order Limits
- 1km Buffer
- Monument Point (SYAS)
- Monuments Point (NLHER)
- Monuments Line (NLHER)
- Monuments Polygon (NLHER)
- Additional Monuments Point (NLHER)
- Non-Designated Buildings selection
- Additional Assets
- LC14 Isle of Axholme

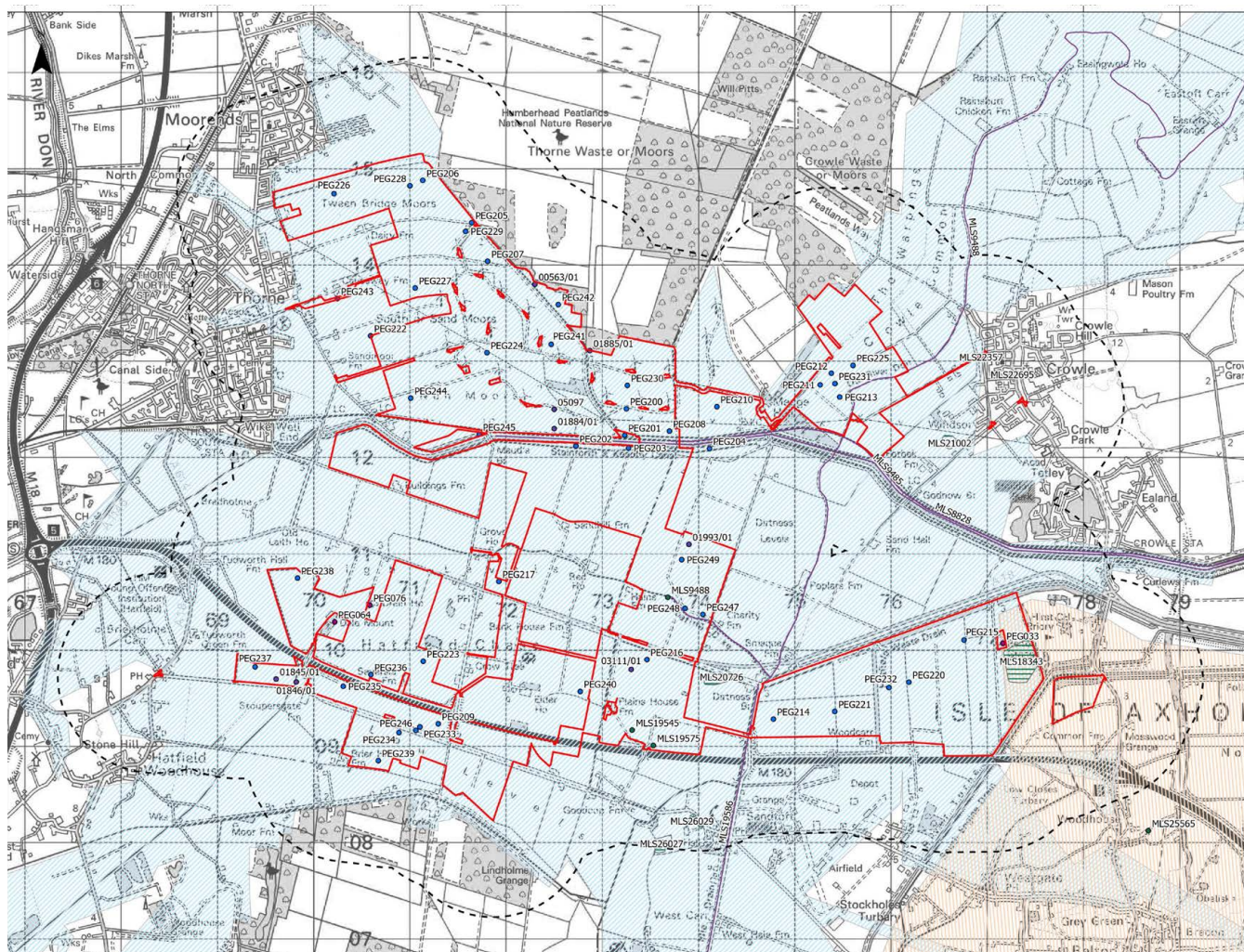


FIGURE 8: NON DESIGNATED HERITAGE ASSETS PLAN (TO SEE FURTHER DETAIL SEE APPENDIX)

8. GROUND CONDITIONS

INTRODUCTION

This chapter of the ES assesses the likely significant effects of the Scheme on Ground Conditions, including soils, geology, groundwater and contaminated land.

BASELINE CONDITIONS

The Order Limits is predominantly formed of large agricultural fields with isolated farmsteads, crossed by a network of roads, railway and canal. It forms part of the lowland basin of the former Rivers Don and Idle, being low-lying at typically 1–4mOD, with very low to Negligible natural gradients. The fields are typically bounded by a grid of numerous drainage ditches and larger watercourses.

The area is underlain by thick sequences of complex superficial deposits including former lake laminated silt/clay deposits, sands and gravels and infill sediments to deep glacial period channels. Thick alluvial clay and silt blankets these and overlap marginal peat deposits. The old rivers have been historically diverted and artificial alluvium (floodwarp) deposited to provide better draining agricultural soils.

Surface soils are loamy or clayey, slowly to moderately permeable, or relatively impermeable and seasonally wet with impeded drainage. This helps maintain a naturally high groundwater table. There are no bog peat soils mapped.

The Scheme area lies beyond the Hatfield Moors gas field and two Petroleum Exploration and Development License areas cover parts of the western Order Limits. The area has a prolonged agricultural history with isolated farmsteads. Peat working is not specifically mapped but has likely occurred historically, with peat works beyond the boundaries. A World War II airfield and bomb stores in the extreme southeast has been returned to agriculture.

Groundwater levels are maintained below ground level for much of the year by drainage and there is likely hydraulic continuity between groundwater and water courses. The overall level and flow will also be controlled by local factors such as former drainage courses or historical features. The western and central zones are in Source Protection Zone (SPZ) 3, due to a SPZ 1 at a pumping station 600m west of the Order Limits, and SPZ 2, 250m West. Groundwater vulnerability to pollution is typically Medium, with parts being High where sands of the Secondary Superficial Aquifer occur.

Four past pollution incidents within the Order Limits are considered as plausible contaminant sources have been considered within the conceptual modelling. Other potential sources of contamination identified include the former RAF Sandtoft airfield extending into the south of Land Parcel E including a possible bomb storage area, unspecified ground workings and pumps.

LIKELY SIGNIFICANT EFFECTS

The assessment indicates that during construction the majority of effects can be controlled by Construction Design Management (CDM) Regulations and the Construction Environmental Management Plan (CEMP) as they are well understood and standard methods.

Prior to mitigation during the construction period the potential effects deemed Moderate or Major Adverse (**significant**) comprise: UXO risk at the former airfield/ bomb stores; potentially polluting construction plant and materials working near water courses; disturbance of any contaminated soils where deeper or larger scale construction proposed for substations and BESS area; fines run-off to water courses if heavy machinery working during adverse weather; and directional drilling at surface water crossing points. However with the implementation of well practiced and well understood mitigation measures the residual effects would reduce to Negligible (**not significant**).

Once operational the land use as a solar farm will maintain or lower the probability of future ground contamination of soils and geology occurring which is considered to have a minor neutral or beneficial effect (**not significant**).

The decommissioning phase is considered to create potential similar effects to that during construction, or of lesser magnitude.

MITIGATION AND ENHANCEMENT

Environmental effects determined as Moderate or Major would be mitigated within the design measures of the Scheme to prevent, reduce and offset those effects. Those embedded mitigation measures will be secured by adoption of agreed Outline and Detailed CEMP. These include measures such as (but not limited to):

- The selection of appropriate plant and best practice working measures to control or reduce the creation of new pathways during construction activities which involve ground penetration such as piling;
- Appropriate buffer or non-working zone incorporated into the construction layout alongside surface water course to prevent run off and pollution entering the water courses; and
- Appropriate locations for storage of hydrocarbons or chemical.

