Little Crow
Solar Park

Little Crow Solar Park, Scunthorpe

ENVIRONMENTAL STATEMENT

CHAPTER 4 - DEVELOPMENT PROPOSAL

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4 DEVELOPMENT PROPOSAL

4.1 INTRODUCTION

4.1.1 This chapter of the Environmental Statement describes the development proposal subject of the application for a Development Consent Order. It provides a detailed description of the physical characteristics of the development for the purpose of identifying and assessing the likely significant effects resulting from the development. It provides an indicative programme for the construction of the development, operation, maintenance and subsequent decommissioning of the development.

4.1.2 This chapter should be ready alongside the relevant submission drawings: -

- Works Plan (Document Ref 2.8 LC DRW)
- Development Drawings (Document Refs 2.10 LC DRW to 2.36 LC DRW)
- Proposed Temporary Diversion of Public Footpath 214 (Document Ref 2.39 LC DRW)

4.1.3 This chapter is also supplemented by the following documents provided in the Environmental Statement Technical Appendices: -

- **Appendix 4.1**: Outline Construction Environmental Management Plan (Document Ref 7.8 LC TA4.1)
- **Appendix 4.2**: Outline Decommissioning Strategy (Document Ref 7.9 LC TA4.2)
- **Appendix 4.3**: Grid Network Constraints Report (Document Ref 7.10 LC TA4.3)
- **Appendix 4.4**: Outline Soil Management Plan (Document Ref 7.11 LC TA4.4)
- **Appendix 4.5**: Air Quality Assessment and Carbon Assessment (Document Ref 7.12 LC TA4.5)
- **Appendix 4.6**: EMF Assessment (Document Ref 7.13 LC TA4.6)
- **Appendix 4.7**: Outline Battery Safety Management Plan (Document Ref 7.14 LC TA4.7)
- **Appendix 4.8**: Arboricultural Impact Assessment (Document Ref 7.15 LC TA4.8)
- **Appendix 4.9:** Noise Impact Assessment (Document Ref 7.16 LC TA4.9)

4.2 DEVELOPMENT SUMMARY

4.2.1 The main element of the proposal is the construction, operation, maintenance and decommissioning of a ground mounted solar park with an intended design capacity of over 50MWp (megawatts peak) with associated development.

4.2.2 An operational lifespan of 35 years would be sought linked to the first export date from the development. The development will progress in accordance with a phasing plan. A single substation compound will serve the whole development, and this will be required for the duration of the development and retained thereafter. The substation compound would be located near the northern boundary of the application site and to

the east of the existing double row of 132kV overhead electricity pylons which traverse the site.

4.3 MAXIMUM DESIGN SCENARIO AND MICRO-SITING

4.3.1 The need for flexibility in design, layout and technology is identified in a number of National Policy Statements to address uncertainties inherent to the Development. This very pertinent to solar and battery industries due to the rapid pace of change in technology.

4.3.2 The Little Crow Solar Park EIA has employed a maximum design scenario approach which reflects the Rochdale Envelope approach. The Rochdale Envelope provides a 'worst case' scenario approach to the environmental impact of a project and allows for a broad definition of the project to be framed within a number of set parameters. This approach allows for a project to be assessed on the basis of maximum project design parameters in order to provide flexibility, while ensuring all potentially significant effects (positive or adverse) are assessed within the EIA process and reported in the Environmental Statement. Those parameters include a range of potential values.

4.3.3 The maximum design scenarios are identified from the range of potential options for each design parameter for the development. The maximum design scenario assessed is therefore the scenario which would give rise to the greatest potential impact. For example, where several solar panel options are provided, then the assessment of Little Crow Solar Park has been based on the solar panel type that would have the greatest impact. Where there is only a single design parameter put forward then this is deemed to be the worst-case scenario, for example (i) maximum development footprint and height of the substation compound; and (ii) the total area covered by the solar panels. As technology advances, it is possible that solar panels could become more efficient, their rated maximum power could also increase from the candidate 420 watts per solar panel to over 500 watts per solar panel. This provides a potential range for solar of between 150MWp to 200MWp depending on the wattage output of the panels.

4.3.4 This in turn could require the micro-siting of ancillary equipment to reflect such changes, i.e. the final locations of cabling and the number and location of inverters and transformers.

4.3.5 Accordingly, the ability of the applicant to micro-site during the construction phase is an important consideration and this could be a requirement to reflect any technological advancement or changes in plant design or shape. In this regard, the applicant proposes the imposition of a pre-commencement requirement for the submission of a phasing plan and detailed design plan to the Local Planning Authority for approval. The purpose of this submission would be to: -

- Clarify the construction & operational sequencing of the development; Demonstrate compliance with the requirements included in the DCO; and

- Demonstrate that the final detailed design remains within the parameters of the design principles and therefore the Rochdale Envelope standards considered by this Environmental Statement.

