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TABLES

3.0 THE SITE AND SURROUNDING AREA

3.1 Site Location

3.1.1 The Proposed Development Site comprises land within the boundary of the existing Keadby Power Station site near Scunthorpe, Lincolnshire and falls within the administrative area of North Lincolnshire Council (NLC). The Keadby Power Station site currently encompasses the operational Keadby 1 Power Station and Keadby 2 Power Station (under construction), both owned and under control of the Applicant. The location of the Proposed Development Site is shown in **Figure 1.1:** Site Location (PEI Report Volume III).

3.1.2 The Proposed Development Site boundary is shown on **Figure 3.1**: Indicative DCO Site (PEI Report Volume III). This boundary is provisional and for the purposes of the PEI Report. The final Proposed Development Site boundary for the purposes of the DCO Application, including land for associated connections and temporary land required during construction of the Proposed Development, will be refined through on-going studies. The Proposed Development Site is approximately centred on national grid reference (NGR) 482351, 411796. The majority of land is within the ownership of the Applicant.

3.1.3 Access to the Proposed Development Site during construction and operation would be via the existing access road from the A18. This access road passes over the Stainforth and Keadby Canal and the Scunthorpe to Doncaster passenger rail line via Pilfrey Bridge (refer to **Figure 3.2**: Areas of the Site Described in PEI Report - in PEI Report Volume III). It then links to Bonnyhale Road and onwards towards the Proposed Development Site along existing private access roads. This access road has previously been used for transporting wind turbine components to Keadby Windfarm and is currently used by construction workers and for the delivery of construction materials associated with the construction of Keadby 2 Power Station.

3.1.4 The existing Keadby 1 Power Station site is accessed from the B1392, a single-carriageway road that serves the village of Keadby. The B1392 joins the A18 trunk road approximately 1.2km south of the Waterborne Transport Offloading Area at a junction to the west of the village of Althorpe. Plans showing the highway network in the vicinity of the Proposed Development Site are presented in the Transport Assessment (**Appendix 10A** (PEI Report Volume II)).

3.1.5 This Chapter is supported by **Figure 3.1** to **Figure 3.4** (PEI Report Volume III).

3.2 The Proposed Development Site and existing land-use

3.2.1 The Proposed Development Site encompasses an area of approximately 88.1 hectares (ha), of which approximately 17.7ha of land is currently under evaluation to determine the suitability for potential construction laydown.

3.2.2 Multiple components together make up the Proposed Development Site, with the different areas described in turn below. These terms have been used throughout the PEI Report to describe land use zones within the Proposed Development Site. Distances to environmental receptors reported within the PEI Report are measured relative to the areas illustrated on **Figure 3.2** (PEI Volume III).

3.2.3 The Proposed Development Site is divided into the following areas of permanent and temporary land use (the proposed use described in more detail in **Chapter 4**: Proposed Development (PEI Report Volume I) and shown on **Figure 3.2** (PEI Report Volume III)):

- Proposed Power Station and Carbon Capture Site (Proposed PCC Site);
- Electrical Connection Area to National Grid 400 kilovolt (kV) Substation;
- Emergency Vehicle Access Road and Potential Electrical Connection to 132kV Substation;
- Land within the Keadby Power Station site for the purposes of facilitating connections to the Proposed Development for natural gas supply, and other necessary infrastructure (including 'Gas Connection Corridor');
- Water Connection Corridors (River Water Abstraction Option; Canal Water Abstraction Option and Water Discharge Corridor);
- Waterborne Transport Offloading Area;
- Additional Abnormal Indivisible Load Route;
- Indicative Construction Laydown Areas; and
- Construction and Operational Access Route and Gatehouse.

The 'Proposed PCC Site'

3.2.4 The Proposed PCC Site, on which the built development associated with the CCGT and CCP is proposed, is located approximately 4.1km to the west of the town of Scunthorpe. The village of Keadby is the nearest settlement which lies immediately adjacent to the Proposed Development Site and approximately 1km east of the Proposed PCC Site at its closest point (refer to **Figure 3.2** (PEI Report Volume III)).

3.2.5 The Proposed PCC Site covers an area of approximately 18.7ha of the Keadby Power Station site that is located within Keadby Common. Until circa 2017/ 2018, this area was used for arable production but has since been re-seeded. Keadby Common has a drain on each boundary (four drains in total), and a drain crosses the Common between a northern field and the southern area which is currently temporarily being used for soil storage during construction of the Keadby 2 Power Station.

3.2.6 The Proposed PCC Site is bisected by overhead electricity transmission lines associated with the existing National Grid 400kV Substation to the east of the Proposed PCC Site. A further 4.8ha of built development is proposed to the south of these overhead lines for administration/ control room/ warehouse buildings and car parking areas within the Proposed PCC Site. The approximate central point of the area where the main operational components of the Proposed Development would be sited in the Proposed PCC Site is NGR 482019, 412027.

Electrical Connection to 400kV Substation

3.2.7 The existing 400kV Sub-station owned and operated by National Grid is included within the Proposed Development Site at PEI stage for the purposes of indicating the connection for the Proposed Development into the National Grid electricity

transmission system. The 400kV Sub-station comprises electrical generation and transmission equipment on a hardstanding surface within a secure fenced compound.