With the adoption and implementation of the agreed embedded mitigation measures, the effects identified for construction, operation and decommissioning of the Scheme are Negligible (**not significant**).

CONCLUSION

With the implementation of appropriate mitigation measures the residual effects are therefore **Negligible and Not Significant**.

9. WATER RESOURCE

INTRODUCTION

This chapter of the ES identifies the potential impacts on the water environment from the construction, operation and decommissioning of the Scheme. The water environment includes surface waterbodies (e.g. rivers, streams, ditches, canals, lakes and ponds, etc.), groundwater bodies, as well as flood risk and drainage.

The potential impacts on the water environment resulting from the Scheme focus on four main events:

- Erosion/sediment movement;
- Chemical/pollution events;
- Alteration/interruption of surface water flows; and
- Alteration/interruption of ground water flows.

BASELINE CONDITIONS

There are many field drain ditches running across the Order Limits, assumed to be used for agricultural drainage. There are a large number of watercourses located at the Order Limits and in the immediate vicinity. These include several Main Rivers which are managed by the Environment Agency. In addition, there are a large number of Ordinary Watercourses running through the Order Limits, some of which fall under the control of two Internal Drainage Boards.

The Flood Map for Planning (2025) generally defines the entire Order Limits as Flood Zone 3, at High risk of flooding, predicted to be impacted by a 1 in 100 year fluvial flood event or 1 in 200 year tidal flood event. The Risk of Flooding from Rivers and Seas data set, also predicts the vast majority of the Order Limits to be at risk of flooding.

Correspondence with the Environment Agency highlights that the Order Limits is at risk of flooding from the tidal River Trent, the River Torne and associated Drains. The Environment Agency also highlight that land drainage represents the dominant flood risk at the Order Limits.

The Risk of Flooding from Surface Water data set highlights areas at the Order Limits with a High to Low likelihood, predicted to be impacted by a 1 in 30 and 1 in 1000 year rainfall event, respectively, spread across the Order Limits. These at-risk areas are generally isolated and associated with surface water arising within the Order Limits boundary itself. Surface water flood depths at the Order Limits are generally not predicted to exceed 300mm on site.

The Order Limits has a low risk of flooding from groundwater, sewers, artificial sources and historical flooding.

LIKELY SIGNIFICANT EFFECTS

The likely **significant effects** of the Scheme during decommissioning are similar to those encountered during the construction phase due to the operations being the same. Therefore, those effects considered for construction are expected during the decommissioning phase.

The likely **significant effects** during construction includes the effects on Flood Risk and Drainage and water resources. The effects of construction on the impermeable area at the Order Limits would be temporary and short term. Without mitigation measures spillages of chemicals/fuel stored could cause short term, temporary effects on the local watercourses. The significance of effects is Moderate Adverse (**significant**).

The likely **significant effect** during operation includes the effects on Flood Risk and Drainage and water resources. Increased impermeable areas on site are generally associated with proposed infrastructure on site rather than proposed solar PV modules which are generally considered to have a negligible impact on surface water drainage patterns. The sensitivity of people and property to increased flood risk during operation is considered medium and the significance of effect is Major Adverse (**significant**). Surface watercourses and groundwater bodies are considered to be at risk to operational pollutants. Without mitigation the increase in highway spillage risk is considered to have an effect of a Low Adverse magnitude. The significance of effect is Minor Adverse (**not significant**) which is considered permanent if left unmitigated.

MITIGATION

As noted above, there are several adverse effects that may occur during the construction and operational phases of the Scheme. These effects could impact water resources and flood risk and drainage on site and elsewhere. In order to mitigate these potential effects, mitigation measures are proposed on site.

Mitigation measures to reduce the effects on water resources and flood risk and drainage during the operation phase include:

- Surface water runoff from proposed equipment and access tracks will be directed towards Sustainable Drainage Systems (SuDS) features that would provide water quality treatment to mitigate the risk of water pollution on site;
- Contributions could be made from permeable surfacing, wildflower planting and linear infiltration trenches;
- Future maintenance of any proposed SuDS on site will be privately managed by the Applicant;
- A surface water drainage strategy will be implemented on site; and
- Solar PV modules proposed on site will have their lowest edge raised above the ground (above the 1 in 1000 year tidal Trent flood level plus an allowance for 100mm of freeboard), to ensure surface water across the vast majority of the site will continue to drain as per the existing conditions.

Overall, following the allocation of the mitigation measures through the DCO, the residual effects of the Scheme during operation are considered to be Negligible (**not significant**).

During the construction phase, additional mitigation measures will be implemented to reduce effects on Water Resources, Flood Risk and Drainage which includes:

- Where necessary a temporary drainage network will be installed prior to the commencement of construction and a maintenance plan, confirmed through a CEMP;
- A temporary construction drainage system will be developed to prevent silt-laden runoff from entering surface water drains, watercourses and ponds without treatment (e.g. earth bunds, silt fences, straw bales, or proprietary treatment) under any circumstances;
- Construction SuDS (such as temporary attenuation) may also be used during construction if necessary; and
- Easements of 9m on both bank sides will be preserved adjacent to all receptors to ensure that there is a sufficient buffer from the sensitive receptor.

Following the implementation of mitigation measures the residual effects during construction are considered to be Negligible (**not significant**).

CONCLUSION

With the mitigation measures described above for the construction, operational and decommissioning phases all identified potential effects have been assessed as being of **Negligible significance**, and therefore **Not Significant**.

10. SOCIO ECONOMICS

INTRODUCTION

This chapter of the ES has analysed the baseline Socio-Economic conditions and then gone on to assess the likely Socio-Economic effects of the Scheme.

BASELINE CONDITIONS

Doncaster experienced population growth of 3.7% between 2013 and 2023, in North Lincolnshire there was a lower population growth of 1.1% and in East Riding of Yorkshire there was growth of 4.6%. Relative to the benchmark areas of Yorkshire & the Humber and England, Doncaster's, North Lincolnshire's, and East Riding of Yorkshire's population grew at a slower rate over this timeframe. Employment growth in Doncaster over the last seven years has been fairly strong with 6.4% increase in job numbers, this was higher than the regional figure (6.3%) but lower than the national figure (8.9%), in North Lincolnshire jobs increased by 4.1%, whilst the highest jobs growth was seen in East Riding of Yorkshire (6.9%). The construction sector, which is likely to see increased employment opportunities during the Scheme build phase represents 6.7% of total employment in Doncaster, 6.5% in North Lincolnshire, and 5% in East Riding of Yorkshire which is above the proportion of total jobs at the regional scale (4.9%) and England (4.8%).

LIKELY SIGNIFICANT EFFECTS

No significant adverse effects in either the construction, operation or decommissioning of the Scheme have been identified.

Significant beneficial effects are expected in relation to employment and economic contribution during both the construction and decommissioning phases, and business rates during the operational phases.

During the construction and decommissioning phases there will be **no significant adverse impacts** on accommodation demand in respect of visitors as there is sufficient capacity to accommodate workers. Conversely, albeit **not significant**, there is expected to be beneficial effect on the local tourism sector during the construction and decommissioning phases through a proportion of bedspaces being filled throughout the year by workers, which enables local businesses to be boosted through increased occupancy rates and revenue and contribute towards realising key aims set out in relevant local tourism policy.

MITIGATION

There are **no significant adverse effects** relating to Socio-Economics, and therefore no mitigation measures proposed.

Moderate beneficial effects (**significant**) are predicted in respect of employment in the construction and decommissioning phases. Enhancement of employment is proposed in the form of an Outline Supply Chain, Employment and Skills Plan (Outline SCESP) which will be agreed with the relevant authorities and secured by a DCO Requirement. It aims to optimise the number of local people who will have access to employment and training opportunities arising from the Scheme. The legacy effect of upskilling the local workforce where possible will result in a long-term major benefit effect (**significant**) at the at Doncaster, North Lincolnshire and East Riding scale.