4.3.6 A full schedule of the requirements is set out in the Draft Development Consent Order (Document Ref 3.1 LC DCO).

4.4 THE WORKS

4.4.1 The proposal comprises seven land use zones or works zones, these are: -

- **Work No. 1:** Arrays of Ground Mounted Solar Panels
- **Work No. 2A:** Battery Energy Storage System
- **Work No. 2B**: Battery Energy Storage System (alternative location)
- **Work No. 3**: Formation of Ecological Corridors
- **Work No. 4:** Substation Building and Compound
- **Work No. 5**: Upgrade to Main Access Track
- **Work No. 6**: Perimeter Development Buffer
- **Work No. 7:** Temporary Construction and Decommissioning Compound

4.4.2 These work zones are presented on the drawing "Works Plan" (Document Ref 2.8 LC DRW).

4.4.3 The description of the work within each Work zone is provided below.

4.5 WORK NO. 1: ARRAYS OF GROUND MOUNTED SOLAR PANELS

4.5.1 The design principles of the solar panels are: -

- A generating station comprising arrays of ground-mounted solar panels with a gross electrical output of over 50 megawatts peak
- All solar panels will be located within the Work No. 1 area as defined on the Works Plan
- Total land coverage of the solar panels would be c800,00sq m. Subject to the wattage output of the solar panel selected for construction the potential maximum range for energy generation is between 150MWp and 200MWp.
- An array is a galvanised steel and anodised aluminium mounting structure with the solar panels attached to it
- The maximum top height of the arrays will be 3.5m
- The minimum height of the lowest part of the arrays will be 0.7m
- All solar panels will be south facing
- Solar panels will be dark blue, grey or black in colour
- Indicative slope of the solar panels from horizontal would be 15 degrees
- Internal access track of permeable construction
- Typical minimum distance between edge of the arrays to the 1.8m high perimeter fencing would be 3m
- Biodiversity would be promoted within and around the arrays
- CCTV positioned along the perimeter of the arrays on 3m high poles

- Planting and ecological works incorporating the biodiversity objectives and management prescriptions in accordance with the Outline LEMP

4.5.2 The solar panels would convert solar irradiance into direct current (DC) electricity. A solar panel consists of a layer of silicon cells, an anodised aluminium frame and various wiring to allow current to flow from the silicon cells. Silicon is a non-metal with conductive properties that allow it to absorb and convert sunlight into electricity. When light interacts with a silicon cell, it causes electrons to be set into motion, which initiates a flow of electric current[1]. The solar panels are connected in series and set out on south facing arrays. The arrays will be laid out in multiple parallel rows running east to west across the various field enclosures. The mounting structure and solar panels will be static. The distance between the arrays would respond to topography but would typically be between 3.5 metres to 6 metres. Land between and beneath the arrays will be used for biodiversity enhancements and seasonal sheep grazing. If sheep grazing is not possible then grassland will be managed through a grass cutting regime.

4.5.3 The mounting structure will be supported at intervals by double mounted posts set approximately 3.75m apart. The posts will be pushed into the ground with a small plant rig to depths between 1m to 2m and this will be guided by localised ground conditions. The exception to this is within areas of archaeological interest where the posts will be fixed into concrete pads resting on top of the ground.

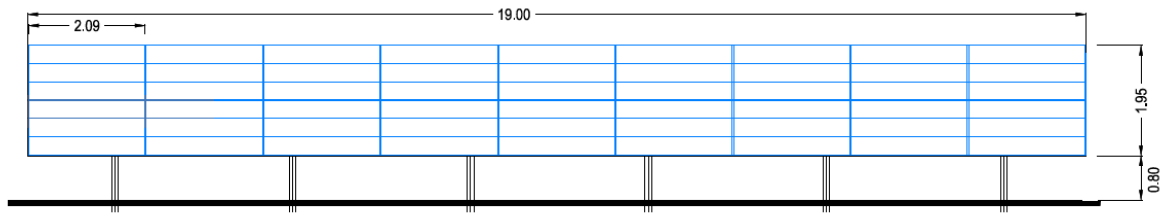

Illustration 4.2: Array of Ground Mounted Solar Panels – Elevation Detail

4.5.4 For archaeological interests, an archaeological exclusion zone has been provided around the area containing the former Gokewell Priory[2]. No arrays or cable runs will go through this area. The area will be used to provide biodiversity measures and will be delineated with a 1.8m high perimeter fence. The existing public right of way running through this area will be retained.

4.5.5 The design shows six rows of panels (in landscape alignment) and the design principle is set by the overall length of the solar panels, which is set at 7.67m as shown on illustration 4.3.

[1] It was first discovered in 1839 by Edmond Becquerel and can be generally thought of as a characteristic of certain materials (known as semiconductors) that allows them to generate an electric current when exposed to sunlight.

[2] Further details of the former Gokewell Priory is contained within the Cultural Heritage Baseline Study (Environmental Statement Technical Appendices 8.1).

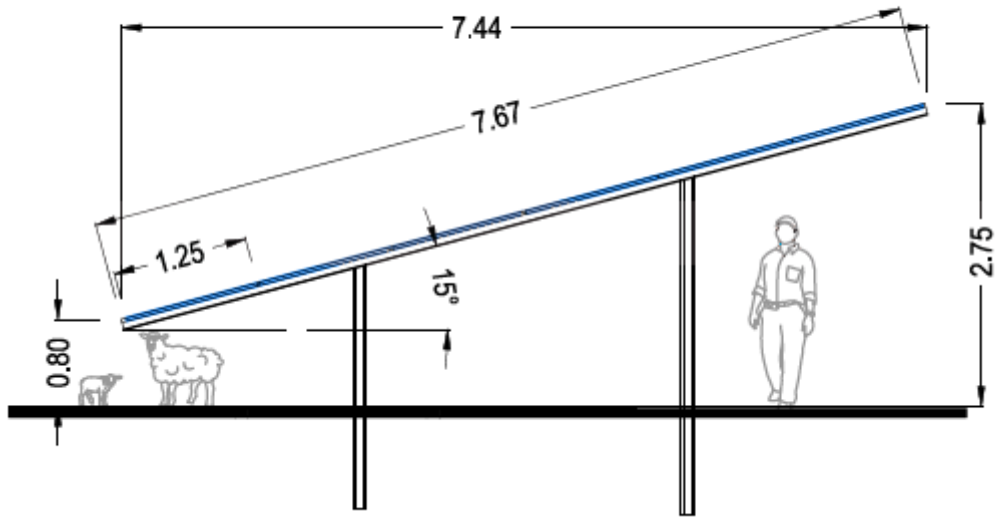

Illustration 4.3: Array of Ground Mounted Solar Panels – Cross Section Detail

4.5.6 The insulated DC cables from the solar panels will be routed in channels fixed on the underside of the mounting structure. The DC string cables will run along the entire underside of each row. The electrical cabling from each array will be concealed through shallow trenches linking the solar panels to the inverters and transformers and then to the main substation. The cable trench will typically be between 0.5m to 1.1m in depth and up to 1.0m wide. The cable trench may also carry earthing and communications cables and will be backfilled with fine sands and excavated materials to the original ground level.

