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North Lincolnshire Green Energy Park

Volume 6
Environmental Statement
6.1 Non-Technical Summary

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1. INTRODUCTION

1.1.1.1 The Applicant proposes to construct a multi-technology integrated energy park, the North Lincolnshire Green Energy Park (NLGEP) on land at and to the south of Flixborough Wharf and Industrial Estate, near Scunthorpe (Figure 1). For the purposes of clarity within this document, the following terminology is used:

- The Order Limits - refers to the limits of the land covered by the development consent order.
- The Project - refers to the whole of the development described below. This relates to the actual built infrastructure, not the land on which it would be constructed.
- The core part of the Project is an energy recovery facility (ERF), including a switchyard and substation, a water treatment facility, and a carbon capture utilisation and storage facility (CCUS).

1.1.1.2 The Project is a Nationally Significant Infrastructure Project (NSIP) with an Energy Recovery Facility (ERF) capable of converting up to 760,000 tonnes of non-recyclable waste into 95 MW of electricity at its heart and a carbon capture, utilisation and storage (CCUS) facility which will treat the excess gasses released from the ERF to remove and store carbon dioxide (CO₂) prior to emission into the atmosphere.

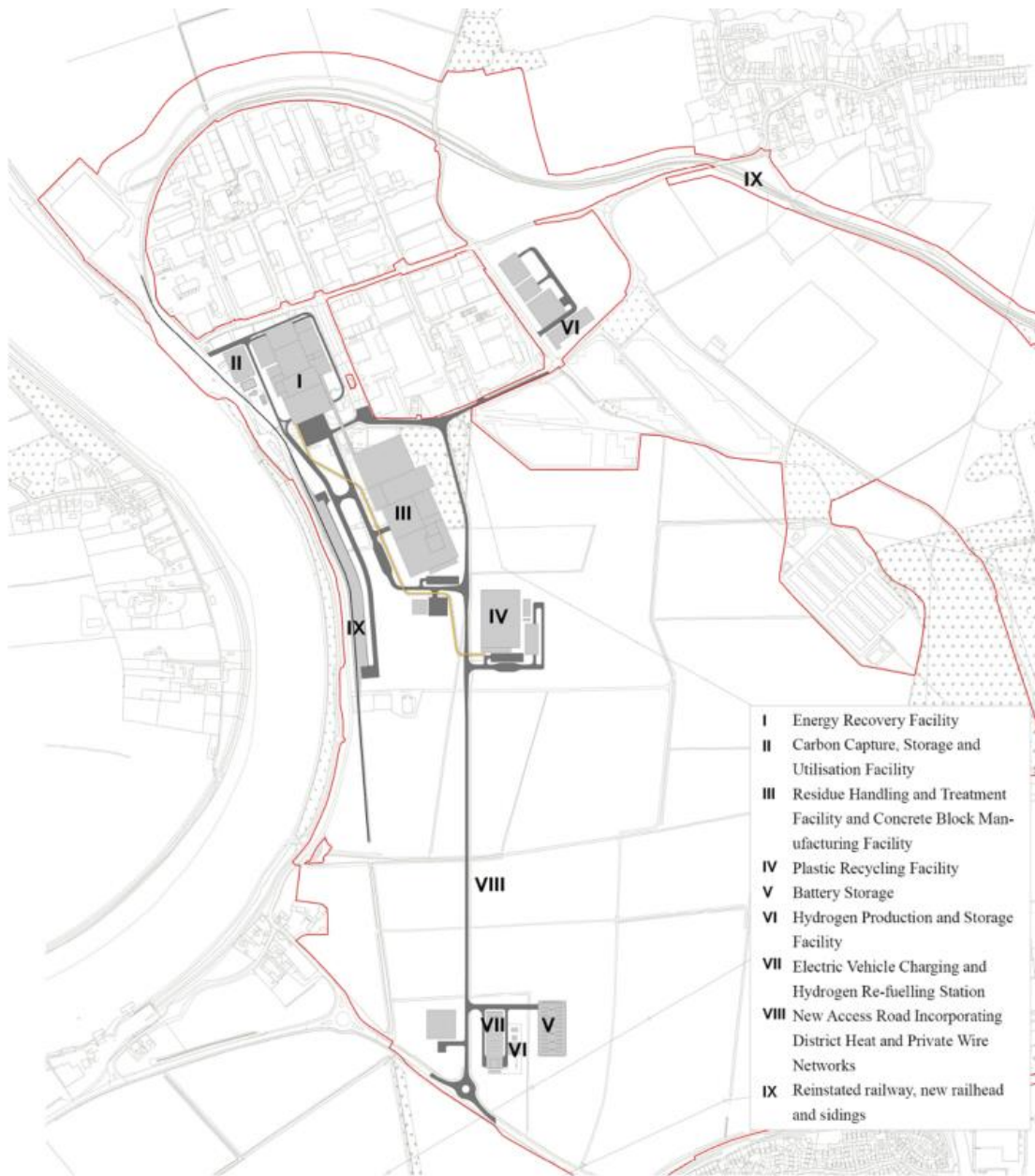
1.1.1.3 The NSIP incorporates a switchyard and substation, to ensure that the power created can be exported to the National Grid or to local businesses, and a water treatment facility, to take water from the mains supply or recycled process water to remove impurities and make it suitable for use in the boilers, the CCUS facility, concrete block manufacture, hydrogen production and the maintenance of the water levels in the wetland area.

1.1.1.4 The Project will include the following Associated Development to support the operation of the NSIP:

- a bottom ash and flue gas residue handling and treatment facility (RHTF);
- a concrete block manufacturing facility (CBMF);
- a plastic recycling facility (PRF);
- a hydrogen production and storage facility;
- an electric vehicle (EV) and hydrogen (H₂) refuelling station;
- battery storage;
- a hydrogen and natural gas above ground installations (AGI);
- a new access road and parking;
- a gatehouse and visitor centre with elevated walkway;
- railway reinstatement works including, sidings at Dragonby, reinstatement and safety improvements to the 6km private railway spur, and the construction of a new railhead with sidings south of Flixborough Wharf;

- a northern and southern district heating and private wire network (DHPWN);
 - habitat creation, landscaping and ecological mitigation, including green infrastructure and 65-acre wetland area;
 - new public rights of way and cycle ways including footbridges;
 - Sustainable Drainage Systems (SuDS) and flood defence; and
 - utility constructions and diversions.
- 1.1.1.5 The Project will also include development in connection with the above works such as security gates, fencing, boundary treatment, lighting, hard and soft landscaping, surface and foul water treatment and drainage systems and CCTV.
- 1.1.1.6 The Project also includes temporary facilities required during the course of construction, including site establishment and preparation works, temporary construction laydown areas, contractor facilities, materials and plant storage, generators, concrete batching facilities, vehicle and cycle parking facilities, offices, staff welfare facilities, security fencing and gates, external lighting, roadways and haul routes, wheel wash facilities, and signage.
- 1.1.1.7 The overarching aim of the Project is to support the UK's transition to a low carbon economy as outlined in the Sixth Carbon Budget (December 2020), the national Ten Point Plan for a Green Industrial Revolution (November 2020) and the North Lincolnshire prospectus for a Green Future. It will do this by enabling circular resource strategies and low-carbon infrastructure to be deployed as an integral part of the design (for example by reprocessing ash, wastewater and carbon dioxide to manufacture concrete blocks and capturing and utilising waste-heat to supply local homes and businesses with heat via a district heating network).
- 1.1.1.8 It should be noted that since the publication of the Scoping Report the Project no longer includes an extension of the existing wharf at Flixborough Wharf. The provision for a separate business and visitor centre has also been revised and a business centre will no longer be included in the DCO application.

Figure 1 Project – Principal Elements



1.2 Purpose of this Document

- 1.2.1.1 The Project is classed as a Nationally Significant Infrastructure Project (NSIP) and therefore a Development Consent Order (DCO) is required under the Planning Act 2008 (the Act 2008).
- 1.2.1.2 Regulations stemming from the Act 2008 include the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the Infrastructure EIA Regulations 2017) which require an Environmental Impact Assessment (EIA) to be undertaken and an Environmental Statement (ES) to be submitted with the draft DCO for a project of this scale and type.
- 1.2.1.3 The Preliminary Environmental Information Report (PEIR) was an output of the EIA and pre-application processes before the production of the final ES. The purpose of the PEIR was to provide consultees, particularly the public and local communities, with relevant information to assist them in identifying the key environmental and socio-economic issues at a stage where feedback can meaningfully influence the design process before the DCO submission is made. The ES includes consideration of the consultee feedback on the PEIR.
- 1.2.1.4 The EIA considered the likely significant effects of the Project on the environment, including direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects, resulting from:
- the existence of the Project;
 - the use of natural resources; and
 - the emission of pollutants, creation of nuisances and waste.
- 1.2.1.5 This document is the Non-technical Summary of the ES for the Project. Further and more detailed information is available from the ES itself:

