ARCUS

ALDEBY SOLAR PARK

ENVIRONMENTAL STATEMENT

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PREFACE

This Environmental Statement is submitted as part of a planning application made by Infinis Solar Developments Ltd for the installation of a ground mounted solar park with associated infrastructure on land at the closed Aldeby Landfill site, located approximately 1.2 km to the southeast of Aldeby and 400 m south of Burgh St Peter in Norfolk.

The Environmental Statement comprises this document, which includes:

- A Non-Technical Summary;
- Text, with chapters on:
    - Introduction, Methods and Scope;
    - The Development (including Alternatives)
    - Planning Policy Context;
    - Landscape and Visual Impact Assessment;
    - Ecology;
    - Traffic and Access;
    - Hydrology and Hydrogeology;
- Figures; and
- Technical Appendices.

A copy of the Environmental Statement including this Non-Technical Summary can be downloaded via the Norfolk County Council website. A hard copy can also be made available from Arcus Consultancy Services for £150 or on CD for £25.

Any comments on the Development or findings of the Environmental Statement should be directed in writing to Norfolk County Council (at County Hall, Martineau Lane, Norwich NR1 2SG), made online using the Council's Public Access system or by email to mawp@norfolk.gov.uk.

In addition, the following documents also accompany the planning application but do not form part of the Environmental Statement:

- Planning, Design and Access Statement, including the following technical reports:
    - Glint and Glare Assessment;
    - Tree Protection Plan.
- Planning Drawings 1-10.

NTS.1 NON-TECHNICAL SUMMARY

NTS1.1 Introduction, Methods and Scope

This is a Non-Technical Summary (NTS) of an Environmental Statement (ES) that identifies and assesses the likely significant effects of the installation of a ground mounted Solar Park with associated infrastructure (the Development) on the closed Aldeby landfill site in Norfolk (the Site).

The Site is located within the area of South Norfolk District Council as local planning authority and Norfolk County Council (NCC) as Mineral and Waste Authority. Due to the location of the Site on Aldeby Landfill, the application is to be considered by the Minerals and Waste Authority – NCC. The Broads is located adjacent to the south of the Site.

The Development consists of the construction of a solar park which includes the following elements: solar PV modules on ground mounted metal racking, DNO switching station, client switching stations, battery containers, general spares container, access track, fencing, security cameras, cabling and landscaping.

The construction period would be approximately 4 months and planning permission is sought for a temporary operational period of 35 years. The Site would be fully decommissioned and restored at the end of the time period for the temporary planning permission.

The Environmental Statement is the documented outcome of the Environmental Impact Assessment (EIA) process, undertaken to identify and assess the likely significant effects of a proposed development on the environment and to identify measures to mitigate or manage significant adverse effects.

This ES has been prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, following a request for a Screening Opinion from NCC. This Screening Opinion (included in the ES as Technical Appendix 1.1) set out that the Council considered that effects of the Development on The Broads which lie adjacent to the south of the Site had the potential to be significant. Consequently, this ES assesses Landscape and Visual, Ecology, Traffic and Access, Flood Risk Assessment and Hydrogeological effects arising from the Development. Other environmental assessments and sensitivities are detailed within the separate Planning Design and Access Statement and associated technical reports.

The process of gathering environmental information is derived from a systematic process of identification, prediction and evaluation of potential effects, comparing the scenario including the Development to the default scenario, were the Development not to go ahead. The likely effect that the Development may have on each receptor is influenced by a combination of the sensitivity of the receptor and the predicted magnitude of change from the baseline conditions (either positive/beneficial or negative/adverse).

Where significant effects are identified, mitigation is proposed, where possible, to reduce or prevent the likely significant negative effects occurring. Residual effects are the effect that remains after the mitigation has been taken into account.

Cumulative effects have also been assessed, which take into account other developments in the area which could lead to additional effects in combination with the Development.

The ES has been prepared by competent authors, as required by the EIA Regulations.

Interaction and accumulation of effects and transboundary effects are scoped out of the EIA as are effects from major accidents and disasters.

NTS1.2 The Development

The Development comprises the following:

NTS1.2.1 Solar PV Array

Rows of solar panels known as strings, which are dark in hue and recessive in the landscape. The panels or modules are composed of photovoltaic cells and are designed to maximise the absorbency of the sun's rays and minimise solar glare. Each string of panels would be mounted on a rack comprising metal poles anchored to the ground via concrete footings of shallow piles. Panels are typically tilted 10 to 25 degrees from the horizontal to face south towards the sun. Moreover, there is usually a distance of 2-6 meters between strings of panels in order to avoid inter-panel shading but this distance is influenced by slope and aspect.

The panels would be mounted at approximately 0.8 m from the ground at the lowest point (the southern edge) rising to approximately 2.6 m at the highest point (the northern edge), although the anticipated maximum height could be up to 3 m to account for variations in slope and aspect at the Site.

NTS1.2.2 Associated Infrastructure

The scale of the associated infrastructure is as follows:

- DNO switching station container - up to 10 m length x 3.5 m height x 2.5 m width;
- Client side switching station – up to 6.1 m length x 3 m height (this includes a plinth of 0.35 m above the ground level) x 2.5 m width;
- Two battery storage containers – 12.2 m length x, 2.6 m height x 2.5 m width;
- One general storage container – 12.2 m length x 2.6 m, height x 2.5 m width;
- 2 m high security fence;
- Gate height 2 m and width 3.1 m;
- CCTV cameras located on 3 m high poles; and
- Access tracks – 3.5 m wide.

NTS1.2.3 Access

Access would be via the existing landfill site access point off Common Road to the west, providing connectivity to Rectory Road and the A143 via Dun Cow Road.

The existing access road within the site boundary has been utilised by HGVs throughout the operation of the landfill site and is therefore suitable for use by construction vehicles. This would minimise the requirement for new tracks. Where necessary, internal stone access tracks will be provided to enable construction and maintenance of the Development.

Full details of the access arrangement, including routing to Site, traffic numbers and construction programme and outline traffic management measures are presented in the Transport Statement that forms part of the planning application.

NTS1.2.4 Landscape and Biodiversity Enhancement Strategy

The landscape proposals for the Site have been designed to preserve and enhance the existing landscape features, to screen views of the solar panels from outside the Site and to enhance the biodiversity and habitat value of the Site.

The Development includes:

- Hedge planting (with a percentage of native evergreens such as native yew and holly) interplanted within existing vegetation to infill gaps and reinforce the existing boundary vegetation and soften and filter the limited views to Site. Planting is concentrated along the access track in the south west near College Cottages and provides green linkages to the fenland landscape to the south.

- Other measures incorporated with the Development to improve its biodiversity value include:
    - The retention of the existing grassland under the solar panels with a graded edge with scalloped bays to boundary hedgerows; and
    - Logs and brushwood produced during woodland management operations may be used to provide biodiversity enhancements such as log piles and hibernacula.

These measures would also help to improve local biodiversity and landscape character.

NTS1.2.5 Site Selection

The purpose of the Development is to harness solar power to generate electricity. The design of a solar development must also take account of potential environmental effects and so strikes a balance between energy yield and minimising environmental effects.

The Site comprises previously disturbed land which is currently in use for energy generation in the form of Captured Landfill Methane (CLM) extraction, which is to continue for the lifetime of the Development. The Development would therefore complement the existing use of the Site and would maximise the benefits of energy generation at the Site. It utilises existing infrastructure to broaden the electricity generation potential of the closed landfill site. The Applicant has a portfolio of CLM electricity generation sites throughout the UK, and has reviewed the suitability of the landfill sites where these are located for solar development.

Not every site will be suitable for accommodating solar, and therefore the Applicant has been through a thorough feasibility exercise to assess the suitability of the Site. The potential for installing a solar development at the Site has been assessed through feasibility work, which assessed technical and environmental issues to identify development sites and then derive the most appropriate scale and infrastructure layout.

NTS1.2.6 Design Rationale

The use of the former landfill site helps to ensure that the environmental impacts of the Development are minimal. The Development would not interfere with the landfill cap, remaining at surface level. Furthermore, the layout has been designed to avoid impacts on CLM infrastructure which is present on the Site.

The Development makes use of an otherwise sterilised site and results in no loss of agricultural land etc. Given the former use as a landfill site and the current CLM electricity generating station, infrastructure for both access and grid connection are already in place ensuring less disruption in the construction of the Development (compared to a green field site). The Development is also fully reversible and the Site would be reinstated in accordance with the agreed landfill restoration plan following the temporary lifetime of the Development (35 years).

The layout and design process of the Development was an iterative one informed by consideration of a variety of environmental and technical assessments, professional advice from consultants and the pre-application and EIA Screening response received from NCC. This included the layout of the solar arrays but also ancillary infrastructure including switching stations, battery containers and access tracks. The final design of the Development is a careful balance between addressing site constraints, minimising environmental impact and ensuring commercial viability.

NTS1.2.7 Development Design Considerations with Landfill Restoration

The Site is situated on the closed Aldeby landfill site which is subject to an approved restoration plan which is currently in the process of being implemented. The Development

would defer the implementation of the affected area of the restoration plan for the lifetime of the Development. Upon decommissioning of the Development, the restoration plan would be re-implemented. The amendment to the timing of the restoration would be implemented via a separate Section 73 application which will be made to vary the restoration scheme (as approved under application C/7/2018/7007, drawing no 601R294) to defer the implementation of the approved restoration plan for the area of the Site.

NTS1.2.8 Need for the Development

The need for the Development is underpinned by national and international commitments on climate change, policy objectives, electricity market reform and industry drivers.

To address these objectives and meet the emissions reduction targets, the electricity being consumed will need to be almost exclusively from low carbon sources. Therefore, a new low carbon energy mix is required which is reliable, secure and affordable.

If consented, the Development would contribute to the delivery of these policy objectives, diversify the energy mix and facilitate the transition to low carbon energy, whilst decreasing the dependency on fossil fuels. Due to rapid advances in technology, solar PV is one of the most cost-effective sources of energy, leading to more affordable and secure energy supply to consumers.

Solar energy generation does not require fossil fuel use during generation, and although there is variability in the amount and timing of sunlight over the day, season and year, a properly sized and configured system can be designed to be highly reliable. In the case of the Development, the proposed array of approximately 7MW would generate approximately 6,633 megawatt hours per year ('MWh/yr') which would offset the annual electricity usage of approximately 1,400 homes in South Norfolk[1].

NTS1.3 Planning Policy Context

The process for determining the planning application under the Town and Country Planning Act can be defined as:

- Identification and consideration of the key provisions within the Development Plan;
- Clarification of whether the Development is in accordance with the Development Plan;
- Identification and consideration of relevant material considerations; and
- Conclusions on whether planning permission is justified.

The National Planning Policy Framework (NPPF) was first published in March 2012 and has since been revised on two occasions, most recently February 2019. It sets out the UK government's planning policies for England and how these are to be applied. The NPPF reiterates that applications for planning permission must be determined in accordance with the Development Plan, unless material considerations indicate otherwise. The NPPF also identifies that national planning policy is a material consideration when making decisions on planning applications.

Due to the landfill properties of the Site the Development will be determined by the Minerals and Waste Authority – Norfolk County Council and therefore the most relevant Development Plan for the Site consists of Core Strategy and Minerals and Waste Development Management Policies Development Plan Document, adopted in September 2011.

[1] The equivalent number of homes supplied has been obtained from *Regional and Local Authority Electricity Consumption Statistics* (Department for Business, Energy & Industrial Strategy, Updated 19 Dec 2019) (available online at: https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics [accessed 27/11/2020]), using the average household energy use for South Norfolk and annual generation estimate calculated by Infinis.

At a local level, the Site falls within the jurisdiction of South Norfolk Council. Therefore, although less relevant than the NCC Development Plan, the development plans for the local council are also briefly considered.

NTS1.4 Landscape and Visual Impact Assessment

NTS1.4.1 Introduction

A Landscape and Visual Impact Assessment (LVIA) has been undertaken and is contained in Chapter 4. The LVIA includes the following:

- Baseline surveys and site visits;
- Desk-top analysis and computer modelling;
- Viewpoint photography to inform the assessment;
- Assessment surveys and site visits;
- Residential visual amenity survey and assessment; and
- Written analysis of the landscape and visual impact of the Development.

The LVIA assesses the effects of the Development upon landscape receptors i.e.:

"…the constituent elements of the landscape, its specific aesthetic or perceptual qualities and the character of the landscape."

And visual receptors i.e.:

"…the people who will be affected by changes in views or visual amenity at different places."[2]

The LVIA uses a structured method that combines both objective assessment and subjective assessment (or professional judgement).

The core study area extends to a 2 km radius from the Site. This is based on potential visibility of the Development, which is likely to be limited due to its low height combined with the landform of the area and screening afforded by hedgerows, trees and wooded areas to the boundaries of the Site and across the wider area.

NTS1.4.2 Nature of Effects

Construction Effects

Overall, the effects of construction on landscape resources will be restricted to small geographical areas within the Site and will not result in the removal of any important landscape features such as hedges and hedgerow trees. The effects will be relatively localised.

The visual effects of construction will be limited to visibility of construction activities with such effects being of short duration.

Operational Effects

Effects on landscape resources during the operation of the Development relate primarily to a change in land-use from former landfill subject to aftercare to grassland with solar panels and ancillary development. This will have a physical effect on the Site which, in turn, will affect the overall character of the Site. The Development will also potentially affect aesthetic and perceptual aspects of landscape character where it is experienced from the surrounding landscape.

[2] Landscape Institute and Institute of Environmental Management and Assessment, 2013, *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition, Routledge, London. Paragraph. 3.21, page 36.

The effects of operation are assessed at Year 1 and Year 15 when the landscape enhancement measures will have become established. These measures will help to soften the appearance of the Development and integrate it with the wider landscape.

Decommissioning Effects

Potential effects arising from the decommissioning of the Development at the end of its operational phase will be limited to construction activities required to dismantle the solar panels, inverters, substations and other above ground features.

NTS1.4.3 Assessment of Effects

The assessment has set out the landscape and visual impact of the Development, and key landscape and visual attributes and sensitivities. Landscape proposals are suggested which in combination with the existing approved embedded landscape restoration proposal may mitigate these impacts. The previous use of the Site combined with the limited height of the Development and the very high degree of containment afforded by boundary vegetation ensure that effects are small in magnitude and restricted to the Site and its immediate setting.

Landscape Effects

The Site is of low sensitivity, but the surrounding local landscape is assessed as being of high to moderately sensitive to development due to its location within the immediate setting of The Broads. There would be a perceived change to the National Character Area (NCA)/ Local Landscape Character Area (LLCA), but the magnitude of this would be barely discernible as an indirect landscape effect. Impact on the landscape characters of the Thurlton Tributary Farmland with Parkland has been evaluated as negligible adverse and the Aldeby to Burgh St Peter LLCA is assessed as minor adverse reducing to negligible with mitigation.

The Development would not detract from the existing high value landscape quality, features and characteristics of The Broads National Park. The magnitude of change arising from the Development within The Broads National Park would be minor adverse reducing to negligible within the designated area in comparison to the current baseline situation. The Broads are appraised as having the capacity to accept the level of change that a Development of this nature would bring about without harm.

Visual Effects

The nature, scale, and form of the Development would inevitably result in some minor adverse effects on landscape character and on visual amenity. However, the previous use of the Site combined with the limited height of the Development and the high degree of containment afforded by existing boundary vegetation and in the surrounding area, ensure that effects are relatively small in magnitude and restricted to the Site and a small number of receptors.

The Development would introduce a new element into the landscape but is not deemed inappropriate in terms of scale or massing for this location. There is farming infrastructure within the Sites environs and the Site itself should be viewed in the context of its previous industrial use as a landfill site following quarrying activity. The Development would form an incidental component of glimpsed and filtered views from minor lanes and a few isolated properties. There would be a change in view, but this change, with mitigation, is not harmful in this analysis.

A mitigation strategy has been developed which aims to provide an enhanced interim restoration to the existing approved landfill restoration scheme. This will visually integrate the Development into the wider landscape and provide a landscape buffer to the limited views from the south.

NTS1.5 Ecology

NTS1.5.1 Introduction

Chapter 5 presents the ecological baseline conditions informed from a combination of surveys and desk study information and an assessment of potential ecological impacts from the Development, taking into account relevant planning policy and legislation.

NTS1.5.2 Nature of Effects

The Site is located 800 m north of a number of nationally and internationally designated ecological sites, including Broadland Special Protection Area (SPA) and Ramsar, The Broads Special Area of Conservation (SAC) and Barnby Broad and Marches Site of Special Scientific Interest (SSSI). The Site is also adjacent to the west of Boons Heath County Wildlife Site.