4.5.7 Cable trenching will not take place through any archaeological sensitive areas.

4.5.8 The inverters, transformers and associated switch gear are required to convert the DC energy produced by the arrays into AC energy, these will be located across the Works area as shown on Works Details – Whole Site Plan (Document Ref 2.10 LC DRW). The AC cable will also be laid in trenches and would run directly to the main substation compound.

4.5.9 The arrays would be set within perimeter fencing up to 1.8m in height with wooden supporting posts placed at intervals of c. 3.5m.

4.5.10 The perimeter fencing would be either green or galvanised aluminium in finish and would typically follow the outer field boundaries containing the solar panels. The minimum distance between the edge of the arrays and the perimeter fence would be 3m. A CCTV system mounted on poles will be positioned at intervals along the inside face edge of the perimeter fencing (between the fence and the arrays).

4.5.11 This Work zone also provides an alternative location for the battery energy storage system (Work No. 2B shown on Document Ref. 2.36 LC DRW) which is positioned to the north of the proposed substation compound. The alternative location may be utilised if, for example, technological advances with solar which allow the overall footprint of the development to be reduced, thus the battery energy storage system can be relocated amongst the solar panels.

4.6 WORK NO. 2A: BATTERY ENERGY STORAGE SYSTEM & WORK NO. 2B BATTERY ENERGY STORAGE SYSTEM

4.6.1 Two alternative locations are presented for the associated battery energy storage system these are Work No. 2A and Work No. 2B and the Environmental Statement has considered both options. Work No 2B is positioned amongst Work No 1. This option could be utilised if the post-consent detailed design of the ground mounted solar panels allows for a reduction in their development footprint which in turn may allow the battery storage facility to be located within Work No. 2B instead of the location allocated for Work No. 2A. If Work No.2A is constructed the area identified in the works plan for Work No. 2B will be used to house solar panels (as part of Work No.1). If, however, Work No. 2B is constructed, the area identified in the works plan for Work No. 2A will be used for the ecological corridor (as part of Work No. 3).

4.6.2 The design principles of the battery energy storage system for either location, namely Works No. 2A or Works No. 2B are:-

- A battery energy storage system
- The candidate storage capacity is 90MW
- Total land coverage of the battery energy storage system compound would not exceed 11,200 m sq
- The system would be made secure by a 3m high gated palisade fence
- Battery containers would have a maximum length of 17m, maximum width of 3m and a maximum height of 4m. The maximum storage capacity of a single battery container would be 6MW
- The battery containers would be dark green in colour

4.6.3 The battery energy storage system consists of containerised battery units that can store energy and are able to release or absorb energy from the power network. Being able to absorb and release energy, the battery energy storage system at Little Crow can be used to contribute towards the frequency balancing services, where the power is being generated or absorbed statically or dynamically depending on the system frequency. When there is not enough power, batteries are discharged to balance under frequency preventing black and brown outs. To balance over frequency batteries are charged to prevent dangerous spikes across electricity infrastructure[3].

4.6.4 The maximum development footprint of the battery energy storage system will be 70m by 160m and will be surfaced with stone chippings. Under normal conditions the development will be unmanned. Visual checks will be undertaken during maintenance visits to the development.

4.6.5 The candidate equipment to be installed at the battery energy storage system include: -

[3] The National Electricity Transmission System is an islanded network with no AC connections to other networks. In order to manage the system frequency within the normal operating range 49.5Hz to 50.5Hz, National Grid relies on frequency balancing service providers to modulate their active power output or consumption in order to minimise the imbalance between generation and demand on the system. The extent of the required modulation is determined by the deviation of the system frequency from 50Hz. A change in grid frequency is caused by an imbalance of supply and demand.

- Security fencing – 3m high palisade fencing
- Internal access tracks
- Vehicular parking within a gated compound
- 16 no. containerised battery units
- 18 no. skid mounted transformers and inverters
- Cable circuits connecting to the substation compound
- 2 no. client switchroom containers housing the switchgear
- Earthing and communication circuits
- 6 no. CCTV on 3m pole mountings

4.7 WORK NO 3: FORMATION OF ECOLOGICAL CORRIDORS

4.7.1 Ecological and biodiversity measures are promoted across the entire Order Limits area and this is enhanced within Work No 3.

4.7.2 Within this area, a number of measures and features are proposed for the benefit of biodiversity. This includes the planting of new hedgerows and bolstering of existing field boundaries to increase coverage of this habitat, provide effective landscape screening, and to improve connectivity of the hedgerow and woodland network across and beyond the order limits.

