

CHAPTER 3: DETAILS OF THE VARIATION

THE APPLICATION

3.1 In 2011 Ecotricity submitted an application, under section 36 of the Electricity Act 1989 to install and operate an electricity generating station with a capacity of over 50MW (together with deemed consent pursuant to s.90 of the Town and Country Planning Act 1990 (the TCPA)). Following an Environmental Impact Assessment the development was defined more specifically as:

A wind energy development comprising the erection of up to twenty two wind turbines, each with a maximum overall height of up to 125m together with access tracks, crane pad areas, electricity sub-station, temporary construction compound, amended vehicular access on agricultural land at Heckington Fen, near East Heckington.

3.2 This application seeks to vary the consent granted in February 2013 under section 36 of the Electricity Act (and deemed planning permission under s. 90 of the TCPA). The original consent is presented in **Appendix 1.1**. The amendments sought to the Development are:

- *Amending the onsite access track along two sections within the Development Site and an allowance for micro-siting as set out in **Figure 3.1**;*
- *Relocating and increasing the footprint of the onsite substation, including relocating the temporary construction compound to an area of existing hardstanding, providing temporary auxiliary crane pad areas and an underground cabling corridor from the turbines to the onsite substation as set out in **Figure 3.1**;*
- *Amending the turbine rotor diameter from 90m, as indicated on the consented Site Edged Red plan (4038_A0085_03), to a maximum rotor diameter of up to 103m and a 10 metre radius micro-siting allowance around each turbine location where onsite constraints allow as set out in **Figure 3.1**;*
- *The following amendments to the original section 36 consent:*
 - *the wording of Condition 1 to substitute the words “drawing number 4038_A0085_03” with the words “Figure 3.1 and Figure 3.4”;*
 - *the wording of Condition 5 to read: ‘No construction of a wind turbine shall commence unless and until a Radar Mitigation Scheme has been submitted to and approved in writing by the Secretary of State, having consulted with the Ministry of Defence and NATS (En Route) plc, to address the impact of the wind farm upon air safety’;*
 - *the wording of Condition 7 to remove the words “shown on Figure 4.1” at the end of the second sentence; and,*
- *The following amendments to the original section 90 planning permission:*
 - *In paragraph 8(1), amend the definition of “Environmental Statement” to read: “means the document entitled ‘Heckington Fen Wind Park Environmental Statement’ dated 20 July 2011 and supplemented by a document titled ‘Heckington Fen Wind Park Further Environmental Information Landscape Clarification’ submitted on 9 December 2011, together with the document entitled ‘Heckington Fen Wind Park Variation of Consent Environmental Statement’ dated [February 2015].”; and*

- *In paragraph 8(1), amend the definition of “Site” to substitute the words “on Figure 3.4: Site Edged Red” for the words “on drawing number 4038_A0085_03”.*

3.3 The proposed variations set out above are necessary for a range of reasons:

- The onsite access track is proposed to be varied along two sections for the purpose of utilising existing agricultural tracks, to reduce the amount of permanent arable land loss and to minimise disruption of current agricultural practices on the land. An allowance for micro-siting is also proposed to ensure some flexibility in agreeing bye-law consent with Black Sluice Internal Drainage Board for access tracks close to drains, to allow some flexibility for ground conditions and to allow for underground cabling alongside the access tracks;
- The onsite substation is to be increased in size due to the necessity for an onsite 132kV substation rather than a 33kV control building as discussed with Western Power Distribution. Due to the increase in size it is proposed that the substation is moved away from the A17 and residential properties to minimise the visual impact of the substation. As the land to the north of the development site is lower than the south, a compromise between reducing the visual impact of the substation by moving it away from sensitive receptors and ensuring that the substation can be sufficiently protected from potential flooding has been made. The new location of the substation offers existing woodland screening and the potential for further screening as is proposed. Underground cabling from the turbines to the relocated onsite substation is also proposed;
- The temporary construction compound is to be relocated to an area of existing hardstanding to reduce the temporary loss of agricultural land and to take advantage of the existing woodland screening afforded by the new location;
- Temporary auxiliary crane pad areas are also proposed due to the potential that the chosen turbine model may require a secondary crane to assist with the turbine construction;
- The turbine rotor diameter is proposed to be increased from 90m to a maximum rotor diameter of up to 103m to maximise the renewable energy generation from the proposed development without increasing the overall tip height, number of turbines or locations of turbines. A 10 metre radius micro-siting allowance around each turbine location where onsite constraints allow, is also proposed to allow for minor alterations in the final constructed turbine location due to particular ground conditions that may be encountered during the construction phase;
- The wording of Condition 1 is to be amended to refer to revised plans reflecting the proposed variations set out above;
- The wording of Condition 5 is proposed to be amended to allow the discharge of this condition prior to the installation of the turbines, as opposed to the requirement for its discharge prior to commencement of the development. As the scheme is required to mitigate the potential impacts of the turbines on the Watchman Primary Surveillance Radars at RAF Coningsby, RAF Waddington and the air traffic control operations of the MOD, plus the Primary Radar Installations at Claxby and the air traffic management operations operated by NATS (En Route) plc, the requirement for the scheme to be agreed prior to the erection of the turbines should still provide the necessary protection, while still allowing the proposed development to be commenced;
- Condition 7 is proposed to be amended to allow flexibility on the number of ‘remaining turbines’ referred to in this paragraph; allowing for a reduced number of turbines requiring 25