CONCLUSION

The Scheme will result in **beneficial effects** in terms of employment, economic contribution, accommodation demand effects on the local tourism sector, and business rates in all relevant phases of development, as relevant. **No significant adverse effects** are identified.

11. TRANSPORT AND ACCESS

INTRODUCTION

This ES Chapter assesses the potential likely significant effects of the Scheme on vehicular traffic flows, severance, driver delay, non-motorised user delay, non-motorised amenity, road safety, fear and intimidation, and hazardous/large loads.

The Transport and Access chapter of the ES has been prepared alongside a Transport Statement and Outline Construction Traffic Management Plan.

BASELINE CONDITIONS

The Scheme is centered at approximately 10km to the northeast of Doncaster and 14km to the west of Scunthorpe. Access to the Order Limits during the construction and operational phases is anticipated to be provided from Moor Edges Road; High Bridge Road; the A18 Tudworth Road; Marsh Road; an unnamed access road which links the A161 and High Levels Bank; High Levels Bank; Sandtoft Road and Low Levels Bank. The proposed routing of vehicles to the Scheme is identified in [Figure 9](#).

Data from the most recent five-year period shows that there are not any existing highway safety issues on the local highway network that would be exacerbated by the Scheme. Nineteen highways links have been assessed as part of the assessment.

The Scheme currently compromises agricultural land uses. Access to the Order Limits is currently provided via agricultural access points in multiple locations in the local highway network.

LIKELY SIGNIFICANT EFFECTS

Impact Magnitudes have been defined for the construction phase with regard to the IEMA traffic guidance, which states that a **significant** environmental impact may occur when traffic flows (or its HGV component) increase by 30% (or 10% where a link is of high sensitivity significance).

The impact of the construction phase traffic is generally considered to be of Negligible to Moderate significance on the majority of assessed links. On Link 19 (Marsh Road) there are **significant effects** relating to Road Safety and Driver Delay. There will therefore be a direct, temporary, medium-term moderate adverse residual effect during the construction phase. However, there is a low baseline number of total traffic and HGVs using the link which affects the percentage increase in vehicle flow and magnitude of change.

Once operation the Scheme is considered to have negligible (**not significant**) effect at all assessed links.

The impact of the decommissioning phase traffic is generally considered to be of Negligible to Moderate significance. On Link 19 (Marsh Road) there are **significant effects** relating to Road Safety and Driver Delay. There will therefore be a direct, temporary, medium-term moderate adverse residual effect during the construction phase. However, there is a low baseline number of total traffic and HGVs using the link which affects the percentage increase in vehicle flow and magnitude of change.

LEGEND

- Order Limits
- Weak Bridge (7.5 tonne)
- Motorway
- Stainforth and Keadby Canal
- Railway Line
- Public Right of Way
- ➔ Approximate Access Locations
- Local Authority Boundary

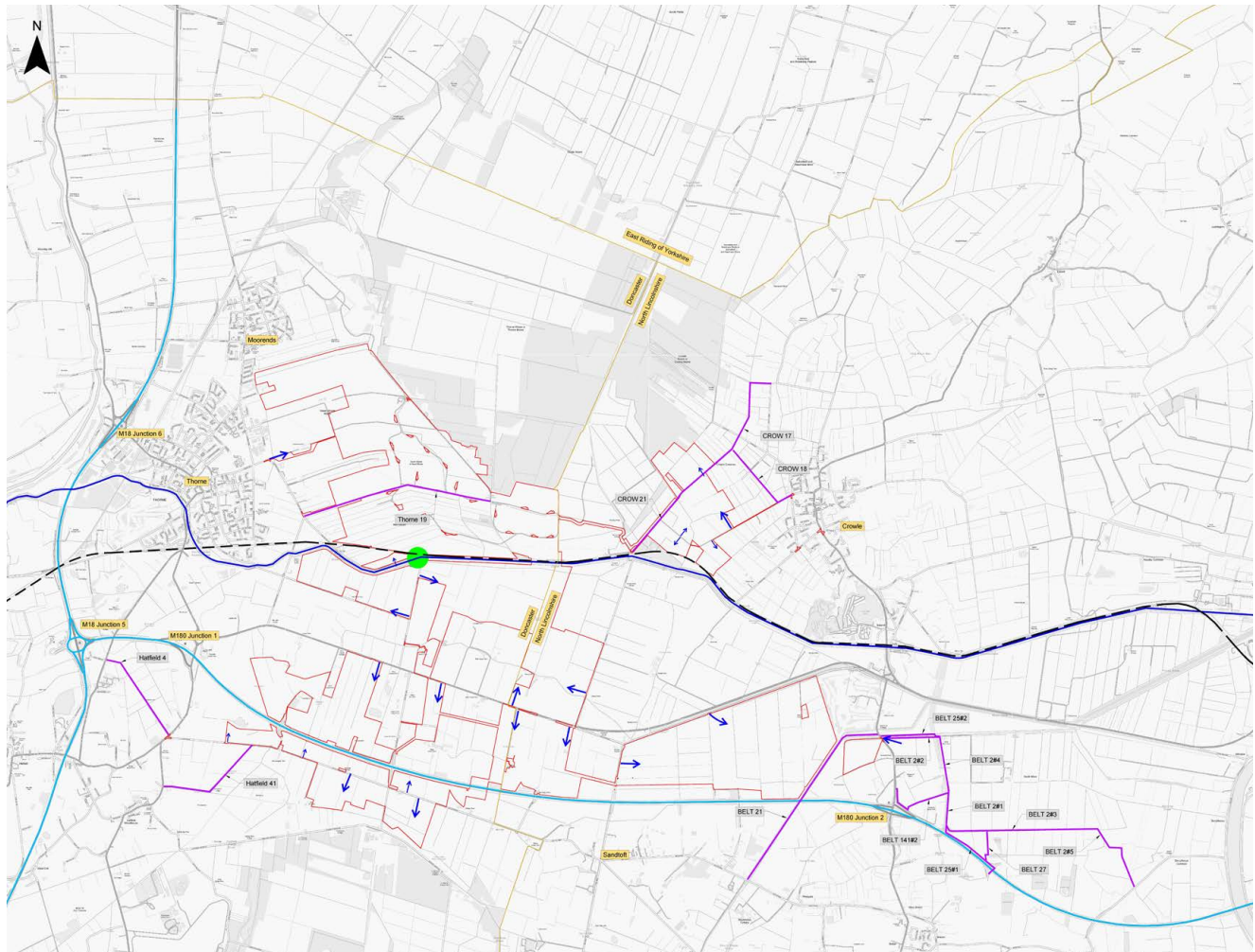


FIGURE 9: INDICATIVE ACCESS STRATEGY PLAN



MITIGATION AND ENHANCEMENT

Mitigation has been provided in the form of an Outline Construction Traffic Management Plan (CTMP) to reduce the impacts of the construction phase. Measures set out within this include (but are not limited to):

- Construction traffic movement to be kept to agreed working hours and designed to minimize disruption to the highway network and residents;
- Temporary off site highway improvements to accommodate HGV construction traffic;
- Provision of contractor's compounds within the Order Limits, providing an area on site for HGVs to park and manoeuvre, off the local highway network;
- The arrival and departure of the HGVs will be strictly managed by the site manager;
- The introduction of wheel washing facilities should ground condition dictate, before allowing vehicles to return to the local highway. In addition, a road sweeping vehicle could be made available to remove any site residue upon the local roads as and when necessary;
- Temporary signage will be erected in the vicinity of the Scheme as appropriate during the construction phase to indicate that heavy construction vehicles are turning; and
- The contact details of the contractor and those of the highway department at CDC and NLC will be exchanged before commencement of works on site. This will allow for any issues to be resolved efficiently.