2. EIA APPROACH AND METHODOLOGY

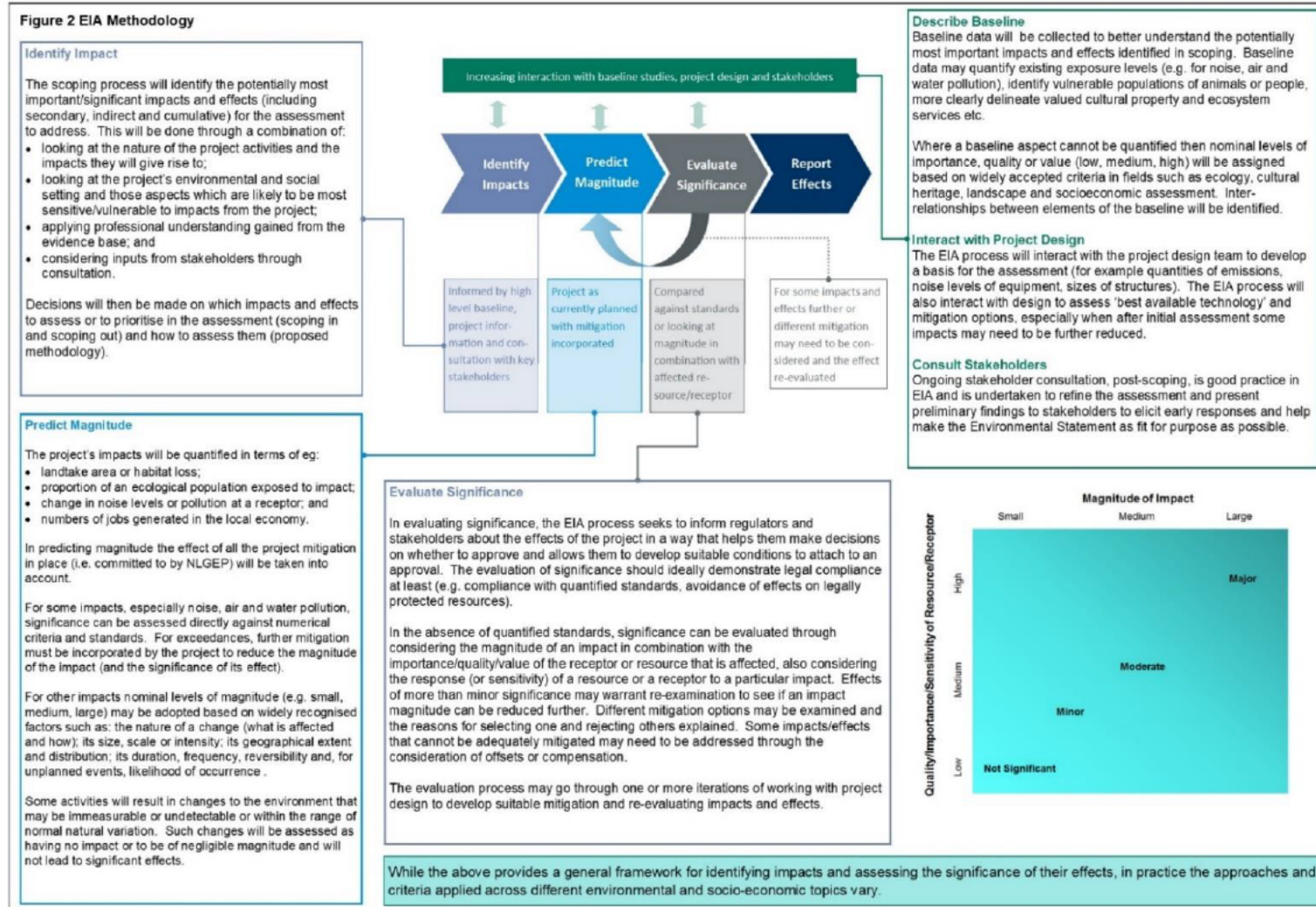
2.1 Overall Approach

- 2.1.1.1 The Project has been subjected to its own stand-alone EIA process, undertaken in accordance with the EIA Regulations and guidance provided by the Planning Inspectorate.
- 2.1.1.2 To allow flexibility as the design of the Project progresses towards being finalised, a design envelope was developed for some features and where this was done, the EIA took the environmental worst-case as the basis of assessment.

2.2 Methodology and Scope

- 2.2.1.1 In order to report the assessment of the effects of the Project, the ES includes:
- a description of the baseline environmental conditions within the Order Limits and in the surrounding area;
 - a definition of the components and activities that make up the Project, including consideration of potential alternatives;
 - an identification of the potential environmental effects of the Project; and
 - a discussion of the measures intended to avoid, minimise, or reduce the potential environmental effects of the Project.
- 2.2.1.2 Figure 2 EIA Methodology sets out the general approach taken to assessing the likely significant effects that may arise from the Project.

Figure 2 EIA Methodology



2.2.1.3 The scope of the EIA was defined by identifying the potential areas of interaction between the Project and its environmental and socio-economic setting, in order to identify the key issues to be addressed. The EIA addressed the following topics:

- air quality;
- climate;
- noise and vibration;
- ground conditions, contaminated land, gas monitoring and hydrogeology;
- water resources and flood risk;
- ecology and nature conservation;
- landscape and visual amenity;
- archaeology and cultural heritage;
- traffic and transport;
- socio-economic characteristics;
- waste;
- major accidents and hazards; and
- health.

2.2.1.4 For each topic, a spatial scope for the assessment was defined taking into account the physical extent of the components and activities that make up the Project and considering how their effects on the environment were likely to occur and to be transmitted away from the Order Limits. The assessment was also structured by considering the effects likely to occur during each phase of the Project: construction, operation, and decommissioning.

2.3 Consultation

2.3.1.1 Consultation was a key aspect of the EIA process for the Project. It allowed the EIA scope to be agreed at an early stage and ensured that the EIA focused on the environmental and socio-economic issues of most relevance to the Project's location and context. The ES directly responds to the Scoping Opinion provided by the Planning Inspectorate and statutory consultees, as well as feedback received following submission of the PEIR and also to the feedback from informal consultation with local communities.

2.4 Overview of Existing Environmental and Socio-economic Conditions

2.4.1.1 The Order Limits lies entirely within the administrative boundary of North Lincolnshire Council (NLC).

2.4.1.2 The land within the Order Limits (the Application Land) and the immediate surrounding area is currently a mix of both brownfield and greenfield land with the River Trent forming the western boundary. Large industrial

- facilities within the wider Flixborough Industrial Estate and on adjacent land include a cement works, wind turbines, grain processing facilities, and a small power station. The current industrial operations at the Flixborough Wharf and the Flixborough Industrial Estate provide a brownfield setting that is appropriate for further development.
- 2.4.1.3 Adjacent land includes areas in arable agriculture, comprising a number of fields separated by hedgerows and well-established drainage ditches and areas of open space, which are served by a network of public rights of way (PROW) and also includes Local Nature Reserves.
- 2.4.1.4 The land to the north and northeast of the Order Limits is predominantly a rural area with a number of small villages. To the southeast, the character becomes increasingly urban with industrial and retail parks and residential areas of Scunthorpe.
- 2.4.1.5 The Order Limits is located approximately 2 kilometres (km) southwest of Flixborough, and 800 metres west of Amcotts.

Ground Conditions Contaminated Land

- 2.4.1.6 The geology underlying the Application Land comprises a mixture of superficial deposits composed of alluvium and blown sands with glacial lake deposits, overlying bedrock comprised primarily of mudstone and limestone
- 2.4.1.7 Historical mapping indicates that the majority of the Application Land has comprised undeveloped/agricultural land to present day, with some development associated with Flixborough Wharf and Flixborough Industrial Estate in addition to the construction of railways and road infrastructure.
- 2.4.1.8 Intrusive site investigations undertaken in August/September 2021 obtained baseline soil and groundwater data and targeted areas of potential contamination. The results of the site investigations found no concentrations that were likely to significantly affect human health or controlled waters or indicated widespread soil or groundwater contamination.

Water Resources and Flood Risk

- 2.4.1.9 Based on the Environment Agency's catchments Data Explorer, the Application Land falls within three separate surface water sub-catchments of the River Trent and Humber Estuary. These are the Bottesford Beck, Winterton Beck, and the River Trent catchments, respectively.
- 2.4.1.10 Within these catchments, there are a large number of watercourses that are hydraulically connected to the Project. However, the Winterton Beck is the only Water Framework Directive (WFD) waterbody to be in direct hydraulic connection, with all other waterbodies being classed as artificial, agricultural, or IDB controlled land drains.
- 2.4.1.11 With regards to the Bottesford Beck, the Project will only marginally cross into the catchment of this watercourse where the DHPWN runs south and west towards the M180 and Scunthorpe centre, respectively. At its closest point, the DHPWN will be over 2.5km from the Bottesford Beck.

Air Quality

2.4.1.12 As the Energy Park Land is located in an industrial area there are local sources of emissions to atmosphere surrounding the Project; these are predominantly made up of industrial sources and road traffic. North Lincolnshire Council has investigated air quality within its area as part of its responsibilities. An Air Quality Management Area (AQMA) has been declared in Scunthorpe. However, this AQMA is sufficiently distant from the Project as to not require consideration in the Air Quality Impact Assessment (AQIA).

Ecology

2.4.1.13 Six sites of international importance are present within 15 km of the Order Limits, two of which extend to areas adjacent to the Project:

- The Humber Estuary Ramsar Site;
- The Humber Estuary Special Area of Conservation (SAC);
- The Humber Estuary Special Protection Area (SPA);
- Thorne Moor SAC;
- Thorne and Hatfield Moors SPA; and
- Hatfield Moor SAC.

2.4.1.14 The desk study found no SAC within 30 km with bats as a qualifying feature.

2.4.1.15 A total of 13 nationally and regionally important designated sites, including Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR) were found within 2 km of the Order Limits. Four statutory designated sites partially overlap with the Order Limits of the Project:

- Conesby (Yorkshire East) Quarry SSSI;
- Phoenix Parkway LNR;
- Atkinson's Warren LNR; and
- Phoenix LNR.

2.4.1.16 There are 30 non-statutory designated wildlife sites within 2 km of the Order Limits. This includes 26 Local Wildlife Sites (LWS), seven Local Geological Sites (LGS) and one Regionally Important Geological Site (RGS). The following sites partially overlap with the Order Limits of the Project:

- Phoenix Parkway LWS;
- Atkinson's Warren LWS;
- Conesby Quarry LWS and LGS;
- Slag Banks LWS; and
- Yorkshire East Gullet LWS.

Noise

- 2.4.1.17 The acoustic environment at potential residential receptors near to the Application Land is affected by the various industrial activities on the Flixborough Industrial Estate, traffic, and commercial noise sources.
- 2.4.1.18 Background noise levels have been established through baseline noise monitoring in order to quantify the noise environment at locations close to the Project. Locations for noise monitoring were established in consultation with the environmental health noise team at North Lincolnshire Council (NLC) and determined following stakeholder feedback on Scoping and PEIR. Eleven receptor locations have been monitored, with both daytime and night-time noise levels recorded to provide a representative noise baseline for assessing the potential impacts of both construction and operational noise.

Landscape

- 2.4.1.19 There are no nationally designated landscapes or land designated in terms of specific national statutory landscape designations within 2.5 km of the Order Limits. The area to the west of the Order Limits is characterised by the channel of the River Trent and is surrounded by large-scale agricultural land interspersed by small woodland copses. Industrial activity and residential settlement at the north-eastern edge of Scunthorpe characterises the land to the southeast.