3.2.8 Any works undertaken within the sub-station would be the responsibility of National Grid.

Emergency Vehicle Access Road and Potential Electrical Connection to 132kV Substation

3.2.9 An existing 132kV Northern Powergrid compound off Chapel Lane is included within the Proposed Development Site boundary for the purposes of a potential lower voltage electrical connection to supply the Proposed PCC Site during plant start-up (refer to **Chapter 4**: The Proposed Development). This compound includes existing buildings and an adjacent area of compacted hardstanding. A potential route for the 132kV cable between the compound and the Proposed PCC Site is included within the Proposed Development Site boundary.

3.2.10 An emergency pedestrian/ vehicle access road from the northern boundary of the Proposed PCC Site is also included in the indicative Proposed Development Site boundary. This route crosses an existing unnamed drainage ditch bounding the north of Keadby Common and utilises farm access tracks previously used during the existing SSE Renewables Keadby Windfarm, connecting towards Chapel Lane.

3.2.11 This access track would not be utilised during construction or normal operation of the Proposed Development; it would only be utilised as a second point of Site access and egress in the event of an emergency.

Land within the wider Keadby Power Station site

3.2.12 The Proposed Development Site currently includes land adjacent to both Keady 1 and Keadby 2 Power Stations for the purposes of facilitating connections to the Proposed Development for gas, electricity, water and other necessary infrastructure. As the design progresses, it is intended that the Applicant will provide further refinement of the indicative order limits in these areas, noting that all these areas are within the control of the Applicant.

3.2.13 Natural gas will be used as the fuel for the operation of the CCGT. Therefore, land within the wider Keadby Power Station site, which includes the existing high pressure gas pipeline along Bonnyhale Road operated by National Grid ('7 Feeder Eastoft') is included within the Proposed Development Site boundary. Subject to agreement with National Gas Grid (NGG), natural gas will be supplied via a tie-in to the HP gas transmission network on the Proposed Development Site. It is currently anticipated that a minimum off-take connection (MOC) will be constructed, and natural gas will be transferred via a below ground pipeline corridor within the Proposed PCC Site from a new National Grid AGI and gas receiving area, where the gas would be metered and conditioned to that required for the Proposed Development.

3.2.14 Keadby 1 Power Station was built on the site of a former coal fired power station which was operational between 1952 and 1984. The Keadby 1 Power Station was commissioned in 1996 and comprises two F Class gas turbines (230MWe each) fitted with dry low NO_x burners. Each gas turbine exhausts through a heat recovery boiler

with the combined steam output passing to the condensing steam turbine (nominal capacity of 260MW). The windshields for the 2 combined cycle gas turbine (CCGT) stacks are 60m high and the 2 gas turbine stacks are 47m high.

3.2.15 The total thermal input for the Keadby 1 gas turbines and steam turbine is approximately 1,329MWth. A standalone auxiliary gas turbine of 25MW electrical output (75MW thermal input) operates in open cycle mode, with a 50m high stack and provides additional supply to the grid during high demand periods and for main plant start up during black start conditions.

3.2.16 Keadby 1 Power Station is fuelled by natural gas which is supplied via an underground pipeline from an Above Ground Installation (AGI). Within the AGI is the local gas treatment plant that consists of a storage vessel, injection unit, instrumentation and associated pipework, mercaptan (odorant) storage and injection, pressure/ temperature regulation, pig trap facilities (inspection of the spur), filtration, metering, boiler house, heat exchangers, gas chromatograph, flow computers and associated telemetry..

3.2.17 The River Trent provides water for evaporative cooling and boiler make-up for Keadby 1 Power Station. The River Trent is used for discharge of treated cooling water from Keadby 1 Power Station.

3.2.18 All electrical output from Keadby 1 Power Station is exported to the National Grid Electricity Transmission System via the 400kV sub-station.

3.2.19 Adjacent to the west of Keadby 1 Power Station is Keadby 2 Power Station; a 910MW CCGT power station currently under construction, following the grant of a variation to an existing Section 36 consent in 2016. Construction by the Applicant's Engineering, Procurement and Construction (EPC) contractor Siemens Energy commenced in April 2019 and is ongoing; expected completion is by quarter 1 (Q1), 2022.

3.2.20 Once built, Keadby 2 Power Station will comprise the following components:

- an H Class gas turbine generator;
- waste heat recovery boiler;
- a condensing steam turbine generator;
- hybrid cooling towers;
- control room and instrumentation system;
- water treatment plant; and
- cooling water abstraction and discharge pipe work.

3.2.21 Combustion gases from Keadby 2 Power Station will be released through a single stack (75m in height). The key elements of the power station will be distributed between two areas: a main power island in the eastern part of the Keadby 2 Power Station site which incorporates the power generating equipment including the turbines, boilers and associated buildings; and a western part of the Keadby 2 Power Station site, which will contain the hybrid cooling towers and an area of land set aside for possible future retrofit of CCP equipment.

3.2.22 Keadby 2 Power Station will be fuelled by natural gas supplied from the existing National Gas Transmission System, via a new AGI. A new pipeline within the boundary of the Keadby 2 Power Station site will connect to the existing AGI used by Keadby 1 Power Station.