The majority of the Site comprised bare ground with small sections of short ephemeral/ perennial vegetation. Species-poor semi-improved grassland was present in the south and east of the ESA with a hardstanding compound and associated buildings in the far western extent. The surrounding landscape is predominately agricultural and distinctively flat. Given the majority of the Site was bare it classed as being of less than local value and had little potential to support protected species.

Assessment of effects on ecologically designated sites is the focus of the assessment with consideration also given to mitigation for other ecological receptors to ensure legal compliance.

NTS 1.5.3 Assessment of Effects

The survey, desk studies and subsequent assessment that have been carried out confirmed the following:

- There are several designated sites in the surrounding area, including the internationally important Broads SAC and Broadlands SPA and Ramsar.
- The Site has a limited range of low value habitats, all of which are the result of recent and ongoing landfill operations.
- The Site had limited potential to support protected and priority species; specifically, reptiles, Great Crested Newt (GCN), badger and bats.

Boon's Heath is designated due to its bracken-dominated heath on sandy soils, a habitat that is not present within the Site. Additionally, Boon's Heath is open for recreational use so experiences a baseline level of disturbance. Given the restricted and relatively low magnitude impacts arising from the construction of the Development, combined with the lack of clear ecological connectivity between the Site and Boon's Heath, no significant adverse effects are anticipated and no mitigation is required.

All other designated sites are sufficiently distant from, or lack ecological connectivity with, the Site, or are designated due to habitats and species not present within the Site and thus significant adverse impacts are extremely unlikely. Further details on potential impacts to statutory designated sites are detailed in Table 5.6 of Chapter 5.

An extended Phase 1 Habitat Survey was carried out of the Site which identified there were no additional protected species surveys required. In the absence of mitigation, the construction phase of the development has the potential to adversely affect some sensitive ecological features. These effects would be not significant but may, in some cases, constitute legal offences. Mitigation measures have been proposed for habitats, bats, great crested newts, reptiles, badgers and birds. Following the implementation of mitigation, no significant adverse ecological impacts or legal offences are predicted during construction. The habitat management prescriptions will compensate for the minor effects of habitat loss/disturbance and, in the long term, provide benefits to the ecological features considered in the assessment, which will constitute a net gain in biodiversity.

No significant effects, in terms of the EIA Regulations, are predicted.

NTS1.6 Traffic and Access

NTS1.6.1 Introduction

Construction of the Development will involve the installation of ground mounted solar PV array and associated infrastructure including inverters, a switching compound as well as fencing, security cameras, cabling, storage containers and access tracks. Vehicle movements to the Site will likely consist of heavy goods vehicles delivering materials and components, light goods vehicles and cars.

Vehicle movements to the site during the operation of the Development will comprise activities associated with inspection, monitoring and general site up-keep. It is anticipated that such visits will occur up to once per week on average and be via van or other similar sized vehicles and as such operational traffic effects are scoped out of the assessment.

In addition to operational traffic the following effects have also been scoped out of the assessment:

- Decommissioning effects
- Visual effects;
- Cyclist Amenity;
- Noise; and
- Air Quality

The proposed construction route to site is:

- Exit A143 onto Hollow Way Hill;
- Follow Hollow Way Hill for approx. 0.5 miles, continuing onto Beccles Road;
- Follow along Beccles Road for approximately 1.2 miles, continuing onto Rectory Road north of Aldeby;
- Continue on Rectory road for 0.2 miles;
- Turn right onto Common Road; and
- Continue along Common Road for approx. 1 mile, turning right at the Dun Cow Road Junction before reaching Site entrance.

All construction vehicles departing the Site will use Common Road before continuing straight onto Dun Cow Road towards Rectory Road.

NTS1.6.2 Nature of Effects

The key potential effects for the construction phase include:

- Traffic generation;
- Accidents and safety;
- Driver delay;
- Pedestrian and Cyclist amenity;
- Severance;
- Noise and vibration;
- Hazardous loads;
- Pedestrian delay;
- Visual effects; and
- Air quality.

NTS 1.6.3 Assessment of Effects

The Transport Statement (Technical Appendix A6.1) provides further details on the construction programme and the anticipated construction traffic associated with the Development. The construction period is expected to run for approximately 4 months. Approximately 7,458 two-way vehicle movements are expected to occur during this period for staff, and to deliver construction materials and components.

During the peak month of construction there are 2,132 two-way movements, which consists of 2,080 car movements and 52 HGV movements. Assuming a 26-day working month, this would equate to a maximum of 82 two-way vehicle movements per day which would consist of 80 car movements and 2 HGV movements on average.

In order to prevent the risk of obstruction of the delivery routes due to construction traffic it is proposed to implement a temporary one-way system. Additionally temporary traffic lights would be installed at the Dun Cow Road/Common Road junction in order to control access to the final section of Common Road towards the site entrance.

Final details of the traffic management procedures will be provided prior to the commencement of construction. These will be developed by the Principal Contractor or their appointed traffic management sub-contractor and would be agreed in consultation with Norfolk County Council Highways department prior to installation. It is anticipated that a number of temporary traffic regulation orders (TTROs) would be required in order to implement the proposed measures.

The following specific measures are provided as an outline of how the route could be managed, although it is anticipated that these will be refined and developed during the consultation process:

- Common Road to temporarily become one-way (southbound) from the Beccles Road Junction to Dun Cow Road Junction;
- Dun Cow Road to become temporarily one-way (northbound) from the Common Road junction to Rectory Road/Beccles Road;
- Temporary traffic lights to be located at the Dun Cow Road/Common Road/ Lily Lane Junction to control traffic on Common Road between this junction and the site entrance junction.

The effect of construction on traffic generation on Dun Cow Road and Common Road is considered to result in a negligible magnitude of change on a receptor of medium sensitivity. Thus, the effect of increased traffic on this route is considered negligible and not significant as per the EIA Regulations.

The roads on the access route are operating within acceptable safety parameters at present and in the absence of identifiable trends in RTCs or known accident hotspots, an increase in overall traffic flow or HGV composition is not sufficient to affect a change in safe operation of the road network. The effect of construction on accidents and safety is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on accidents and safety is considered minor and not significant as per the EIA Regulations.

NTS1.7 Hydrology and Hydrogeology

NTS1.7.1 Introduction

Chapter 7 presents the hydrological and hydrogeological baseline conditions informed from desk study information and an assessment of potential hydrological and hydrogeological impacts from the Development, taking into account relevant planning policy and legislation.

NTS1.7.2 Nature of Effects

The design of the Development has considered the sensitive nature of the Site, which is located close to The Broads, the River Waveney and on a part of the landfill which is uncapped and known as dilute and disperse.

Flood Risk

The Flood Risk Assessment (FRA) assesses the effect of the Development on flood risk for the following sources:

- Fluvial;
- Pluvial;
- Tidal;
- Groundwater; and
- Reservoirs.

The potential of any increase in surface water runoff and thus potential increase in vulnerability at receptors elsewhere has been considered in the design of the Development. The FRA outlines the implementation of native wildflower mix beneath the base of PV arrays to limit the potential of a concentration of surface water along the base of the racking system.

Groundwater Risk

The Groundwater Risk Assessment was undertaken to assess the impact of the Development on hydrological and hydrogeological receptors. It outlines two design options for the panel foundations (short piled anchor system or ballasted system). The short piled anchor system design option will only be selected where there is sufficient capping depth to ensure that the landfill cap is not penetrated. This consideration will ensure the integrity of the existing landfill cap will not be compromised and no pollutant pathways are created through the proposed infrastructure.

Good practice will be followed in all aspects of construction, operation and decommissioning specifically through a Pollution Prevention Plan (PPP) which will be incorporated into a final Construction Environmental Management Plan (CEMP) as part of any required planning conditions ahead of construction. The PPP will set out measures to be employed to avoid or mitigate potential pollution for all phases of the development, and will also include an Incident Plan to be followed should a pollution event occur. This plan will be produced following consultation and agreement with the Environment Agency (EA) and all appropriate personnel working on the construction site to be trained in its use. The Construction Project Manager will have specific responsibility for implementation of the CEMP.

Method statements will also be applied, which will follow the principles laid out in relevant CIRIA guidance and the principles of the archived EA Pollution Prevention Guidelines (PPGs).

NTS 1.7.3 Assessment of Effects

Flood Risk

The Development does not result in an increase in flood risk elsewhere and thus at receptors elsewhere, which are therefore scoped out of the assessment.

The existing landfill Development is a 'More Vulnerable' land use and thus a receptor of Medium sensitivity. The Development sits upon the capped areas of the Site and is classed as 'Essential Infrastructure' which shall be unoccupied, apart from ad-hoc maintenance personnel and is therefore a receptor of Low sensitivity.

The site-specific FRA assesses flood risk from all identified sources as Negligible to Low with no increase in flood risk as a result of the Development. This equates to a Negligible change of magnitude and therefore a Negligible residual effect. This is not significant in terms of the EIA regulations.

Groundwater Risk

The River Waveney is identified as a receptor with a 'Moderate' EA Quality classification and is therefore attributed a Medium sensitivity.

Groundwater underlying the Site is classified as a 'moderately productive aquifer' of the wider Anglian groundwater body, which is therefore classified as High sensitivity.

Potential pollutant pathways to the groundwater from the Development are from the supporting structures for the emplacement of the solar panels creating new routes for leachate to reach offsite receptors. The short pile anchor system requires at least 800 mm of capping soil above the capping layer, while the ballasted system comprises concrete 'shoes' that are at ground level. The short pile anchor system will only be used where the final capping depth is sufficient, which will be determined through a geophysical survey.

Embedded measures to manage chemical and sediment pollution, aligned with good practice, will be followed through construction, operation and decommissioning through a Pollution Prevention Plan (PPP) included within the Construction Environmental Management Plan (CEMP).

As a result of these measures the Development will not create any additional pollutant pathways at Aldeby landfill and will have a Negligible magnitude of change. Given the Medium (surface water) and High (groundwater) sensitivity of receptors, the residual effects are assessed as Negligible and Minor respectively. This is not significant in terms of the EIA regulations.

NTS1.8 Summary of Effects

There are no significant effects identified with regards to:

- Ecology
- Traffic and Access; or
- Hydrology or Hydrogeology

The principal landscape sensitivity is the proximity to the Broads, located adjacent to the south of the Site. The nature, scale and form of the Development will inevitably result in some effects on landscape receptors, specifically to the character of the Site which will be altered by the addition of solar panels and associated infrastructure across it.

The LVIA has set out the landscape and visual impact of the Development, and key landscape and visual attributes and sensitivities. Landscape proposals are suggested which in combination with the existing approved embedded landscape restoration proposal may mitigate these impacts. The previous use of the Site combined with the limited height of the Development and the very high degree of containment afforded by boundary vegetation ensure that effects are small in magnitude and restricted to the Site and its immediate setting.

In terms of landscape effects, the Development would not detract from the existing high value landscape quality, features and characteristics of The Broads National Park. The magnitude of change arising from the Development within The Broads National Park would be minor adverse reducing to negligible within the designated area in comparison to the current baseline situation. The Broads are appraised as having the capacity to accept the level of change that a Development of this nature would bring about without harm.

In terms of visual effects, the Development would introduce a new element into the landscape but is not deemed inappropriate in terms of scale or massing for this location. There is farming infrastructure within the Sites environs and the Site itself should be viewed in the context of its previous industrial use as a landfill site following quarrying activity. The Development would form an incidental component of glimpsed and filtered views from minor lanes and a few isolated properties. There would be a change in view, but this change, with mitigation, is not harmful.

1 INTRODUCTION, METHODS AND SCOPE

1.1 Introduction

This document is an Environmental Statement (ES) that is submitted as part of a planning application made by Infinis Solar Developments Ltd (the Applicant) for the installation of a ground mounted Solar Park with associated infrastructure (the Development) on the closed Aldeby landfill site in Norfolk (the Site). The ES identifies and assesses the likely significant effects of the Development.

A plan showing the location of the Site and extent of the Development (outlined in red) is provided as Figure 1.1.

The Site is located within the area of South Norfolk District Council as local planning authority and Norfolk County Council (NCC) as Mineral and Waste Authority. Due to the location of the Site on Aldeby Landfill, the application is to be considered by the Minerals and Waste Authority – NCC.

The Development consists of the construction of a solar park which includes the following elements: solar PV modules on ground mounted metal racking, DNO switching station, client switching stations, battery containers, general spares container, access track, fencing, security cameras, cabling and landscaping. A plan showing the layout of the Development is provided as Figure 1.2.

The construction period would be approximately 4 months and planning permission is sought for a temporary operational period of 35 years. The Site would be fully decommissioned and restored at the end of the time period for the temporary planning permission.

The Development would cover a site area of approximately 11.7 hectares (ha) and have a capacity of approximately 7 megawatts (MW), and so falls under the Town and Country Planning regime, as a result of this it is subject to the Town and Country Planning (Environmental Impact Assessment) Regulations 2017[3] (the EIA Regulations).

The ES is the documented outcome of the Environmental Impact Assessment (EIA) process, undertaken to identify and assess the likely significant effects of the Development on the environment and to identify measures to mitigate or manage significant adverse effects.

The ES assesses the potential effects of the Development on landscape and visual, ecology, traffic and transport and hydrology and hydrogeology; other potential effects are scoped out of the ES but are considered in a separate Planning Design and Access Statement which accompanies the planning application.

This chapter of the ES provides:

- A description of the location of the Development;
- The structure of the ES and the principal authors;
- A description of the EIA process and a summary of the requirements of the EIA Regulations for the Development;
- A description of the general methods used in the assessment of significant effects;
- A commentary on those aspects specified in regulation 4(2) of the EIA Regulations not likely to be significantly affected by the Development (elements scoped out of the EIA), including climate and major accidents and/or disasters; and
- A description of the relevant aspects of the current state of the environment (baseline scenario) and its evolution without implementation of the Development.

[3] http://www.legislation.gov.uk/uksi/2017/571/contents/made

1.2 The Location of the Development

The aspect of the land within the Site is predominantly south-facing and is therefore the optimal orientation for a solar PV array. The current landform on the Site rises to the north east from the southern boundary, rising from 15 m Above Ordnance Datum (AOD) to 28m AOD. This is relative to Ordnance Survey contour mapping of the wider area, which shows a 10 m AOD contour along the eastern section of St Mary's Road. The landform continues to slope down here towards sea level at 0 m AOD where the low-lying levels and marshes approach the River Waveney.

The Site is currently a closed landfill and prior to that was used for the extraction of sand and gravel. Waste is no longer accepted at the Site and the restoration scheme is ongoing.

Access to the Site would be proposed off Common Road to the west, providing connectivity to Rectory Road and the A143 via Dun Cow Road. Existing landfill access roads will be used wherever possible.

There are hedgerows with trees along the southern and eastern boundaries of the Site. Immediately north and west of the site is closed landfill with restoration activities ongoing. The landfill site boundary to the north and west is bounded by mature trees and woodland.

The Site is situated in rural countryside, with the extensively drained River Waveney valley to the south. The low-lying solar development would sit within the gently rolling landform, broken up by existing lines of mature trees. The Broads National Park is located adjacent to the south of the Site.

The Site surroundings are generally flat and low-lying, mainly agricultural. To the north is the remainder of the landfill site, followed by arable fields and a woodland area, then isolated properties and farms and the village of Burgh St. Peter. To the west is woodland and farmland, and a few residential properties (College Cottages) to the southwest of the proposed Site access. To the east is woodland and further agricultural land, with some isolated properties such as The Shrublands and Greys Cottages.

1.2.1 Structure of the ES

The structure of the ES and details about the authors and contributors to each chapter is set out in Table 1.1.

In line with regulation 18(5) of the EIA Regulations, the ES and all technical assessments have been undertaken by suitably qualified 'competent experts' within the project team, as identified by professional accreditations. Details of their relevant expertise is set out in Table 1.1.