Socioeconomic Characteristics

- 2.4.1.20 The site is on the east bank of the tidal River Trent, immediately west of the village of Flixborough and within 2 km northwest of Scunthorpe. The main settlements within 3 km are Amcotts, Burton-upon-Stather, Dragonby, Gunness and Normanby set in a predominantly rural landscape. North Lincolnshire Unitary Authority (UA) and the Scunthorpe Travel to Work Area (TTWA) are the most likely to be affected by the potential socio-economic impacts of the Project.
- 2.4.1.21 The assessment study areas include the areas of land required both temporarily and permanently for the Project, as well as a wider corridor within which receptors or resources could be affected by a combination of effects.
- 2.4.1.22 The area local to the Energy Park Land is not a major tourist destination but provides opportunities for local recreational and outdoor activities such as at Normanby Hall Country Park. In the vicinity of the Energy Park Land, there are some recreational amenities including, public open space, a network of footpaths and areas sensitive from a landscape perspective including Burton Wood LWS, Lincolnshire Edge LCA and the Trent Levels LCA.

Archaeology and Cultural Heritage

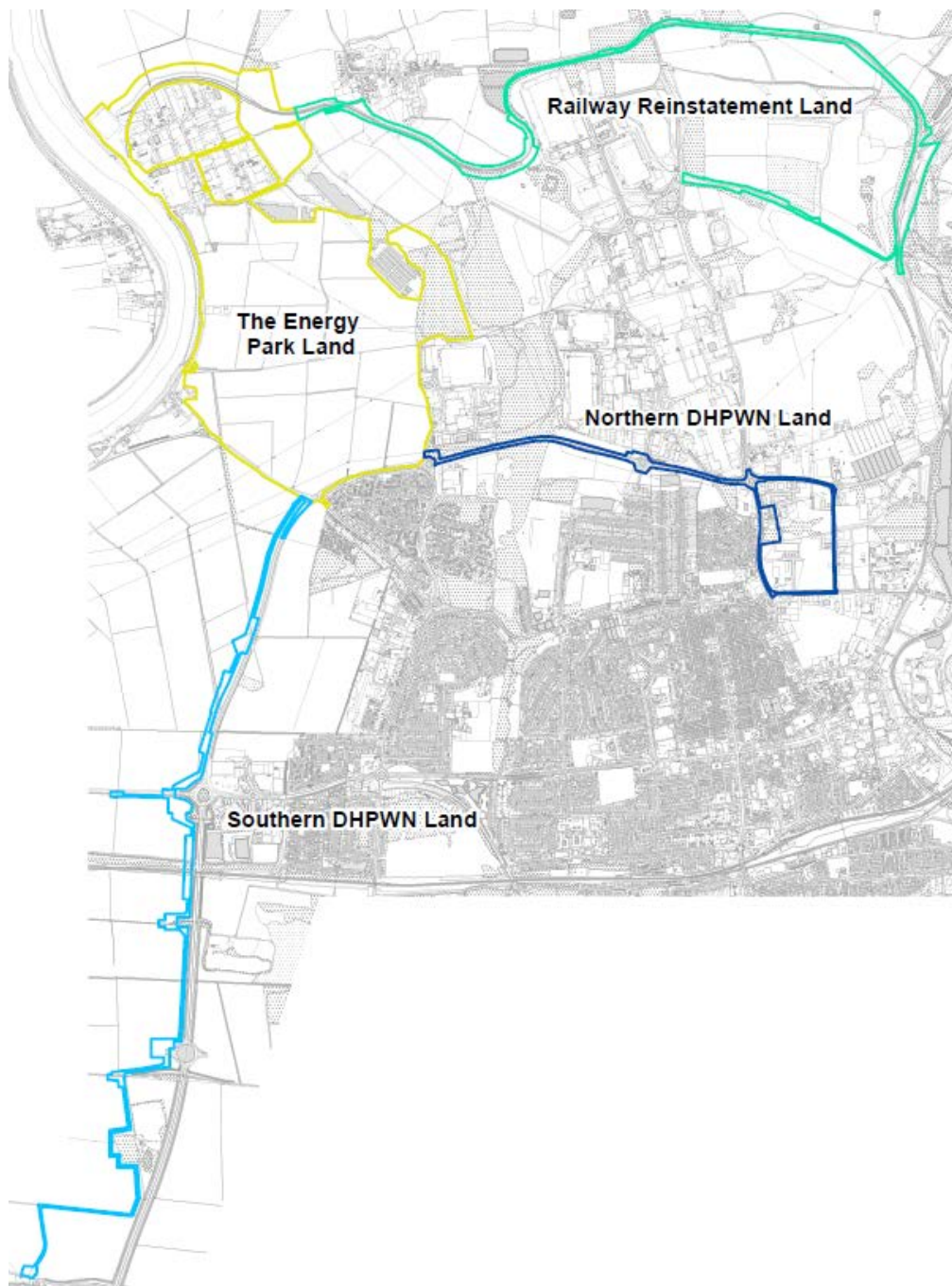
- 2.4.1.23 A number of Scheduled Monuments and Listed Buildings are located within 7.5 km of the Energy Park Land including buildings within the study area, for example the scheduled site at the medieval settlement of North

Conesby excavated between 1989 and 1991, commonly referred to as Flixborough Saxon Nunnery. There are also two listed buildings in Amcotts to the west of the Trent, where the Grade II Church of St Mark and the adjacent Grade II rectory are situated. Views from or towards designated listed buildings in many of the closest settlements will not be affected by the Project. The ES considers both impacts on buried archaeology and settings, including that of archaeological remains associated with the designated Saxon Nunnery at Flixborough.

3. THE PROJECT

- 3.1.1.1 The ERF and other above ground elements of the Project will be situated on a plot of land within and adjacent to Flixborough Wharf on the east bank of the River Trent (the Energy Park Land). As well as the Energy Park Land, the Application Land also encompasses the Northern DHPWN, Southern DHPWN and Railway Reinstatement Land. Both DHPWNs will include buried cables and pipes to deliver power and heat to areas outside the Energy Park Land.
- 3.1.1.2 For the purposes of providing clarity within the ES, the Application Land is divided into four distinct geographical areas relating to the specific elements of the Project (Figure 3).

Figure 3 Project Areas



3.2 The Energy Park Land

- 3.2.1.1 The Energy Park Land is located on land within and to the south of Flixborough Industrial Estate, to the west of Scunthorpe, North Lincolnshire. The Order Limits encompasses an area within and adjacent to Flixborough Wharf (RMS Trent Ports) on the east bank of the River Trent. The Flixborough Wharf and Flixborough Industrial Estate together form an industrial complex that has supported a range of businesses and industrial activities since the early 1900s. Existing infrastructure at the site includes roads, a rail spur, a 155m long wharf, weigh bridge, cranes, warehousing and stock sheds, workshops, and portable offices.
- 3.2.1.2 The Project will have transport connectivity by road, rail, and river to sea via the River Trent and River Humber, with the latter two used for freight transport only.

3.3 The Northern District Heat and Private Wire Network (DHPWN) Land

- 3.3.1.1 The route of the Northern DHPWN runs from the ERF down the new access road to the southern end of the Energy Park Land where the B1216 (Ferry Road West) meets the A1077 (Phoenix Parkway). The route follows the A1077 towards the east, passing the Skippingdale Retail Park on its south side and crossing the common land at Atkinsons' Warren / Foxhills Plantation.
- 3.3.1.2 Since submission of the PEIR this area of the Order Limits has been refined to remove the southern extent of the Northern DHPWN. Prior to the formal consultation, the Northern DHPWN extended south along A1430 (Normanby Road) and terminated at the North Lincolnshire Council Offices. The route will now terminate at the Warren Road junction with Normanby Road. The route has been amended to reduce noise and traffic impacts on local residents during construction, and to improve the constructability of the network. Furthermore, an alternative Northern DHPWN route (Option B) has been incorporated for consideration by the Examining Authority. In summary the two alternative route options at the roundabout junction with the A4130 (Normanby Road) are as follows:
- Option A - the route passes south towards the built-up urban centre of Scunthorpe via Normanby Road, where the route remains lined on both sides by residential and industrial areas; or
 - Option B –the route continues on the A1077 until the junction with Bessemer Way to the south. The route will follow Bessemer Way until the junction with Warren Road turning due west to meet the Normanby Road.

3.4 The Southern District Heat and Private Wire Network (DHPWN) Land

- 3.4.1.1 The route of the Southern DHPWN runs from the southern end of the Energy Park Land where the B1216 (Ferry Road West) joins the A1077,

and then heads south through the agricultural land on the west side of the A1077. It will pass under the IDB drain north of the roundabout.

- 3.4.1.2 At Doncaster Road, the Southern DHPWN will pass under the carriageway and continue south across the agricultural land, where it will pass under the Crowle to Scunthorpe railway line and terminate in the field to the north of the B1450 (Burringham Road).
- 3.4.1.3 Although the route of the Southern DHPWN has not changed, the area of this element of the project has been significantly reduced within the Order Limits as the understanding of construction requirements has increased. This is most apparent within the agricultural land to east of the A1077, where the Order Limits have been reduced to include only the land needed for construction and operation of the DHPWN. This has reduced the Order Limit in this area from approximately 400m wide, to approximately 30m wide.

3.5 The Railway Reinstatement Land

- 3.5.1.1 The Project also includes the reinstatement of the disused 6km Dragonby to Flixborough branch line. To facilitate the re-opening of the line, it will be necessary to undertake some essential maintenance and vegetation clearance which will allow the line to operate safely over the lifetime of the Project.
- 3.5.1.2 The Project will also include the construction and operation of a new railhead to the south of Flixborough Wharf, with the primary purpose of facilitating the delivery and export of materials at scale to and from the Project, reducing the need for road vehicle movements.
- 3.5.1.3 The disused railway line between the main Network Rail line at Dragonby and Flixborough Wharf previously served the port operations through the delivery of steel and other materials to and from British Steel at Scunthorpe up until its closure in 2012. The line runs in a roughly east-west direction, weaving between the industrial settings of Normanby Industrial Estate, the mineral workings, industrial developments at Dragonby sidings, slag dumping zones, quarries, and arable agricultural land, on a mix of embankments and cuttings that are lined with trees along much of the line length.
- 3.5.1.4 The line passes immediately to the north of the Normanby Enterprise Park before winding around a long 's' bend to the south of Flixborough village and looping around the northern edge of Flixborough Industrial Estate, where the line terminates at the wharf edge.
- 3.5.1.5 Although the route of the railway reinstatement has not changed, the area of this element of the project has been significantly reduced within the Order Limits as the understanding of construction requirements has increased. This is most apparent within the agricultural land to the north and south of Hopeton Street, adjacent to Dragonby Rail Sidings.