4.7.3 Several measures have been designed specifically for the benefit of wildlife species which are targeted for conservation both locally and nationally. Circa 10 ha of the Work area will be cultivated annually to promote suitable conditions for uncommon and declining arable plants to thrive. An area totalling approximately 23 ha within the Work area will be managed under a seasonal grazing regime or a grass cutting regime with the aim of providing optimal conditions for ground-nesting farmland birds during the breeding season. Field margins and easements spread across the work area will be sown with a species-rich acid grassland seed mix, which will contain larval food plants and nectar sources for several pollinating invertebrate species of conservation importance, which are present locally. A considerable number of features for nesting birds and roosting bats, as well as hibernation/sheltering sites for various species, will be installed at the field boundaries.

4.7.4 The described measures will be managed and maintained for the benefit of the respective target ecological features for the lifespan of the scheme.

4.7.5 Other key development within this work area include

- planting and ecological works incorporating the biodiversity objectives and management prescriptions in accordance with the outline LEMP;
- internal access tracks;
- fencing archaeological exclusion zone;
- swale buffer;
- temporary diversion of public footpath;

- underground connection to the electricity network; and

- cable trenches.

4.8 WORK NO 4: SUBSTATION BUILDING AND COMPOUND

4.8.1 A single substation compound will be required for the development and this will likely be constructed at the start of the development. Following construction and commissioning the substation compound will be adopted and become the property of the District Network Operator, who will maintain the compound throughout the lifetime of the development. The decommissioning of the substation is not considered as part of the application as this will be the property of the DNO and as such would be outside the gift of the developer to decommission.

4.8.2 The function of the new substation will be to take power from the solar arrays and connect this to the existing 132kV underground cable that runs through the order limits.

4.8.3 The maximum development footprint of the substation compound will be 80m by 80m and will be surfaced with stone chippings. Under normal conditions the development will be unmanned. Visual checks will be undertaken on a monthly inspection visit to the development. Whilst external lighting will be installed at the substation for emergency work during hours of darkness, the substation will not normally be lit.

4.8.4 The candidate equipment to be installed at the substation would include: -

- Security fencing – 2.4m high palisade fencing with an electrical fence backing of 3m high from ground level.

- Car parking

- NPG Control Room - A small single-story amenities building housing the main control systems and welfare unit with WC. The building would have a maximum height of 8m.

- Customer Switchroom – A small single storey building housing the switchgear for controlling the power flows from the solar park and battery storage. The building would have a maximum height of 5m.

- 1 No. NPG 11KV pad-mounted transformer (provides standby LVAC supplies in event of power failure)

- 2 no. Flood light columns at a maximum height of 5m

- Gantry with voltage and current transformers

- Circuit breakers

- Earthing circuits

- Cable circuits

- Cable trenches

- Access track with separate access provision for the District Network Operator to access its substation

- Cess pit
- sealing end structures
- high level 132kV busbars
- low level disconnectors

4.8.5 The initial preparatory work would comprise the temporary removal and storage of topsoil and the installation of a temporary stone capping in the substation construction area to provide a clean and stable working platform. Where required, excavations and concrete foundations will be provided for the substation electrical equipment.

4.8.6 An earth grid would be installed below the ground to create an 'earth mat' to make the compound electrically safe. The substation support structures, and electrical equipment then would be erected.

4.8.7 Following construction of the substation compound by the Independent Connection Provider ('ICP') the ICP will request Northern Power Grid ('NPG') to review the substation compound and confirm it meets with their requirements. The ICP will also complete a Connection Agreement requesting NPG to connect the substation to their network. Once this review is completed and NPG are satisfied that the substation compound meets their requirements NPG will proceed to connect the substation to their network. NPG will also issue an Adoption Agreement to be completed by the ICP. The Adoption Agreement when completed transfers the ownership of the substation compound to NPG. Electrification of the fence would take place when the substation has been connected to the electricity.

4.9 WORK NO 5: UPGRADE TO MAIN ACCESS TRACK

4.9.1 The existing access track fronting the B1207 will be used for the development for all phases, namely, construction, operation & maintenance and subsequent decommissioning. The unbound granular track, with 2 No. passing bays, will be upgraded with similar materials and drainage channels where required. Vegetation will be removed in order to achieve visibility splay at the site access for construction and this would be maintained during the operational period. The vegetation management requirements would be set out in the LEMP in accordance with the outline LEMP.

4.10 WORK NO. 6: PERIMETER DEVELOPMENT BUFFER

4.10.1 For the outer edge of the development, a typical development buffer of 10m would be provided between the edge of the order limits and the perimeter fencing. This allows the provision of future mitigation planting should it be required during the lifetime of the development. The provision of any additional mitigation planting would be assessed as part of the ongoing yearly management of the LEMP and submitted to and approved by the Local Planning Authority before its implementation. The buffer area would also accommodate a temporary diversion to the Public Right of Way footpath that would be implemented during the construction and decommissioning periods. The temporary diversion follows the southerly outer edge of the fields containing the solar panels. The purpose of the temporary diversion is to provide clear separation between construction workers and any members of the public using the public right of way footpath. Development within Work No. 6 include

- security fencing, boundary treatment and other means of enclosure and internal access;
- bunds, embankments and swales;

- temporary diversion of public footpath during construction and decommissioning;
- ancient woodland buffer;
- public footpath buffer;
- pond buffer;
- hedge buffer;
- swale buffer; and
- mitigation planting and maintenance corridor.
- planting and ecological works incorporating the biodiversity objectives and management prescriptions in accordance with the Outline LEMP

4.11 WORK NO. 7: TEMPORARY CONSTRUCTION AND DECOMMISSIONING COMPOUND

4.11.1 If all elements were constructed as at the same time, then the construction period will take approximately 11 months (up to 47 weeks).

4.11.2 The supporting Outline Construction Traffic Management Plan (Document Ref 7.36 LC TA9.2) assumes the worst-case scenario whereby the entire development is constructed in a single phase. Details of the expected traffic movements are considered in detail through Chapter 9 and the Outline CTMP which includes the maximum expected number of vehicle movements.