Table 1.1 Structure of the ES and Contributors

Document		**Author / Contributors**	**Lead Author's Expertise**
Non-Technical Summary		Andrew Mott, Arcus Consultancy Services	Institute of Environmental Management and Assessment (IEMA) Registered EIA Practitioner
Chapter 1	Introduction, Methods and Scope	Andrew Mott, Arcus Consultancy Services	IEMA Registered EIA Practitioner
Chapter 2	Project Description	Andrew Mott, Arcus Consultancy Services Infinis Solar Developments Ltd	IEMA Registered EIA Practitioner

Document		Author / Contributors	Lead Author's Expertise
Chapter 3	Planning Policy Context	Liz Russell, Arcus Consultancy Services	Chartered Town Planner of Royal Town Planning Institute (MRTPI) and IEMA Associate
Chapter 4	Landscape and Visual Impact Assessment	Clare Horner, Arcus Consultancy Services	Chartered Member of Landscape Institute (CMLI)
Chapter 5	Ecology	Dr Mike Gray, Arcus Consultancy Services	Chartered Environmentalist (CEnv) and a Full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM)
Chapter 6	Traffic and Access	Tomos ApTomos, Arcus Consultancy Services	Member of the Chartered Institution of Highways and Transportation
Chapter 7	Hydrology and Hydrogeology	Liam Nevins, Arcus Consultancy Services	Chartered Water and Environmental Manager, CIWEM
Supporting Figures and Drawings			
Technical Appendices			

As detailed in Table 1.1 the ES has been compiled by experienced experts. An overview of their relevant experience is included below:

- Andrew Mott – EIA Coordinator – Associate Director at Arcus Consultancy Services Ltd and an IEMA Registered EIA Practitioner. Andrew has over 15 years' experience in environmental consultancy, specifically EIA for developments largely in the renewable energy sector, including solar. The EIA coordinator role is to produce the introductory chapters of the ES and to review and approve the technical assessments undertaken by competent experts.
- Liz Russell – Principal Planning Consultant at Arcus Consultancy Services Ltd. Liz is a chartered town planner with the Royal Town Planning Institute and IEMA Associate with over eight years' experience working in environmental planning with a focus on energy projects.
- Clare Horner – Landscape Architect - Associate Director at Arcus Consultancy Services Ltd and Chartered Landscape Architect with the Landscape Institute. Clare has over 20 years' experience in all aspects of landscape architectural work, focussing on landscape and visual impact. Experience includes extensive renewable energy sites, for wind, solar and battery storage.
- Dr Mike Gray - Mike is a skilled ecologist with over 20 years experience in the public, academic and private sectors. He is a Chartered Environmentalist (CEnv) and a Full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). As well as a range of field skills, Mike has acted as Ecological Clerk of Works for major developments and has provided Expert Witness at Public Inquiry. Mike is an accomplished practitioner of Ecological Impact Assessment (EcIA) and has undertaken EcIA for hundreds of developments, including many large-scale, high-profile and complex projects across the UK.
- Tomos ApTomos –Technical Director Engineering and Member of the Chartered Institution of Highways and Transportation, and has technically reviewed the traffic and transport elements of the EIA. Tomos has over 24 years experience in the design, management and delivery of infrastructure projects across the UK. He has prepared a large number of ES chapters for renewable development projects;
- Liam Nevins - chartered Principal Hydrologist and heads up the Hydrology Team at Arcus. His key roles are the production of Flood Risk Assessments, Drainage Strategies, and EIAs. Liam has had responsibility for a large number of Flood Risk

Assessments and Drainage Strategies for a range of development types across the UK, including those requiring EIA in the solar sector such as Cleve Hill Solar Park, the first solar farm to be granted Development Consent Order as a Nationally Significant Infrastructure Project.

1.3 EIA Requirement

1.3.1 The EIA Regulations

Environmental Impact Assessment (EIA) is a process undertaken to identify and evaluate the likely significant effects of a proposed development on the environment and to identify measures to mitigate or manage any significant adverse effects.

The requirement of the European Council Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, is transposed into law by The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the EIA Regulations).

Certain types of development require an EIA:

- For development described in Schedule 1 of the EIA Regulations ("Schedule 1 development") EIA is mandatory; and
- For developments of a type described in Schedule 2 of the EIA Regulations ("Schedule 2 development") EIA may be required if the development has the potential to give rise to 'significant' environmental effects by virtue of its nature, size or location.

If the Development is of a type described in Schedule 2, then two further criteria should be considered:

- If the proposed development is located in or partly located in a sensitive area for the purposes of the EIA Regulations; or
- If the proposed development exceeds the respective applicable threshold in Schedule 2.

1.3.2 The EIA Regulations as applied to the Development

Solar development is not listed in Schedule 1 of the EIA Regulations, which details development types where EIA is mandatory. There is also no express threshold for solar developments to be considered as Schedule 2 development under the EIA Regulations. However, a development area threshold of 0.5 hectares (ha) is applied to category 3 (a) industrial installations for the production of electricity. The Development exceeds this Schedule 2 area threshold of 0.5 ha and, as such, whether the Development is EIA development or not depends on an assessment against the screening selection criteria, as set out in Schedule 3 of the EIA Regulations, which comprise:

- The characteristics of the development;
- The location of the development; and
- The characteristics of the potential impact.

Due to the Development falling within Schedule 2, 3(a) of the EIA Regulations, an EIA Screening Opinion request was submitted to the Council on 16th November 2020 in accordance with the EIA Regulations. The Council confirmed on 29th December 2020 (Ref: SCR/2020/0005) that the Development would require an EIA.

In reaching this decision, the Council considered the characteristics and scale of the Development, site location and likely effects associated with the Development. The Council considered that the Development in certain circumstances has the potential to create a significant environmental effects and concluded that the EIA for the Development should focus on these matters. The EIA Screening Opinion is included in Technical Appendix 1.1.

1.4 Scope of the EIA

In order to comply with the EIA Screening Opinion, an EIA has been undertaken which focuses on potential effects on landscape and visual interests, ecology, traffic and transport and hydrology and hydrogeology. This ES has been prepared following the EIA process, and accompanies the planning application.

The results and findings of the EIA are presented in this ES. The environmental information presented is derived through a systematic process of identification, prediction and evaluation of the likely significant environmental effects of the Development.

Schedule 4 of the EIA Regulations requires that the following information is provided as a minimum a description of:

1. The development, including location of the development, the physical characteristics of the development, the land-use requirements during the construction and operational phases, a description of the main characteristics of the operational phase of the development;
2. The reasonable alternatives, and an indication of the main reasons for selecting the chosen option;
3. The baseline scenario;
4. The factors likely to be significantly affected by the development and a description of the likely significant effects of the development on the environment;
5. The forecasting methods or evidence used to identify and assess the significant effects on the environment;
6. The measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment;
7. The expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters; and
8. A non-technical summary of the aforementioned information.

Points 1 and 2 are covered in Chapter 2 of the ES. Points 3, 4 and 5 are described in Chapter 4. Regarding bullet point 6, measures embedded in the design of the Development are detailed in section 2.3 and any additional mitigation measures are detailed in the technical assessment presented in Chapter 4. Bullet point 7 is covered in section 1.4.10 and, in accordance with bullet point 8, the NTS is provided as part of the ES.

1.4.1 EIA Guidance

The preparation and production of this ES has been conducted in accordance with the latest Government regulations and advice on good practice, comprising:

- The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (SI 2017/571);
- PPG: Environmental Impact Assessment, last updated 6th March 2014[4]; and
- Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment) 2006[5].

Where additional guidance exists to inform an assessment for a particular technical area *e.g.*, landscape and visual, this is outlined in the relevant chapter of this ES.

Good practice advises that the EIA should be an iterative process rather than a single, post design, environmental appraisal. This approach has been adopted in respect of the Development. Where likely significant effects have been identified, the Development has been designed to avoid or minimise these as far as practicable within the parameters of

[4] https://www.gov.uk/guidance/environmental-impact-assessment

[5] IEMA (2006), Guidelines for Environmental Impact Assessment (2004) as updated. Institute of Environmental Management and Assessment: London

the project. This is referred to within this ES as 'embedded mitigation' i.e. mitigation which has been embedded within the project design. A summary of the design strategy is provided in Chapter 2: The Development.

1.4.2 Consultation

The aim of the consultation process is to identify key environmental issues at an early stage, to determine which elements of the Development are likely to result in significant effects on the environment and to establish the extent of survey and assessment required for the EIA.

Pre-application consultation has taken place with the Council to introduce the Development and to clarify the requirements of the proposed planning application, the technical assessments that the Council would expect to support an application of this nature, and the application process in general.

A pre-application consultation request (ENQ/2020/0028) was submitted to NCC in November 2020 with a virtual meeting held on the 19th November and formal written advice provided on the 15th January 2021. The meeting involved the Applicant, Arcus, the Council's planning officer and the landscape officer from The Broads.

In addition an EIA Screening Opinion Request was submitted to NCC on the 16th November 2020 with an EIA Screening Opinion provided on 29th December 2020, confirming that the Development comprised EIA Development and that an ES should accompany any planning application for the Development.

In January 2021 notification of the Development and proposed planning application was sent to the local parish council with the offer of a meeting to discuss the Development further and answer any questions.

1.4.3 Assessment of Effects

The potential effects[6] associated with the Development will be influenced by a combination of the sensitivity of the environment and the predicted degree of alteration (the magnitude of change) from the baseline position (both positive and negative). Environmental sensitivity may be categorised by a multitude of factors which is outlined in the methodology described in Chapter 4 of this ES. Within the technical chapter the criteria for assessing significance of effects is also made explicit.

The EIA Regulations require ES documents to identify where significant effects are likely to occur. For the purposes of environmental assessment, 'effects' are generally identified as being one of the following categories:

- Negligible - no detectable or material change to a location, environment, species or sensitive receptor;
- Minor - a detectable but non-material change to a location, environment, species or sensitive receptor;
- Moderate - a material, but non-fundamental change to a location, environment, species or sensitive receptor; or
- Major - a fundamental change to a location, environment, species or sensitive receptor.

Effects assessed as either negligible or minor are generally deemed to be not significant as per the EIA Regulations. Effects assessed as moderate or major are generally considered to be significant, however professional judgement is used to inform the final conclusion relating to whether an effect is significant as per the EIA Regulations. Chapter 4 of this ES

[6] Authors note: the term "impact" and "effect" are synonymous in this ES; for consistency, the term "effect" is used throughout.

sets out the specific threshold of significance relevant to the EIA undertaken to assess the effects of the Development.

1.4.4 Mitigation

Should the assessment identify significant adverse environmental effects, mitigation measures are proposed during the iterative design process in order to avoid, reduce or offset those effects, where appropriate. The most effective mitigation measures are those which avoid or prevent the creation of adverse effects at source. Such measures include design evolutions; for example, location of the PV array, location of electrical infrastructure. Measures also include best practice management and operational measures to avoid the impact. These measures are referred to as "embedded mitigation".

This strategy of avoidance, reduction and remediation is a hierarchical one which seeks:

- First to avoid or prevent significant adverse effects;
- Then to reduce those which remain; and
- Lastly, where no other remediation measures are possible, to propose appropriate mitigation to offset the impact.

These measures have been largely integrated into the overall design strategy as embedded mitigation rather than "added on" to the Development following finalisation of the design. By adopting a flexible and iterative approach to the design of the Development, the Applicant has been able to respond to the findings of consultation and environmental assessment work, and apply embedded mitigation measures accordingly.

1.4.5 Assessment of Residual Effects

The residual effects of the Development are those that remain, assuming successful implementation of the identified mitigation measures.

Chapter 4 concludes with an assessment of residual effects alongside a statement of their significance in terms of the EIA Regulations.

1.4.6 Cumulative Effects

In accordance with the EIA Regulations, the ES should give consideration to 'cumulative effects'. These are effects that result from incremental changes caused by past, present or reasonably foreseeable actions together with the Development.

Following a review of South Norfolk, East Suffolk and Norfolk County Councils' online planning application databases, the nearest ground-mounted solar schemes are opposite the River Waveney Valley in East Suffolk, south of the A146, of which identified three solar farms, the closest of which is 4 km to the south east of the Site. Given the distance, there is no potential for impacts from these schemes to interrelate.

A review of planning applications in the vicinity of the Development has been conducted, and there are no extant planning applications or permissions with potential for significant combined impacts with the Development. They include retention of equestrian centre buildings to the southwest of the Site, retention of equestrian use of land, a new equestrian centre and extension of use of a model aircraft flying ground.

In any case the potential cumulative effects are considered in Chapter 4.

1.4.7 Interaction and Accumulation of Effects

The EIA Regulations state that the EIA should contain a:

"*description of the aspects of the environment likely to be significantly affected by the Development… and the interrelationship between the above factors*".

Interrelationships may occur where two or more effects arise that have the potential to impact on the same receptor during construction, operation or decommissioning. An impact taken in isolation may not have a significant impact on a receptor, but where several effects are considered in an interrelated manner, the resultant impact could then be considered significant.

The ES focuses on effects on landscape and visual, ecology, traffic and transport, hydrology and hydrogeology receptors and there are not considered to be any receptors that would be subject to more than one type of effect and so the assessment of these effects is scoped out of the ES.

1.4.8 Transboundary Effects

The EIA regulations require the consideration of the potential for the Development to give rise to significant effects on the environment in another European Economic Area (EEA) State. These are termed 'transboundary effects'.

As a result of the scale and nature of the Development, and its location, the Development is not considered to have the potential for any significant transboundary effects and so the assessment of these effects is scoped out of the ES.

1.4.9 Site Selection and Consideration of Alternatives

The EIA Regulations require the consideration of alternatives, defined as:

"*A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*"

The ES includes a section presenting the reasonable alternatives considered by the Applicant in respect of the location of the Development, its scale and design. This is detailed in Sections 2.7.

1.4.10 Major Accidents or Disasters

1.4.10.1 Vulnerability of the Development

It is considered that the Development is only potentially vulnerable to one type of major accident or disaster; flooding. This has been assessed in the Flood Risk Assessment which accompanies the planning application. The FRA confirms that the Development would be safe and able to return to operation in the event of a flood event, including accounting for climate change.

1.4.10.2 Potential for the Development to Cause Major Accidents or Disasters

The Development is not considered likely to cause a significant accident or disaster risk during either the construction or operational phases and so the assessment of these effects is scoped out of the ES. Further detail is provided in the following subsections.

Construction and Decommissioning Phases

There are various health and safety considerations particularly for workers during construction and decommissioning of the Development. Workers are in the closest proximity to the Development and as a result are considered to be the most at-risk group.

There will be no access to the general public and there are no public rights of way which pass through the Site. During the construction phase of the Development there will be no direct impact on public rights of way.

Comprehensive health and safety assessments are an essential part of the construction process and would be carried out prior to construction by the contractor in accordance with legislation. A Construction, Design and Management (CDM) co-ordinator will be appointed and be responsible for the provision of a pre-construction information pack, as required under the Construction (Design and Management) Regulations 2015. The appointed contractor will be required to provide a construction phase plan.

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;
- Construction (Design and Management) Regulations 2015; and
- Electricity Safety, Quality and Continuity Regulations 2002.

The Site would operate to the Health and Safety Executive 'Health and safety in the new energy economy: Meeting the challenge of major change' published in August 2010.

Operational Phase

When operational the majority of the Development comprises solar PV modules which are inert. Electrical infrastructure will be located across the Development, in the form of inverters 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. Such areas will be appropriately fenced to prevent unauthorised access.

All electrical equipment will be subject to routine maintenance such that it is not considered to pose a significant risk of creating an accident or disaster. Such areas will be appropriately fenced to prevent unauthorised access.

1.5 Summary of Scope of the EIA

1.5.1 Issues Included in the EIA

The scope of the EIA was informed by the EIA Screening Opinion provided by the Council and the results and findings of the EIA are detailed in this ES. The scope of technical assessments includes:

- Landscape and Visual Impact Assessment – required given the proximity and potential for effects on The Broads;
- Ecology – required given the proximity and potential for effects on ecologically designated sites within 0.8 km of the Site;
- Traffic and Access;
- Flood Risk Assessment – required given the proximity of The Broads, which is a 'sensitive area'; and
- Hydrogeology – required given the proximity of The Broads, which is a 'sensitive area' and the siting of solar panels on a dilute and disperse unlined part of the landfill site..

1.5.2 Issues Scoped Out of the EIA

The ES does not assess environmental sensitivities which are not likely to significantly affect the environment; such technical aspects are considered within the accompanying Planning Design and Access Statement and associated technical reports including:

- Glint and Glare Assessment; and
- Tree Protection Plan.

In addition interaction and accumulation of effects and transboundary effects are scoped out of the EIA as are effects from major accidents and disasters.

1.6 References

Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Available online at: http://www.legislation.gov.uk/uksi/2017/571/contents/made

Guidance of Environmental Impact Assessment. Available online at: https://www.gov.uk/guidance/environmental-impact-assessment

IEMA (2006), Guidelines for Environmental Impact Assessment (2004) as updated. Institute of Environmental Management and Assessment: London

2 THE DEVELOPMENT

This Chapter of the ES details the Development, including the individual development components and access arrangements, the landscape and biodiversity enhancement strategy, the construction, operational and decommissioning phases of the Development, the site selection process, the design evolution which ultimately resulted in the final layout presented in Figure 1.2, and an overview of the need for the Development.

This Chapter is supported by the following figures:

- Figure 2.1 – Racking and Solar Panel Elevation
- Figure 2.2 – DNO Switching Station Elevation;
- Figure 2.3 – Client Switching Station Elevation;
- Figure 2.4 – Inverter Elevation;
- Figure 2.5 – Battery Elevation; and
- Figure 2.6 – General Storage and Container Elevation; and
- Figure 2.7 – Gate, Fence, CCTV, Road Elevations.