3.6 Changes to the Project since PEIR Consultation

- 3.6.1.1 Since submission of the PEIR the Application Land has been refined to include or exclude the following areas:

- the inclusion of First Avenue, Flixborough Industrial Estate into the Order Limits to facilitate the construction of underground utilities;
- the inclusion of part of Bellwin Drive, Flixborough Industrial Estate into the Order Limits to provide construction access for the ERF;
- a section of highway land along Ferry Road West has been removed by streamlining the construction of the new roundabout;
- Connesby Quarry has been removed from the Order Limits as a construction laydown compound due to potential archaeological sensitivity in that area;
- an area on the Flixborough Industrial Estate has been removed where proposed flood defences have been replaced by a flood wall and establishing a Flood Evacuation Plan as discussed with the Environment Agency;
- areas to the north and south of the railway line have been consolidated to match the planned screening, biodiversity habitats and public rights of way;
- the areas required for the DHPWN have been consolidated and include construction zones and construction compounds;
- the Northern DHPWN has been shortened to manage the impact of construction noise and traffic disruption; and
- the Northern DHPWN now includes an additional route option to mitigate traffic disruption and noise impacts on residents during construction.

4. SUMMARY OF ENVIRONMENTAL EFFECTS

4.1 Air Quality

- 4.1.1.1 A desk-based assessment together with atmospheric dispersion modelling has been undertaken to assess any potential impacts upon air quality from the Project.
- 4.1.1.2 The construction phase will include the implementation of mitigation measures to minimise emissions of dust and PM₁₀. These measures will be implemented for the construction of the ERF (and associated facilities), the new road and the district heating scheme. Site boundary dust or PM₁₀ monitoring will be undertaken during construction, as part of the Dust Management Plan. With mitigation in place, emissions to air during the construction phase will have no significant effects.
- 4.1.1.3 The operation of the ERF will result in the emission of combustion products from an elevated stack. The assessment considered gaseous and particulate combustion products, together with trace metals. Based on the results of the atmospheric dispersion modelling of combustion emissions, added where appropriate to baseline concentrations of the pollutants of concern, and comparing these levels with air quality standards, the assessment concluded that operational impacts on air quality at sensitive human receptors will be negligible. The predicted levels will not lead to significant effects on human health.
- 4.1.1.4 Operation of the carbon capture facility will release small quantities of amines. The atmospheric concentrations predicted at the nearest sensitive receptors are well within the levels of acceptable risk defined by the Environment Agency. Given that the assessment of N-amines is a relatively new area of environmental study, albeit based upon a long history of experimental science, the Project commits to undertaking monitoring of amines when operational, both in flue gases and in the environment.
- 4.1.1.5 During operation key mitigation measures include Best Available Technique abatement systems for reducing emissions to air such as particulate material together with design of stack heights for optimal dispersion of emissions. A number of measures will also be applied to avoid odour nuisance from the delivery and handling of the refuse derived fuel; these include delivery in sealed containers or wrapped and baled, no outdoor storage, and keeping the tipping hall under negative pressure so that during unloading odours will be drawn into the combustion process and eliminated.
- 4.1.1.6 Regarding air quality impacts on ecological receptors, the assessment concluded that for most pollutants of concern and protected sites the Project will not make a significant contribution. However, further assessment of potentially significant effects on habitats for some protected sites is presented in the ecological impact assessment, with further consideration of the spatial aspects of the Project, and the specific sensitivity of receptor species.

- 4.1.1.7 The AQIA concludes that operational impacts on air quality at sensitive human receptors will be negligible and there will be no significant effects on human health due to airborne concentrations of pollutants.

4.2 Climate

- 4.2.1.1 The design of the ERF meets government planning policy requirements to consider and implement uses of combined heat and power (CHP). Also, with the inclusion of carbon capture, utilisation, and storage (CCUS), the Project is aligned with government proposals for all new energy recovery facilities to have CCUS or be CCUS ready from the end of the 2020s.
- 4.2.1.2 A desk-based modelling assessment was undertaken to define the scope and study area boundaries; identify the data related to greenhouse gas (GHG) emissions from the Project; calculate GHG emissions; and undertake a sensitivity analysis to assess potential uncertainties. This assessment concluded that there will be a net reduction in GHG from the Project compared to the alternative baseline landfill scenario. Therefore, there will be no significant residual effects on climate from the Project and there should be a positive impact.
- 4.2.1.3 The development of a procurement strategy for materials required for the Project, which prioritises the identification and purchase of materials with lower embodied GHG emissions, would further limit the GHG emissions from the Project. The transport of materials to or from the site by train or boat, rather than road, would also provide benefits as regards GHG emissions.
- 4.2.1.4 In addition to the above, long-term storage of captured carbon dioxide (CO₂) (e.g. in geological storage), instead of utilisation, may provide further net reductions in GHG emissions, if practicable access to suitable storage schemes becomes available. The Applicant is a member of the Zero Carbon Humber Partnership, and the site is well situated to connect to the proposed CO₂ pipeline currently going through its own DCO process having been selected by BEIS as one of the two UK Track-1 decarbonisation clusters.
- 4.2.1.5 The sensitivity analysis included in the assessment did note that a lower biogenic content in the refuse derived fuel (RDF) would affect the potential net GHG benefit of the Project. Should insufficient processing facilities exist to manage the organic fines present in municipal solid waste, these fines would by default remain mixed with the RDF. Therefore, monitoring of the biogenic carbon content of the RDF used at the site will be undertaken to give confidence that the net benefit in GHG emissions is being maintained or improved upon.

4.3 Noise

- 4.3.1.1 An assessment of noise and vibration during construction, operation and decommissioning has been carried out. The assessment follows relevant standards and guidance to measure, predict and assess likely significant noise and vibration effects.

- 4.3.1.2 Baseline noise levels were established at various noise sensitive locations in the vicinity of the Project. The monitoring locations were chosen in consultation with the environmental health noise team at North Lincolnshire Council prior to undertaking the surveys.

Construction Noise

- 4.3.1.3 In order to manage construction noise, construction works will be undertaken in accordance with a Construction Environmental Management Plan (CEMP) that will be prepared by the construction contractor. The CEMP will set out the key management measures that contractors will be required to adopt and implement. These measures will be developed based on those identified during the EIA process. They will include strategies and control measures for managing the potential environmental effects of construction and limiting disturbance from construction activities as far as reasonably practicable. In developing the CEMP, the Contractor will be required to obtain prior consent from North Lincolnshire Council under Section 61 of the Control of Pollution Act (CoPA) for the construction works. The consent application will set out detailed measures to minimise construction noise (and vibration), including control of working hours, and provide a further assessment of construction noise and vibration if necessary.
- 4.3.1.4 The predicted residual effects of construction noise impacts are predicted to be of moderate significance at most. In general, most impacts are on a small number of noise-sensitive receptors, or over short periods of time such as is likely for the night works to connect the reopened railway with the existing mainline railway, or the transitory works associated with the DHPWN.
- 4.3.1.5 The effect of noise during demolition and construction has also been considered on the neighbouring industrial buildings at Flixborough Industrial estate on a worst-case basis. Taking into account the potential for disturbance but bearing in mind that the noise levels will not be at their highest every day, the effect has been assessed as being of moderate significance and will be investigated further during the Section 61 (CoPA) process once more information is available; detailed mitigation will be incorporated as necessary into the CEMP.
- 4.3.1.6 At Normanby Road and at Concord House on Bessemer Way, noise, and vibration from the installation of Northern DHPWN pipework and cables has the potential to lead to impacts of large magnitude. However, these works will be undertaken during the day and over a relatively short period. Therefore, moderate significance residual noise effects are predicted.
- 4.3.1.7 The closest receptors in Normanby Road are also likely to be subject to vibration impacts during breaking out of the road surface and vibratory compaction, but these are expected to be of minor significance.
- 4.3.1.8 Effects of moderate significance are predicted during night works associated with the Northern DHPWN at Betony Close during works associated with crossing the Skippingdale Roundabout if directional drilling

cannot be used to cross the roundabout which would allow the work to be carried out during the day.

- 4.3.1.9 Significant effects are also likely if the work on the main construction areas needs to be undertaken during the evening at the same intensity as during the day. However, the current information suggests that work outside of core daytime hours would be discussed with NLC to establish which works could be performed with a low likelihood of significant effects.
- 4.3.1.10 No significant vibration effects are predicted for the majority of construction activities. However, a worst-case estimate of vibration levels from vibratory compaction during installation of the DHPWN indicates a medium magnitude impact. The duration of the impact is expected to be limited to a few nights outside each receptor for this type of work, and the impact is well below thresholds for structural damage and is therefore predicted to be an effect of moderate significance at most.

Operational Noise

- 4.3.1.11 The residual effects from the operation of the Project are predicted to be of up to moderate significance when the context of the noise impact is considered. A range of mitigation measures have been applied to reduce the noise levels from the key items of equipment. These measures primarily comprise acoustic enclosures and cladding around processing plant and equipment, together with noise specifications of equipment. The external plant (mainly unloading equipment) operating at the wharf and the railhead will include at-source mitigation such as exhaust silencers and enclosed engine compartments.
- 4.3.1.12 Opportunities for further mitigation will be explored during detailed design to reduce predicted significant noise effects which have been reported in the ES. However, it should be noted that the mitigation options, including the use of building facades with higher acoustic insertion losses, have been considered with the Project engineering team, and lower noise methods of unloading aggregate from the train which avoid the need for a grab crane have been explored, and these have been included in the assessment. As a result, options for further mitigation are not expected to significantly change the predicted noise levels. The use of noise barriers along the railhead and on-site roads has also been considered, however, these have not been included due to concerns regarding the potential obstruction of flood water flows on the site and would only mitigate noise from unloading trains.
- 4.3.1.13 A noise-monitoring and management programme will be developed and agreed with NLC and will be implemented before the development becomes operational. The purpose of the programme will be to demonstrate noise from the operation of the Project is no higher than reported in the ES and where practicable to reduce noise levels below those that have been predicted. The programme will also set out good practice operational procedures to minimise noise such as use of tonal reversing alarms and control of doors opening/closing that allow noise breakout.