CONCLUSION

It is concluded that the proposed package of mitigation measures will ensure that the Scheme is acceptable and that there will be **no significant adverse effects** as a result of the Scheme.

12. NOISE AND VIBRATION

INTRODUCTION

This chapter of the ES identifies the potential effects of the Scheme in terms of noise and vibration during the construction, operational and decommissioning phases of the Scheme.

BASELINE CONDITIONS

An environmental noise survey has been undertaken to quantify the current noise climate across the Order Limits and the results have been used to derive appropriate noise limits at the identified noise sensitive receptors. The survey was undertaken between January and February 2024. Measurements were made at eight representative noise locations, the locations of these are shown on [Figure 10](#).

For the purposes of the assessment a study area of 1km from the Order Limits has been utilised. Due to the size of the Scheme, a selection of receptors has been identified. These include the closest residential, sensitive ecological areas, identified heritage assets and public rights of way.

No vibration monitoring has been undertaken as part of this assessment.

LIKELY SIGNIFICANT EFFECTS

The assessment of potential noise impacts during the construction phase has identified buffer zones for activities such as solar PV module frame construction. Adherence to these buffer zones will ensure Minor noise (**not significant**) impact at the nearest receptor locations.

Additionally, adherence to the buffer zones will ensure that groundborne vibration would not be perceptible at the receptor locations, giving a Negligible (**not significant**) impact.

Overall, it is demonstrated that construction noise and vibration is temporary in nature, and with the implementation of measures outlined in the Outline CEMP, the impacts will not be adverse.

The assessments of the noise during the operational phase indicates that noise during the daytime and night-time period would be Minor Adverse (**not significant**) at worst, requiring no specific noise mitigation measures.

The noise and vibration effects during the decommissioning phase are expected to be similar, if not lower than those in the construction phase, and therefore **not significant**.

MITIGATION

Mitigation measures are embedded within the design and outlined within the Outline CEMP, these measures include (but are not limited to):

- Construction hours generally be limited to daytime working between 07:00–19:00hrs Monday to Saturday and 09:00–13:00 on Sunday;
- Buffer zones of 175m required between areas where piling is proposed and the closest residential receptor; and
- Construction compounds will be at least 300m from the nearest noise sensitive dwelling.

A buffer will also be applied between construction areas and ecological receptors.

CONCLUSION

With use of embedded construction phase mitigation measures in place, the Scheme is **unlikely to result in any significant adverse effects** on any of the identified noise sensitive residential and non-residential receptors. The Scheme is also **unlikely to result in any significant adverse effects** during the operational or decommissioning phase.

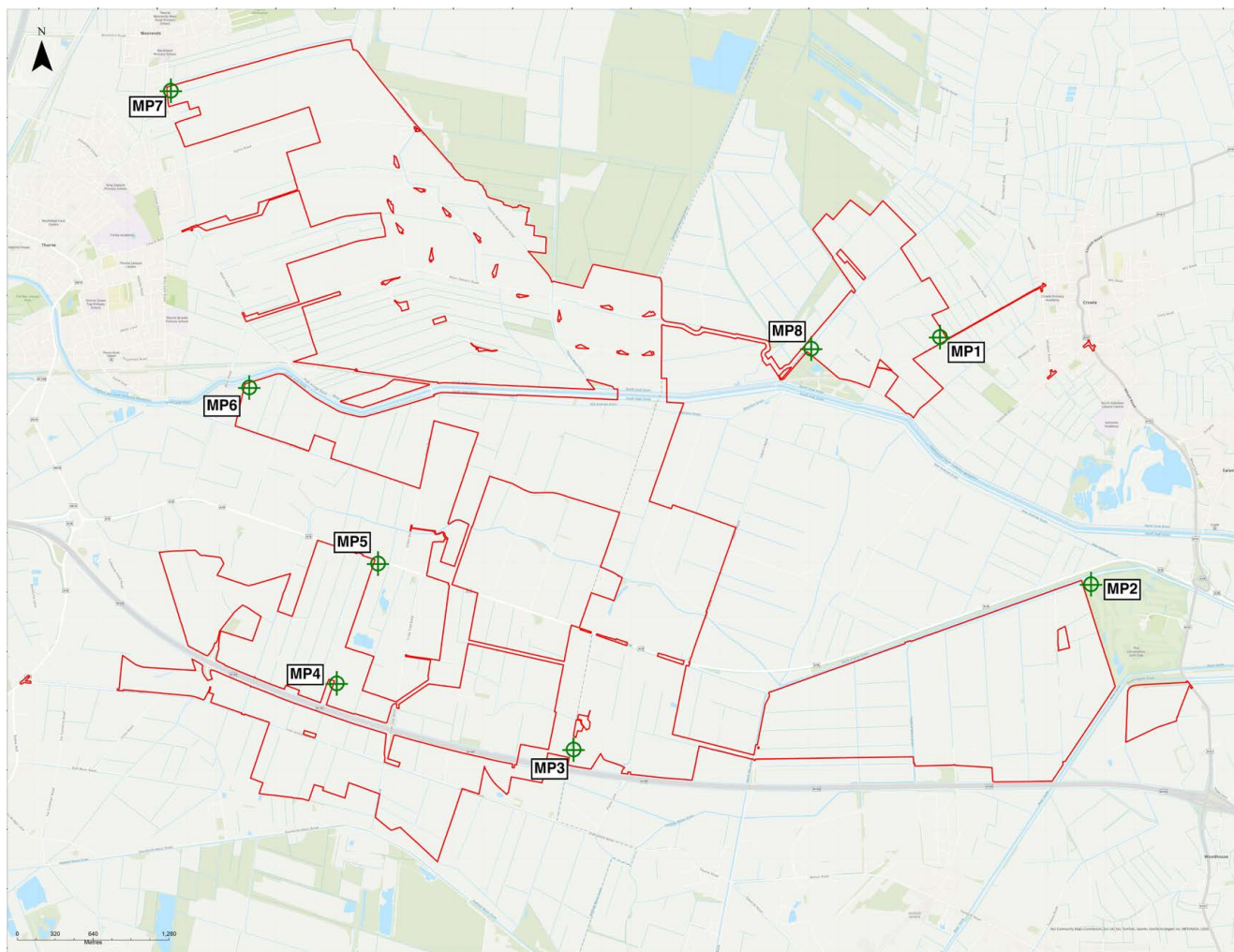


FIGURE 10: PROPOSED DEVELOPMENT LOCATION AND ROUTING PLAN

13. AIR QUALITY AND GREENHOUSE GASES

INTRODUCTION

This chapter of the ES identifies the potential effects of the Scheme on air quality and greenhouse gases (GHG). The assessment has considered the potential for effects to occur during the construction and operational phases of the Scheme; effects from decommissioning have been scoped out since emissions beyond 2050 should be approaching zero given the UK's commitment to Net Zero.

BASELINE CONDITIONS

The assessment has demonstrated that air quality conditions in the local area are generally good, with pollutant concentrations below the relevant air quality objectives.

Doncaster Council has declared eight Air Quality Management Areas (AQMAs) for exceedances of the annual mean nitrogen dioxide objective, the nearest of which, covering a section of the M18 near Bessacarr, is over 10km from the western boundary of the Order Limits.

North Lincolnshire Council has declared a single AQMA for exceedances of the 24-hour mean PM10 objective as a result of industrial emissions. The AQMA covers part of the town of Scunthorpe and an area to the east which covers the steelworks, and which is approximately 7km from the eastern boundary of the Order Limits.

The Scheme is currently used for agricultural purposes which are a small source of GHGs emissions. There are peat soils in areas throughout the Scheme but these are degraded and in poor condition and not sequestering large quantities of carbon.

LIKELY SIGNIFICANT EFFECTS

The assessment has demonstrated that, with mitigation, the effect of construction dust on sensitive receptors will be '**not significant**'. Traffic generated by the Scheme during both the construction and operational phases will be below published screening thresholds, and thus will be '**not significant**'.