3.2.23 Cooling water for Keadby 2 Power Station will be sourced from the Stainforth and Keadby canal.

Water Connection Corridors

3.2.1 Two potential cooling options are under evaluation for the Proposed Development. both are therefore included within the Proposed Development Site boundary and have been considered within the PEI assessments. One option is to utilise water abstracted from the River Trent, the other is to utilise water abstracted from the Stainforth and Keadby canal. Whichever water source is utilised, treated return cooling water will be directed to the river Trent and discharged through the existing Keadby 1 Power Station outfall which is also proposed to be utilised for treated water from Keadby 2 Power Station, once operational.

3.2.2 The Proposed Development Site therefore includes pipework corridors currently associated with the cooling operations for the Keadby 1 Power Station. One corridor relates to the potential water abstraction from the river Trent. The other corridor relates to the intended water discharge back to the River Trent.

3.2.3 The route of the existing discharge and outfall to the River Trent, follows a route north-east referred to herein as the 'Water Discharge Corridor'. The Water Discharge Corridor crosses land which is intensively managed for arable crop production, and traverses beneath a number of unnamed dry ditches and/ or wet drains including Eastoft Moors Drain/ Warping Drain before its outfall location on the western bank of the River Trent.

3.2.4 A second corridor running east-west from the existing cooling water intake from the River Trent is also included in the Proposed Development Site (referred to herein as the 'River Water Abstraction Option'). This corridor spans Trent Road and encompasses the existing buried pipework beneath areas of improved grassland / agricultural fields. An engineered flood embankment maintained by the Environment Agency is present along the eastern bank of the River Trent in this location.

3.2.5 Additional land associated with the potential cooling water intake from the Stainforth and Keadby Canal is included in the Proposed Development Site to facilitate the option to use this infrastructure for the Proposed Development (referred to herein as the 'Canal Water Abstraction Option'). The canal will also supply cooling water to Keadby 2 Power Station via a new pumping station and interconnecting pipework. This part of the canal falls within the boundary of the Stainforth and Keadby Canal Corridor local wildlife site (LWS), which is designated for its aquatic flora and associated bankside habitats.

Waterborne Transport Offloading Area

3.2.6 This existing level hardstanding area of the Proposed Development Site comprises a river wharf with a short stretch of access road, bounded by grassed earth

embankments directly adjacent to the River Trent and to the north of Keadby Lock which provides access to the Stainforth and Keadby Canal. The area incorporates a reinforced concrete slab which can be used for the positioning of temporary tower cranes for lifting and transfer of abnormal indivisible load (AIL) components/ equipment. Use of this area for the Proposed Development would be consistent with the existing use of this area for AIL deliveries during construction of Keadby 2 Power Station.

Additional Abnormal Indivisible Load (AIL) Route

3.2.7 The Proposed Development Site incorporates land currently used as a temporary construction haul road for Keadby 2 Power Station from the Waterborne Transport Offloading Area into the Keadby Power Station site for the purposes of transporting AILs that have been delivered and unloaded at the Waterborne Transport Offloading Area.

3.2.8 This Additional AIL route commences at the Waterborne Transport Offloading Area, crosses a short section of the B1392 and then incorporates an existing temporary haul road that runs to the east of PD Port Services freight yard, through an agricultural field (owned by the Applicant). The temporary haul road has been constructed using geotextile separation membrane with granular compacted stone laid on top, using temporary steel bridges to span over drainage ditches. The additional AIL route then crosses the existing hardstanding 'Outage' car park and into the existing Keadby 1 Power Station Site.

3.2.9 This temporary haul road is the subject of a planning permission granted by North Lincolnshire Council ('NLC') which requires its restoration following completion of construction of Keadby 2 Power Station; it is therefore assumed that the land will be returned to its previous use prior to commencement of the Proposed Development. As it is proposed to utilise retain, use and improve (if required) this temporary haul road for the Proposed Development Site, it is included within the indicative Order Limits and effects associated with its retention as a temporary haul road and use are included in the environmental assessments of this PEI Report (**Chapters 8-19** PEI Report Volume I).

Indicative Construction Laydown Areas

3.2.10 A number of indicative construction laydown areas are under consideration (refer to **Chapter 5**: Construction Programme and Management) and subject to ongoing assessment. It is anticipated that up to approximately 17.7ha of land will be required for construction laydown (refer to **Figure 3.2** and **Figure 3.3** in PEI Report Volume III) which may be provided in different parts of the Proposed Development Site.

3.2.11 The feasibility of using the laydown area currently utilised by Keadby 2 Power Station is being considered. The former site of the previous substation for Keadby 1 Power Station is also under consideration where all equipment has been removed and the remaining site is flat and mostly concrete. An overhead line crosses this land and a pylon within the area would provide some constraints for working.

3.2.12 South of the Stainforth and Keadby Canal and west of Pilfrey Bridge, an area of mown improved grassland and land used for Keadby 2 Power Station laydown is also

included as a potential laydown area. To the south and west of the access road, an area of farmland has also been included within the Proposed Development Site boundary for potential use as temporary construction laydown, should other areas be insufficient in size. The exact area of farmland that could be used in this way has yet to be finalised and is the subject of ongoing technical and environmental studies. All farmland under consideration for laydown is under intensive arable management.