4.4 Ground Conditions, Contamination, and Hydrogeology

- 4.4.1.1 A literature review of the baseline conditions indicated that the bulk of the Application Land poses a low risk to human health or controlled waters either during construction or operation. There were a number of small areas of potential contaminant sources identified at the northern end of the Energy Park Land (Flixborough Industrial Estate, historic tank farm) and the potential for more widespread soil contamination due to the Nypro disaster.
- 4.4.1.2 An intrusive site investigation (SI) was undertaken on the Energy Park Land and the Southern DHPWN Land, targeting areas where potentially contaminated sources were identified during the desk study investigation, as well as to obtain baseline soil and groundwater data. No concentrations were recorded that were likely to significantly affect human health or controlled waters or indicated widespread soil or groundwater contamination. Where ground conditions or access restrictions meant that intrusive sampling was not feasible these areas will be investigated at the pre-construction stage and any further management measures needed will be set out in the CEMP.
- 4.4.1.3 Low concentrations of asbestos fibres were identified at two locations in the made ground at Flixborough Wharf. An asbestos management plan will be prepared and implemented at the pre-construction/construction phase (as part of the CEMP) to manage any potential risk to human health on or offsite.

Construction

- 4.4.1.4 The implementation of standard good construction practice measures, which will be developed specifically for the Energy Park Land and set out in detail in the CEMP, will reduce any adverse effects on soils and groundwater (and human health) arising from either accidental spills or due to mobilisation/disturbance of previously unidentified sources, down to negligible significance.
- 4.4.1.5 Full compliance with the Construction Design and Management (CDM) Regulations and other relevant Health and Safety legislation will apply throughout the construction works on site. Particular considerations will apply in the event of encountering any contamination on site, including additional site investigation and developing remediation options in consultation with North Lincolnshire Council. Where contaminated material is encountered it will be suitably segregated and stored prior to remediation or off-site disposal at a licensed facility. Potentially hazardous materials used during construction, including chemicals, fuels and oils, will be stored using secondary containment appropriate to the level of risk, to prevent accidental spills or releases to ground and water resources. A spill management plan will be developed to address the risk of accidental spills.
- 4.4.1.6 If contamination is encountered and removed/remediated during or prior to the construction of the Project, there will be a beneficial residual effect as a result of construction of the Project.

- 4.4.1.7 Monitoring of groundwater and surface water quality may be required under the Environmental Permitting Regulations before construction, during construction, and post-construction.

Operation

- 4.4.1.8 Potential impacts during operation will be controlled through the design of the Project including measures that will contain and control any releases of contaminants to ground and surface and foul drainage networks. Maintenance and operation of the Project will be in accordance with environmental legislation and good practices.
- 4.4.1.9 The Project will be operated in accordance with the requirements of its Environmental Permit, which will include conditions and measures for the protection of soils and groundwater.
- 4.4.1.10 Ground gas monitoring has been undertaken on the Energy Park Land as part of the site investigation. Preliminary results indicate that there may need to be some mitigation measures due to methane (CH₄) and CO₂ levels. Any necessary mitigation will be included in the detailed design once the ongoing programme of ground gas monitoring has been completed.
- 4.4.1.11 Monitoring of groundwater quality will be undertaken throughout the operational life of the Project to determine whether there are any operational impacts.
- 4.4.1.12 In conclusion, based on the results of the assessment, and taking into account mitigation measures, no significant effects on geology, human health, ecological receptors, controlled waters or buildings from the construction, operation and decommissioning of the Project are predicted.

4.5 Water Resources and Flood Risk

- 4.5.1.1 A desk-based assessment, supplemented with a site walkover survey was undertaken to understand the nature of the local surface water environment, both within the Application Land and within hydraulic connection of the Project. In addition, detailed hydraulic modelling and a flood risk assessment was undertaken to understand how the development of the Project might affect water levels during a future flood event.
- 4.5.1.2 The Order Limits are located on the east bank of the tidal River Trent to the northwest of Scunthorpe and covers an area across three surface water catchments.
- 4.5.1.3 Within these catchments, there are a total of 50 watercourses that are hydraulically connected to the Project. However, the Winterton Beck is the only 'Water Framework Directive' (WFD) waterbody to be in direct hydraulic connection, with all other waterbodies being classed as artificial, agricultural, or internal drainage board (IDB) controlled land drains.

Effects on Surface Waters

- 4.5.1.4 The construction and decommissioning activities of the Project have the potential to have adverse effects upon a number of agricultural drains and

- ditches within the Application Land and downstream of the Order Limits. No WFD water bodies will be affected. There will be no abstractions or discharges from or to the River Trent. All operational water will be sourced from the mains supply and treated process water will be discharged to sewer.
- 4.5.1.5 Mitigation measures will address appropriate working methods to avoid/minimise effects on water courses that need to be crossed. Oil interceptors will be an integral part of the surface water drainage provisions. Material stockpiles will be sited a minimum distance from watercourses and suitably managed to avoid silty or polluted runoff entering watercourses. Maintenance and refuelling of construction machinery on-site will only take place within suitably kerbed or bunded areas to prevent the accidental leakage of lubricating and hydraulic fluids. Similarly, potentially hazardous materials to the water environment will be stored within bunded areas with impermeable bases.
- 4.5.1.6 With the implementation of site-specific and standard good practice mitigation measures (which will be developed in detail in the CEMP and related plans at the pre-construction stage), the assessment concluded that the effects of the construction and decommissioning of the Project will not result in any significant effects on the water environment.
- 4.5.1.7 The CEMP will also stipulate the necessary inspection and monitoring measures the Project will adopt to demonstrate that mitigation measures are implemented properly, in a timely manner and work as anticipated.

Flood Risk

- 4.5.1.8 The Project is located within Flood Zones 2 and 3, meaning the risk of flooding would be very high in the absence of flood defences. However, the Application Land is protected by flood embankments along the River Trent, and it has been determined that during the existing scenario the Application Land is at a low risk of flooding from tidal sources with the defences in place or resulting from overtopping of the defences during events that exceed a 1 in 200 chance of causing flooding.
- 4.5.1.9 The layout of the Project has been designed in combination with a detailed flood risk assessment (FRA) (**Document Reference 6.3.3**), undertaken in consultation with the Environmental Agency to make sure that the Project can meet the requirements of the 'Exception Test.' This test, which is a requirement of all UK developments, requires that a proposed development within flood zone 2 or 3, must demonstrate that it can operate safely in the event of a flood considering the vulnerability of its users, whilst not making flooding worse in other areas.
- 4.5.1.10 Mitigation of flood risk is therefore primarily achieved through the layout of the Project, which has been determined by hydraulic modelling to identify the best position of buildings and the extent to which floor levels and raised land areas will be introduced to reduce the potential to displace flood water to other areas as much as reasonably possible. In addition, flood bunds or flood walls will be included within the Project to prevent the displacement of flood water to adjacent sites.

4.5.1.11 The FRA (**Document Reference 6.3.3**) concluded that the effects of the operation of the Project will result in a significant effect at just one receptor and only during a breach scenario: a commercial building at Flixborough Wharf, located to the north of the wharf. This building is currently used as a stockpile and storage warehouse. It is proposed that this effect will be mitigated through the implementation of a flood management plan. This plan will set out the procedures that will be put in place to ensure that the site could remain safe during a flood event; and will include items such as (but not limited to):

- an evacuation route plan;
- a flood resilience implementation plan;
- enrolling the site onto the Environment Agency's flood warning system; and
- appointment of a flood officer.

The details of this flood management plan will be agreed with the Environment Agency and secured as a requirement of the DCO application.

4.6 Ecology and Nature Conservation

4.6.1.1 The ecological impact assessment was based on findings from a desk-based study and a wide range of comprehensive field surveys completed up to and including April 2022.

4.6.1.2 Using the information from the baseline studies, mitigation has been incorporated into the construction and operational phases of the Project to avoid significant effects on important ecological features. Key ecological features identified by the assessment include the Humber Estuary Ramsar Site, SAC, SPA; nationally and locally designated sites; Habitats of Principal Importance (HPI) (including hedgerows and lowland calcareous grassland); and legally protected and notable species (including water vole, great crested newt, badger, reptiles, bats, and birds).

4.6.1.3 The internationally designated Humber Estuary (Ramsar Site, SAC, SPA) was also subject to the Habitats Regulations Assessment (HRA) process which is reported separately to the ES.

4.6.1.4 Mitigation for effects on ecology has been developed in accordance with the 'Mitigation Hierarchy' of the Chartered Institute of Ecology and Environmental Management: minimising the loss of ecologically important and designated habitats; avoiding harming such habitats; and designing appropriate compensation for unavoidable habitat loss.

4.6.1.5 Standard mitigation measures will be implemented to minimise loss of habitats and species. These measures will include in all cases keeping the working footprint to a minimum and avoiding impacts on key receptors wherever possible. To date this has included careful design of the Order Limits to reduce habitat loss, with particular focus given to habitats which require more time to establish (e.g. woodland), as well as avoiding encroachment into regional and local designated wildlife sites.

- 4.6.1.6 Regarding avoidance of harm, the Code of Construction Practice (CoCP) (**Document Reference 6.3.7**) includes an outline Invasive Non-native Species Management Plan and an outline Protected Species Management Plan and provides the basis for a future Construction Environmental Management Plan (CEMP) which will be prepared pre-construction by the relevant contractor. The final content of the CEMP will be approved by the Local Planning Authority, in consultation with Natural England (and others), and adhered to as a condition of the works during all construction activities. The CEMP will include all measures to avoid impacts on designated sites, other habitats of importance and protected/sensitive species. The CoCP (**Document Reference 6.3.7**) makes provision for the appointment of a suitably qualified (or team of suitably qualified) Ecological Clerk of Works who will undertake pre-works surveys for protected species as required, establish suitable exclusion zones, advise on site access, timing and micro-siting of works, and supervise construction activities to ensure mitigation measures are implemented.
- 4.6.1.7 Appropriate mitigation and compensation will be secured for all unavoidable impacts on habitats and protected species. Wherever possible, habitats will be carefully reinstated; if this is not possible, compensatory habitat will be created elsewhere at least equal in area to that lost. Areas proposed for compensatory habitat creation have been developed alongside design of the Project. An outline Landscape and Biodiversity Management and Monitoring Plan has been prepared and provides the basis for a detailed plan for the creation and ongoing management of compensatory habitats, together with the techniques to enhance existing habitats and protect species during the operational phase.
- 4.6.1.8 Mitigation measures included as part of construction practices will therefore be set out in detail by the construction contractor in the CEMP, which will be based on the CoCP (**Document Reference 6.3.7**) and approved by NLC. Together with the ecological mitigation embedded in project design this will allow for the avoidance and reduction of impacts, particularly on legally protected and notable species and terrestrial habitats.
- 4.6.1.9 Residual impacts on badger have been assessed as minor, however, this will be dependent on the success of the use of badger fencing and tunnelling beneath the new road to prevent the main sett identified during the surveys from becoming fragmented. On-going monitoring during construction and operation will include monitoring of activity in and around the badger sett, monitoring of any injured/killed badgers, as well as regular maintenance of badger fencing and tunnelling.
- 4.6.1.10 The ES includes details of the target for 10% net-gain of biodiversity. Use of the recognised UK Government metric has demonstrated the Project can achieve this through minimising loss, habitat creation, reinstatement, and enhancement of habitats. Overall, there is potential through mitigation, compensation, and enhancement to deliver an overall positive impact for wildlife.