The assessment has demonstrated that the Scheme will lead to residual GHG emissions across its lifetime; these mainly arise during the construction phase. However, once operational, the Scheme will generate electricity with a lower carbon factor than other non-zero fuels, such that its operation will lead to net reductions in GHG emissions, and facilitate a transition to net-zero. The overall GHG effects are judged to be beneficial and therefore **significant**.

MITIGATION AND ENHANCEMENT

A suite of mitigation measures will be in place throughout the duration of the construction phase to ensure that the residual air quality effects are '**not significant**'. This includes good design and best practice measures will be put in place during the construction phase to minimize dust and emissions to air. To minimise vehicle emissions, routing arrangements will be in place such that vehicles will not be able to travel through the village of Thorne.

The Scheme incorporates a number of best practice measures to minimise its GHG footprint. Reducing GHG emissions during construction would include consideration of:

- Minimising the use of construction materials through recycling and reuse of materials where possible, and ensuring that surplus materials are not ordered;
- The procurement of sustainable materials, with consideration to the embodied carbon footprint of the materials and components, from the extraction of the raw materials to the production of the final construction products; and
- The transport of products between suppliers and the Scheme.

CONCLUSION

The Scheme will not lead to **significant effects** on air quality and will have a **significant beneficial effect** in relation to reducing GHG emissions from the UK's energy supply.

14. AGRICULTURAL CIRCUMSTANCES

INTRODUCTION

This chapter of the ES considers the effects agricultural land, soils and agricultural businesses as a result of the Scheme and is informed through an Agricultural Land Classification Survey (ALC).

Agricultural land quality is assessed by use of Natural England’s Agricultural Land Classification (ALC) system. The ALC system divides land into grades 1 to 5, with grade 3 divided into subgrades of 3a and 3b. The National Planning Policy Framework (NPPF) (2024) places Grades 1, 2, and subgrade 3a within the definition of the ‘Best and Most Versatile’ (BMV) agricultural land. National policy advises that while land type should not be a predominating factor with sites for development, land of lower ALC grade (i.e., non BMV) should be preferred where possible.

BASELINE CONDITIONS

An ALC survey has been undertaken across the Order Limits, the results of this are shown on [Figure 11](#) and summarized in the below table.

ALC GRADE	DESCRIPTION	AREA (HA)	PROPORTION (%)
1	Excellent	48	2.6
2	Very good	180	9.8
3a	Good	585	32.0
3b	Moderate	1,001	54.7
N/A	Not affected	17	0.9
Total		1,848.2	100.0

There are 19 farm businesses located within the Order Limits, each farm business has been interviewed where possible which has informed the assessment.

LIKELY SIGNIFICANT EFFECTS

The construction of the panel areas has little impact on the soils as the panels are pile driven into the soils and not removal of the soil is required with the soil being simply pushed aside by the pile, therefore the installation of the panels is consider to result in a negligible effect which is **not significant**.

Fixed infrastructure is proposed which includes substations and BESS area Collectively the fixed infrastructure will cover 13.7ha of BMV land, of which all except 0.4ha will be restored at decommissioning. The impact is consequently temporary and of low magnitude, and the overall effect is minor adverse, which is **not significant**.

In terms of the effect on soils, the disturbance to soils is generally temporary and limited. Disturbance to soils is mostly restricted to the physical moving of soils for the creation of tracks and bases. The effects are minor adverse or negligible, which is **not significant**.

Once operational there will be no further disturbance to soils, the agricultural land quality within the Order Limits will not be affected during this phase of the Scheme. The effect on agricultural land quality during the operational phase is therefore negligible, which is **not significant**.

Once operational there is the potential for improvements to soils as a result of a change from agriculture to grassland, however this will be temporary and could be reversed following decommissioning. Therefore during operation the effect is consider minor or negligible beneficial which is **not significant**.

Legend

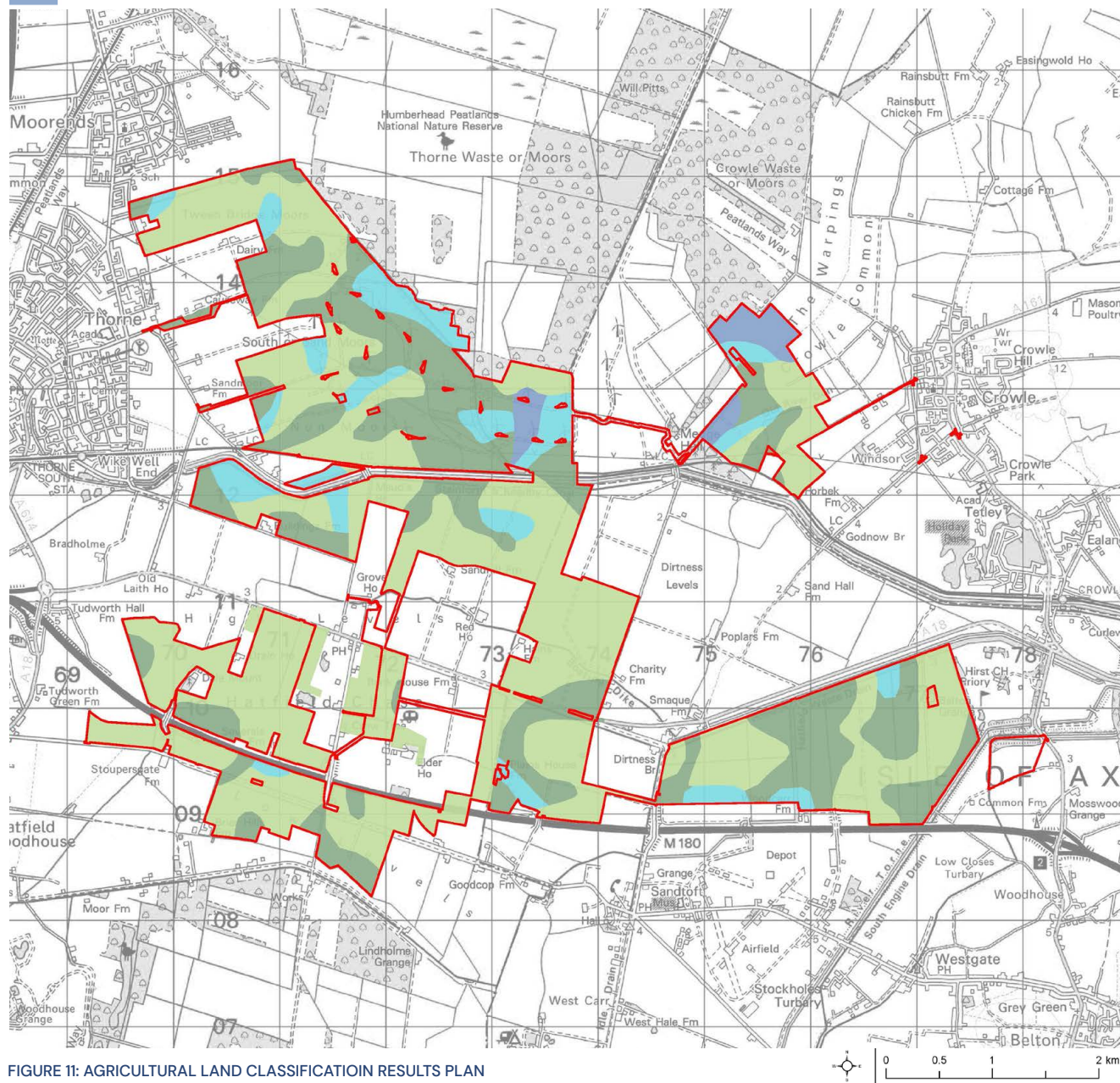
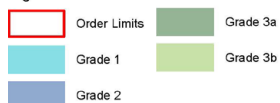


FIGURE 11: AGRICULTURAL LAND CLASSIFICATION RESULTS PLAN

There are 19 farm businesses with land within the Scheme. The land is all used for arable cropping and the impacts on all farm businesses during both construction and operation are minor adverse or negligible, which is **not significant**. There are **no significant adverse effects** on food production or security, or the wider land-based rural economy.