Construction and Operational Access Route and Gatehouse

3.2.13 Access to the Proposed Development Site during construction and operation would be via the existing access roads from the A18. Perpendicular and skewed construction access points off the A18, built for construction vehicles during construction of Keadby Wind Farm and currently used by all construction vehicles associated with the Keadby 2 Power Station, would be used to access the Proposed Development Site. The skewed access would be used, where required to transport oversized AIL into the Proposed Development Site. The feasibility of upgrading the junction by undertaking carriageway improvements is currently under consideration (refer to **Figure 3.2** in PEI Report Volume III).

3.2.14 This access road passes over the Stainforth and Keadby Canal and the Scunthorpe to Doncaster passenger rail line via Pilfrey Bridge. It then links to Bonnyhale Road and onwards towards the Proposed Development Site along existing private access roads.

3.2.15 Alongside the access road to the Proposed Development Site from the A18, a small permanent gatehouse/ security building is proposed to replace the current temporary building on this road and the existing parking arrangement for vehicles using the security building would be formalised for the Proposed Development .

3.3 Site Topography

3.3.1 Land within and surrounding the Proposed Development Site is generally low lying at elevations below 10m Above Ordnance Datum (mAOD) and with very shallow gradients. According to the Environment Agency Digital Terrain Model, the ground level varies from a low point of approximately 0m AOD, to a high point of 4m AOD within the within the Proposed PCC Site. The majority of the Proposed Development Site lies between 0 and 2m AOD, including the Proposed PCC Site.

3.3.2 A notable steep ridge is present immediately to the west of the Proposed PCC Site (outside the Proposed Development Site boundary) where land associated with the former Ash Tip is in excess of 19m AOD.

3.3.3 Levels on the Keadby 1 and Keadby 2 Power Station sites are slightly elevated compared to the surrounding land within the Proposed Development Site, with levels typically between 1 and 3m AOD. Levels within the construction laydown areas (farmland) under consideration are typically circa 1m AOD.

3.4 Site History

3.4.1 Available historic Ordnance Survey (OS) maps have been studied to determine the previous land uses within and surrounding the Proposed Development Site, as detailed in **Appendix 13A**: Phase 1 Desk Based Assessment (PEI Report Volume II). The

mapping shows no notable development on-site until 1967 – 1969 editions when a power station is shown as having been developed in the central/ eastern area of the Proposed Development Site, with electricity transmission cables and pylons originating from the power station, that span across the centre of the Proposed Development Site. It is understood that this is a former coal fired power station which was operational between 1952 and 1984, and which was demolished by the early 1990's.

3.4.2 On the 1967 – 1969 editions, railway lines are shown to occupy the south-western area of the Proposed Development Site, leading towards and terminating at the power station. Adjacent to the railway lines is a conveyor system, which it is inferred may have been used for the transport of materials and fuels, such as coal, from trains to the power station.

3.4.3 An area of marshland is shown as present on the 1967 – 1969 editions in the south-west of the Proposed Development Site, along with a small refuse heap, with tracks leading to and from this. Three tanks of unknown contents are also shown south and east of the power station and are inferred to be associated with the former power station. Keadby Common Farm shown as present at the centre of the Proposed Development Site. Drains are mapped within the Proposed Development Site boundary. To the east of the Proposed Development Site, an increase in properties on the 1967 – 1969 editions is noted. A pond and a tank are also shown as present on the eastern-most spur of the Proposed Development Site. Multiple tanks occupy the land south of the power station on the 1978 – 1982 mapping.

3.4.4 No notable changes occur at the Proposed Development Site until 1991 – 1994 editions when the power station is mapped as disused. Within the Proposed Development Site to the east, jetties are shown as now present on the River Trent, with a pumping station located inland where the pond and tanks are located. Keadby Common Farm is now absent from mapping.

3.4.5 Mapping from 1995 shows that the power station previously present (and disused) is now an electricity generation station and a change in site layout is noted. The railway and conveyor system that was previously present terminating at the power station is now absent from the mapping. A set of small tanks and a single tank is located to the west; five tanks run parallel to the south, and an additional set of tanks are located east of the electricity generation station. Further west from the electricity generation station, towards the centre of the Proposed Development Site, are three large tanks. The refuse heap and area of marsh land to the south-west of the Proposed Development Site are now absent from mapping. A large electricity substation is now present within the north of the Proposed Development Site with electricity transmission cables and pylons connected to the electricity generation station and associated overhead cables leading off-site to the north, south and west. A building and mast are present to the north of the electric generation station. No notable changes are shown on Google Earth imagery from 2003, 2008 and 2015.

3.4.6 Extensive historical landfilling has been identified on-site and off-site in close proximity (to the west) (refer to Section 5.3 of **Appendix 13A**: Phase 1 Desk Based Assessment (PEI Report Volume II). This is illustrated on **Figure 3.4** (PEI Report Volume III).

3.5 Potential Sensitivities/ Receptors within the Surrounding Area

3.5.1 When undertaking an EIA, it is important to understand which receptors should be considered as part of the assessment. A number of environmental receptors relevant to the EIA have been identified within and outside the boundary of the Proposed Development Site, as shown on **Figure 3.4** (PEI Report Volume III). Each of these is detailed in the relevant topic chapter of the PEI Report, and as such, this list is not exhaustive. Where distances are quoted in the PEI Report, the distance is defined (unless otherwise stated) as the shortest distance between the receptor and the closest point of the boundary of the Proposed Development Site or part thereof.