2.1 Development Description

2.1.1 Overview

The Development would cover an area of approximately 11.7 hectares (ha) and would have a capacity of approximately 7 MW. Access to the Development would utilise existing landfill site access off Common Road to the west providing connectivity to Rectory Road and the A143 via Dun Cow Road. Land within the landfill site is included within the proposed red line boundary for provision of an access track between Common Road and the Site utilising existing landfill access roads. Access would be extended as needed to reach areas of panels further within the site. This would minimise the requirement for new tracks. Where new access tracks are required, they will be constructed approximately 3.5 m wide.

The Development comprises the following elements, further details of which are set out in the following subsections: array of ground mounted solar PV panels with associated infrastructure including DNO switching station, client switching stations, battery containers, general spares container, access track, fencing, security cameras, cabling and landscaping.

The construction phase of the Development will be approximately four months, and planning permission is sought for a temporary operational period of 35 years. The Site would be fully restored at the end of the time period for the temporary planning permission. The timescale for decommissioning would be similar to that of construction.

2.1.2 Development Infrastructure, Amount, Use, Appearance and Scale

2.1.2.1 Solar PV Array

The Development would consist of rows of solar panels known as strings, which are dark in hue and recessive in the landscape. The panels or modules are composed of photovoltaic cells and are designed to maximise the absorbency of the sun's rays and minimise solar glare. Each string of panels would be mounted on a rack comprising metal poles anchored to the ground via concrete footings of shallow piles. Panels are typically tilted 10 to 25 degrees from the horizontal to face south towards the sun. Moreover, there is usually a distance of 2-6 meters between strings of panels in order to avoid inter-panel shading but this distance is influenced by slope and aspect.

The panels would be mounted at approximately 0.8 m from the ground at the lowest point (the southern edge) rising to approximately 2.6 m at the highest point (the northern edge), although the anticipated maximum height could be up to 3 m to account for variations in slope and aspect at the Site.

Typical elevations of the solar panels are shown in Figure 2.1. Due to the rapid advancement of Solar PV technologies, it is possible that the design of the solar panels may differ slightly from those shown on the plan.

2.1.2.2 Associated Infrastructure

The scale of the associated infrastructure is as follows:

- DNO switching station container - up to 10 m length x 3.5 m height x 2.5 m width;
- Client side switching station – up to 6.1 m length x 3 m height (this includes a plinth of 0.35 m above the ground level) x 2.5 m width;
- Two battery storage containers – 12.2 m length x, 2.6 m height x 2.5 m width;
- One general storage container – 12.2 m length x 2.6 m, height x 2.5 m width;
- 2 m high security fence;
- Gate height 2 m and width 3.1 m;
- CCTV cameras located on 3 m high poles; and
- Access tracks – 3.5 m wide.

2.2 Access

Access would be via the existing landfill site access point off Common Road to the west, providing connectivity to Rectory Road and the A143 via Dun Cow Road.

The existing access road within the site boundary has been utilised by HGVs throughout the operation of the landfill site and is therefore suitable for use by construction vehicles. This would minimise the requirement for new tracks. Where necessary, internal stone access tracks will be provided to enable construction and maintenance of the Development as shown in Figure 2.7.

Full details of the access arrangement, including routing to Site, traffic numbers and construction programme and outline traffic management measures are presented in the Transport Statement that forms part of the planning application.

2.3 Landscape and Biodiversity Enhancement Strategy

The landscape proposals for the Site have been designed to preserve and enhance the existing landscape features, to screen views of the solar panels from outside the Site and to enhance the biodiversity and habitat value of the Site.

The Development includes planting proposals and enhancements which are detailed fully in Chapter 4 but described as follows:

- Hedge planting (with a percentage of native evergreens such as native yew and holly) interplanted within existing vegetation to infill gaps and reinforce the existing boundary vegetation and soften and filter the limited views to Site. Planting is concentrated along the access track in the south west near College Cottages and provides green linkages to the fenland landscape to the south.
- Other measures incorporated with the Development to improve its biodiversity value include:
    - The retention of the existing grassland under the solar panels with a graded edge with scalloped bays to boundary hedgerows; and
    - Logs and brushwood produced during woodland management operations may be used to provide biodiversity enhancements such as log piles and hibernacula.

These measures would also help to improve local biodiversity and landscape character.

2.4 Construction Phase Overview

2.4.1 Construction Activities

The construction and installation of the Development will take approximately 4 months.

The construction process would consist of the following principal activities:

- Site mobilisation and provision of welfare/office facilities;
- Construct access track and site preparation;
- Delivery of materials;
- Construction of the solar PV array, underground cables, transformer and substation compound, security fencing and CCTV;
- Testing and commissioning; and
- Site restoration and landscaping.

Most of these operations would be carried out concurrently in order to minimise the overall length of the construction programme. Site restoration would be programmed and carried out to allow restoration of disturbed areas as early as possible.

2.4.2 Construction Control Mechanisms

2.4.2.1 Traffic Management

Outline traffic management measure are detailed in the Transport Statement which forms part of the planning application, which the Principal Contractor will implement during the construction phase and include measures such as ensuring construction vehicles follow approved routes and operating the entrance to the site under set protocol. Details of the expected traffic movements and staff numbers are given in the Transport Statement. The full details of the traffic management measures will be agreed as a planning condition.

2.4.2.2 Working Hours

Standard daytime working hours are likely to be utilised, between 7:30am to 6pm Monday to Friday and 7:30am to 4pm on Saturdays.

Depending on the time of year, some work lighting may be required to facilitate construction during these hours.

2.4.2.3 Waste Management

Any non-hazardous waste produced is likely to be primarily packaging and cable off cuts. This waste will be stored in a covered skip and recycled or appropriately disposed of. Re-vegetation of working areas will occur as soon as naturally possible after construction.

2.5 Operational Phase Overview

The Development will have an operational period of 35 years during which time it will be unmanned and monitored remotely. Maintenance would be overseen by suitably qualified contractors who would visit the Site as required but typically less than twice per month. Activities would be restricted principally to vegetation management, equipment/ infrastructure maintenance and servicing including replacement of any components that fail, and monitoring to ensure the continued effective operation of the Development.

2.6 Decommissioning Phase Overview

When the operational phase ends, the Development will require decommissioning. The operational phase is limited to 35 years therefore decommissioning must be considered. All solar PV array infrastructure including modules, mounting structures, cabling, switching

stations and battery containers would be removed from the Site and recycled or disposed of in accordance with good practice and market conditions at that time.

Decommissioning would be expected to take approximately 4 months. The effects of decommissioning are similar to, or often of a lesser magnitude than construction effects and have been included in Chapter 4. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies are likely to change over the operational life of the Development.

Notice will be given to the Council in advance of commencement of the decommissioning works, with all necessary licenses or permits being acquired. Decommissioning will be timed to minimise its environmental impact.

2.7 Site Selection, Development Design and Consideration of Alternatives

This section provides an overview of the site selection process undertaken to identify the Site. It also provides a description of the evolution of the Development design so far and the main alternatives considered.

This information meets the requirements of Schedule 4, Part 2 of the EIA Regulations which states that an ES should include:

"A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects".

This section includes the following sub sections:

- Site Selection. An overview of the site selection process undertaken for the Development;
- Development Design. A description of the ongoing iterative design process for the Development; and
- Consideration of Alternatives. A description of the main alternatives to the Development and the selection of the Development as the preferred option.

2.7.1 Site Selection

The purpose of the Development is to harness solar power to generate electricity. The design of a solar development must also take account of potential environmental effects. The Development must therefore strike a balance between energy yield and minimising environmental effects.

The Site comprises previously disturbed land which is currently in use for energy generation in the form of CLM extraction, which is to continue for the lifetime of the Development. The Development would therefore complement the existing use of the Site and would maximise the benefits of energy generation at the Site. It utilises existing infrastructure to broaden the electricity generation potential of the closed landfill site. The Applicant has a portfolio of CLM electricity generation sites throughout the UK and has reviewed the suitability of the landfill sites where these are located for solar development.

Currently, the dominant source of renewable energy in the UK is wind[7]. Energy diversification, including one within the renewable energy mix is an important contribution to sustainable development. Increasing sources of energy supply within the renewable energy mix will allow the promotion of energy security, efficiency and accessibility locally and internationally.

[7] Office of National Statistics (2019) *UK Energy Statistics* [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/812626/Press_Notice_June_19.pdf (Accessed 29/10/2019)

The Applicant aims to draw on the unique blend of natural resources and energy demands to promote diversification of the renewable energy mix and add a new Solar Park at the Site.

Not every site will be suitable for accommodating solar, and therefore the Applicant has been through a thorough feasibility exercise to assess the suitability of the Site. The potential for installing a solar development at the Site has been assessed through feasibility work, which assessed technical and environmental issues to identify development sites and then derive the most appropriate scale and infrastructure layout.

The key criteria which have led to the Site being selected for solar development include:

- Solar irradiation levels;
- Proximity to an existing grid connection with capacity to accept the Development with no or minimal upgrades;
- Separation from local population;
- Existing landfill infrastructure including access;
- Land which is not suitable for conventional uses (i.e. no loss of agricultural land as the existing gas infrastructure results in limited uses for the Site);
- Existing screening provided by trees and hedges;
- Topography;
- Field size/shading;
- Access to the site for construction;
- Absence of nature conservation designations;
- Located within flood zone 1 and so of low flood risk; and
- Potential for a commercial/land agreement with a landowner.

Following consideration of the above factors and the existing infrastructure within the wider area, the selected site was identified as having very good potential for development with minimal environmental impacts.

2.7.2 Development Design

This section outlines how the design of the Development evolved to reach the final layout which is the subject of this application. It includes the key decisions taken in the design stage, including evaluation of constraints, to ensure that the design of the project has been undertaken in a rigorous and considered manner.

2.7.2.1 Design Rationale

The use of the former landfill site helps to ensure that the environmental impacts of the Development are minimal. The Development would not interfere with the landfill cap, remaining at surface level. Furthermore, the layout has been designed to avoid impacts on CLM infrastructure which is present on the Site. Given this there is minimal potential for impacts on, or the disturbance or potential spread of, contaminated land and soils. Therefore, the Development makes use of an otherwise sterilised site and results in no loss of agricultural land etc. Given the former use as a landfill site and the current CLM electricity generating station, infrastructure for both access and grid connection are already in place ensuring less disruption in the construction of the Development (compared to a green field site). The Development is also fully reversible and the Site would be reinstated in accordance with the agreed landfill restoration plan following the temporary lifetime of the Development (35 years).

After an appraisal of the Site it has been found to be both technically and environmentally viable for solar development. The scheme has been designed to be as visually unobtrusive as possible and to avoid incursions into areas with environmental sensitivities.

The layout and design process of the Development was an iterative one informed by consideration of a variety of environmental and technical assessments, professional advice

from consultants and the pre-application and EIA Screening response received from NCC. This included the layout of the solar arrays but also ancillary infrastructure including switching stations, battery containers and access tracks.

Indicative layouts were developed on the basis of initial site visits, desk-based information and assumptions based on known constraining factors. More detailed site assessment and investigation was then undertaken by obtaining baseline information relating to environmental effects including landscape, ecology, access and flood risk amongst others.

Following the collation of this baseline information, key determining factors included ensuring that residential amenity and ecological assets would be protected through the minimisation of adverse impacts. The layout and location of the PV array and other infrastructure was chosen as it was felt that it would provide the most suitable design layout for the Site.

The final design of the Development is therefore a careful balance between addressing site constraints, minimising environmental impact and ensuring commercial viability. This approach to site design helps minimise unnecessary environmental impacts at an early stage. Where this is not feasible, such effects can be reduced through identification of mitigation measures that can be integrated early on in the development process.

The proposed tree planting and landscape improvements have been designed to provide visual screening and general landscape improvements using native species which will integrate the Development in the wider landscape and at the same time provide a biodiversity net gain.

2.7.2.2 Development Design Considerations with Landfill Restoration

The Site is situated on the closed Aldeby landfill site which is subject to an approved restoration plan which is currently in the process of being implemented. The Development would defer the implementation of the affected area of the restoration plan for the lifetime of the Development. Upon decommissioning of the Development, the restoration plan would be re-implemented. The amendment to the timing of the restoration would be implemented via a separate Section 73 application which will be made to vary the restoration scheme (as approved under application C/7/2018/7007, drawing no 601R294) to defer the implementation of the approved restoration plan for the area of the Site.

As the implementation of the restoration plan is well progressed, much of the planting and mitigation which has been implemented in line with the plan would be maintained throughout the life of the Development. Chapter 5: Ecology finds there would be a small loss of vegetation as a result of the Development, however adverse impact from this loss would be negligible. As detailed in Section 2.3 proposed planting and mitigation would compensate for this change. Upon decommissioning of the Development, the Site would be reinstated to the agreed restoration plan layout.

2.7.3 Future Baseline

In accordance with Schedule 4(3) of the EIA Regulations this section details the future baseline at the Site in the absence of the Development, and is based on known information and professional judgement.

As detailed above the Site is subject to an agreed restoration plan, following the cessation of waste acceptance at the landfill. The restored landfill would therefore form the basis for the future baseline, whereby the Site would be covered by rough grassland and enclosed by boundary vegetation. There are no proposals for public access on the restoration plan and the CLM collection infrastructure of wells and pipes would remain, at least for the proposed duration of the Development - 35 years.

The part of the landfill where the Development is proposed is the oldest part of the landfill and therefore the ground levels are most settled and stable. There is not expected to be any further ground subsidence during the lifetime of the Development so that current contours over the Site, as shown in Planning Drawing 10, would be the same at the end of the Development's lifetime.

The Development is largely compatible with the landfill restoration plan, with the change being from rough grassland with CLM infrastructure to rough grassland with CLM infrastructure and solar park. There would be no loss of trees or hedges associated with the Development, which additionally proposes landscaping measures in the form of a hedge along the northern solar park boundary and tree planting to the southwest and infilling of trees to the southeast. These additional planting proposals would not form part of the future baseline should the Development not proceed.

Once decommissioned all infrastructure associated with the Development, with the exception of the DNO switch room, would be removed from the Site and as such the Site would return largely to its current appearance. All planting implemented as part of the Development would also remain.

2.7.4 Consideration of Alternatives

Sections 2.7.1 and 2.7.2 of this chapter set out the alternatives to the Development as currently proposed in terms of alternative sites and alternative designs and layouts.

As detailed in the Planning Design and Access Statement there are clear benefits to having a balanced mix of energy sources. Solar power, as a renewable energy source, would contribute to this aspiration of a more balanced energy source. The Applicant is an experienced energy developer and so has expertise in this field.

With regards to the consideration of alternatives for energy projects, it should be noted that the White Paper on Energy (May 2007)[8] sets out a number of initiatives, including an emphasis that applicants no longer have to demonstrate either the overall need for renewable energy or for the particular proposal to be sited in a particular location.

2.7.5 Need for the Development

The need for the Development and the key policy drivers are detailed in the Planning Design and Access Statement submitted with the planning application.

The need for the Development is underpinned by national and international commitments on climate change, policy objectives, electricity market reform and industry drivers.

The UK is one of 195 signatories to the Paris Agreement under the United Nations Framework Convention on Climate Change (2016)[9], which commits to limiting the global average temperatures to under 2 °C above pre-industrial levels with an aim of reducing this figure to 1.5 °C. Considerable reductions in greenhouse gas emissions are required to meet this goal.

Following the Paris Agreement, the UK has recently committed to meeting a legally binding target to cut greenhouse gas emissions by at least 100% from the 1990 baseline by 2050, which would result in net zero greenhouse gas emissions. This target, which is set out in the Climate Change Act 2008 (2050 Target Amendment) Order 2019[10], is more ambitious

[8] BERR (2007). Meeting the Energy Challenge - A White Paper on Energy. The Stationary Office, Norwich. Available online: https://www.gov.uk/government/publications/meeting-the-energy-challenge-a-white-paper-on-energy Accessed 16/10/2018

[9] United Nations Framework Convention on Climate Change (2016) *The Paris Agreement* [Online] Available from: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement (Accessed 12/11/2020).

[10] HM Government (2019) *The Climate Change Act 2008* (2050 Target Amendment) Order 2019 [Online] Available from: http://www.legislation.gov.uk/uksi/2019/1056/made (Accessed 19/08/2019)

than the 80% reduction set out in the 2011 National Policy Statement for Energy (EN-1)[11]. The 2008 Climate Change Act[12] also introduced legally binding carbon budgets which restrict maximum greenhouse emissions for five-year periods ahead of the 2050 Net Zero Target. The fifth carbon budget, set out in the Carbon Budget Order 2016[13] requires a 57% reduction in annual UK greenhouse gas emissions between 2028 and 2030 relative to 1990 levels.