4.11.3 Prior to commencement of any phase of development a Construction Environmental Management Plan, which build upon the Outline CEMPs (Document Refs 7.8 LC TA4.1 & 7.27 LC TA7.7) and a detailed Construction Traffic Management Plan for that phase of development would be submitted to and approved by the relevant planning authority and this will be secured by requirements of the DCO.

4.11.4 Construction activities will be carried out Monday to Friday 07:00-18:00 and between 08:00 and 13:30 on Saturdays. Where possible, construction deliveries will be coordinated to avoid HGV movements during the traditional AM peak hour (08:00-09:00) and PM peak hour (17:00-18:00).

4.11.5 During the construction phase (or phases) one main construction compound will serve the development and this will be located off the main site entrance, thus reducing the distance delivery vehicles will need to travel after reaching the site's entrance.

4.11.6 The temporary construction / decommissioning compound would comprise: -

- Temporary portacabins providing office, canteen, and welfare facilities for construction operatives (the dimension of the portacabins would vary and the maximum size for individual units is expected to be 10m by 3m with a maximum height of 3m).
- Parking area for construction and workers vehicles
- Secure compound for storage
- Temporary hardstanding

- Wheel washing facilities
- Temporary gated compound
- Storage bins for recyclables and other waste

4.11.7 All construction vehicles will exit through the wheel wash area in order to reduce the spread of mud and dirt onto the local highway network. Temporary roadways may be utilised to access parts of the development site and this would be guided by weather conditions at time of construction. The objective would be to use temporary matting to avoid excessive soil disturbance or compaction. The temporary construction compound would be removed within three months after the completion of work or each phase of work if development is constructed in phases.

4.12 OUTLINE LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN

4.12.1 The development proposal is an example of a development which presents considerable opportunity for landscape and biodiversity mitigation and enhancement. The Landscape and Biodiversity proposal are discussed in detail in the supporting Outline Landscape and Ecological Management Plan (Document Ref 7.28 LC TA7.8). The objectives are: -

- To create new grassland habitats through seeding existing arable land with of locally appropriate native species
- Hedgerow planting
- To manage the grassland to establish a diverse sward beneath the arrays
- To manage grassland outside the array for wildlife
- To manage areas to provide suitable conditions for arable flora
- To manage hedgerows to provide habitat for a range of species and ensure visual screening of the site from the footpath
- To manage aquatic habitats as necessary
- To provide sheltering features around the site for nearby populations of bats, birds and other notable faunal species
- To assess the need and implement any additional planting required along the outer edge of the development resulting from any significant felling of woodland located outside the boundary of the site.
- To monitor the site and assess the success of management and adherence to the prescribed management
- Provision of 15m where the development site adjoins Scheduled Ancient Woodland.

4.12.2 Ecological and biodiversity measures are promoted across the entire site and this is enhanced within Work No. 3. Following construction, land between and beneath the panels, namely Work No. 1, would be used for biodiversity enhancements and seasonal sheep grazing. If sheep grazing is not possible then grassland will be managed through a grass cutting regime. Tree planting would be introduced along the north east section of the development boundary. The field boundary hedgerows located within the Order

Limits will be managed in accordance with the Landscape and Ecological Management Plan.

4.12.3 The woodland located to the north, east and west of the order limits are not under the control of the applicant and as such will continue to be managed by the respective landowners. The buffer zone located around the inner periphery of the order limits allows for the provision of future mitigation planting should it be required during the lifetime of the development.

4.12.4 In terms of requirements, prior to commencement of each phase of the authorised development, a LEMP covering that phase of authorised development and in accordance with the outline LEMP would be submitted to and approved by the local planning authority.

4.13 OPERATIONAL LIFESPAN

4.13.1 An operational lifespan of 35 years would be sought, starting from the first export date of the development.

4.13.2 During the operational phase, the activities on site would amount to servicing and maintenance of plant and equipment associated with the development, including solar panels, inverters, transformers, battery energy storage system, substation compound and vegetation management in accordance with the Outline LEMP.

4.14 STATUTORY UNDERTAKERS

4.14.1 The provision of easements for the existing services that traverse the site, such as overhead powerlines and the 21 inch iron water main, are incorporated into the candidate layout design (Document Ref 2.10 LC DRW). No arrays will be erected within the agreed easements and thus unrestricted access will be available to the statutory undertakers at all times. Concrete cross-overs will be provided where the internal access tracks cross any existing underground services.

4.15 RENEWABLE ENERGY AND CARBON DISPLACEMENT[4]

4.15.1 Based on the candidate design varying between 150MWp to 200MWp, the solar park would generate clean renewable energy for the equivalent of between 45,000 and 60,000 homes a year. The anticipated CO_2 displacement is between 64,500 and 86,000 tonnes per annum. There could also be additional carbon displacement linked to the associated battery storage if these were charged by renewable energy.

4.15.2 The proposal would provide a clean, renewable and sustainable form of electricity. It would make a valuable contribution to the generation of electricity at a local level. The scheme would add to the Council's progress in meeting its renewable energy target. It would also assist in meeting national targets.

4.16 ROUTING

4.16.1 It is proposed that construction traffic will arrive from the M180 junction 4, the A15, the A18, the B1208 and B1207 to the site access. From the M180 junction 4 vehicles will use the A15 northbound to the Briggate Lodge Roundabout and then travel east along the A18 towards Brigg. From the A18, vehicles will turn left onto the B1208.