The decommissioning phase will not have any **significant effects** on agricultural land or soils, nor on farm businesses.

During decommissioning, in the scenario where the RWE 400kV substation is not removed and all the farm tracks are left in-situ (which would be at the discretion of the landowners), there could be a **moderate adverse effect** from the loss of BMV, which would be **significant**.

MITIGATION AND ENHANCEMENT

A Soil Management Plan will be required to minimise damage to soils and ensure that any damage is ameliorated. Example measures include the best practice methodology for soil handling, seed mixes for stockpiles of soil, and the use of appropriate equipment to construct the Scheme to avoid unnecessary damage to soils.

The restoring of arable soils with grassland for the duration of the operation phase will produce benefits for the soil resource.

CONCLUSION

There will be **no significant adverse effects** from the loss of BMV soils for the duration of the Scheme, and all areas will be fully restored at decommissioning.

In the scenario where the RWE 400kV substation is not removed and all the farm tracks are left in-situ (which would be at the discretion of the landowners), there could be a **moderate adverse effect** from the loss of BMV, which would be **significant**, but would need to be balanced against the agricultural operational benefits those tracks will allow.

15. OTHER ENVIRONMENTAL TOPICS

The other Environmental Topics chapter of the ES assesses the following topics:

- Major Accidents and Disasters;
- Waste;
- Electric and Electromagnetic Field;
- Climate Change Resilience and Adaptation; and
- Glint and Glare.

None of these topics require individual chapters in the ES, either due to the brevity of the assessment, or the small impact associated with the Scheme.

MAJOR ACCIDENTS AND DISASTERS

Introduction

This section summarises the potential effects of the project on the risks of major accidents or disasters occurring and affecting the Scheme. 'Accidents' are an occurrence resulting from uncontrolled developments in the course of construction, operation and decommissioning (e.g., major emission, fire or explosion). 'Disasters' are naturally occurring extreme weather events or ground related hazard events (e.g., subsidence, landslide, earthquake).

Baseline Conditions

A number of receptors are present in the vicinity of the Scheme that 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, and isolated dwellings / farmhouses;
- Tween Bridge Wind Farm;
- Commercial sites and buildings;
- Strategic Road – M180;
- Strategic Road – A18;
- Local Roads;
- Railway;
- Canal;
- Public Right of Way;
- Designated Ecological sites, woodland, farmland and waterbodies; and
- Underground infrastructure including electricity, water, communications and gas.

Likely Significant Effects

There are various health and safety considerations particularly for workers during construction and decommissioning of the Scheme. As a result, workers are considered to be the most at-risk group. However, the risk to both construction workers and the general public is low and **not significant** during the construction and decommissioning phases. The risk of construction would be managed in accordance with all applicable legislation and as such, **no significant effects** are anticipated.

The cable route would need to cross existing infrastructure, which includes a railway line, the Keadby Canal and the M180. Trenchless techniques, such as horizontal directional drilling (HDD), will be used to construct the crossing of the cables (as required); therefore, the works will be undertaken deep below the crossing and a distance either side, not interfering with the operations of the existing infrastructure. The construction and decommissioning of relevant underground cable crossings will be managed to the specific requirements for the relevant party and therefore the risk of a rail accident as a result of the crossing will be minimised. Therefore, **no significant effects** are anticipated.

The potential exists for utilities to be affected during the construction/decommissioning of the Scheme through damage caused as a result of excavation and engineering operations. For workers working in the immediate vicinity of a gas or high voltage electricity utility asset, the potential impacts are physical injury or death as a result of a utility strike. For communities dependent on the utility assets, the potential impact is the disruption to services provided by the assets. Prior

to the construction and decommissioning phases, the design team and appointed Contractor will review the locations and alignments of the utilities using utilities plans and use them to inform the plans for the proposed works to ensure all known utilities are avoided. **No significant effects** are therefore anticipated.

The Scheme's infrastructure, such as batteries, could lead to a fire risk if there was equipment failure. However, such risk is low, and to a lesser extent for workers during the construction and decommissioning phases than onsite employees during the operational phase, as the BESS will be containerised, thus reducing the risk of damage which may cause fires. The risk of fire is small and is mitigated by the design of the equipment and the design of the Scheme. Therefore, the Scheme is not expected to have an effect on the risk of a major accident occurring as a fire during construction and decommissioning. **No significant effects** are anticipated.

With regard to the operational phase, the Scheme would operate to Health and Safety Guidance. Maintenance activities associated with the Scheme would be performed in accordance with relevant legislation. **No significant effects** are anticipated.

Mitigation

Minimising the risk of major accidents during construction and decommissioning will be addressed through appropriate risk assessments as required in the oCEMP and the oDEMP. An Outline Battery Safety Management Plan has been produced for the Scheme and will be updated through the operational lifetime of the Scheme, to reduce the risk of fire and propagation within the BESS compound.

Conclusion

No significant effects have been identified for major accidents and disasters receptors with the Scheme in place during any phase (construction, operation or decommissioning).

WASTE

Introduction

This section of the ES chapter sets out the approach to waste management that will be applied to the design and the expected waste streams during each phase of the Scheme. Waste' is defined as materials that are unwanted, having been left over after the completion of a process which would otherwise be discarded. The legal definition of waste also covers substances or objects, which fall outside of the commercial cycle or out of the chain of utility.

Baseline Conditions

Almost all of the land is in arable farming use, by a mixture of tenures and management methods, and therefore waste in the Order Limits is currently associated with agricultural practice. Potential waste streams currently could include left over crop and straw bales, fertiliser sacks and chemical containers. Spreading of organic manure and slurries has taken place in the Order Limits.

Likely Significant Effects

The Order Limits comprises mainly agricultural land; therefore, no demolition waste will be produced as part of the Scheme. It is also anticipated that minimal site preparation and excavation waste would be generated from the Scheme.

All electrical infrastructure such as solar PV modules will be manufactured off the Order Limits and delivered to the Order Limits ready for installation. Therefore, any associated waste is expected to be minimal, including any packaging waste.

Construction activities will also generate waste materials as a result of general handling, losses and surpluses and these wastes can be mitigated through good site practices, including proper storage and handling of materials to avoid damage, and accurate quantity estimates and efficient purchasing arrangements to avoid over ordering.

The generation of construction-related waste can be significantly reduced through the choice of materials and other opportunities and this will be explored as far as possible before construction of the Scheme begins. Possibilities to reuse or recycle materials will be explored before resorting to landfill options, in accordance with the Waste Hierarchy. The main anticipated construction waste streams are all capable of being recycled (e.g., cardboard, plastic, metal among other materials), with recycling routes generally available for such materials. The overall recovery rate from landfill diversion is expected to be at least 60- 89% of materials and as such, **no significant effects** are anticipated.

During the operational phase of the Scheme waste arising is expected to be substantially less than during the construction phase and would include welfare facility waste; equipment needing replacing; waste metals; and general waste (paper, cardboard, wood, etc.). Further, some waste could arise from the maintenance of the operational Scheme, including solar PV modules, inverters, BESS and transformers. The operational phase effects associated with waste are anticipated to be **not significant**.

During decommissioning, waste streams are expected to include, but not be limited to, solar infrastructure, batteries, cables, welfare facility waste, waste metals, and wastewater. Prior to decommissioning, opportunities to minimise waste as far as possible will be explored and are anticipated to be **not significant**.

Mitigation

Waste arisings from the Scheme will be designed out where possible. Opportunities to re-use material resources will be sought where practicable. Where re-use and prevention are not possible, waste arisings will be managed in line with the Waste Hierarchy.