Meeting these legally binding targets requires major investment in new technologies, the electrification of heating, industry and transport, prioritisation of sustainable energy and cleaner power generation.

An integral part of UK energy strategy is to reduce the dependency on fossil fuels. Paragraph 2.2.16 of National Policy Statement EN-1 identifies that a significant proportion of the UK's generating capacity is due to close and that new low-carbon generation is required which to make up for the reduction in energy generated by fossil fuels. The National Infrastructure has recommended that 65% of the UK's electricity should be provided by renewable sources by 2030 in order to tackle climate change while meeting energy demand.

To address these objectives and meet the emissions reduction targets, the electricity being consumed will need to be almost exclusively from low carbon sources, in contrast with the third quarter of 2019, when around 39% of our electricity was supplied by burning gas, oil and coal. Therefore, a new low carbon energy mix is required which is reliable, secure and affordable.

If consented, the Development would contribute to the delivery of these policy objectives, diversify the energy mix and facilitate the transition to low carbon energy, whilst decreasing the dependency on fossil fuels. Due to rapid advances in technology, solar PV is one of the most cost-effective sources of energy, leading to more affordable and secure energy supply to consumers.

Solar energy generation does not require fossil fuel use during generation, and although there is variability in the amount and timing of sunlight over the day, season and year, a properly sized and configured system can be designed to be highly reliable. In the case of the Development, the proposed array of approximately 7MW would generate approximately 6,633 megawatt hours per year ('MWh/yr') which would offset the annual electricity usage of approximately 1,400 homes in South Norfolk[14].

Solar power production also generates electricity with a limited impact on the environment as compared to other forms of renewable electricity production, as there is no need for extensive ground disturbing foundations, there are no tall vertical structures or moving parts involved and there is no noise associated with solar PV arrays during operation.

[11] Department of Energy & Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1)* [Online] Available from: https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure (Accessed 12/11/2020)

[12] HM Government (2008) *The Climate Change Act 2008* [Online] Available from: https://www.legislation.gov.uk/ukpga/2008/27/contents (Accessed 12/11/2020)

[13] HM Government (2016) *The Carbon Budget Order 2016* [Online] Available from: https://www.legislation.gov.uk/uksi/2016/785/made (Accessed 12/11/2020)

[14] The equivalent number of homes supplied has been obtained from *Regional and Local Authority Electricity Consumption Statistics* (Department for Business, Energy & Industrial Strategy, Updated 19 Dec 2019) (available online at: https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics [accessed 27/11/2020]), using the average household energy use for South Norfolk and annual generation estimate calculated by Infinis.

2.8 References

Office of National Statistics (2019) UK Energy Statistics [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/812626/Press_Notice_June_19.pdf

BERR (2007). Meeting the Energy Challenge - A White Paper on Energy. The Stationary Office, Norwich. Available online: https://www.gov.uk/government/publications/meeting-the-energy-challenge-a-white-paper-on-energy

United Nations Framework Convention on Climate Change (2016) The Paris Agreement [Online] Available from: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

HM Government (2019) The Climate Change Act 2008 (2050 Target Amendment) Order 2019 [Online] Available from: http://www.legislation.gov.uk/uksi/2019/1056/made

Department of Energy & Climate Change (2011) Overarching National Policy Statement for Energy (EN-1) [Online] Available from: https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure

HM Government (2008) The Climate Change Act 2008 [Online] Available from: https://www.legislation.gov.uk/ukpga/2008/27/contents

HM Government (2016) The Carbon Budget Order 2016 [Online] Available from: https://www.legislation.gov.uk/uksi/2016/785/made

Department for Business, Energy & Industrial Strategy (2019) Regional and Local Authority Electricity Consumption Statistics. Available online at: https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics

3 PLANNING POLICY CONTEXT

3.1 Introduction

This section of the ES identifies the key Development Plan policies and guidance which cover the Site and relate specifically to the Development. It should be noted that a separate Planning Design and Access Statement is submitted with the planning application which aims to establish the land use implications of the Development, consider its compliance with the Development Plan and national policies, and identify other material considerations to be taken into consideration during the determination process.

3.2 Legislative Background

The Town and Country Planning Act 1990 Section 70(2) states that:

"*In dealing with such an application the authority shall have regard to the provisions of the Development Plan, so far as material to the application, and to any other material considerations*."

The Planning and Compulsory Purchase Act 2004 forms an amendment to the Town and Country Planning Act 1990. Section 38(6) of the Planning and Compulsory Purchase Act 2004 states that:

"*If regard is to be had to the Development Plan for the purpose of any determination to be made under the Planning Acts the determination must be made in accordance with the plan unless material considerations indicate otherwise."*

The process for determining a planning application can be defined as:

- Identification and consideration of the key provisions within the Development Plan;
- Clarification of whether the Development is in accordance with the Development Plan;
- Identification and consideration of relevant material considerations; and
- Conclusions on whether planning permission is justified.

3.3 National Planning Policy Framework (February 2019) (NPPF)

The NPPF was first published in March 2012 and has since been revised on two occasions, most recently February 2019. It sets out the UK government's planning policies for England and how these are to be applied. The NPPF reiterates that applications for planning permission must be determined in accordance with the Development Plan, unless material considerations indicate otherwise. The NPPF also identifies that national planning policy is a material consideration when making decisions on planning applications. The most relevant aspects of national planning policy contained within the NPPF are as follows:

3.3.1 Presumption in Favour of Sustainable Development

The NPPF sets out the economic, environmental and social planning policies for England. Central to these main themes is a presumption in favour of sustainable development, and that development should be planned positively. In achieving sustainable development, three overarching objectives are identified for the planning system; economic, social and environmental. The environmental objective includes *"mitigating and adapting to climate change including moving to a low carbon economy".*

3.3.2 Renewable Energy

The NPPF is clear that planning has a key role in supporting renewable energy and associated infrastructure. Whilst there is no specific policy for solar energy development contained in the NPPF, Paragraph 148 proposes that the planning system should support the transition to a low carbon future in a changing climate.

"The planning system should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings, and support renewable and low carbon energy and associated infrastructure"

In order to increase the supply of renewable and low carbon energy, Paragraph 151 states that plans should provide a positive strategy for renewable energy development and consider identifying suitable areas for renewable and low carbon energy.

The NPPF is also is clear that LPAs should not require applicants for energy development to demonstrate the overall need for renewable or low carbon energy and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions (Paragraph 154). Applications for renewable and low carbon development should be approved if the impacts are (or can be made) acceptable.

3.3.3 Guidance on Environmental Issues

The NPPF contains policies on a number of environmental issues in achieving sustainable development.

The approach to encouraging sustainable transport and managing impacts on transport networks is set out in Paragraphs 102 to 111. Paragraphs 170 to 202 emphasise the importance of preservation and enhancement of the built and natural environment. They set out detailed requirements for the assessment of the impact on the landscape value, biodiversity and habitats, and the historic environment.

3.4 Local Development Plan

Due to the landfill properties of the Site the Development will be determined by the Minerals and Waste Authority – Norfolk County Council and therefore the most relevant Development Plan for the Site consists of Core Strategy and Minerals and Waste Development Management Policies Development Plan Document ('CSMWDMPDPD'), adopted in September 2011.

At a local level, the Site falls within the jurisdiction of South Norfolk Council. Therefore, although less relevant than the NCC Development Plan, the development plans for the local council are also briefly considered.

3.4.1 Norfolk County Council – Core Strategy and Minerals and Waste Development Management Policies Development Plan Document 2010-2026

The Core Strategy and Minerals and Waste Development Management Policies Development Plan Document (CSMWDMPDP) was adopted by NCC in September 2011. The Minerals Safeguarding Areas policy map identify the Site as being in a Sand and Gravel Safeguarded Mineral Resource. The relevant policies from within the CSMWDMPDP are listed below:

- CS13 – Climate change and renewable energy generation
- CS16 – Safeguarding mineral and waste sites and mineral resources
- DM1 – Nature Conservation
- DM8 – Design, local landscape and townscape character

3.4.2 South Norfolk Council

The South Norfolk Local Plan is made up of various documents. The Development Management Policies Document was adopted in October 2015. The Site is not subject to any allocations within the Policies Map. The core policies from the Local Plan relevant to the Development are outlined below.

Development Management Policies Document (2015)

- DM 1.1 – Ensuring development management contributes to achieving sustainable development in South Norfolk
- DM 1.3 – The sustainable location of new development
- DM 1.4 – Environmental quality and local distinctiveness
- DM 3.8 – Design Principles applying to all development
- DM 3.13 – Amenity, noise and quality of life
- DM 4.1 – Renewable Energy
- DM 4.2 – Sustainable drainage and water management
- DM 4.5 – Landscape Character and River Valleys
- DM 4.8 – Protection of Trees and Hedgerows
- DM 4.9 – Incorporating landscape into design
- DM 4.10 – Heritage Assets

The Joint Core Strategy for Broadland, Norwich and South Norfolk was adopted in March 2011 and also forms part of the South Norfolk Local Plan, and is likely to be relevant to the determination of the full application. The Core policies from the Local Plan relevant to the Development are outlined below.

Joint Core Strategy for Broadland, Norwich and South Norfolk (2011)

- Policy 1 – Addressing climate change and protecting environmental assets
- Policy 2 – Promoting good design
- Policy 3 – Energy and water
- Policy 18 – The Broads

4 LANDSCAPE AND VISUAL ASSESSMENT

This Chapter presents the findings of a Landscape and Visual Impact Assessment (LVIA) undertaken to support the project as set out in the preceding chapters. The assessment methodology, methodology for assessing residential properties, photography/ visualisations and Zone of Theoretical Visibility (ZTV) is included in Technical Appendix 4.1. The chapter is also supported by Figures 4.1-4.9.

4.1 The Development

A full description of the Development, a solar park with ancillary infrastructure over an area of 11.7 hectares (ha), is found in Chapter 2: The Development.

4.2 Landscape Legislation and Policies

This section summarises current legislation, planning policy and guidance of national and local importance that are pertinent to landscape and visual matters and which are likely to have a bearing on the Site with implications for the Development.

In summary, the Site lies within the setting of the The Broads National Park so policies covering valued landscapes would be relevant as would other general policies covering landscape and visual matters. Note has been taken of any Supplementary Planning Documents that are relevant to this LVIA.

4.2.1 European Landscape Convention

The European Landscape Convention (ELC) was ratified in the UK on the 21 November 2006 and became binding on 1 March 2007.

The ELC defines landscapes as: "*An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*."

The ELC applies to natural, rural, urban, and peri-urban areas including land, inland water, and marine areas. Its purpose is to promote landscape protection, management, and planning in relation to all landscapes, regardless of whether their quality and condition is considered outstanding, ordinary, or degraded.

The UK is recognised as already putting many of the principles of the ELC into practice. The importance of landscapes in contributing to local identity and in reflecting local cultural influences and ecological diversity is demonstrated using Landscape Character Assessments at a national, regional and/ or local level.

4.2.2 National Planning Policy Framework (NPPF)[15]

The National Planning Policy Framework (NPPF) sets out the Government's strategic vision for the planning system in England and how it is expected to be applied at a local level in development plans and planning decisions. The NPPF places great emphasis on plans and developments that contribute to sustainable development.

Policies and paragraphs which cover landscape and visual matters, and which are potentially relevant to the Site and the Development include:

- Paragraphs 148 and 154 which deal with climate change, with para. 148 emphasising the importance of the planning system in supporting the transition to a low carbon future, including support for renewable and low carbon energy. Para. 154 also requires local planning authorities, when determining applications for renewable and low carbon schemes, to grant consent if the impacts are (or can be made) acceptable.

[15] Ministry of Housing, Communities and Local Government (February 2019), National Planning Policy Framework. Available online at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed on 25/09/2020).

- Paragraph 170, which deals with the natural environment and notes that policies and decisions should protect and enhance valued landscapes as well as recognise the intrinsic character and beauty of the countryside.
- Paragraph 172 relates to valued landscapes and states that 'Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty which have the highest status of protection in relation to these issues'; and
- Paragraph 180 requires decisions to ensure that '*new development is appropriate for its location'* and that impact of light pollution on local visual amenity is handled sensitively to maintain *'intrinsically dark landscapes'.*

4.2.3 Planning Practice Guidance for Natural Environment (Updated July 2019)[16]

This document mostly relates to the protection of biodiversity but also has a section relating to landscape and reiterates policy set out in the NPPF. It clarifies that land outside the boundaries of National Parks and Areas of Outstanding Natural Beauty (AONB) *'often makes an important contribution to maintaining their natural beauty, and where poorly located or designed developments can do significant harm. This is especially the case where long views from or to the designated landscape are identified as important, or where the landscape character of land within and adjoining the designated area is complementary. Development within the setting of these areas will therefore need sensitive handling that takes these potential impacts into account' (paragraph 042, ID: 8-042-20190721)."*

4.2.4 Local Planning Policy

At a local level, the adopted Development Plan for South Norfolk Council (SNC) currently comprises a few documents of which the most pertinent to this LVIA are:

- Development Management Policies Document (Adopted 25th October 2015);
- Policies map (which identifies areas where policies and proposals apply); and
- Joint Core Strategy (Adopted 2011 and Amended January 2014).

Other documents that are potentially relevant to this LVIA include adopted Neighbourhood Plans and Supplementary Planning Documents, however, a search of the South Norfolk Council website has not identified any of relevance.

4.2.5 South Norfolk Council Local Plan[17]

The Joint Core Strategy for Broadland, Norwich, and South Norfolk, Development Management Policies Document and associated Policies Map make up the Local Plan. There are key planning documents which sets out the policies and proposals that will determine future development within South Norfolk.

Key policies covering landscape and visual matters that are potentially relevant to this LVIA are listed below:

Development Management Policies:

- Policy DM 4.1: Renewable Energy notes 'permission will be granted' for renewable energy production schemes 'where there are no significant adverse or where adverse effects are out-weighed by the benefits'.

[16] Planning Practice Guidance for the Natural Environment (Updated July 2019). Available online at: https://www.gov.uk/guidance/natural-environment (Accessed on 25/09/2020).

[17] South Norfolk Council: Development Management Policies and Policies Map. Available online: www.south-norfolk.gov.uk/residents/planning/planning-policy/adopted-south-norfolk-local-plan/development-management-policies (Accessed on 18/09/2020).

Joint Core Strategy:

- Policy 2: Promoting Good Design specifies 'the need to design development to avoid harmful impacts on key environmental assets and in particular, SACs, SPAs, and Ramsar sites';
- Policy 17: Smaller Communities in the Countryside notes that development 'will be permitted in the countryside where it can be clearly demonstrated to further the objectives of this Joint Core Strategy'; and
- Policy 18: The Broads clarifies that 'in areas in close proximity to the Broads Authority area particular regard will be applied to maintaining and enhancing the economy, environment, tranquillity, setting, visual amenity, recreational value and the navigational use of the Broads'. It goes on to note that proposals in relation to The Broads should 'support its protection and enhancement while ensuring no detrimental impact on the Broadland SPA, Broadland Ramsar and Broads SAC'.

4.2.6 Landscape Planning Designations

As part of the baseline, any value attached to features within the landscape of the study area is considered. This usually takes the form of landscape-related designations valued for their wild or scenic beauty at a national, regional, or local level such as National Parks, Areas of Outstanding Natural Beauty (AONBs) and Special Landscape Areas.

The baseline also takes account of any protected features, the presence of which may indicate value at a national, regional, or more local level. Protected features mostly relate to cultural heritage or nature conservation assets such as World Heritage Sites, Ancient Monuments, Conservation Areas, Listed Buildings, Historic Parks and Gardens, Sites of Special Scientific Interest, Nature Reserves, Ancient Woodland, etc.

Landscape-related designations and protected features identified within the Site and wider study area from a search of the BBC website and MAGIC website[18] are listed in Table 4.1 below and shown on Figure 4.4 (Landscape Baseline with Public Rights of Way).

Table 4.1: Landscape Designations and Protected Features

Landscape Designations & Protected Features	**Present Within Site**	**Present within Study Area (2km radius)**
National Parks	None	Yes (refer to 4.5.4.1 for details)
Areas of Outstanding Natural Beauty (AONBs)	None	None. The Suffolk Coast & Heaths AONB outside Study Area (4.3km)
Special Landscape Areas (or equivalent)	Yes	None
Green Belt	None	None
Country Parks	None	None
World Heritage Sites	None	None
Scheduled Monuments	None	None
Conservation Areas	None	None
Listed Buildings	None	Yes (refer to 4.5.4.2 for details)

[18] MAGIC website. Available online at: https://magic.defra.gov.uk/ (Accessed on 25/09/2020).