[4] For every 5MW installed, a solar farm will power over 1,500 homes annually (based on an average annual consumption of 3,300 kWh of electricity for a house) and save 2,150 tonnes of CO2, source the Solar Trade Association https://www.solar-trade.org.uk/solar-farms/

The B1208 measures between approximately 5.5 and six metres wide. Vehicles will travel along the B1208 to the junction with the B1207 and then continue straight ahead into the site access.

4.16.2 No construction vehicles associated with the development proposal would travel through Broughton.

4.17 TEMPORARY DIVERSION OF PUBLIC RIGHTS OF WAY FOOTPATH DURING CONSTRUCTION AND DECOMMISSIONING.

4.17.1 Temporary diversion of a section of footpath 214 a public right of way ('PRoW') traversing the Order Limits will be required only during the construction period of the arrays and substation.

4.17.2 The temporary closure will be secured through the DCO and during the duration of the temporary closure the existing footpath will be diverted along an alternative temporary path which will run around the southern perimeter of the site until it re-joins the existing PRoW at the site boundary.

4.17.3 The temporary diversion will only be required to allow the build out of the solar park and main substation compound and this will be for approximately 11 months. No construction works would be carried out with regards to the solar park and main substation compound until the provision for the temporary footpath has been made available within the site. The temporary diversion will cease following the energisation of the solar panels and the substation compound. Temporary diversion of the footpath would also take place during decommissioning. The temporary diversion is shown on Proposed Temporary Diversion of Public Footpath 214 (Document Ref 2.39 LC DRW)

4.18 DECOMMISSIONING

4.18.1 Following a 35 year generation period, the development would then enter a single decommissioning stage.

4.18.2 Within six months of cessation a decommissioning strategy would be submitted to the relevant planning authority for approval. The decommissioning strategy would detail how plant and machinery located within the Order Limits would be removed. The decommissioning strategy will follow the principles laid out in the Outline Decommissioning Strategy (Document Ref 7.9 LC TA4.2).

4.18.3 The exception to this is the substation and DNO access track which will remain in perpetuity or until such time as it is decommissioned by the DNO.

4.18.4 Temporary diversion of the footpath would also take place during decommissioning.

4.19 ELECTRIC AND MAGNETIC FIELDS

4.19.1 All equipment that generates, distributes or uses electricity produces electric and magnetic fields (EMFs). The accompanying technical specifications of the proposed substation identifies how the development complies with EMF exposure guidelines. The main potential sources of interference are the substation and battery storage compounds. Solar panels and underground cables do not in general produce any significant radio-frequency emissions.

4.19.2 An EMF Assessment report prepared by EMF Comp is presented at Appendix 4.6 (Document Ref 7.13 LC TA4.6). The assessment demonstrated that the field levels generated by the proposed Little Crow Solar Park under full load at the site boundary and along the public footpath would be significantly less than the EC Council Recommendation 1999 (EC 1999) Reference Levels which form the UK Guidance for electromagnetic field limits. Therefore, the study concluded that the electromagnetic fields produced by the Little Crow Solar Park would not present a hazard to members of the public in accessible areas outside of the site boundary and along the public footpath.

4.20 ACCIDENTS OR DISASTERS

4.20.1 The Environmental Statement should also include a description and assessment of the likely significant effects resulting from potential accidents or disasters applicable to the development proposal. The development is not considered likely to cause a significant accident or disaster risk during either the construction, operation and decommissioning phases.

Construction and Decommissioning

4.20.2 The risk both to construction workers and the general public is low and not significant during the construction phase and subsequent single decommissioning phase. This would be regulated by the Health and Safety Regulations and the construction (Design and Management) Regulations 2015. The construction of the Development would be managed in accordance with the Health and Safety at Work Act 1974 and would comply with all other relevant Health and Safety Regulations, including the Construction (Health, Safety and Welfare) Regulations 1996 and Electricity Safety, Quality and Continuity Regulations 2002.

Operational Phase

4.20.3 When operational, the majority of the development comprises of solar panels which are inert. Electrical infrastructure will be located across the Development, in the form of inverters, transformers and cabling, all of which will be subject to routine maintenance such that it is not considered to pose a significant risk to creating an accident or disaster.

4.20.4 The substation compound will have a concentration of electrical infrastructure which will include the substation and transformers and it will be operated and managed by Northern Power Grid as part of their routine maintenance regime. Accordingly, it is not considered to pose a significant risk of creating an accident or disaster.

4.20.5 Overall, no potential has been identified for the development proposal to lead to increased risk of a major accident or disaster in isolation or in combination with cumulative developments.

Battery Energy Storage System

4.20.6 To protect the battery energy storage system, it equipped with an FFS (Fire Fighting (Suppression) System) inside each container. The FFS includes a smoke detector, control panel, alarm device, exhaust pipe and bump head. It uses a clean fire suppression gas to minimize the second loss. Before gas blow-out, the system controller will send a signal to the HVAC main power switch to stop working as well as isolating the fans and thus achieve fire suppression process. Details of the fire suppression system is contained in the Outline Battery Storage Installation Specification (Document Ref No 7.14 LC TA4.7).

4.21 CLIMATE CHANGE

4.21.1 The Environmental Statement should also include description of the likely significant effects the development proposal has on climate and the vulnerability of the project to climate change.

4.21.2 With regards to vulnerability to climate change, the solar panels are designed to capture the sun's energy and therefore built to withstand extreme climatic conditions and are purposefully located in open locations. The site is not located within a coastal location and as such is not at risk to any changes to the sea level. The mounting structure holding the solar panels are either driven into the ground at an appropriate depth which responds to site specific ground conditions or fixed into concrete pads which are designed to accommodate the predicted relatively small change in wind speed during the lifespan of the development.