3.5.2 Key receptors for each topic area have been identified as part of the assessment process and details are included in the relevant technical chapters (**Chapters 8 - 19**, PEI Report Volume I). A summary is also provided below.

Surrounding Land-Use

3.5.3 Beyond the current Keadby Power Station Site, land use is almost entirely arable farming, however, the immediate site surroundings have been developed in recent years with power infrastructure, including the Keadby Windfarm to the north which became operational in 2014. Additional wind turbines and electricity transmission and distribution infrastructure is present over the wider surrounding area.

Residential Receptors

3.5.4 The nearest settlement is the village of Keadby which is located immediately adjacent to the Water Discharge Corridor and approximately 1km east from the Proposed PCC Site at its closest point.

3.5.5 Other settlements nearby include: Crowle (3.6km) and Ealand (2.2km) to the west; Althorpe (1.7km) to the south-east and Gunness (580m) to the east on the eastern bank of the River Trent. Closer to the Proposed PCC Site are a small number of residential areas and individual residential properties. Those closest residential and other sensitive receptors to the Proposed Development Site include:

- a pair of semi-detached residential properties ‘Holly House’ and ‘Hawthorn House’ located 15m west of the Water Discharge Corridor;
- properties along Chapel Lane, located 30m east of the Water Discharge Corridor;
- properties along Trent Road including Blacksmiths Cottage (former Trentvale Preparatory School), No. 7 and 8 Mariners Arms Flats and No. 19 Trent Side – the closest of this group of properties is located immediately adjacent to (within 0m – 5m of) the Water Connection Corridor (River Water Abstraction Option);
- a single residential property (No. 5 Trent Side), approximately 35m east of the Additional Abnormal Indivisible Load Route;
- an isolated property at Vazon Bridge, approximately 50m south of the Proposed Development Site boundary, adjacent to the Stainforth and Keadby Canal;
- Keadby Grange, approximately 550m east of the Indicative Construction Laydown Areas, within the agricultural fields north of A18;

- Pilfrey Farm, approximately 200m east of the skew construction access road from the A18;
- farms along Bonnyhale Road including Ealand Warpings and North Pilfrey Farm located approximately 225m north-west and 275m north-west of the Construction and Operational Access Route;
- Ealand Poultry Farm, located on Bonnyhale Moor Road, approximately 1.6km west of the Proposed PCC Site; and
- North Moor Farm located approximately 500m north of the Potential Electrical Connection to 132kV Substation.

3.5.6 **Figure 3.4** (PEI Report Volume III) illustrates the location of surrounding residential and other sensitive receptors and communities.

3.5.7 Potential effects on residential receptors are considered in **Chapter 8:** Air Quality, **Chapter 9:** Noise and Vibration, **Chapter 10:** Traffic and Transport, and **Chapter 14:** Landscape and Visual Amenity.

Ecological Receptors

3.5.8 Designated nature conservation sites within 15km of the Proposed Development Site are presented in Table 3.1Table 3.1. **Figure 8.2** (PEI Report Volume III) and **Figure 11C.1** (in **Appendix 11C** of PEI Report Volume II) indicate the locations of these sites.

Table 3.1: Statutory Ecological Designations within 15km (shown by distance from the Proposed Development Site)

Name	Type	Approximate distance (km) from the Proposed Development Site
Humber Estuary	Ramsar	0.0 Within the land required by the Proposed Development, the River Trent has been identified as a potential water abstraction and discharge location, and during construction the existing infrastructure associated with the Waterborne Transport Offloading Area on the River Trent may be used to facilitate offloading of AIL, as is undertaken for Keadby 2 Power Station construction.
Humber Estuary	SSSI	
Humber Estuary	SAC	
Crowle Borrow Pits	SSSI	1.3

Name	Type	Approximate distance (km) from the Proposed Development Site
Hatfield Chase Ditches	SSSI	1.4
Eastoft Meadow	SSSI	3.6
Belshaw	SSSI	5.2
Thorne & Hatfield Moors	SPA	5.5
Thorne Moor	SAC	5.5
Thorne, Crowle and Goole Moors	SSSI	5.5
Conesby (Yorkshire East) Quarry	SSSI	7.0
Epworth Turbary	SSSI	7.4
Risby Warren	SSSI	7.6
Hatfield Moor	SAC	8.2
Hatfield Moors	SSSI	8.2
Messingham Heath	SSSI	8.9
Tuetoes Hills	SSSI	9.1
Haxey Turbary	SSSI	9.5
Rush Furlong	SSSI	9.7
Hewson's Field	SSSI	10.5
Messingham Sand Quarry	SSSI	10.7
Manton and Twigmoor	SSSI	10.8
Scotton and Laughton Forest Ponds	SSSI	11.3
Broughton Far Wood	SSSI	12.2
Broughton Alder Wood	SSSI	12.5
Scotton Beck Fields	SSSI	13.0
Scotton Common	SSSI	13.0
Laughton Common	SSSI	13.0
Manton Stone Quarry	SSSI	13.5
Haxey Grange Fen	SSSI	14.0
Cleatham Quarry	SSSI	14.3
Castlethorpe Tufas	SSSI	14.6
Mother Drain, Misterton	SSSI	14.7
Misson Training Area	SSSI	14.7
Cliff Farm Pit	SSSI	14.8

3.5.9 Non-statutory ecological sites in the vicinity of the Proposed Development Site are presented in Table 3.2 and illustrated on **Figure 11C.2** (presented in **Appendix 11C:** Preliminary Ecological Appraisal of PEI Report Volume II).