candela omni-directional aviation lighting or infrared aviation lighting, should the 18 or 19 turbine schemes be taken forward.

- The definition of the “Environmental Statement” within paragraph 8(1) of the deemed permission is to be amended to reflect the Variation of Consent Environmental Statement provided as part of this application; and
- the definition of “Site” is to be amended to refer to the revised red line plan as a result of the proposed variations.

3.4 **Figure 3.1: ‘For Approval’ Site Layout Zone Plan** shows the positioning of the turbines (which have not changed as shown in **Table 3.1**) and ancillary works. These are presented within appropriate buffer zones which allow for some micro-siting as described below.

- **Turbine zone** – turbine locations are based on the original grid referenced locations, with a 10 metre radius micro-siting buffer applied where this would not impinge on the onsite constraints identified in **Figure 4.1**. This micro-siting buffer allows for minor alterations in the final constructed turbine location due to particular ground conditions that may be encountered during the construction phase. In each of the technical assessments this turbine micro-siting buffer has been considered and assessed where appropriate.
- **Turbine construction zone** – the turbine construction zones are based on the indicative crane pad areas, temporary auxiliary crane pads and temporary turning heads for each turbine. Given the 10m radius micro-siting buffer applied for the turbine locations, a similar 10m micro-siting buffer is also applied to the turbine construction zone in the event that a turbine should move slightly at the construction phase, subject to the onsite constraints identified in **Figure 4.1**. In each of the technical assessments this turbine micro-siting buffer has been considered and assessed where appropriate.
- **Construction compound and substation zone** – a 10 metre micro-siting buffer has been applied around the onsite substation to allow for minor alterations in the final constructed substation due to particular ground conditions that may be encountered during the construction phase. A micro-siting buffer is not considered around the temporary construction compound due to the proximity of woodland and a pond in this location.
- **Access and cabling zone** – a 10 metre micro-siting buffer has been applied to either side of the onsite access tracks where appropriate, to accommodate the underground cabling route which will run adjacent to the access tracks. In some cases the cabling route will run at the edge of the field, such as between T20 location and the onsite substation. Where ditches or drains are adjacent to the access track this micro-siting buffer has been removed or reduced as indicated on **Figure 3.1**. In each of the technical assessments this turbine micro-siting buffer has been considered and assessed where appropriate.

3.5 **Figure 3.2: Indicative Site Layout Plan** shows the indicative positioning of the turbines and ancillary works indicating permanent and temporary infrastructure. **Figure 3.3: Site Layout Comparison Plan** compares the original consented site layout with the new proposed indicative site layout. **Figure 3.4: Site Edge Red Plan** outlines the application site in red and the extent of the site boundary adjoining the application site in blue. **Figure 3.5: Indicative Elevation Plan** compares an elevation drawing of a candidate wind turbine for this variation of consent application against an indicative wind turbine consented in the original application.

3.6 **Figure 3.6** provides indicative details of the turbine foundations and **Figure 3.7** illustrates an indicative 132kV sub-station (actual sub-station dimensions will depend on the Distribution Network Operator’s requirements at the time of connection).

3.7 The proposed turbines will be located at the same grid co-ordinates published in the original ES. For completeness, the same grid references are listed in **Table 3.1**.