4.21.3 Turning to the proposal effects on climate change, the UK Government has set ambitious targets for reducing greenhouse gas emissions by 2050. The Development, in conjunction with other renewable energy developments, will contribute to the UK's aims to reduce carbon emissions and achieve its ambitious greenhouse gas emissions reduction targets. When operational, the Development will generate electricity from a renewable source and export this to the National Grid.

4.21.4 The proposal would provide a clean, renewable and sustainable form of electricity. It would make a valuable contribution to the generation of electricity at a local level. The scheme would add to the Council's progress in meeting its renewable energy target. It would also assist in meeting national targets. The generation of electricity from the Development will displace the generation of electricity from other conventional power sources, typically coal, oil or gas-fired electricity production as these are more often being decommissioned.

4.22 ALTERNATIVES

4.22.1 The consideration of alternatives can be one of the key ways in which the impact of a proposed development can be reduced, by exploring alternative avenues and their relative advantages and disadvantages for achieving the development objectives.

4.22.2 With regards to renewable energy, the principal methods of considering alternatives is through the site selection process and the establishment of a site which is both technically feasible and which minimises potential environmental impacts. Alternative energy generating solution is also a material consideration together with the 'do nothing' approach.

4.22.3 It is regarded as best practice within the EIA to consider the 'do nothing' alternative. The 'do nothing' option would entail leaving the development site in its current condition and it is assumed that the current land use would remain as it is, that is, available for agricultural use. It is an obvious statement that any impacts associated with the proposed development would therefore not occur. However, the 'do nothing' option will result in the loss of potential renewable energy source and storage proposed by the development proposal. Other benefits that would not be secured are farm diversification and biodiversity enhancements.

4.22.4 In terms of comparative alternatives when considering agricultural land take, the production of energy from solar panels is far more efficient than alternative forms of energy production gained from cropping the land. Ground mounted solar schemes represent a prudent and efficient use of agricultural land in comparison to the energy

output from biofuels. A 'land take' comparison of equivalent energy crop production is set out in Table 4.1[5]:

Table 4.1: energy crop – MWh per acre per annum

Energy Source / Crop	***MWh per acre per annum (approx. values)***
Short rotation coppice	19 MWh per acre per annum
Miscanthus	26 MWh per acre per annum
Wheat Straw	5 MWh per acre per annum
Rapeseed oil diesel	5 MWh per acre per annum
Bioethanol (from sugar beet)	13 MWh per acre per annum
Bioethanol (from wheat)	7 MWh per acre per annum
Ground Mounted Aarrays	**186 MWh per acre per annum**

4.22.5 As noted above, the ground mounted solar array scheme represents an efficient and effective use of land compared to other energy crops grown on agricultural land. Purely, therefore, in terms of the utilisation of natural resources, production of energy from solar panels is far more efficient than other forms of energy production from cropping the land. Wind could be harnessed within the site, however a number of large scale turbines would be necessary to generate the equivalent amount of export power. Given the site context it is concluded that the preferred technology is ground mounted solar arrays.

Alternative Design

4.22.6 Over the course of the design process, the project team have continuously refined the scheme's design to encompass the Council and other stakeholders' feedback at numerous junctures together with specialists' advice. At the preliminary stage of the development, the applicant considered the suitability of a wider parcel of land in-between the steelworks and the B1207 that extended to the north up to Higher Santon. Following preliminary assessment, the northern area was dismissed for reasons that included its proximity to human receptors from Higher Stanton and its predicted higher quality land. Key changes to the design introduced during the non-statutory consultation period included the introduction of a development exclusion zone extending around the former Gokewell Priory; a temporary diversion of the public right of way during the construction period and the refinement to the approach towards biodiversity mitigation and enhancement measures. The biodiversity measures were refined during the statutory consultation period and other alterations for this stage of development included the provision of concrete shoes for the solar panels located within another area of archaeological interest.

4.23 SITE SELECTION

[5] Source – information adapted from http://www.biomassenergycentre.org.uk/portal/page?_pageid=75,163231&_dad=portal&_schema=PORTAL

4.23.1 The remaining section of this chapter summarises the site selection process undertaken to identify the development area.

4.23.2 One of the biggest constraints which has to be considered when developing renewable led energy scheme is securing a viable point of connection to the electricity network. Securing grid connection is very difficult and problematic for energy proposals and sourcing a site with viable grid connection is a reasonable constraint to take into account. Increasingly, electrical connections are being forced back to substations and Bulk Supply Points as the amount of renewable generation connected within the electrical lines has grown. For storage schemes the situation is more complex as the connecting substation must have sufficient export and import capacity.

4.23.3 The proposed development will be served by an electrical (grid) looped connection to the existing short section of underground 132kV cables within the development site. Typically, the point of connection (PoC) for a project of this size would be located outside the site boundary and in many instances would necessitate the laying of kilometres of underground cable at a substantial cost to connect to the electricity network and potentially rendering projects unviable. The PoC is on the Northern Power Grid (NPG) network section known as Keadby – Broughton – Teed – Scawby Brook overhead 132kV line circuit.

4.23.4 The applicant has accepted the grid offer from NPG and secured the 99.9MW export capacity required for a project of this size. The grid offer accepted can only be used for the Little Crow Solar Farm and cannot under be transferred to any other site, as this would be deemed by NPG as a significant alteration to the original application. The only viable connection voltage for a project of this size is 132kV and it requires the construction of a new 132kV substation on-site.