4.7 Landscape and Visual Amenity

- 4.7.1.1 A landscape and visual impact assessment was undertaken based on a desk study, site visit to the Project area and preparation of photomontages from selected viewpoints.

Effects on Landscape Character

- 4.7.1.2 The Project will have a major adverse effect on the landscape character of the Application Land during construction, reducing to moderate during the operational stage (both years 1 and 15). During construction, adverse effects on landscape character will arise from the presence of construction activity having an incongruous influence. Construction effects will be both reversible and of short duration.
- 4.7.1.3 During the operational stage, the Project will represent a change in landscape character and land use at the Site scale, albeit in a context of an urban edge location where the existing Flixborough Industrial Estate forms a key element of the landscape. Direct impacts on landscape features have been avoided primarily through the siting of the Project within an area that is partly brownfield land, with few trees, hedgerows or other valued landscape features. In addition, the Project buildings have been grouped so that they relate primarily to the existing commercial and industrial land uses at Flixborough Industrial Estate. The railway reinstatement will take place entirely within the existing footprint of the existing railway line, also reducing the landscape impact. The approach to lighting for the Project has been developed to minimise impacts on night-time views from the surrounding landscape. The planned landscaping for the Project addresses both impacts on landscape and visual amenity as set out below.
- 4.7.1.4 Effects on the wider landscape character ('Flat Drained Farmland' and 'Industrial Landscape') are judged to be moderately adverse in both the construction and operational (year 1) stages. Moderate adverse effects are also predicted for 'Steep Wooded Scarp' and 'Despoiled Landscape' during construction and year 1 of operation. The landscape mitigation included as part of the Project will provide a degree of landscape integration by year 15, reducing effects to minor.

Effects on Visual Amenity

- 4.7.1.5 Views of the Project were considered within a 7.5km radius 'Visual Study Area' and evaluated at 11 representative locations. A Zone of Theoretical Visibility (ZTV) based on assumed maximum parameters (e.g. ERF stack windshield height) for the Project suggests that views could be obtainable from most of the Visual Study Area. Long range views will be largely available from the western portion of the Visual Study Area, and closer views from land lying close to the River Trent. Vegetation and buildings within Scunthorpe will screen views of the Project, restricting the availability of views to the east and southeast. Localised screening will also be provided by the undulating topography associated with the ironstone and limestone scarps to the east.

- 4.7.1.6 The assessment identified major adverse effects, albeit temporary and reversible, during construction for receptors with short viewing distances or characterised by a lack of mature intervening vegetation. Major adverse effects are predicted during the temporary construction phase for viewpoints within Amcotts and Flixborough, due to their short viewing distances. Moderate adverse effects during the temporary construction phase are also identified for several other viewpoints within 5 km of the ERF itself.
- 4.7.1.7 Landscape and visual impact mitigation is set out in Indicative Landscape and Biodiversity Plans (**Document Reference 4.10**) aimed at mitigating, to the extent practicable, impacts identified in the assessment of landscape and visual impacts. Key measures include:
- introduction of pockets and strips of woodland planting at strategic locations at the perimeter of proposed buildings;
 - extension of the distinctive existing linear Burton Wood and extension of this woodland west along the railway line, to provide a wider connection and strategic belt of green infrastructure as well as to provide visual screening to the ERF;
 - creation of a wetland area extending north to south along the west side of the Project, to enhance local landscape quality and recreational opportunities; and
 - creation of various other habitats such as areas of grassland, pockets of vegetation, reinstatement of hedgerow, more formal landscape planting along roads, all aimed at enhancing both local landscape quality and biodiversity.
- 4.7.1.8 As noted above an outline Landscape and Biodiversity Management and Monitoring Plan (**Document Reference 5.7**) has been prepared and provides the basis for the ongoing management and maintenance of landscaping features and integrating these with biodiversity requirements.
- 4.7.1.9 At year 1 of the operational stage, effects are predicted to be major at Amcotts and Flixborough viewpoints, and moderate at some other viewpoints within 2 km. At more distant viewpoints, year 1 effects are predicted to be minor.
- 4.7.1.10 The incremental growth of intervening vegetation and landscape mitigation planting indicates that visual effects would reduce to minor adverse by year 15 at all viewpoints with the exception of the Amcotts viewpoint 1 and Flixborough viewpoint.

4.8 Archaeology and Cultural Heritage

- 4.8.1.1 The potential for significant effects as a result of the Project on archaeology and cultural heritage has considered three sub-topics: buried archaeology (archaeological and palaeoenvironmental remains, including geological deposits that may contain evidence of the human past); built heritage (historic buildings and the historic built environment); and the historic landscape (the current landscape, whose character is the result of the action and interaction of natural and/or human factors).

- 4.8.1.2 A study area for designated and non-designated assets was defined by a 1km buffer around the Order Limits for the Project, extending in all directions. The potential for impacts on the setting of heritage assets to a distance of 7.5km has also been considered.
- 4.8.1.3 A desk-based assessment (DBA) has been completed drawing on a wide range of baseline data sources, which has subsequently informed the completion of geoarchaeological monitoring of ground investigations and a programme of geophysical surveys in accordance with Written Schemes of Investigation (WSI) developed in consultation with NLC and Historic England.
- 4.8.1.4 The results of the DBA, geoarchaeological and geophysical surveys have revealed extensive evidence for archaeological remains in the vicinity of the Project, with a particular concentration on the eastern slopes of the Trent Valley.
- 4.8.1.5 Likely significant effects have been identified on the deep sequences of organic deposits of probable prehistoric date (with potential to contain associated archaeology), the site of a World War 2 searchlight near Neap House, archaeological features identified by desk-based analysis and geophysical survey on the site of the proposed Gas AGI/substation site to the east of Flixborough Industrial Estate and on the setting of the 'Flixborough Nunnery' scheduled monument. There will also be a significant adverse effect on the Axholme Fens HLCA.
- 4.8.1.6 For the purposes of mitigating potential effects on archaeological assets the Project site has been divided into 'impact areas'. Based on current understanding of the heritage interest present in the impact areas, specific measures have been developed for each. These measures may be modified following the completion of evaluation and following further consultation with the Historic Environment Officer for North Lincolnshire. Archaeological mitigation will therefore be carried out in accordance with the general measures, and combinations thereof, set out below but developed in detail in the Construction Environmental Management Plan (CEMP) and in accordance with a Written Scheme of Investigation (WSI) for each impact area as agreed with the Historic Environment Officer:
- additional evaluation or full excavation and/or sampling;
 - specifications for how the groundworks in each Impact Area should be monitored and recorded;
 - provisions for archaeological recording should any remains be encountered and a detailed protocol for suspension of works, consultation with the Historic Environment Officer, and the design and implementation of further evaluation and mitigation works;
 - recording of buried remains by controlled archaeological excavation down to proposed foundation levels;
 - archaeological watching brief;
 - trial trench and other evaluation of geoarchaeological deposits (e.g. alluvium and peat); and

- additional consultation with the Historic Environment Officer as required.

4.8.1.7 In addition, a programme of public engagement to communicate the results of archaeological field investigation will be undertaken to enhance public understanding and appreciation of the historic environment.

4.9 Traffic and Transport

Construction Phase

- 4.9.1.1 The effects of traffic generated by the Project during construction and operation on the local highway network has been assessed. The assessment was based on a worst-case assumption that all freight would be transported by road during operation.
- 4.9.1.2 The construction of the Project will lead to additional construction vehicle movements on the highway network. Construction related traffic will comprise employee transport, deliveries and disposal of construction materials and excess excavated materials (if there is a surplus). The new access road will be constructed at an early stage in the construction programme to be used by construction vehicles.
- 4.9.1.3 The proposed New Access Road for the Project will be constructed at the start of the construction phase in 2024 so that it can be used by construction vehicles during the peak construction period.
- 4.9.1.4 An outline Construction Logistics Plan (CLP) (**Document Reference 6.2.13**) has been submitted with the DCO. The CLP includes a number of measures to help mitigate the environmental impact of construction activities, including a Construction Traffic Management Plan (CTMP) and a Construction Workers Travel Plan. During all construction phases mitigation of effects on the transport network and other road users will be implemented via a CTMP. The CTMP will define the hours during which deliveries can be made to and from the site and also the routes that vehicles will take. Deliveries will be timed to avoid the peak times for pedestrian movement (such as school start and finish times) as far as possible so as to limit the impact of the additional HGV movements on pedestrian /cycle delay and amenity. In terms of construction workforce, whilst the majority of travel is expected to fall outside the highway peak hours, additional measures will be implemented to help reduce the impact of construction workforce traffic, such as: provision of a shuttle bus service/park and ride facility during peak construction periods; construction Workers Travel Plan to encourage the use of non-car modes; and staggered arrival/departure times for construction workers wherever possible.
- 4.9.1.5 With the implementation of the CLP and its provisions, the effects on all road users on the local highway network during the demolition and construction phase are predicted to be not significant.
- 4.9.1.6 The CLP will provide the mechanism for delivery of mitigation relating to all types of freight vehicles to and from the Project during construction; with the aim of improving the safety and reliability of deliveries to the Project

and minimising the environmental impact. The use of river /rail modes during construction will continue to be explored during detailed logistics planning as the use of these modes would be favourable from an environmental perspective.