Table 3.1: Turbine grid references

Turbine	Easting	Northing
1	519572	346370
2	519586	346048
3	519600	345643
4	519920	345963
5	519933	345564
6	519983	345205
7	520210	346312
8	520237	345901
9	520257	345556
10	520260	345116
11	520622	346522
12	520609	346171
13	520631	345770
14	520597	345416
15	520596	345008
16	520981	346391
17	520979	346055
18	521052	345766
19	520933	345357
20	520902	344899
21	521420	345863
22	521297	345450
Site Centre	520462	345745

SITE DESCRIPTION AND CONTEXT

The Site

- 3.8 The proposed application site is located on agricultural land within a 604ha land holding which comprises of mainly arable crops with some limited grazing. The land holdings are bound to the south by the A17, to the east by Holland Dike, to the North by Head Dike and to the east by Sidebar lane. The development area lies between 0m - 3m AOD.
- 3.9 The main access point will be provided from the A17, 340m west of East Heckington Village, where a new access track will be constructed to facilitate onsite access, as shown in **Figure 11.1**. There is one public right of way within the site boundary. There will be no direct impact on this right of way.
- 3.10 The application site does not lie within any Areas of Landscape Importance and there is no Site of Special Scientific Interest (SSSI) or other ecology designations within the development site boundary.
- 3.11 The application site falls within an area designated by a 1 in 100 year flood zone as identified by the Environment Agency flood map.

The Surrounding Area

- 3.12 In general the area surrounding the application site is flat, being generally between 0 - 5m AOD, and is comprised of agricultural land and drainage ditches, dikes, and scattered settlements.
- 3.13 The village of East Heckington is located 1km south from the nearest proposed wind turbine while the town of Swineshead is 5km to the south east, Heckington 5.2km to the west and South Kyme 4km to the north. An 11/33kV overhead power line runs across the landholdings roughly following the southern boundary parallel to the A17 and another on the northern boundary running northeast / southwest. The closest residential properties are Mill Green Farm to the north, College Farm and Catlins farm to the east, Glebe Farm and properties along sidebar lane to the West and an assortment of farms and residential properties to the south. The nearest property is Home Farm to the south at approximately 998m from the nearest turbine.

WIND SPEED

- 3.14 The predicted Annual Energy Production (AEP) of the site has been calculated using a number of data sources. The average mean wind speed of the site is calculated at 7.5 metres per second at 80m height, based on the actual wind speeds collated from the temporary meteorological mast present on the site between December 2009 and August 2011.

THE WIND TURBINES

- 3.15 Three candidate turbines are considered for this Environmental Statement. The physical characteristics for all three are very similar as shown in **Table 3.2** below.

Table 3.2: Turbine Options

Item	Specification		
	Enercon	Siemens	GE
Manufacturer	Enercon	Siemens	GE
Model	E-101	SWT-101	GE-103
Rated Capacity	3.05 MW	2.3 MW	2.85 MW
Hub Height (to centre)	74.5m	74.5m	73.5m
Rotor Diameter	101m	101m	103m
Overall Tip Height	125m	125m	125m

- 3.16 In terms of considering the candidate turbines for this Environmental Impact Assessment, **Table 3.3** shows which turbine(s) have been evaluated in each specific assessment and the justification for each.

Table 3.3: Assessment against candidate turbine(s)

Assessment	Candidate turbine(s)	Justification
LVIA	GE-103 (but based on up to 22 turbines)	Largest rotor diameter was used to assess potential additional landscape and visual impacts, as it was felt this represented the worst case scenario given the scope of the assessment.
Cultural Heritage	GE-103 (but based on up to 22 turbines)	Largest rotor diameter was used on the Cultural Heritage photowirelines presented in Figure 6.1, as it was felt this represented the worst case scenario from these two viewpoints.
Ecology	SWT-101 E-101 GE-103	All three candidate turbines were considered.
Ornithology	SWT-101 E-101 GE-103	All three turbines considered given the expected differences in potential collision risk rates. Note that indicative 18-turbine and 19-turbine layouts were considered for the GE and Enercon layouts. A 22-turbine layout was considered for the Siemens layout.
Noise	SWT-101 E-101 GE-103	All three turbines considered given the slight differences between turbines in noise generation. Note that indicative 18-turbine and 19-turbine layouts were considered for the GE and Enercon layouts. A 22-turbine layout was considered for the Siemens layout.
Transport & Access (Miscellaneous)	GE-103 (but based on up to 22 turbines)	Largest blade length was used for the Swept Path Assessment figures.
Shadow Flicker (Miscellaneous)	GE-103 (but based on up to 22 turbines)	Largest rotor diameter was used for the shadow flicker analysis, representing the worst case scenario.
Hydrology (Miscellaneous)	Based on generic 22	No changes to the rotor diameter of the turbine are expected to affect hydrological, geological or flood risk

Assessment	Candidate turbine(s)	Justification
	turbine layout	considerations on the site, therefore a 22-turbine layout is considered. No change is expected in the extent of the turbine foundations from the original application. Amendments to other site infrastructure is identified and considered.
Aviation (Miscellaneous)	Based on generic 22 turbine layout	No changes to the rotor diameter of the turbine are expected to affect aviation interests, therefore a 22-turbine layout is considered (note the maximum tip height remains the same).