Landscape Designations & Protected Features	Present Within Site	Present within Study Area (2km radius)
Registered Historic Parks and Gardens	None	None
Registered Battlefields	None	None
National Trails/ Cycle Routes and Long-Distance Footpaths	None	Yes – Angle's Way (refer to 4.5.5.2 for details)
Public Rights of Way	None	Yes (refer to 4.5.5.2 for details)
Nature Reserves	None	None
Sites of Special Scientific Interest (SSSI)	None	Yes (refer to 4.5.4.3 for details)
Ramsar Sites	None	Yes (refer to 4.5.4.4 for details)
Special Areas of Conservation	None	Yes (refer to 4.5.4.5 for details)
Special Protection Areas	None	Yes (refer to 4.5.4.5 for details)
Ancient Woodland	None	None

4.3 Consultation

An EIA screening consultation was sent in November 2020. Several responses are outstanding, but Natural England, the Broads Authority and Norfolk County Council have responded.

Consultee responses that have been received are summarised below in Table 4.2 as follows:

Table 4.2: Consultee Responses

Consultee	Issue	How this has been addressed in the ES
Norfolk County Council SCR/2020/005 Dated 29th Dec 2020	Likely to have effects on the adjacent Broads Authority landscape, which has cultural and historical significance. High probability of an impact due to the size (greater than 5ha) and scale of development. Potential visibility from PROW and waterways within the protected wetland landscape	All publicly accessible viewpoints have been reviewed and effects described. Appropriate mitigation has been proposed. PROW have been walked and potential visibility and likely residual effects on landscape and visual receptors appraised

Broads Authority BA/2020/0421/SCRCON Dated 22.12.2020	Adjacent to Broads Authority area and may affect its setting. Potential visibility from sensitive visual receptors including users of Angle's Way long-distance footpath and the River Waveney Size is deemed unacceptable Solar PV is uncharacteristic in relation to the surrounding rural landscape context Sensitivity of the receiving landscape Long-term nature of the proposals	Potential visual effects have been assessed. Winter review of sequential viewpoints from Angles Way and The Broads has been undertaken Size is less than the previous extent of quarrying and landfill operation Visual and landscape effects have been assessed. Screening function of boundary vegetation will be enhanced. Proposals are long-term reversible. Solar PV will not affect the landscape restoration of the landfill operation, but will sit on top of the restored landfill landform,
Natural England 335077 Dated 25.11.2020	Potential for significant effects on statutorily designated nature conservation sites and high value landscapes, including: - Barnby Broad Marshes SSSI - Broads SAC - Broadland SPA & Ramsar site - Broads Authority - Suffolk Coast and Heath AONB - Suffolk Heritage Coast	Effects will be assessed, and appropriate mitigation proposed to minimise any identified residual effects

4.4 Assessment Methodology and Significance Criteria

4.4.1 Introduction

This section comprises:

- General approach to methodologies and establishing significance; and
- The project specific approach.

This includes how the scope is determined; how baseline is assessed; establishing receptor sensitivity; and establishing the level of impact. The last two parameters determine overall impact and to identify those affects that would be considered significant.

There is a list of the types of impacts and assumptions and limitations of applied methodologies for this assessment. Landscape and visual effects are assessed separately, but the methodologies in the section apply to both.

4.4.2 General Approach to Methodologies and Establishing Significance

4.4.2.1 Scope of Assessment

The scope of the LVIA has been determined by:

- Responses from consultees, including statutory and non-statutory stakeholders;

- Reference to desk-based studies, such as the identification of statutory sites and designations;
- Remotely sensed data – e.g., Zones of Theoretical Visibility; and
- Professional judgement.

4.4.2.2 Landscape Baseline Assessment

The scoping (above) determines the parameters of the baseline for both landscape and visual resources. The study area is defined, with its size dependent upon the nature of the development and local/regional topography. The baseline is assessed by site survey in which the identified receptors and landscape characteristics, elements and features are recorded. Panoramic views from receptors are photographed, and a systematic record of the site visit is prepared. The overall landscape quality, value and sensitivity are determined. This information coupled with the desk-based information is used to prepare the Landscape Baseline. Some of this information is also used to prepare the Visual Baseline, as discussed in 4.4.2.3 below.

The two following tables demonstrate Criteria for Landscape Value and Sensitivity to Change. For any given area, not all high value landscapes are highly sensitive (susceptible) to change; similarly, low value landscapes do not always have a low sensitivity. These need to be assessed using the methods described above for each case.

Table 4.3 Landscape Value Criteria

Landscape Value	Description
International Value	The landscape has been designated at an international level (e.g. an UNESCO World Heritage site) and designation relates to the landscape and /or recreational opportunities
National Value	Designation is at a national level such as a National Park or Area of Outstanding Natural Beauty (AONB) or relates to a landscape feature with a statutory designation or significant time depth or cultural relevance e.g., Scheduled Monument or Listed Building
County/District Value	Landscape feature or area designated at a County/Borough or District level e.g. Area of Local Landscape Importance (ALLI) or Special Landscape Area (SLA) or a non-designated landscape with distinctive features or value as a setting
Local Community Value	An undesignated landscape with features which shows evidence of responsible management and use may be valued locally
Unvalued	The landscape or individual elements have been despoiled or subject to actions which show it is not valued e.g., fly tipping and vandalism

Table 4.4 Landscape Sensitivity (Resilience to change) Criteria

Landscape Sensitivity	Description
Very Sensitive	Character is pristine with high scenic quality with low resilience to change. Wildness or tranquillity is particularly highly valued or promoted and views are an integral characteristic. Policies aim to achieve 'no change' and proposal would be incompatible with this aim due to the type of development, scale and location.
Moderate Sensitivity	Key characteristics are strongly expressed and/or resilience to change is weak or views are an integral characteristic. Policies aim to conserve key elements and changes brought about by development would have poor compatibility due to the type, scale, and location of the proposals.
Low Sensitivity	Landscape resilience to change or views is relatively robust; and policies promote or accept limited change to key characteristics. The changes to the landscape character brought about by development is moderately compatible with the type, scale and location of proposals.
Slight Sensitivity	Clarity of key characteristics is not strongly expressed and/or resilience to change is good and/or views are incidental. Policies accept or promote landscape evolution and the change brought about by the development is compatible due to the type, scale and location of proposals.
Negligible Sensitivity	Landscape characteristics are not clear and resilience to change is very strong and/or views are irrelevant to landscape character. Policies strongly promote or accept major changes to key characteristics. Development has excellent compatibility with the type, scale and location of proposals.

4.4.2.3 Visual Baseline Assessment

Similarly, Visual Receptors are also assessed using slightly different criteria. Visual receptors always relate to humans that view the site, and the sensitivity of the views are in part subject to the activity of the viewer in the identified location. The viewpoints are selected initially by reference to the ZTVs and then refined on Site to take account of screening by vegetation, buildings, and local landform. Following methodology established in GLVIA3, the viewpoints were chosen based on the following criteria:

- Viewpoints should be representative of the likely impacts;
- Viewpoints should show a range of different types of views;
- Viewpoints should be representative of a range of different receptor groups;
- Viewpoints should be representative of a range of distances and directions; and
- Viewpoints should be representative of the varying image of the Development within the landscape.

Visual receptors include people who:

- Live and work in the area;
- Visit the area for a specific reason (for instance, visitors to tourist or recreational attractions); and
- Pass through the area (on foot, by horse, by bike, by car or by train).

Table 4.5 Visual Receptor Value Criteria

Value of Location or View	Description
Very High or National Value	A scenic view in a highly valued landscape that has been designated at an International or National level. Particularly applicable to views from a National Trail or a promoted route or a recognised view to or from a culturally significant feature or statutorily designated landscape element e.g., Scheduled Monument or Listed Building
High or County Value	A view to or from a designated landscape or a view described in publications or visitor guides from promoted routes or locations of interest or limited cultural significance
Moderate Local Community Value	A view with amenity value in an undesignated landscape with evidence of responsible use
Low or Unvalued	Landscape is despoiled and there is evidence of fly tipping or vandalism that suggest users or society do not value the landscape or the views to or from it

4.4.2.4 Visual Receptor Susceptibility to Change

Susceptibility of the receptor relates to their location, activity and distance or angle and extent of view of development.

Table 4.6 Visual Receptor Susceptibility to Change

Visual Receptor Type	Susceptibility to Change
Engaged in Recreational Activity	*High* – stationary or moving slowly and may be orientated towards the view or within location primarily to enjoy views of the landscape i.e. bench or picnic site *Moderate* – stationary or moving slowly and may be orientated towards the development or at the location to enjoy views of the landscape but also has other purposes for being in that location (i.e. active sports)
Travellers (public and private road and rail)	*High* – moving slowly primarily to enjoy views of the landscape and orientated towards view of the development. *Moderate* – moving swiftly possibly orientated towards views of the development and may be in the location to enjoy views of the landscape but has other purpose for travelling (i.e., journey to work) *Low* – moving very swiftly in a direction of travel with an oblique view or glimpsed view of development but has other primary purpose for being in that location other than views of the landscape (i.e., motorway or long-distance travel)
Outdoor Workers	*Moderate* – outdoor workers moving slowly in locations with a view orientated towards the development and which may be experienced daily. *Low* – outdoor workers moving more swiftly in a location which may or may not be orientated towards the development but have a primary focus not connected with enjoyment of the view or not experienced frequently
Indoor Workers	*Low* – limited views and in the location for activities unconnected with enjoyment of the view.

Table 4.7 Visual Receptor Sensitivity Criteria

Visual Receptor Sensitivity	Description
Very High Sensitivity	Stationary or moving very slowly with prolonged view from a Public Rights of Way in a highly valued landscape or at a heritage asset where awareness of changes to visual amenity is acutely pronounced.
High Sensitivity	Moving slowly or steadily and exposed to view consistently for prolonged periods and when attention or interest is focused on the landscape and visual amenity and awareness of change is likely to be elevated.
Moderate Sensitivity	Movement is steady and receptor is going to be exposed to the view for infrequent periods or has less interest in visual amenity (e.g., people in transit).
Low Sensitivity	Receptor is moving swiftly through the landscape, exposure to views of the development are limited and primary focus is not on the landscape but on an activity or pursuit that does not include an appreciation of views. Outdoor workers may be included here where the setting is of some value to the quality of working life.
Negligible Sensitivity	Receptor is predominantly indoors or focused on an activity or pursuit where setting has limited value and awareness of landscape change is likely to be seen of very low importance.

4.4.2.5 Significance Criteria

To determine the significance of impacts, the sensitivity of the receptor is identified, then the magnitude of the change (the impact) is be determined. Data from the Baseline Survey coupled with the Development location, size, topography, scale, and massing, are used. The following table illustrates how landscape impacts are classified:

Table 4.8 Magnitude of Landscape Effects Criteria

Magnitude of Change	Description of Expected Change
Very Substantial Adverse or Beneficial	Proposal would become defining characteristic or dominant feature of the landscape and would be in extreme contrast or substantially enhance the existing landscape context through re-instating valued features that have been degraded or lost in the locality. Development will introduce an entirely new feature into the landscape with no similar developments in the locality.
Substantial Adverse or Beneficial	Development proposal would be a key characteristic of the landscape and would detract or enhance existing landscape context. Contains features of a similar nature to a few existing features in the landscape or will reinstate valued features previously lost or degraded which will be a prominent feature in the landscape.
Moderate Adverse or Beneficial	Development proposals would become a characteristic of the landscape and would contrast or enhance the existing landscape context. A few similar developments are already in the landscape

	and proposals will re-instate several features that have been lost or degraded and would be a noticeable additional feature.
Slight Adverse or Beneficial	Development proposals would become a characteristic of the landscape and would contrast with or enhance the existing landscape context. A few similar developments are already in the landscape and proposals will re-instate a few features that have been lost or degraded and would be a visible additional feature.
Negligible Adverse or Beneficial	Development proposals would become a characteristic of the landscape and would contrast or enhance the existing landscape context. Several similar developments are already in the landscape and proposals will re-instate minor features that have been lost or degraded but these would be a barely discernible additional feature.

Table 4.9 illustrates how visual effects are evaluated.

Table 4.9 Magnitude of Visual Effects Criteria

Magnitude of Change	Description
Very Substantial	The proposed development is close to receptor viewpoint and full extent is openly visible. Proposals are in stark contrast to the existing landscape context and would become a dominant adverse/ beneficial feature
Substantial	Proposed development is located close or middle distance to receptor viewpoint and is perceived in its full extent or partially screened. The development contrasts with the existing landscape context and would stand out as a prominent adverse/ beneficial feature
Moderate	Proposed development is in the middle distance and the full extent is visible or partially screened or close to receptor viewpoint and more moderately screened. The development contrasts less with the existing landscape context and would be a noticeable adverse/beneficial feature
Slight	Proposed development would be perceived in the distance or far distance. Full extent of development may be visible or partially screened or at closer distance and substantially screened. Development may contrast with the existing landscape context but would be a visible adverse/ beneficial feature
Negligible	Proposed development would be perceived in the far distance (3km +) or partially or substantially or completely screened. Development may contrast with the existing landscape context but would be a negligible or barely discernible adverse/ beneficial feature

Once the above two factors are determined for each identified landscape and visual impact receptor, then these are combined as shown schematically in Table 4.10, to assess the level of impact.

Table 4.10 Predicted Level (i.e., Weight) of Impacts of Different Type and Magnitudes Upon Receptors of Different Degrees of Importance or Sensitivity

	Value /Importance of Receptor				
Impact Type and Magnitude	***Inter-national*** *(very high)*	***National*** *(high)*	***County*** *(moderate)*	***Local*** *(Low)*	***Unvalued*** *(Poor)*
High (e.g., large scale, long-term, irreversible)	Major	Major	Moderate	Minor	Negligible
Medium	Major	Moderate	Moderate	Minor	Negligible
Small (e.g., small scale, short term, recoverable impact)	Moderate	Minor	Minor	Negligible	Negligible
Negligible (e.g., small impact and unlikely to affect the landscape or visual receptor)	Negligible	Negligible	Negligible	Negligible	Negligible

The assessment has been undertaken by a Chartered Landscape Architect and their professional judgement and experience has been used to assess the potential landscape and visual impacts of the Development. Whilst there are no hard and fast rules as to what is considered to be a significant impact, the above matrix has been used as the basis. Generally, impacts lower on the scale and to the right are less likely to be significant.

Effects are classified on the basis of their nature and duration as follows:

- **Beneficial** – effects that have a positive influence on receptors and resources;
- **Adverse** – effects that have a negative influence on receptors and resources;
- **Temporary** – effects that persist for a limited period only (due for example, to particular activities taking place for a short period of time);
- **Permanent** – effects that result from an irreversible change to the baseline environment (e.g., land-take) or which persist for the foreseeable future (e.g. noise from regular or continuous operations or activities);
- **Direct** – effects that arise from the impact of activities that form an integral part of the scheme (e.g., direct employment and income generation);
- **Indirect** – effects that arise from the impact of activities that do not explicitly form part of the scheme (e.g., off-site infrastructure upgrades to accommodate the development);
- **Secondary** – effects that arise as a consequence of an initial effect of the scheme (e.g., induced employment elsewhere); and
- **Cumulative** – effects that can arise from a combination of different effects at a specific location or the interaction of different effects over different periods of time.

4.4.3 Application of the Methodologies to Prepare the Baseline

4.4.3.1 The Landscape Baseline

This was prepared by a desk study review, responding to consultees, and field surveys as set out below. While landscape and visibility are treated separately, the data for both are collected by means of many of the same steps. Section 4.4.3.6 below discusses those elements that apply to the visual baseline only.

The study area for the LVIA has been set as a 2-kilometre (km) radius from the planning application boundary for the Site and encompasses the villages of Burgh St. Peter, Aldeby, and the outskirts of Barnby to the south, as well as the many isolated hamlets and farmsteads in the surrounding countryside. Beyond 2km, it was concluded that the Development is highly unlikely to have any meaningful influence on landscape character or visual amenity due in part to its limited height.

A detailed study area of 1km radius around the Site has been used to appraise the effects of the Development on residential properties and public rights of way. The extent of the study area is shown on Figure 4.1 and Figure 4.2.

4.4.3.2 Desk Based Study

Information for the LVIA was gathered from the following key sources:

- South Norfolk Council's Development Management Policies document and associated Policies Map (Adopted 26th October 2015);
- Joint Core Strategy (Adopted 2011 and Amended 2014);
- The Broads Local Plan (Adopted May 2019);
- Natural England (2013), National Character Area Profile 80. The Broads;
- Land Use Consultants Landscape Character Assessment of the South Norfolk District (2001): C2 Thurlton Tributary Farmland with Parkland;
- Ordnance Survey mapping at 1:50,000 and 1:25,000 scales;
- Aerial Photography;
- Web GIS data bases;
- Lidar data;
- MAGIC website; and
- Google Earth, Street View and Maps.