Operational Phase

- 4.9.1.7 During operation the New Access Road is intended to serve the existing Flixborough Industrial Estate and Port area as well as the Project and will therefore remove existing traffic from Stather Road via Neap House, which is very narrow and generally unsuitable for two-way heavy goods vehicle movements. During operation a number of other mitigation measures will be provided, especially in the form of enhanced safe pedestrian and cyclist access and rights of way. In addition, reinstatement of the existing 6 km Dragonby to Flixborough branch line will include provision of continued amenity access across the branch line. The construction and operation of a new railhead to the south of Flixborough Wharf will reduce the need for road vehicle movements associated with the Project.
- 4.9.1.8 Based on the net change in operation-phase trips over and above the future baseline traffic flows, no significant adverse effects on road users are predicted. Users of motor vehicles on the B1216 Ferry Road West (east of the New Access Rd) and Ferry West Road (east of A1077), may experience a minor (but not significant) adverse effect in relation to driver delay, due to the increase in traffic movements. The Travel Plan and improvements to sustainable travel options will mitigate some of this impact by potentially reducing the volume of traffic generated by the Project. The use of rail and river modes to transport operational freight would also reduce the number of road trips and minor effects associated with the Project's road traffic. The effect on all other highway links in terms of severance and highway safety is predicted to be negligible.
- 4.9.1.9 In terms of pedestrians and cyclists, a beneficial effect of moderate significance has been identified due to the increase in walking and cycle trips being facilitated through proposed improvements to pedestrian/cycle accessibility at the Energy Park Land and surrounding area as well as to the public realm areas within the Application Land.
- 4.9.1.10 The overall effect of a Travel Plan is difficult to quantify, however it is widely acknowledged that a successful Travel Plan for a project such as this is likely to have a beneficial effect on influencing sustainable travel modes, particularly as it will seek to encourage a modal shift from public transport to healthy modes of travel such as walking and cycling. By encouraging employees to travel by active and sustainable modes, this would subsequently lead to a potential reduction of any impacts on the highway network.
- 4.9.1.11 The use of river /rail modes to transport freight during operation has also been explored whilst taking account of any practical constraints and commercial factors. Based on a Navigational Risk Assessment (**Document Reference 6.3.6**), the anticipated increase of vessel movements could be adequately accommodated at Flixborough Wharf within the existing two

berths available and its effect upon navigational safety on the River Trent would not be significant.

4.10 Economic, Community and Land Use Impacts

4.10.1.1 The largest employment sector for the local area is manufacturing, followed by wholesale and retail trade, then human health and social work, with the proportion of workforce within these professions higher than the national averages. The local and wider areas also contain a resident population with experienced construction workers and unemployed residents for whom employment generation may provide welcome opportunities.

4.10.1.2 An Economic and Employment Group has been established to help ensure that the economic benefits of the Project are maximised locally. The group includes various regional stakeholders, such as NLC, Hull and Humber Chamber of Commerce, North Lindsey College, CATCH, Greater Lincolnshire LEP, HETA and Lincolnshire Chamber of Commerce. Its objective is to:

- maximise job opportunities for local people;
- maximise supply chain opportunities for local businesses;
- work with local training providers to ensure that local people have the right skills to take advantage of the opportunities the Project presents, including reskilling people that are unemployed; and
- raise awareness of the green jobs offered by the Project and encourage local people, particularly under-represented groups, to consider a career in 'net zero' industries.

4.10.1.3 Potential adverse effects on the local community and neighbouring land uses will be mitigated by measures introduced to address impacts across a range of other topics including noise, traffic and transport, landscape and visual impact.

4.10.1.4 Construction Phase

4.10.1.5 There are likely to be beneficial significant effects as a result of the Project. An estimated 2940 net FTE jobs over the whole of the construction phase of the Project will benefit the area, supported through the implementation of an Employment and Skills Policy. There will be a net economic impact of £140.1m spread across the six-year construction period.

4.10.1.6 There will be a temporary significant effect on the businesses at Wharfside Court unless suitable alternative premises can be agreed.

4.10.1.7 There are no community resources considered likely to experience significant direct effects during the construction of the Project; however, there is potential for significant in-combination effects during construction for residents of Charnwood Park estate from noise and visual impact. This will be addressed through mitigation measures specified in the Construction Environmental Management Plan (CEMP) to be prepared by the construction contractor.

4.10.1.8 No significant direct adverse effects on PRoWs, open space, recreational facilities, or agricultural land have been identified.

Operational Phase

- 4.10.1.9 There are likely to be beneficial significant effects as a result of the development. An estimated 175 net FTE jobs will be created as a result of the Project with a net economic impact of £8.34m per annum, supported through the implementation of an Employment and Skills Agreement and training and education opportunities.
- 4.10.1.10 There are no community resources considered likely to experience significant direct effects during the operation of the Project and demand for local services will not be significant.
- 4.10.1.11 There are no public rights of way considered likely to experience direct effects during the operation of the Project. The creation of new paths and public access represents a moderate positive benefit, which is significant.
- 4.10.1.12 There are no areas of open space considered likely to experience direct effects during the operation of the Project. Overall, there will be a moderate positive benefit associated with access to increased areas of open space, which is significant. No direct operational effects on recreational facilities are anticipated.
- 4.10.1.13 No significant adverse effects on agricultural land have been identified. The two agricultural barns that are to be demolished will not be replaced and the landowner will be compensated.

4.11 Waste

- 4.11.1.1 The assessment considered the potential effect of waste generation during the construction and operational phases of the Project, considering the estimated volumes and the proposed options for recycling, recovery, or disposal of waste. The applicable legislative framework, the waste hierarchy, and the capacity of existing local and regional waste management facilities were taken into consideration in the assessment.
- 4.11.1.2 There are a number of waste management facilities including landfill and incineration facilities in the East Midlands region. The baseline data show that incineration and landfill facilities have limited capacity.
- 4.11.1.3 There is a regional need for the Project to intercept the volume of RDF currently being exported and the volume of household waste currently being landfilled in the East Midlands region. In addition, the closure of landfill sites and the tariffs being placed on exported waste due to Brexit will require additional energy recovery infrastructure to manage waste.
- 4.11.1.4 A number of mitigation measures are inherently included in the Project's approach to waste management and are outline below.

Construction Waste Management

- 4.11.1.5 It is estimated that the majority of waste from the Project itself will be generated from site clearance, excavations, and ancillary works during the construction phases. The greatest potential for impacts regarding waste management will therefore be during the construction phases from site

- preparation, excavation, and potential encounters with contaminated materials.
- 4.11.1.6 The majority of non-hazardous and inert waste arising will be recovered and reused on site. As construction methods are further developed, the aim will be to maximise the balancing of cut and fill so that possible inert and non-hazardous material from site clearance and excavations can be stockpiled and reused to reduce the use of imported material. It is not expected that large amounts of material will require removal from the site and the effects on existing capacity at local and regional waste management facilities are not likely to be significant.
- 4.11.1.7 There has been no allowance for reuse and recycling of materials from the demolition of pre-existing buildings and structures within the Application Land. Assessment at the time of construction will be required within the CEMP and Construction Waste Management Plan (WMP) to establish the amount of non-hazardous and inert waste, which can be recovered and reused. However, demolition waste is not expected to give rise to significant effects on existing capacity at regional waste management facilities.
- 4.11.1.8 As there is further potential to apply the waste hierarchy and likely to be no significant effects on existing waste management capacity with the mitigation in place, there will be no significant effects associated with construction waste management.
- 4.11.1.9 The CEMP to be produced by the construction contractors will set out detailed best practice measures related to waste management, in the form of a site-specific construction waste management plan. The implementation of such measures will mitigate the majority of potential waste-related effects from construction. Addressing issues associated with the possible encountering of contaminated materials will also be addressed through the CEMP. Monitoring will be undertaken as a normal part of the Construction WMP.

Operational Waste Management

- 4.11.1.10 During operation, the production of waste is likely to be significantly less, although minimal quantities of both non-hazardous and hazardous waste are likely to be produced.
- 4.11.1.11 The feedstock for the ERF will be RDF, non-hazardous household and commercial waste. By taking waste and turning it into a usable commodity the Project aims to promote sustainability and energy efficiency.
- 4.11.1.12 Incinerator bottom ash (IBA) and fly ash will be the primary waste by-products from the ERF and these materials will be transferred for reuse to the CBMF following on-site treatment. Minimal amounts of rejected IBA will be generated for disposal via landfill. Ferrous metals recovered from the process will be recycled.
- 4.11.1.13 The PRF will generate small amounts of metals and oversize materials that are present within the sorted plastics. Metals will be removed from site for recycling or sale and oversize material will be disposed of in the ERF.

- 4.11.1.14 Municipal and recyclable waste will be generated by offices, gatehouse, and visitor centre, canteen and sanitation facilities, bathrooms etc. Waste from these facilities will be collected as part of the wider municipal waste collection and recycled or disposed of by a licenced waste contractor or fed into the ERF.
- 4.11.1.15 The waste removed from the Project for disposal is expected to be a very small percentage of the overall volumes accepted and generated.
- 4.11.1.16 As there is a regional need for a waste treatment facility, the effects on local capacity can be considered to be positive.
- 4.11.1.17 Likely negative effects on local/regional waste management capacity as a result of the operational phase of the Project are considered not significant. With the proposed mitigation in place and the requirement to operate within the conditions of an Environmental Permit there will be no significant waste management effects during operation.
- 4.11.1.18 As there is a regional need to intercept the volume of RDF currently being exported through the Humber ports and the volume of household waste currently being landfilled in the East Midlands region, the effects on local capacity can be considered to be positive.
- 4.11.1.19 Monitoring will be undertaken during operation in accordance with the Environmental Permit.

4.12 Major Accidents and Disasters

- 4.12.1.1 An assessment of possible effects on people and the environment resulting from accidents and disasters was carried out using a standard hazard identification methodology. The approach included identification of hazard sources/pathways/receptors, an assessment of the worst-case credible safety and environmental consequences and documenting planned measures to prevent or mitigate the undesirable events. The hazard sources assessed included natural and 'man-made.'
- 4.12.1.2 The development is to be undertaken in North Lincolnshire, which is not an area associated with unusual meteorological hazards. The Application Land however is located in an area at risk of flooding from the tidal River Trent. The potential effects of flooding have been considered in the standalone Flood Risk Assessment presented with the ES.
- 4.12.1.3 The assessment identified a number of scenarios which could have potentially significant consequences for people and the environment, particularly in relation to the storage of dangerous substances (such as hydrogen).
- 4.12.1.4 However, the assessment demonstrated that with the design mitigations in place, the residual risks can be judged to be either 'tolerable' (on the basis that they have been reduced to as low as reasonably practicable) or 'broadly acceptable' according to widely used definitions used in safety assessment. Key mitigations include such matters as designing facilities, processes and layouts in accordance with recognised codes and standards, safeguards and controls in handling and storing potentially

hazardous materials, operational procedures, emergency planning and pre-construction safety assessments.