- 3.17 **Figure 3.5** provides a comparison of the indicative elevation of the GE-103 candidate turbine against the consented elevation of the candidate Vestas V-90 turbine.
- 3.18 Consideration of the grid capacity available at the Bicker Fen substation, as well as the expected noise levels identified within **Chapter 9: Noise**, has limited the various turbine layouts for each candidate turbine to those presented in **Table 3.4** below.

Table 3.4: Candidate Turbine Layouts.

Item	Specification		
	Scenario 1	Scenario 2	Scenario 3
Manufacturer	Enercon	Siemens	GE
Model	E-101	SWT-101	GE-103
Number of Turbines	18	22	19
Total Rated Capacity	54.9MW	50.6MW	54.15MW

- 3.19 All information contained within the EIA is based upon the candidate turbine(s) and layout(s) presented in **Table 3.3** above. Where there could be potentially significant differences between the three candidate turbine layouts presented in **Table 3.4**, all three layouts have been considered. This approach applies to the Noise, Ecology and Ornithology assessments.
- 3.20 In the remainder of the technical assessments a 22-turbine GE-103 layout has been considered to encompass the largest number of turbines and the largest rotor diameter. This has ensured that all chapters within the EIA addendum encompass each turbine type and number of turbines, and each assessment considers the worst case scenario. Further information can be viewed in corresponding chapters 5 to 10 where relevant.

TECHNICAL DETAILS

- 3.21 The technical details provided in the original ES are all still relevant to the three candidate turbines and layouts considered as part of this Variation of Consent application.
- 3.22 All turbines will have the ability to be monitored remotely through a SCADA (Supervisory Control And Data Acquisition) system, a Global Satellite Monitoring (GSM) digital connection linked to the Ecotricity computer system.

- 3.23 As conditioned in the original consent (see **Appendix 1.1** - conditions 12 & 14), prior to the erection of any wind turbine, details of the colour and finish of all parts will be submitted for approval to the Local Planning Authority. This is also the case for the onsite substation.

Overall change in land take

- 3.24 The proposed amendments would result in an overall decrease in the permanent loss of arable habitat from an original 99,035m² to 83,650m² as shown on **Figure 3.3**.

On-site access tracks

- 3.25 It is proposed that the location of onsite access tracks will change as shown in **Figure 3.3**. This will result in a reduction in the area of arable habitat lost by 1.54 ha.

Ditch crossings

- 3.26 The minor changes in turbine and access tracks will increase the number of crossing of dry ditches from 15 to 16 but will not change the number of crossing of permanently wet ditches (**Figure 3.3**).

Crane Pads and substation

- 3.27 The area of land required for permanent crane pad will remain the same as the original layout but the substation will be moved to the east of the site and the area required will increase by 0.35ha. An underground cable trench up to 2m wide and 1.2m in depth will run alongside the existing Six Hundred Drove in the field edge and to the substation in its new location. The trench will be backfilled once the cables have been laid and therefore represent a temporary disturbance for approximately four weeks whilst the cables are laid. The existing Six Hundred Drove will be used to gain access to the substation, and therefore does not appear as part of this development. The substation will be screened with new woodland planting and new hedgerow covering 660m² (**Figure 3.3**).

Temporary infrastructure

- 3.28 The area for temporary infrastructure will increase by 0.5 ha due to an increase in the area of the construction compound and the potential need for temporary auxiliary crane pads depending on the final turbine selected. The temporary construction compound will now be placed within an area of bare ground screen by existing woodland in the centre of the site (**Figure 3.3**).

Overall change in land take

- 3.29 Although the proposed changes in layout will result in a temporary increase in land take of 0.5ha, overall the new layout will require 1.54 ha less of permanent land take assuming the 22 turbine layout. The land take will be less with the 18 turbine layout. There will be approximately 660m² of additional woodland planting and new hedgerow.

CONSTRUCTION

3.30 As detailed in the original ES, the construction process is based on a rolling timetable i.e. each turbine foundation is constructed in turn and turbine installation commences as soon as a foundation is prepared. This can be classified into four stages:

- Site enabling works and access
- Foundation construction
- Grid connection
- Turbine installation

3.31 It is anticipated that these construction stages may overlap, so there may be two or more phases in operation at any time.