Table 3.2: Non-Statutory Ecological Designations (Local Wildlife Sites) within 2km (shown by distance from the Proposed Development Site)

Name	Approximate distance (m) from the Proposed Development Site
Hatfield Waste Drain	0 - crossed by the existing A18 access road
Keadby Boundary Drain	0 - adjacent, to the west of Keadby Common
Keadby Warping Drain	0 - crossed by the buried pipeline for the existing line of discharge from Keadby 1 Power Station
North Engine Drain, Belton	0 - vicinity of the A18 access road which may be subject to junction improvement
Stainforth and Keadby Canal Corridor	0 - if used, the Canal Water Abstraction Option would take water from the LWS and may use infrastructure installed for Keadby 2 Power Station
River Torne	20 - south of the A18 access road which may be subject to junction improvement
South Soak Drain, Keadby	25 – south of the Canal Water Abstraction Option
Keadby Wetland	30 – south of the Canal Water Abstraction Option
Keadby Wet Grassland	50 – south of the Canal Water Abstraction Option
Three Rivers	105 - south of the Waterborne Transport Offloading Area
South Engine Drain, Belton	105 - south of the existing A18 access road
Gunness Common	1.3km - east

3.5.10 The potential effects of the Proposed Development on designated ecological sites and other ecological receptors are considered in **Chapter 11:** Biodiversity and Nature Conservation, with supporting information provided in **Chapter 8:** Air Quality, **Chapter 9:** Noise and Vibration and **Chapter 12**: Water Resources and Flood Risk.

Transport Receptors

3.5.11 Access to the Proposed Development Site during the construction and operation would be via the existing tarmacadam access road from the A18. Two construction access points off the A18 were built for accessing Keadby Windfarm and are currently used by construction vehicles associated with the Keadby 2 Power Station. The access road crosses Hatfield Waste Drain via a steel bridge and continues north and then east towards the Proposed Development Site, crossing the Stainforth and Keadby Canal and the Scunthorpe to Doncaster passenger rail line on the North Pilfrey Bridge, constructed in 2012. The access road then links to Bonnyhale Road and onwards towards the Proposed Development Site along existing private access roads. This access road is shown on **Figure 3.2** (PEI Report Volume III).

3.5.12 The wider Keadby Power Station site is accessed from the B1392, a single-carriageway road that serves the village of Keadby. The B1392 joins the A18 trunk road approximately 1.2km south of the Waterborne Transport Offloading Area at a junction to the west of the village of Althorpe. This access is not proposed to be used for the Proposed Development.

3.5.13 A section of Chapel Lane is included in the Proposed Development Site where it incorporates the potential Electrical Connection to the 132kV Substation owned and operated by Northern Powergrid. This section of Chapel Lane will not be used by construction traffic or construction staff during construction of the Proposed Development. Chapel Lane continues through the land associated with Keadby 2 Power Station and Keadby 1 Power Station towards Vazon Bridge.

3.5.14 Other roads within the Proposed Development Site include Ealand Road/ Bonnyhale Road which runs east-west along the southern edge of Proposed PCC Site and Electrical Connection Area to National Grid 400kV Substation.

3.5.15 Trent Road, North Road and West Road are all roads facilitating the movement of internal traffic within the current Keadby 1 Power Station site and the Keadby 2 Power Station construction site within the Proposed Development Site boundary.

3.5.16 The Stainforth and Keadby Canal, managed by the Canal and Rivers Trust, is located immediately to the south of the Proposed Development Site. At the intersection with the River Trent, Keadby Lock is present which provides access to the Stainforth and Keadby Canal from the River Trent for freight and pleasure craft.

3.5.17 To the south of the Proposed Development Site (and running beneath Pilfrey Bridge which provides access into the Proposed Development Site), the Scunthorpe to Doncaster passenger rail line is present; there are no existing connections or sidings into the Keadby Power Station site. A passenger service is provided by TransPennine Express every hour in each direction.

3.5.18 No public rights of way (PRoW) are located within the Proposed Development Site. The nearest PRoW are:

- KEAD 10: a bridleway which runs north-south from Chapel Lane to a point north of Warping Drain. The southernmost point of this footpath is approximately 40m from the Water Discharge Corridor;
- Footpath CROW11 located along Bonnyhale Road, approximately 250m north-west of the access road for the Proposed Development Site; and
- Footpath KEAD 9 which runs parallel to Warping Drain east-west from the northern terminus of Footpath KEAD 10 approximately 500m north of the Proposed PCC Site. Footpath LUDD9 joins Footpath KEAD 10.

3.5.19 A permissive 'traffic-free cycle route' south of the Stainforth and Keadby Canal is also noted together with a number of other PRoW located within the wider surrounding areas. These routes are shown on **Figure 3.4** (PEI Report Volume III).