Design considerations will seek to minimise waste from the construction phase, and are likely to follow approaches such as:

- Maximise the use of reclaimed materials during construction;
- Maximise recycling opportunities in the decommissioning phase;

- Use prefabricated and standardised components in the standard product sizes (e.g., panels, mounting structures). As these are made in a factory controlled environment, they tend to generate less waste and if standard product sizes are made use of, this minimises wastage on site;
- Segregation of construction waste on site to maximise potential for reuse/recycling;
- Use of suppliers who collect and reuse/recycle packaging materials;
- The off-site separation and recycling of materials where on site separation is not possible; and
- Training of contractors in waste minimisation and materials reuse.

Conclusion

No significant effects have been identified for waste receptors with the Scheme in place during any phase (construction, operation or decommissioning).

ELECTRIC AND ELECTROMAGNETIC FIELD

Introduction

This section sets out the approach to the potential of electric, magnetic and electromagnetic fields (EMFs) produced by the Scheme. EMF is produced both naturally and as a result of certain human activities. EMFs are inevitable wherever electricity is produced, distributed, and used, including electrical substations, power lines and electric cables and around domestic, office or industrial equipment that uses electricity.

Electric fields are produced by voltage. Magnetic fields are produced by the flow of electric current; however, most materials do not readily block magnetic fields. The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source.

Baseline Conditions

The Order Limits is located within a mixture of primarily rural and semi-rural areas, which accommodate existing electrical assets. There is approximately 2km of 400kV overhead line in the northern part of the Order Limits, bisecting through Land Parcels A and B. There are eight towers located within the solar panel areas associated with the overhead lines. This infrastructure would produce electric and magnetic fields.

No overhead electricity cables will be used or constructed as part of the Scheme. Medium voltage onsite (33kV) cables are required to connect the solar pV modules and BESS Containers to inverters, and the inverters to transformers, and then transfer electricity between Solar Stations and the 132kV substations and/or the RWE on-site 400kV Substation. The typical installation depth is expected to be between 1.2– 1.5m.

The electricity is then exported from the RWE on-site 400kV Substation via an underground 400kv cable to the edge of the Order Limits. The typical installation depth is expected to be between 1.2–1.6m for the 400kv cabling.

Likely Significant Effects

Effects during the construction and decommissioning phases of the Scheme are scoped out of the assessment as the cables will not produce any significant EMFs until the Scheme is generating electricity when it is operational.

An underground high voltage 400kV cable system will be installed to connect the RWE on-site 400kV Substation to the edge of the Order Limits. The highest EMFs produced by underground cables are located directly above the buried cables, and field strength decreases with distance from the source. The nearest properties are immediately adjacent to the Order Limits, however cables will not be installed within 10m of any property due to the need for construction vehicles to manoeuvre both sides of the trench within the working width. Therefore, **no significant effects** to residential receptors are predicted to occur.

Taking into account this guidance and the UK limits set for safety of members of the public, the maximum reported electromagnetic for HV cables buried at a minimum depth of 1.2m would comply with the ICNIRP limits even if the cabling were directly under a human receptor. Therefore, **no significant impacts** are expected to arise from magnetic fields as a result of all underground cables that form part of the Scheme.

Mitigation

The requirement to consider EMF exposure guidance is fully understood by the Applicant and has been factored into the consideration of the route alignment inside the Order Limits from an early stage.

No specific mitigation measures are considered necessary, given the maximum magnetic field produced by any proposed underground cables will not exceed public or occupational exposure reference levels for the ICNRIP guidelines.

Conclusion

No significant effects have been identified for EMFs with the Scheme in place during any phase (construction, operation or decommissioning).

CLIMATE CHANGE RESILIENCE AND ADAPTATION

Introduction

This section summarises the effects of the Scheme's vulnerabilities and resilience by identifying relevant climate change projections, hazards, and impacts throughout its construction and operational lifetime.

Likely Significant Effects

Four key climate hazards have been identified and assessed, which include:

- hotter summers with extreme temperatures (heatwaves);
- Wetter winters including extreme rainfall (pluvial and groundwater flooding);
- Drier summers and drought; and
- Increased wind and storms.

With the relevant mitigation measures in place as discussed in the following section **no significant effects** are anticipated during either the construction or operation of the Scheme.

Mitigation

Mitigation measures include:

- Equipment will be maintained, serviced and inspected for the need to refurbish, reconstruct or removed;
- Equipment will not be fitted or constructed during extreme temperatures and will be suitably protected;
- All equipment will be designed to relevant standards and specifications to withstand climate change effects;
- Contractors will monitor weather forecasts and plan works accordingly to avoid any extreme weather;
- Habitats are to be suitably protected and enhanced and include natural habitats for the area;
- The layout has been designed to be flood resilient with certain infrastructure elements not located in higher flood risk areas or raising of equipment; and
- A Health and Safety Manager will be responsible for monitoring and controlling health and safety compliance onsite.

Conclusion

In conclusion, **no significant effects** were identified in the assessment for relevant receptors of climate change resilience and adaptation.

GLINT AND GLARE

Introduction

This section summarises the effects of the Scheme on glint and glare for surrounding road users, railway operations, dwellings, and aviation activity.

Two glint and glare assessments have been prepared to assess the two layout options assessed within the Environmental Statement. Layout Option 1 is for a fixed solar panel design and Layout Option 2 is for a hybrid, fixed and tracker solar panel design.

Baseline Conditions

The following receptors within the vicinity of the Scheme have been identified and included in the assessment:

- Road receptors;
- Dwelling receptors;
- Train driver receptors;
- Railway signals; and
- Aviation receptors.

Likely Significant Effects

With the implementation of relevant mitigation measures discussed in the next section, **no significant effects** as a result of glint and glare are anticipated at any of the identified receptors for either layout option.

Mitigation

Mitigation measures have been embedded within the design of the proposals to limit effects as a result of the Scheme, and include measures such as proposed vegetation planting across the Order Limits as part of the landscape strategy.

Conclusion

In conclusion, **no significant effects** were identified in the assessment for relevant receptors of glint and glare as a result of the Scheme.

16. SUMMARY

The ES demonstrates that there are no overriding environmental constraints which would preclude the Scheme.

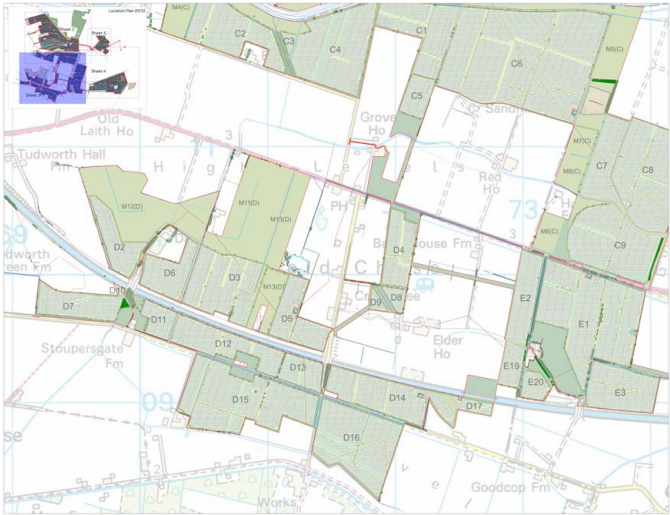
The design of the Scheme has taken account of the likely significant environmental effects (alone and in-combination with other cumulative developments). Mitigation measures form an integral part of the Scheme to ensure that the environment is suitably protected.