- 4.12.1.5 The Project is located just to the South of an existing Upper Tier Control of Major Accident Hazards (COMAH) site: Jotun Paints. During detailed design safety studies, the Applicant will liaise with this establishment to verify if there are any potential major accident hazards associated with this site.
- 4.12.1.6 As is normal practice, further hazard and risk analysis will be undertaken throughout the lifecycle of the Project in accordance with the requirements of applicable legislation and industry good practice guidance, to ensure risks continue to be managed to a level that is considered as low as reasonably practicable (ALARP) during the detailed design, construction planning and operation of the Project.

4.13 Health

- 4.13.1.1 The assessment of health and wellbeing draws upon information from wider topic assessments undertaken as part of the EIA, but also feeds into the overarching assessment of cumulative effects of the Project. In this manner, due consideration is given to the inter-relationship of local populations and the physical environment with which they inhabit and interact with, to ensure that all determinants of health and wellbeing are considered.
- 4.13.1.2 A community health profile was informed by a number of data sets, including national statistics such as the National Census 2011 and the Indices of Multiple Deprivation 2019 and the UK business register and employment survey (BRES). The Project is located within the Burton upon Stather and Winterton ward.
- 4.13.1.3 The life expectancy of the population of Burton-Upon-Stather is higher than the national average, with lower levels of economic activity and unemployment than in the region, suggesting most of the population have retired from work. Life expectancy in North Lincolnshire is lower, most evident in the more deprived areas, with average incomes lower than the average nationally and have been static or declining in recent years.
- 4.13.1.4 The area has a lower economic activity rate and income, as well as higher levels of deprivation and crime than the national average.
- 4.13.1.5 Construction effects of the Project on health as a result of landscape changes will be experienced by relatively few people, will be reversible and of short-term duration. There is therefore unlikely to be significant impacts to the population's health and wellbeing.
- 4.13.1.6 There will be no effects of significance on health at the population level as a result of the landscape changes during the operational phase.
- 4.13.1.7 The increase in construction and operational traffic predicted as part of the Project will have no significance on the health and wellbeing of communities closely situated to the Project.
- 4.13.1.8 The Project does not have any potential for increasing or decreasing crime rates in the locality. The construction site has some potential for an impact

- on safety through trespass, but this is an extremely limited possibility and does not have any significance for health effects at the population level.
- 4.13.1.9 Whilst the Major Accidents and Disasters assessment concluded that with design mitigations in place residual risks can be judged to be either 'tolerable' or 'broadly acceptable' the assessment and mitigation of potential accident scenarios will continue to evolve in consultation with the Health and Safety Executive.
- 4.13.1.10 The Project is being primarily developed in a brownfield site and has, therefore, limited impact upon greenspaces. The masterplan for the Project will integrate green space and habitat creation into scheme design and landscaping, to enhance the physical environment and engagement will continue with key environmental stakeholders such as the local Wildlife Trust to inform the delivery of this. Enhancements to the local landscape are expected to contribute to increased quality of life and leisure opportunities for local communities, generating a positive effect on health and wellbeing.
- 4.13.1.11 Consistent heightened noise levels can affect the health of people living nearby, with effects including stress, annoyance, and a decreased sense of wellbeing. The significance of the residual effects from the operation of the Project will be greater than moderate. However, opportunities for mitigation to reduce predicted significant noise effects are reported in the ES.
- 4.13.1.12 Social capital within the communities and local population affected by the Project could be influenced in several ways. In particular, the Project has the capacity to change the way local people perceive the area in which they live and to have an impact on feelings of 'reciprocity' and trust in institutions. The analysis of impacts on social capital at the population level indicates that any effects on health and wellbeing will be temporary. However, ongoing communication and liaison with the local community will be undertaken to ensure maintenance of trust and alleviate potential concerns, in particular, around construction activity but also at the operational stage of the Project.
- 4.13.1.13 Additional permanent jobs are expected to be created locally as a result of the Project. Further indirect employment opportunities will be generated for supply chain local businesses. In addition to income and enhanced socio-economic status, health benefits will be experienced by those employed during the operation phase and will be of long-term benefit. The Project has been assessed to generate significant socio-economic benefits to the local and wider regional economy. The health and wellbeing benefit this accrues to local communities can be maximised through local procurement policies and enhancing access to employment opportunities for those who are economically inactive or on less favourable employment terms.
- 4.13.1.14 The assessment has concluded that the operation of the facility is not predicted to lead to significant negative health and wellbeing effects. The Project will be subject to strict regulatory controls and the requirement for ongoing monitoring of various activities. In terms of mitigating physical effects on health those measures included to address such matters as air quality, noise, visual impact and traffic will be sufficient. To reduce potential

anxiety, consideration will be given to periodic publication of environmental monitoring data which local communities, and wider stakeholders, can access via the Project website.

5. DELIVERING MITIGATION COMMITMENTS

5.1.1.1 The ES includes a full listing of all the mitigation measures included in the application. Appropriate provisions to secure these measures have been made in the draft DCO, meaning that any consent granted for the Project will include mechanisms for the implementation of suitable mitigation measures for significant environmental effects.

5.1.1.2 Delivering the mitigation will be through three main means as summarised below.

5.2 Overall Design Considerations

5.2.1.1 Many elements of mitigation are integral to the design and are secured by the Design Principles and Codes and the Parameter Plans included in the application. It is therefore important to note that, save for the permitted preliminary works, no part of the authorised Project will commence until details of the following have been submitted to and approved by North Lincolnshire Council (NLC):

- the siting design, external appearance and dimensions of all buildings and structures which make up the Project, and which are to be retained following commissioning;
- the colours, materials and surface finishes of all new permanent buildings and structures referred to above;
- the permanent circulation roads, vehicle parking and hardstanding; and
- ground levels and heights of all permanent buildings and structures.

5.2.1.2 The detailed design for the above matters will be in accordance with the Design Principles and Codes and the Parameter Plans.

5.3 Construction Phase Mitigation

5.3.1.1 In advance of construction, a detailed Construction Environmental Management Plan (CEMP) will be prepared by the contractor for approval by NLC and relevant statutory consultees. The main purpose of the CEMP will be:

- to provide a mechanism for ensuring that measures to mitigate potentially adverse environmental social and economic effects are implemented;
- to ensure that standards of good construction practice are adopted throughout the construction of the Project;
- to provide a framework for mitigating impacts that may be unforeseen or unidentified until construction is underway;
- to provide assurance to third parties that their requirements and the commitments made in the ES with respect to environmental and social performance will be met; and

- to provide a framework for compliance auditing and inspection to the Applicant to be assured that its aims with respect to environmental performance are being met.
- 5.3.1.2 The CEMP will be developed as the Project proceeds through the detailed design and pre-construction phases. A Code of Construction Practice (CoCP) which provides the framework for the CEMP is included in the application together with the following subsidiary plans in outline:
- Dust Management Plan;
 - Remediation Strategy;
 - Spill Response Plan;
 - Asbestos Management Plan;
 - Construction Flood Management Plan;
 - Construction Waste Management Plan;
 - Protected Species Management Plan;
 - Invasive Non-Native Species (INNS) Management Plan; and
 - Soil Management Plan.
- 5.3.1.3 In addition to the CEMP, construction phase mitigation measures will also be secured through the following means.
- The Outline Construction Logistics Plan (CLP) will be developed in detail to include a Construction Traffic Management Plan and a Construction Workers Travel Plan, all to be produced in accordance with the principles set out in the Outline CLP.
 - The Indicative Landscape and Biodiversity Plan setting out measures that will be implemented during the construction phase to provide landscaping mitigation, mitigation for habitat losses, implementing habitat enhancements and providing biodiversity net gain measures.

5.4 Operation Phase Mitigation Measures

- 5.4.1.1 An Environmental Permit (the EP) will be required to operate the Energy Recovery Facility (ERF) and related aspects of the Project such as the carbon capture facility. The EP will have its own management and monitoring requirements set by the Environment Agency and will require an Environmental Management System (EMS) to be in place. Most environmental mitigation relating to specific aspects of operation will therefore be secured through the EP.
- 5.4.1.2 Some aspects of the operating Project may not fall within the remit of the EP, and these will be secured through other mechanisms as follows.
- All environmental pollution activities not covered by the EP (e.g. noise, surface water discharges, solid waste management) will be addressed in an Operational Environmental Management Plan (OEMP). This plan will be developed in parallel with the aforementioned EMS. An outline OEMP is included in the application.

- A Landscape and Biodiversity Management and Monitoring Plan (LBMMP) will be developed in accordance with the principles set out in the Outline LBMMP included in the application. The LBMMP will secure delivery during operation, through monitoring, management and maintenance measures, of the landscaping provisions and biodiversity mitigation and enhancements (including those provided in the context of 'biodiversity net gain').
- A Flood Management Plan, which includes an Evacuation Route Plan and Flood Resilience Implementation Plan, to protect workforce, neighbours and built Project assets, will be developed in accordance with the principles set out in the Flood Risk Assessment (FRA) included in the application.
- A Travel Plan will be developed, in accordance with principles set out in the Framework Travel Plan included in the application, to address sustainable travel issues and management measures to mitigate Project transport impacts. Sustainable travel issues addressed in the Travel Plan will include measures proposed to improve access by public transport, walking and cycling, and to reduce the need for parking.
- Permanent surface water drainage and foul water drainage systems will be designed in detail in accordance with the principles set out in the Indicative Surface Water Drainage Plan included in the application.
- A scheme for all permanent external lighting to be installed for the Energy Park and the railway works will be designed in detail and submitted to and approved by NLC. The design of the external lighting will be in accordance with the principles of the Indicative Lighting Strategy included in the application) and include measures to minimise and mitigate any artificial light emissions during the operation of the Project.