Air Quality Receptors

3.5.20 There are no Air Quality Management Areas (AQMAs) within the Proposed Development Site or surrounding areas. The closest AQMA is located approximately 6.3km to the east of the Proposed Development Site in Scunthorpe and is designated for the exceedance of the 24 hour PM_{10} limit value (refer to **Figure 3.4**, PEI Report Volume III). Based on Defra forecast models and local authority monitoring data, no exceedances of the EU standards have been identified in the vicinity of the Proposed Development Site.

Geological and Hydrogeological Receptors

3.5.21 According to the Phase 1 Geo-Environmental Site Assessment (**Appendix 13A**, PEI Report Volume II), the local geology is characterised by approximately 12m to 17m of alluvium and drift deposits of clay, silt and sand, with occasional peat layers recorded at various depths between 0.45m and 1.6m thickness. These superficial deposits overlie the Mercia Mudstone Formation which shows evidence of near surface weathering, the extent to which decreases with increasing depth. Although not mapped, made ground is expected across the Proposed Development Site, given the historical phases of development that have taken place.

3.5.22 The Environment Agency classifies the underlying superficial geology as Secondary A aquifer and the Mercia Mudstone as a Secondary B aquifer. The Proposed Development Site does not contain or lie within or in close proximity (<1km) to any Source Protection Zones (SPZ).

3.5.23 Groundwater levels within the historical borehole records indicate generally shallow groundwater levels within the superficial geology of between 0.9m - 3.0m below ground level (bgl). Occasionally, deeper groundwater strikes were recorded between 5.4m - 6.9m bgl.

Hydrological Receptors

3.5.24 **Figure 12.3** (PEI Report Volume III) illustrates that the Proposed Development Site and surrounding areas lie within the extensive floodplain of the tidal River Trent which flows in a northerly direction towards the Humber Estuary. Parts of the Proposed Development Site lie immediately west of the River Trent (Water Discharge Corridor, River Water Abstraction Option and Waterborne Transport Offloading Area). Other parts of the Proposed Development Site, including the Proposed PCC Site, lie at a greater distance (1.3km) from the River Trent.

3.5.25 is the Water Discharge Corridor traverses beneath Warping Drain (also known as Eastoft Moor Drain) which is an artificial waterbody classified as an Ordinary Watercourse and flows east and into the tidal River Trent via sluice gates.

3.5.26 Approximately 160m west of the Proposed Development Site at its closest point is Keadby Boundary Drain, an Ordinary Watercourse, which runs south to north. At the point where Keadby Boundary Drain joins Warping Drain via a sluice, there are flood gates on Warping Drain.

3.5.27 Lying generally to the south of the Proposed Development (but crossed by Pilfrey Bridge which carries the access road for the Proposed Development), there are a number of watercourses running parallel west to east. These include North Soak Drain and South Soak Drain, which flow either side of the Stainforth and Keadby Canal. Both of these drains flow into the Three Rivers approximately 50m south of the Proposed Development Site in the vicinity of the Canal Water Abstraction Option, which connects with the River Trent via sluice gates. These watercourses are classified as Main Rivers.

3.5.28 The Stainforth and Keadby Canal follows a relatively direct course from west to east, running for approximately 24km) from Bramwith Junction, (where it meets the New Junction Canal and the River Don Navigation to Keadby Lock, where it joins the River Trent. There is a lock at both ends with Keadby Lock controlling passage to the River Trent.

3.5.29 The study area has a complex surface water hydrology and a long history of land drainage. The Proposed Development Site and land north of the Stainforth and Keadby Canal is within the Isle of Axholme and North Nottinghamshire Water Level Management Board (ANNWLMB) area.

3.5.30 The Flood Map for Planning illustrates that the entire Proposed Development Site and surrounding environs is within the Environment Agency's indicative Flood Zone 3. Flood Zone 3 is land assessed as having a 1 in 100 or greater annual probability of river flooding (>1% Annual Exceedance Probability or AEP), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5% AEP) in any year. However, land north of the canal (which includes the majority of the Proposed Development Site) benefits from flood defenses (embankments) along the River Trent. Further information can be found in **Appendix 12A**: Flood Risk Assessment (PEI Report Volume II).

Cultural Heritage Receptors

3.5.31 **Figure 15A.1** (presented in **Appendix 15A**: Desk Based Assessment of PEI Report Volume II) illustrates that there are no World Heritage Sites, scheduled monuments, grade I or II* listed buildings, conservation areas, registered parks and gardens, registered battlefields or protected wreck sites within the Proposed Development Site. A number of non-designated heritage assets are recorded in the North Lincolnshire Historic Environment Record (HER) within the Proposed Development Site.

3.5.32 Outside of the Proposed Development Site boundary, the closest assets are the scheduled monument (also a grade II listed building) at Keadby Lock on the Stainforth and Keadby Canal [NHLE 1005204], located adjacent to the Waterborne Transport Offloading Area. One further scheduled monument lies approximately 4.4km north-east of the Proposed Development Site at Flixborough Saxon Nunnery and Site of All Saints Medieval Church and Burial Ground [NHLE 1009382).