3.32 Where a new amendment is proposed to the construction phase, this is identified by stating (*new*). Where the text is simply referring to the description of the construction phase from the original ES, this is identified by (*existing*).

Site enabling works and access

3.33 Enabling works at the site are required in order to facilitate delivery of the turbine components and cranes and to erect the turbines. As shown on **Figure 3.2** such works include a 20m x 40m crane pad area adjacent to each turbine position and a 5.5m wide access track linking the turbine positions with a total length of 10.4km, which will be allowed to grass over (*existing*). Accommodation has also been provided for an auxiliary crane pad at each turbine location should it be required (*new*).

3.34 Access onto the site will be obtained via a new access point from the A17 as set out in the original ES (*existing*). This location is shown on **Figure 3.1**. Internal access tracks are required in order to reach the turbine locations from this point but utilise existing farm tracks where possible (*existing*). Delivery of the turbine components will be onto site via the A1 onto the A17 from the west. The tuning radii of the abnormal loads delivering the turbine components is illustrated in **Figures 10.2 – 10.5**, which show a 'Swept Path Analysis'. This is a computer run assessment which shows the path the tyres of the abnormal loads will take and the path any wide loads will take. The access point design is illustrated in **Figure 11.8** of the original ES (*existing*).

3.35 A temporary construction compound will also be required to house machinery and materials, the location of which is shown on **Figure 3.1** (*new*). If required, full details of all temporary facilities required will be submitted to the Council, prior to the commencement of development.

Foundation construction

3.36 Foundation design is subject to a site specific design. No change is expected in the extent of the turbine foundations from the original application. A typical foundation design for a turbine of up to 3MW in size is square and measures approximately 16.2m wide and a maximum depth of 2.3m as shown in Figure 4.4 of the original ES (*existing*). As discussed in the original ES, the foundations may require piling given the reclaimed nature of the land but this would be subject to a detailed civil design which, along with an appropriate method statement can be submitted to the local planning authority prior to the commencement of the development (*existing*).

3.37 All other details presented in the original ES remain relevant to foundation construction in this Variation of Consent application.

Grid Connection

3.38 The cabling associated with this development will be underground and will connect the turbines with a new onsite 132kV sub-station located to the south of the turbines, adjacent to an existing agricultural access track as illustrated in **Figure 3.6** (*new*). Locally sourced bricks will be used for the proposed substation control building (see **Figure 3.7** for plan and elevation), to stay in keeping with the character of the surrounding area, subject to the District Network Operators (DNO) requirements (*new*). The sub-station will be designed by electrical and civil engineers to comply with all relevant High Voltage electrical regulations. An example of a 132kV substation at Ecotricity's Galsworthy Wind Park is shown on **Figure 3.8**.

3.39 The underground cables will be trenched at the edge of the proposed access tracks where possible. The cable trenches will measure approximately 0.6m x 1.2m deep. Up to four cable strings are likely to run adjacent to each other from T20 and into the substation compound (*new*). This cable trench is likely to be up to 2m wide and will be located in the field edge adjacent to the existing agricultural track as shown on **Figure 3.1** (*new*). The trench will be backfilled once the cables have been laid and therefore represent a temporary disturbance for approximately four weeks whilst the cables are laid (*new*).

3.40 No new overhead electricity pylons / poles and lines would be required between the turbines and the onsite substation, only the underground cabling described above (*existing*). A separate grid connection application is likely to be required to connect the Heckington Fen Wind Park to the existing Bicker Fen substation approximately 8km south of the proposed wind farm. The grid connection of the proposed scheme from the onsite substation to Bicker Fen is therefore outside the scope of this application.

3.41 All other details presented in the original ES remain relevant to grid construction in this Variation of Consent application.

Turbine Installation

3.42 Delivery of the turbine components and cranes involves access to the site by abnormal loads. As a result, a police escort will be required and an abnormal load certificate obtained for some parts of the delivery. As such, approval will be gained from the Police and Highways Authority for access purposes. The turbine parts will be delivered to the UK from factories in Europe via the nearest appropriate coastal port on routine roll-on roll-off freight transport ferries (*existing*).

3.43 The proposed timing of the construction and the resulting number of vehicle journeys is shown in Table 11.4 of the original ES, and is anticipated to be the same for this Variation of Consent application.

3.44 All other details presented in the original ES remain relevant to foundation construction in this Variation of Consent application.

DECOMMISSIONING

3.45 All details presented in the original ES in Chapter 4: Project Description remain relevant to decommissioning in this Variation of Consent application.