4.4.3.3 Consultation Responses

These were received in early January 2021. While the initial desk-based study and remote sensing had been undertaken by that time, an additional site visit was made on 22 January to assess particular views that were identified by consultees. Refer to Paragraph 4.3 above.

4.4.3.4 Field Study

Following the desk-based appraisal, receipt of consultation responses and a review of the ZTV plans, fieldwork was undertaken in mid-September 2020, and January 2021.

Key activities undertaken during the fieldwork stage to assess landscape were:

- To augment and verify published descriptions of landscape character with fieldwork observations;
- To identify landscape resources including landscape character, landscape sensitivity, landscape features and landscape elements;
- To identify landscape features and elements that may be altered or removed because of the Development.
- To undertake an assessment of the quality or condition of the baseline landscape

- To establish features and elements that could provide mitigation and enhancement if further landscape treatments were undertaken as part of the proposals.

Landscape context and the landscape baseline including Public Rights of Way (PROW) are illustrated on Figures 4.3 and 4.4.

4.4.3.5 Landscape Value & Sensitivity

The methodology has been applied to this site as set out above. The highest value landscape within the Study Area is The Broads, and the site lies within its setting, so any impact (as per Section 4.4 above) on The Broads is evaluated accordingly. Local landscape character is also considered, although at a Moderate level of sensitivity, and effects on the site's intrinsic landscape value is also considered. The intrinsic value of the landscape coupled with its sensitivity to change (in reference to the proposals being considered for this EIA) determines the overall sensitivity of the site. This is described for each receptor in the Assessment.

4.4.3.6 Visual Baseline

While the visual baseline shares many elements with the landscape baseline, there are some differences in the source material used. This includes the preparation of a ZTV, consideration of views identified by consultees, and field work and photography from identified Viewpoints.

4.4.3.7 Zones of Theoretical Visibility (ZTVs)

Two ZTVs have been prepared: 'bare-earth' and 'augmented' or screened, refer to Figures 4.6a and 4.6b. The bare-earth ZTV illustrates theoretical visibility of the Development without the benefit of screening afforded by buildings and vegetation and, as such, it represents a '*worst-case scenario*'. The screened ZTV takes account of screening by buildings and woodland in excess of 3 m high (identified from OS Vector Map District Data), however, it does not take into account hedgerows, individual and groups of trees and other scattered vegetation which are characteristic features of the study area. Therefore, actual visibility of the Development is likely to be much less than that indicated by the screened ZTV when factoring in additional screening by lower hedgerows and scrub, etc. The augmented ZTV (Figure 4.6b) illustrates the areas with theoretical potential for inter-visibility with the Development. This however only notes taller and significant areas of major woodland and hedgerows and there is a higher level of containment afforded by less established woodlands, hedgerows and scrub within the wider landscape which this does not include.

The screened ZTV was used to set the parameters for determining the visual baseline. This comprises an initial site visit and the preparation of a series of photographic panoramas. Several viewpoints have been selected to illustrate likely views of the Development from nearby residential properties, local road network, public rights of ways (PROW) and other publicly accessible locations. Some of the viewpoints described also illustrate the local landscape context surrounding the Site. The main areas with theoretical visibility indicated by the ZTV are listed below relative to the principal points of the compass:

- To the north, patchy visibility for the area between Mill Lane and Common Road south of the business park;
- To the east, there is limited identified visibility apart from an area south of Boons Heath;
- To the south, there are patches of potential high visibility in the environs of College Farm and Eastend Farm and further to the south at Long Dam Level; and
- To the west, along St Mary's Road and west of Oaklands Farm.

Beyond 1 km of the Site, the augmented ZTV indicates very little theoretical visibility of the Development particularly to the north. When factoring in additional screening by intervening built form, hedgerows, trees, and other scattered vegetation not included in the ZTV model, it is highly unlikely that any views of the Development would be gained beyond this distance. A radius of 1 km was considered appropriate given the low-rise nature of the Development and the strong integrity of hedgerows, trees and wooded areas which characterise the wider area.

In this instance, the following key receptor groups have been identified within the study area:

- Occupiers of residential properties (individually, in groups or part of larger settlements);
- Users of sign-posted recreational routes (long distance walking routes as well as local footpaths, bridleways, and byways);
- People engaged in outdoor sport or recreation (walking or ornithology); and
- Users of the existing road and rail network (A and B-class roads, local roads, and railways).

Within these key receptor groups, the assessment of effects focusses on receptors who are most likely to undergo a change in visual amenity arising from views gained of the Development.

4.4.3.8 Visual Baseline Field work

Key activities to assess the visual baseline included:

- To identify any significant features and elements in the landscape such as vegetation or built form that would screen the Development;
- To visit each viewpoint location identified during the desk study and screening report, and to microsite each viewpoint location in accordance with good practice guidance and obtain accurate co-ordinates;
- To undertake viewpoint photography at each viewpoint location;
- To identify residential and recreational receptors;
- Roads; and
- Public footpaths, bridleways, and byways.

4.4.3.9 Visual Receptor Value and Sensitivity

For this Assessment, visual receptors include the people living, working and visiting in the Study Area. Where receptors are identified through an initial ZTV followed by site visits, a Viewpoint has been prepared. These are then assessed in terms of the activities of the receptors. See Table 4.5 above. The sensitivity of the receptor is assigned, and then the magnitude of the effect of development is considered. Significance is determined by means of the matrix as in Table 4.10 above.

4.4.3.10 Limitations of the Assessment

There are three areas that should be considered: these include the effect of glint and glare may have on visual impacts, the way in which residential properties have been assessed; and finally, seasonal and weather effects on visibility.

Glint and glare studies are undertaken as a separate exercise. Their results have been discussed within the Planning Statement which accompanies the application, with a conclusion that there would be limited adverse effects on occupiers of residential properties within the vicinity of the Site. This is due to a combination of the sensitive positioning of the panels, set back from the southern boundary of the Site, and screening by vegetation on or immediately adjacent to the southern boundary which, together, restrict views north towards the panels. As such glint and glare have not been addressed within the LVIA,

although proposals to address any identified impacts have been included within the mitigation approach (refer to Section 4.8 Mitigation).

Changing weather patterns and local climatic conditions would influence visibility of the Development in terms of the extent of view, the colour and contrast of the solar panels and thus the perceived visual impact. There would be periods of low visibility (i.e., fog, precipitation, low cloud, and bright sunny conditions that are accompanied by haze) as well as periods of higher visibility in clear weather.

In some instances, at certain times of day and from some locations, the panels may be reflective and therefore of greater visibility in long-distance views during periods of bright sunshine.

The assessment of residential properties, or groups of properties, is limited to those within approximately 1km of the Development. A number of these properties are accessed from private roads and due to the limitations of access, they have been assessed from the nearest public road or footpath with the aid of aerial photographs. In these cases, the assessment should be regarded as an informed assessment of the likely visual effects.

4.4.4 Visual Baseline

A summary of the final viewpoints included in the LVIA is provided in Table 4.11 below. The location of the viewpoints is shown in conjunction with the ZTVs on Figures 4.5 Viewpoint Location plan. All viewpoints are restricted to publicly accessible locations, of the viewpoints assessed, Viewpoints 1 to 5, 7 and 8 are from the local road network and the series of sequential viewpoints which comprise viewpoint 6 are from a long-distance footpath (Angle's Way) within The Broads.

Viewpoints were assessed during the autumn (September) when the filtering and screening of views by deciduous vegetation when in leaf was still effective. After consultation (see 4.3) these, and additional, viewpoints were reviewed in January when the views were less filtered by vegetation. Baseline photographic panoramas obtained from each viewpoint in the direction of the Site are illustrated on Figures 4.8a-h Viewpoints 1-8. The identified viewpoints that are considered potentially sensitive receptors are set out below.

Table 4.11: LVIA Selected Viewpoints

Viewpoint Number	Viewpoint Name	Reason for Selection	Distance to the Site (m)
1	Common Road looking into former landfill site entrance	Viewpoint illustrates the landscape context	Adjacent
2	College Cottages on St Mary's Road	Viewpoint illustrates the landscape context and is also representative of views available from a cluster of properties to the immediate south west of the Site	140 m
3	College Farm	Viewpoint illustrates the landscape context and is also representative of views available from College Farm	256 m
4	Boons Road	Viewpoint illustrates the landscape context and is also representative of the views available from the boundary of The Broads National Park and its setting	Adjacent
5	Oaklands Farmhouse	Viewpoint illustrates the landscape context and is also representative of views available from a limited number of residential properties and the network of lanes to the North	280 m

Viewpoint Number	Viewpoint Name	Reason for Selection	Distance to the Site (m)
6	The Broads	Sequential viewpoints illustrate the landscape context of the setting and visibility of the Site from The Broads National Park from the River Waveney and Angles Way, a public right of way.	1200 m (1.2km)
7	St Mary's Road	Viewpoint illustrates the landscape context and is also representative of views available from the west	400 m
8	Lily Lane	Viewpoint illustrates the landscape context and is also representative of views available from the west	1000 m (km)

4.5 Baseline

This is divided into the landscape baseline and the visual baseline although there is an overlap. Refer to sections 4.4.3.1 and 4.4.3.6.

This section describes the baseline landscape character and visual amenity against which the Development would be appraised. The methodologies set out in Section 4.4.2.2 have been applied.

An assessment of the baseline landscape character has been considered at three levels:

- National landscape character, in relation to National Character Area (NCA) profiles produced by Natural England[19];
- Regional/ local landscape character, in relation to Local Landscape Character Areas (LLCAs) identified in Land Use Consultant's Landscape Character Assessment of the South Norfolk district[20,21]; and
- Character of the Site and its immediate context based on field observations.

Refer to Figure 4.7 Landscape Character.

4.5.1 National Landscape Character

The Site falls within the National Character Area (NCA) 80: The Broads, as defined by Natural England. This NCA follows the route of three tidal rivers and their tributaries and accompanying low-lying floodplains to the coast. It covers the entirety of the Norfolk Broads and its immediate setting. The Site is located just within a southern extension or finger of the NCA that follows the route of the River Waveney from Ditchingham in the west to the outskirts of Lowestoft in the east.

Further to the North the NCA South Norfolk and High Suffolk Claylands extends into the 2 km study area, however this area NCA has limited inter-visibility with the Site and has therefore been scoped out of this LVIA.

[19] Natural England 2013, National Character Area Profile 80. The Broads. Available online at: http://publications.naturalengland.org.uk/publication/5331490007154688?category=587130 (Accessed on 17/08/2020).
[20] Landscape Character Assessment of the South Norfolk District (2001). Available online at: https://www.south-norfolk.gov.uk/residents/planning-and-building/planning-policy/landscape-character-assessments#:~:text=Landscape%20Character%20Assessments%20are%20comprehensive%2C%20detailed%20studies%20of,evidence%20to%20support%20the%20emerging%20new%20Local%20Plan.(Accessed on 18/09/2020).
[21] Broads Landscape Sensitivity Study for Renewables and Infrastructure (Final Report, LUC July 2012) https://www.broads-authority.gov.uk/__data/assets/pdf_file/0018/185220/LSS-PART-1.pdf (Accessed 05/10/2020)

4.5.1.1 NCA 80: The Broads

The key characteristics of the NCA are set out in a supporting document or 'profile', which was updated by Natural England in 2013. Several of these characteristics are represented in the study area and are relevant to this LVIA. They include:

- "The landscape is low-lying with some areas below sea level and has characteristic open, extensive views over slow meandering rivers, drained marshland and coastal plain in the lower valley flood plain. Views inland are framed by the tree-lined valley ridge lines
- The middle, upper and narrow incised side valley tributaries are small-scale, low, and enclosed often supporting woodland
- Rivers dominate the landscape with the middle and lower reaches flowing between flood banks, above the level of the surrounding land which is drained by dykes, ditches and pumps
- The Broads which are former flooded peat workings, form naturally nutrient-rich shallow lakes of various sizes surrounded by fens, we woodland and large expanses of reedbed, rich in biodiversity
- Woodland cover is generally sparse, especially in the marshland area. Small areas of mainly deciduous woodland occur around the Broads. Carr woodland and willow pollards are typical of the wetter areas, while broadleaved woodland is present as copses and plantations on higher land
- Glacial deposits of outwash gravels and till are in many places overlain by peaty, loamy and clayey flood plain alluvial soils. Where drainage has been carried out, the fertile soils support arable production while in the wetter areas grazing marsh is common
- Field patterns are principally defined by drainage over most of the Broads. Regular 18th and 19th century enclosure fields (generally marshland) are clearly defined by straight, reed-fringed drainage ditches that form a strongly geometric layout across the lower flood plain. Some earlier curvilinear enclosure of marshland also survives
- Much of the Broads is remote and isolated with settlements clustering on higher ground inland, linked by the few roads that run along the valley sides. Isolated farmhouses are the most significant buildings in the marshes
- Vertical features are very distinctive in this generally flat landscape and include some very fine medieval churches on the higher ground and several traditional drainage mills located on embankments flanking some of the drainage channels on the marshes and coastal plain
- Traditional buildings make use of flint, pebble, and brick walls, with pantiles and rare surviving reed thatch
- The road system is limited and follows the edge of the rising land, although footpaths and boat access are extensive…
- The sense of tranquillity and wildness is integral to the distinctiveness of the Broads, inspiring many writers, artists and naturalists and increasingly its popularity as a recreation and tourist destination, which is notable within the popular villages particularly during the summer months."

These characteristics are likely to be represented over a wide area of the NCA. As such, any changes at the Site level relative to the NCA would be extremely small in scale and are unlikely to impact upon those key landscape characteristics identified for the NCA. As such, the NCA is not considered further in the LVIA.

4.5.2 Regional/ Local landscape Character

At a regional/ local level, the main source of reference has been the South Norfolk Landscape Character Assessment (2001)[22] and updated and reviewed by Chris Blandford Associates (in 2012) to support the emerging Local Plan. A more recent detailed assessment has not been found.

This district wide assessment divides South Norfolk into seven different landscape typologies: Rural River Valley; Tributary Farmland; Tributary Farmland with Parkland; Settled Plateau Farmland; Plateau Farmland; Valley Urban Fringe; and Fringe Farmlands. These areas were then sub-divided further to establish 20 discrete Local Landscape Character Areas (LLCAs).

The LLCAs relate to those broad NCAs identified by Natural England but take account of minor and subtle variations in natural and human processes which have shaped the landscape at a more local level. The LLCAs are named specifically to reflect their landscape typology and geographical location within the county (e.g. Tas Rural River Valley; Tas Tributary Farmland etc).

The Site is shown to be within C2: Thurlton Tributary Farmland with Parkland area. The area directly south of the Site within The Broads is subject to the Landscape Character and Sensitivity Assessment by LUC ((2017). This LLCA which adjoins the Site to the south of St Mary's Road and is within The Broads boundary is LLCA 4: Waveney – Aldeby to Burgh St. Peter.

Characteristics of these two LLCA with the potential for landscape effects are summarised below.

4.5.2.1 Area C2 Thurlton Tributary Farmland with Parkland

This LLCA is located on the southern and outer limits of the South Norfolk Landscape Character Assessment area. The landform is flat, rising gently from the lower lying River Waveney flood plain to the south and east. Small tributaries (becks) dissect the flat plateau and provide some minor variation in landform as they drain to the east.

It is predominantly comprised of arable farmland with medium-large scale field pattern. It is sparsely settled with larger villages associated with becks and isolated hamlets and historic farmsteads such as Oaklands Farm. A network of rural lanes and PROW link the hamlets and farmsteads.

It is generally an open character however areas of enclosure are provided by roadside hedgerows, woodland blocks and pine shelterbelts which are often associated with the Halls and historic parklands such as Aldeby Hall and Wheatacre House which are a distinctive feature of this landscape.

There are a few minor detractors such as the presence of sand and gravel sites which reflect the underlying geology and the pylons which form visible vertical features in the wider landscape.

The suggested landscape management prescriptions include:

- Re-instate field boundaries.
- Manage woodlands to conserve character and enhance biodiversity.
- Consider the opportunity during sand and gravel site restoration adjacent to the River Waveney of recreating heathland.
- Maintain key views into and out of The Broads; and the

[22] Landscape Character Assessment of the South Norfolk District (2001). Available online at: https://www.south-norfolk.gov.uk/residents/planning-and-building/planning-policy/landscape-character-assessments#:~:text=Landscape%20Character%20Assessments%20are%20comprehensive%2C%20detailed%20studies%20of,evidence%20to%20support%20the%20emerging%20new%20Local%20Plan.(Accessed on 18/09/2020).