3.5.33 The closest listed building to the Proposed Development Site is the Grade II listed Keadby Lock on the Stainforth and Keadby Canal [NHLE 1342734], which is also a scheduled monument as described above. Other listed buildings in the study area are concentrated in its settlements at Keadby, Althorpe, Gunness, Ealand and Crowle, as well as features associated with land improvement such as late-18th to early-19th

century drainage syphons and sluices [1346690, 1084319 and 1076974]. The study area contains two notable Grade I listed buildings, both called the Church of St Oswald; one in Althorpe [1083258], and one in Crowle [1346672]. The remaining listed buildings are all Grade II and comprise church vicarages, rectories, houses, public houses, shops and small number of former farmhouses.

3.5.34 The nearest conservation area is located in Crowle approximately 3.2km west of the Proposed Development Site and provides the context and setting for some 14No. listed buildings including the Grade I listed Church of St Oswald [1346672].

3.5.35 The non-designated Isle of Axholme area of Special Historic Landscape Interest (saved policy LC14 of the North Lincolnshire Local Plan) is centered on Epworth, with a northern boundary approximately 2km south of the Proposed PCC Site.

3.5.36 A number of non-designated standing buildings are also identified in the North Lincolnshire HER within 1km of the Proposed Development Site.

3.5.37 A number of below ground non-designated heritage assets are recorded on the North Lincolnshire HER within or in the immediate vicinity of the Proposed Development Site. Within the Proposed Development Site, these include (refer to **Figure 15A.2** in **Appendix 15A**: Desk Based Assessment of PEI Report Volume II):

- a findspot comprising deer antlers - uncovered in peat of probable Bronze Age date during construction of the former Keadby Power Station in 1951 [HER 15717];
- a cropmark to the north-west of Pilfrey Farm – interpreted as a possible large rectangular enclosure, measuring c.80m across. Other linear marks within the field appear to be warping drains, so together may represent a warping compartment [HER 21639];
- a palaeochannel – representing a former pre-historic watercourse just west of the River Trent mapped from air photographs in 2003 [HER 22755];
- alignment of a post-medieval land improvement drain [HER 24691] – located within the Water Discharge Corridor;
- the site of a former unnamed post-medieval farmstead, demolished in the 19th century [HER 25874];
- scientifically dated peat deposits dating from the prehistoric period (Neolithic to late Iron Age [AECOM1111); and
- Beyond the Proposed Development Site, additional non-designated assets include a possible former Romano-British settlement site, adjacent to the Water Discharge Corridor – interpreted from fieldwalking in 1982 which yielded a scatter of over 100 Romano-British pottery, [HER 17311] and a mid-18th century discovery of a late-Roman bog body in the vicinity of the site [HER 71] have been recorded. A number of finds are suggestive of favourable conditions for the survival of organic material afforded by the Proposed Development Site's marshland environment (peat).

Landscape and Visual Receptors

3.5.38 The Proposed Development Site lies within the Humberland Levels National Character Area (NCA) which is a flat, low-lying and large-scale agricultural landscape (Natural

England, 2014). There is widespread evidence of drainage history, in particular from the 17th century, in the evidence of ditches, dykes and canalised rivers. The flat landscape enables extensive, unbroken views where vertical structures including power stations and wind turbines, are very prominent.

3.5.39 The Proposed Development Site lies within the Trent Levels Landscape Character Area (LCA) within the North Lincolnshire Landscape Character Assessment and Guidelines (Estell Warren Landscape Architects, 1999). This LCA is characterised as a flat, open floodplain landscape with long distance views with little diversity in character.

3.5.40 The Proposed Development Site and its immediate surroundings are heavily influenced by industrial structures of the existing Keadby Power Station Site as well as Keadby Wind Farm, overhead electricity pylons and transmission lines converging near the existing Keadby 1 and Keadby 2 Power Stations. There are no natural features of noteworthy landscape value within the Proposed Development Site.

3.5.41 The surrounding area is largely arable, with local villages including Keadby village directly east of the Proposed Development Site. The extent of views available to receptors range from close proximity to long distance views. A number of receptors are located at the edge of villages, along roads and along PRoW where the landform is low lying. The rising landform in the east and localised areas of slightly raised ground around the Isle of Axholme in the south-west allows for elevated long-distance views towards the Proposed Development Site.

3.5.42 Further information can be found in **Chapter 14**: Landscape and Visual Amenity (PEI Report Volume I).

Agricultural Land Classification

3.5.43 Provisional Agricultural Land Classification (ALC) plans are available from magic.gov.uk and provide guidance on the ALC where agricultural land is to be developed. These plans indicate that the majority of the Proposed Development Site (including the Proposed PCC Site) is located within land classified as Grade 2 (very good).

3.5.44 Land within the Indicative Construction Laydown Areas, within the agricultural fields north of the A18 are classified as Grade 1 land (excellent quality) under the Provisional ALC. Consideration of temporary impacts and effects on soils during construction is provided in **Chapter 5**: Construction Programme and Management (PEI Report Volume I).

3.6 References

DEFRA Magic Maps (website accessed November 2020) *https://magic.defra.gov.uk/*

Estell Warren Landscape Architects (1999) *North Lincolnshire Landscape Character Assessment and Guidelines.*

Natural England (2014) *NCA Profile: 39 Humberhead Levels (NE339).*