17. APPENDIX

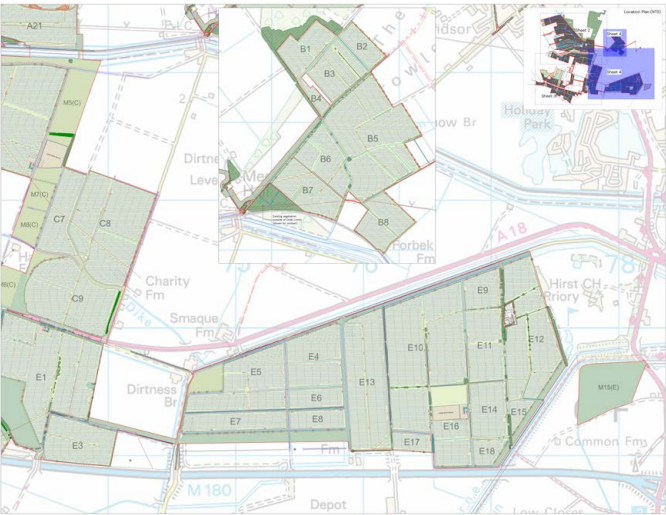
FIGURE 6: LANDSCAPE AND VISUAL MITIGATION STRATEGY PLAN



Sheet 2



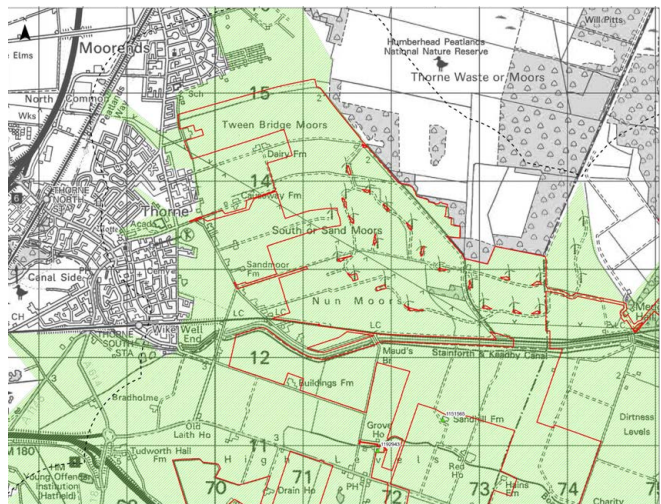
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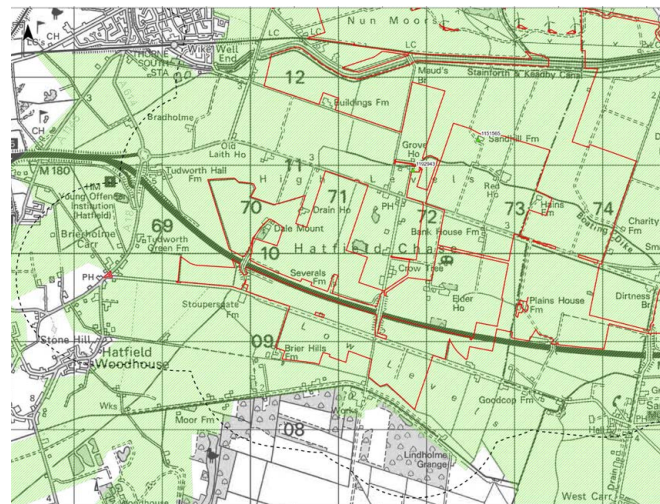
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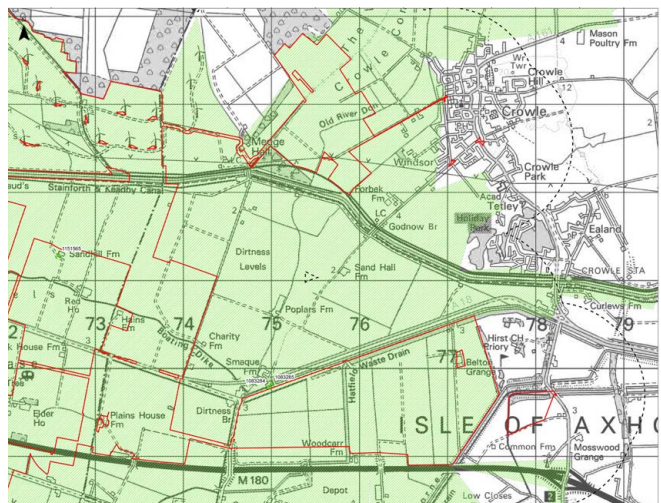
FIGURE 7: DESIGNATED HERITAGE ASSETS PLAN



Sheet 1



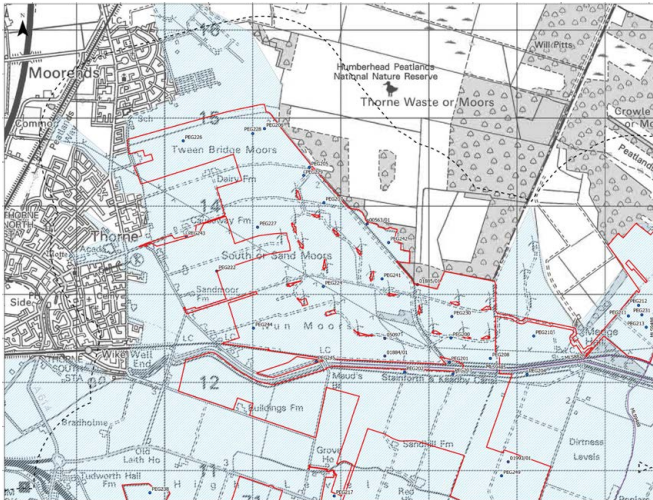
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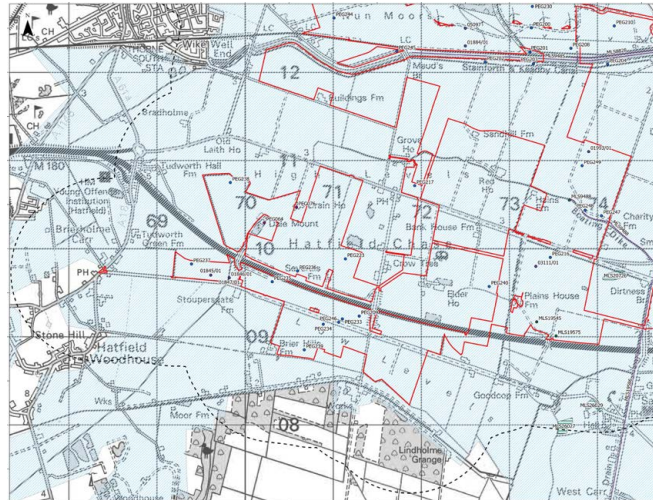
Sheet 3

- Legend
- Order Limits
 - 1km Buffer
 - ZTV
 - Listed Building

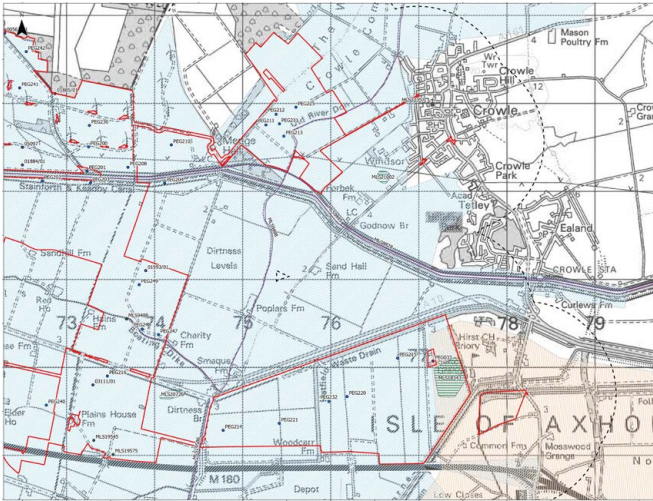
FIGURE 8: NON-DESIGNATED HERITAGE ASSETS



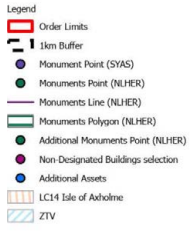
Sheet 1



Sheet 2



Sheet 3



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