4.23.5 The 99.9MW capacity which has been secured by the applicant, has taken the NPG electricity network to its maximum fault level. Therefore, no further distributed generation connections can be connected on to NPG's existing electricity network, within the locality at this time without further significant reinforcement works to the electricity network. The detailed Grid Network Constraints Report is presented at Appendix 4.3 (Document Ref 7.10 LC TA4.3). It should be noted how National Grid carry out periodic reviews of the network and this in turn may allow the applicant to secure a slightly higher export capacity at time of construction.

4.23.6 The 99.9MW capacity has also taken the National Grid Electricity Transmission electricity network very close to its network capability NGET has confirmed that upgrades to the 132kV switchgear and cabling at Keadby substation will be required at a budget cost of £22M. This will have a direct impact on the connection costs and timelines for future projects that have not already secured grid connection offers and may render them unviable in terms of cost and timescales. Accordingly, all energy scheme searches start with grid proximity and capacity availability with the incumbent, as this determines where a development can connect to the electricity grid.

4.23.7 Having established the point of connection, the development site itself was selected through an extensive site sieving exercise based on a range of technical, environmental and economic factors. Whilst each issue is important on its own merits, for nationally significant infrastructure projects each factor must be weighted and measured against other sustainability considerations.

- Solar irradiation levels & shading – An important consideration is selecting a site of suitable shape, orientation and size that can accommodate the proposed development. Large open fields without vegetated boundaries reduce the impact that small fields can have on the layout design. Typically, buffers are left around field edges to vegetation due to shading, tree root protection zones and other

constraints such as ditches which have an impact on the installed capacity of an array. So significantly less capacity can be sited within a group of smaller fields compared to fewer larger fields.

- Topography - The preference is for a site with a southerly aspect; however; northerly aspect sites cannot be dismissed. However, the outcome of selecting a site with a northerly aspect would be a need to increase the overall development footprint of the scheme (operational need to increase the distance between the arrays in order to avoid overshadowing of solar panels).

- Proximity to sensitive human receptors - This criterion requires an assessment of how the proposed development would relate to potentially sensitive human receptors on the site and in relation to neighbouring land uses including proximity to populated areas and or local villages.

- Site access during construction - In order to construct a large scale renewable led energy scheme, an appropriate access for construction vehicles must be available.

- Flood risk - Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. Solar panels are categorised as water compatible and may be sited in flood zones 1, 2 3a and 3b. However, the ancillary components (such as Inverters and Substations) are not water compatible. Accordingly, whilst it is acceptable for part of the site to be located within a higher flood risk zone; locating entire sites within such zones should be avoided.

- Landscape considerations - The landscape and visual effects of energy projects will vary on a case by case basis according to the type of development, its location and the landscape setting of the proposed development. For example, the landscape setting may be industrial in nature with a predominance of vertical features, or it may be dominated by individual developments of lesser scale.

- Agricultural land - Ground mounted solar parks are temporary structures and as such they do not lead to the sterilisation of agricultural land. Accordingly, unlike residential development they do not constitute permanent development resulting in the permanent loss of agricultural land. For ground mounted solar parks, national policy seeks to minimise impact on best and most versatile agricultural land except where this would be inconsistent with other sustainability considerations.

- Heritage - Historic environment - It is preferable for solar park sites to have low levels of archaeological interest and a lack of designated sites, such as scheduled monuments, listed buildings and conservation areas within or adjacent to the site. Assets within or adjacent to a development site could have an impact on the location and design of an array. Proposals should demonstrate that no substantial harm is caused to heritage assets; where there is an impact on heritage assets relevant mitigation measures should be considered to lessen impact.

- Biodiversity and geological conservation - When assessing a potential solar park site, national and international nature conservation designations such as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar wetland sites and nature reserves are generally avoided as site locations. Areas adjacent to such designations may have potential for development depending on the nature of the designation and of the land potentially subject to development.

- Commercial Agreement with the Landowner(s) - In order to implement a solar park development, the agreement of the landowner(s) is required. Commercial terms have been agreed with the landowner(s) for the construction and operation of a solar and battery energy storage system on the land.

4.24 REQUIREMENTS

4.24.1 The application includes various outline management plans and documents that are intended to be detailed and finalised post-consent and these would be secured through the discharge of various proposed requirements. The suggested requirements are laid out in the draft Development Consent Order (Document Ref 3.1 LC DCO), these cover: -

- Time limit to implement development
- Expiry of development consent
- Decommissioning and site restoration
- Phases of authorised development - The authorised development must not be commenced until a written scheme setting out the phases of construction of the authorised development has been submitted to and approved by the local planning authority
- Detailed Design Approval - No phase of the authorised development may be commenced until written details of the following for that phase have been submitted to and approved by the local planning authority
- Battery Safety Management Plan (BSMP)
- Construction Environmental Management Plans (CEMPs)
- Construction Traffic Management Plan (CTMP)
- Landscape and Ecological Management Plan (LEMP)
- Construction hours
- Surface and foul water drainage details
- Archaeology
- Protected Species - No work to commence in any phase until final pre-construction survey work has been carried out for that phase to establish whether a protected species is present on any of the land affected, or likely to be affected, by the authorised development or in any of the trees to be lopped or felled as part of that state of the connection works.
- Temporary diversion to public footpath - Not to commence the authorised development or any decommissioning until a public rights of way management plan for any sections of the public rights of way footpath 214 proposed to be temporarily closed and diverted on the temporary diversion of public footpath plan has been submitted to and, approved by the local planning authority.
- Amendments to approved details - Any amendments to or variations from the approved details must be in accordance with the principles and assessments set out in the environmental statement. Such agreement may only be given in

relation to immaterial changes where it has been demonstrated to the satisfaction of the local planning authority or that other person that the subject matter of the agreement sought is unlikely to give rise to any materially new or materially different environmental effect from those assessed in the environmental statement.