- Integration of development into the wider landscape with new woodland planting to create green linkages or wildlife corridors.

4.5.2.2 Area 4 Aldeby to Burgh St Peter LLCA

This LLCA is described as having a strong visual connection to the area south of the river but a 'somewhat corridor feeling' at lower lying levels. There are blocks of carr woodland which create an enclosed and intimate scale with the marshland to the east more open with a 'big sky' character.

The character analysis identifies the LLCA 4 and the landscape adjoining the executive area as having a high sensitivity to photovoltaic development. However, a more fine-grained analysis, would suggest that the area of the site and its environs do not conform to that sensitivity level, given the high level of containment from topography and vegetation which filter views. The current land use shows the area to be a working and productive landscape with farming, and former quarrying and landfill operations.

It is not disputed that the LCA is generally sensitive, but the site and surroundings are less so.

4.5.3 Landscape Character of the Site Area

The character of the Site and its immediate context has been informed by a review of published landscape character assessment (described above), supplemented by site investigations.

4.5.3.1 Landscape Character of the Solar Site

The Site, as defined by the redline application boundary, extends to an area of 11.7 hectares (ha), excluding the existing site access. It comprises a former landfill site, which is in the process of being restored. It is divided into discrete cells and is now permanently capped.

The Site is comprised of a variety of landscape elements, which give it its overall character. Some of these are of recent origin and extend beyond the redline boundary into the wider area of the original landfill landholding to the North. These features have been broken down into four categories, industrial, regenerating site semi-natural habitats, adjacent semi-natural planting of mainly recent origin; and the wider landscape context:

- Industrial features include:
    - The engineered restored landfill landform, which rises to the north east from the southern boundary, rising from 15m AOD to 28m AOD. This is relative to Ordnance Survey contour mapping of the wider area (1:25,000 scale), which shows a 10m AOD contour along the eastern section of St Mary's Road which abuts The Broads National Park;
    - Boundary fencing;
    - Bare access tracks currently used for maintenance access;
    - Signs;
    - Surface water ditches and areas of standing water; and
    - Vertical pipes which protrude through the surface of the landfill and connect with other pipes laid on the surface.
- Restored or semi-natural features within the red line boundary include:
    - Rough grassland covers the restored landfill area;
    - Established trees and intermittent hedges along most of the Site boundaries;
- Outside of the red line boundary there is:

- A large block of established deciduous woodland and field boundary hedgerow adjoining Oaklands Farmhouse to the north and scrubby, intermittent hedgerows along the eastern, and western boundaries;
- An extensive area of sandy heathland (Boon's Heath) and woodland abuts Grays Road to the east of the Site and extends to The Broads National Park boundary.

The general topography of the wider study area is shown on Figure 4.3 Topography.

There are a few residential properties within the immediate vicinity (500m) of the Site. These clusters are situated within generally flat landscape, where intervening built form, existing woodland, and hedgerows limit and filter views to Site. Beyond this the landscape context is arable farmland to the north and marshland to the south. The outskirts of Burgh St Peter village have clusters of dwellings at Oaklands Farm and Common Farm on Common Road (300m+) and linear settlement along Mill Road (750m+).

4.5.4 Landscape Designations

Landscape-related designations and protected features identified within the study area are summarised below and shown on Figure 4.4.

4.5.4.1 National Park

The boundary to The Broads, which has equivalent status to a National Park, abuts the Site's southern boundary on St Mary's Road.

The Broads are unique in that they share the primary functions of the other fourteen National Parks which are conservation and the promotion of the understanding and enjoyment (which includes recreation) of the special qualities of the designated area alongside a third function which is the management and protection of the waterways and the interests of navigation.

The special qualities of The Broads are described in the Broads Authority Local Plan (Adopted 17th May 2019, page 22) as:

- Rivers and open water bodies;
- Fens, reed beds, and wet woodlands;
- Grazing marshes and dyke networks;
- Flood plains, estuary, and coast;
- Navigable, lock-free waterways;
- Special wildlife and countryside access on land and water;
- Views, remoteness, tranquillity and 'big skies';
- The people, visitors, and activities;
- History: earth heritage, heritage assets, archaeology, historic structures;
- Cultural assets, skills, and traditions;
- Peoples interaction with the landscape;
- The settlements;
- Variety of patterns; and
- Textures of the landscape.

The Broads area between Aldeby and Burgh St Peter is recognised for its purpose as a 'washland', and is regularly flooded by partially saline water which has given rise to a rich biodiversity locally. There are few cultural or heritage features here and are limited to a scattering of 17th – 18th century farmsteads and rectilinear grazing marsh along the river corridor. The area to the north of this section of the River Waveney is a working and productive landscape with farming infrastructure evident, and a recent history of quarrying and waste disposal. There is limited public access to the northern bank of the River Waveney other than by boat.

Consideration has been taken to assess any residual landscape effects on The Broads within this LVIA. In addition to ensuring that the Development is sited to minimise visual intrusion into the surrounding area, the LVIA will also inform the extent to which mitigation is necessary to assimilate the Development into the locality and meet objectives within The Broads Local Plan for habitat creation.

4.5.4.2 Listed Buildings

There is one grade II listed building within 500m of the Site with the potential for inter-visibility: Oaklands Farm (280m approx.) Beyond the 500m study area there are a number of buildings listed, including several isolated farmhouses and a small cluster associated with the historic centre of Aldeby (1.4km distant approx.). The majority are grade II with the of exception of the Church of All Saints (1.3km) and the Church of St Mary (1.4km), which are both Grade I.

4.5.4.3 Sites of Special Scientific Interest (SSSI)

Bramby Broad and Marshes, which is currently in a favourable condition is located 760m south east of the Site.

4.5.4.4 Ramsar Site

Castle Marsh (760m south east of Site) is a Ramsar Site which is recognised as a wetland area / waterfowl habitat of international importance designated under the Ramsar Convention.

4.5.4.5 Special Protection Area (SPA) and Special Area of Conservation (SAC)

Broadland SPA and The Broads SAC are both situated 760m south east of the Site within the boundary of The Broads National Park boundary.

4.5.5 Visual Baseline

4.5.5.1 Settlements and Residential Properties

The Site is in a rural landscape in which the local settlement pattern within the study area is limited to villages, and a variety of dispersed hamlets with a scattering of isolated farmsteads and residential properties along connecting roads. There are larger settlements such as Lowestoft in the wider context. This pattern of settlement is shown on Figure 4.1.

The main settlements identified within the study area and included in the assessment are:

- Burgh St Peter located to the North of the site with ribbon development extending down Mill Lane (approx. 400m+ from Site).
- Aldeby located (1.3km+) northwest of the Site; and
- a variety of hamlets and dispersed manor houses such as Aldeby Hall (1.8km west) and Wheatacre House (approximately 1.7km+ north west).

In addition to the main settlements, there are a few isolated properties, small groups of properties and farmsteads scattered across the study area from which views of the Development may be gained. The LVIA appraises potential effects on occupiers of properties within approximately 1km of the Site.

The nearest residential properties include:

- College Cottages (136 m to the southwest of the access track and 240m from the closest panels);
- College Farm (approximately 256 m south of the Site);
- Oaklands Farmhouse and Hope Cottage (approximately 280 m north of the Site); and

- Cluster of properties including York Cottages, The Hovel and Greenways on Taylors and Mill Road (approximately 400 m north of the Site).

In considering effects on views gained from these settlements, the assessment takes account of any public open spaces or public realm areas included within the settlement boundaries as well as residential areas that make up the built form.

4.5.5.2 Recreational Routes

No national trails or national cycle routes pass through the study area, but a long-distance footpath, the Angles Way passes within 800m of the Site to the south. This long-distance footpath is 124km long and stretches from Great Yarmouth to Thetford. It follows the route of the River Waveney from Beccles to Lowestoft.

A limited number of public footpaths, bridleways and byways also cross the study area and are included in the assessment. These are shown on Figure 4.4.

The routes most likely to be affected (See 4.4.4) are listed below in order of increasing distance from the Site.

- Aldeby FP 12 and FP 14 which connects Mill Hill to Green Farm (750m+).
- Burgh St Peter FP 4 and 5 which extend from Staithe Road to Burgh Road;
- Angle's Way long-distance footpath (800m+); and
- Burgh St Peter FP 6 and FP 7 which extends from Mill Hill, Aldeby to adjacent Green Farm, Burgh St Peter (all 1km+).

4.5.5.3 Transport Routes

The Beccles to Lowestoft railway line is the only major transport route to pass through the study area. A network of narrow and local un-classified roads (4m wide approx.) and tracks cross the study area and are included in the assessment. Routes within approximately 1km of the Site have the most potential to experience a visual effect arising from the Development and consequently the LVIA focuses on these. Routes with potential for inter-visibility with the Site are listed below and can be identified on Figure 4.4:

- Common Road to the west of the Site (the existing Site entrance is located here) and connects to Rectory Road further to the North.
- Taylor's Road (250m to the north) which connects to Mill Road.
- Grays Road (165m east).
- St Mary's Road (adjoins the southern and eastern boundary).
- Mill Road (north east of Site within Burgh St Peter).
- Lily Lane (600m+); and
- Majority of the Beccles to Lowestoft railway line (1.8km+).

4.6 Receptors Scoped Out of the LVIA

Further to the information presented above, a few landscape and visual receptors have been scoped out of the LVIA. These are listed below.

Landscape Receptors

The following landscape character receptor have been scoped out due to a combination of distance and the very small geographic area included in the study area with potential to be affected by the Development. The limited extent of theoretical visibility indicated by the augmented ZTV for some of these receptors has also been a factor:

- NCA 83: South Norfolk and High Suffolk Claylands;
- LLCA 3 Waveney – Barsham, Gillingham and Beccles Marshes;
- LLCA 5 Waveney – Worlingham Wall to Boundary Dyke, Barmby;
- LLCA 7 Waveney Valley – Burgh St Peter to Haddiscoe Dismantled Railway;

- The Suffolk Coast National Heritage Designation; and
- The Suffolk Coast & Heaths AONB.

Visual Receptors

The following receptors have been scoped out since little or no theoretical visibility is indicated by the augmented or screened ZTV:

- Majority of Burgh St Peter;
- Wheatacre;
- Aldeby Hall;
- Majority of Aldeby;
- Staithe Road;
- Grays Road;
- Majority of Mill Road;
- Most of Lily Lane;
- Aldeby PROW FP 12 and 14;
- Burgh St Peter PROW FP 4, 5, 6 and 7;
- Sutton Farmhouse;
- The Shrublands;
- The Suffolk Coast National Heritage Designation; and
- The Suffolk Coast & Heaths AONB

4.6.1 Night-time Baseline

The southern parts of the study area are comprised of marshland and the River Waveney corridor and the sparsely populated outskirts of Barnby, however there are a few small settlements within the extended 2km study area which are a potential source and receptor of light pollution. They include the villages of Aldeby, Burgh St Peter, and the smaller hamlets and dispersed and scattered houses in the area north of the Site.

4.6.2 Future Baseline

The Site is a restored landfill operation and there is an existing approved interim and final restoration scheme. This embedded restoration scheme is discussed at paragraph 2.7.2.2.

Preliminary landscape restoration proposals for the landfill operation have been implemented and will form the future baseline. Visual containment and filtering of views will increase as planting matures and the immediate landscape context will acquire a more coherent appearance.

4.7 Assessment of Likely Effects

The likely effects are appraised, and their significance evaluated as described in Section 4.4. For this EIA, these are divided into Construction and Operation Phases.

4.7.1 Construction

The construction phase of the Development is described in Section 2.4.

4.7.1.1 Landscape

Overall, the effects of construction on landscape resources would be restricted to small geographical areas within the Site and would not result in the removal of any important or unusual landscape features. The effects would be of short duration (3-4 months); generally localised in impact and would not have adverse influence on the existing character of the C2 Thurlton Tributary Farmland with Parkland LLCA in which the Site is located, beyond the Site itself and a limited number of viewpoints / receptors.

4.7.1.2 Visual

The visual effects of construction would be restricted to views of construction activities at the Site entrance and limited and glimpsed views from some sections of Common Road, St Mary's Road, Boon's Road and a short section of Taylor's Road. There will be filtered and intermittent views in winter from Angle's Way. These effects would be of a temporary nature and have a localised impact forming a small component of a view and would not have any meaningful influence on visual amenity beyond the Site.

4.7.2 Operation

4.7.2.1 Landscape

An overview of the operation phase of the solar park is described in Section 2.5.

The landscape will take on a more settled appearance as the Site enters its operational phase. Minimal lighting will be required, limited to bulk head lighting above the access doors to the DNO and client switching station kiosks for health and safety reasons. Access will only be required for maintenance activities.

4.7.2.2 Visual

The Development would be visible from a select number of locations; the potential for indirect effects on the surrounding landscape and visual receptors would be restricted to a small number of locations and receptors.

4.7.3 Decommissioning

The procedures of the de-commissioning of the Development are described in full at Section 2.5.

4.7.3.1 Landscape

The Site would be fully restored at the end of the temporary planning permission to the approved embedded restoration strategy in relation to the landfill operation. Decommissioning will be undertaken at the end of the operational phase, which is expected to be 35 years. The landscape will have taken on a more coherent and vegetated appearance by this time and landscape effects will be negligible and short-term.

4.7.3.2 Visual

The de-commissioning process would have similar short-term effects as the initial construction phase, although visual effects will be of a lesser magnitude as the boundary vegetation and the additional planting will have had time to grow to maturity. The visual effects of de-commissioning would be restricted to views of activities at the Site entrance and limited and glimpsed views from some sections of Common Road, St Mary's Road, Boon's Road, and a short section of Taylor's Road. Depending upon the timing of de-commissioning there may be glimpsed and extensively filtered and intermittent views in winter from Angle's Way to some activities on the landfill landform. These effects would be of a temporary nature (approximately 3 months duration) and of a localised impact.

4.8 Embedded Mitigation

The existing dense road boundary and blocks of woodland adjoining the Site, provide a moderate degree of visual containment particularly from the North. However, there are intermittent and glimpsed views revealed from roads and public rights of way to the east and south of the site and a limited and a filtered view from adjacent residential properties (College Cottages).

The existing approved final restoration scheme associated with the landfill operation illustrated the embedded mitigation for the Site and shows the Site restored to agriculture with internal field boundaries comprised of hedgerows, tree and shrub belts to the boundaries, a series of surface water lagoons and small woodland copse planting. Any further landscape proposals will be an enhancement to these existing mitigation measures.

The Site is located within the immediate setting of The Broads. To help integrate the proposal into the wider landscape the following additional landscape treatments are proposed:

- Hedge planting (with a percentage of native evergreens such as native yew and holly) interplanted within existing vegetation to infill gaps and reinforce the existing boundary vegetation and soften and filter the limited views to Site. Planting will be concentrated along the access track in the south west near College Cottages and provide green linkages to the fenland landscape to the south;
- New hedge planting with standard trees randomly situated along the northern boundary of the solar array to further filter any potential glimpsed views from the limited number of residential properties located on Common Road, Taylors Road, and Mill Road to the north; and
- Other measures incorporated with the Development to improve its biodiversity value include:
    - the retention of the existing grassland under the solar panels with a graded edge with scalloped bays to boundary hedgerows; and
    - Logs and brushwood produced during woodland management operations may be used to provide biodiversity enhancements such as log piles and hibernacula.

Details of the approach to mitigation is shown on Figure 4.9.

4.9 Assessment of Residual Landscape Effects

This section considers the potential residual effects of the Development on the landscape of the area during its operational phase after implementation of the secondary mitigation measures described above. The effects on both landscape and visual resources are considered separately. Residual effects are those that are predicted to remain after implementation of the secondary mitigation measures described above.

The baseline assessment has established that there are four landscape receptors that are considered to have the potential to be significantly affected by the Development:

- C2 Thurlton Tributary Farmland and Parkland LLCA;
- Area 4 Aldeby to Burgh St Peter LLCA;
- The Site itself; and
- The Broads.

4.9.1 Landscape Character

4.9.1.1 C2 Thurlton Tributary Farmland and Parkland LLCA

South Norfolk Landscape Character Area C2 Thurlton Tributary and Parkland LLCA is the 'host' landscape for the Development and therefore has the most potential to be directly affected by it. The Site itself forms a very small part of the LLCA.

Intrinsic Landscape Value

In terms of value, the local landscape is undesignated, however, it does serve a wider landscape / visual function as the setting for The Broads National Park which adjoins the Site to the south. There are high value features within the wider rural and sparsely settled

landscape, and although the former landfill site within the LLCA is degraded it does not conflict with the sense of tranquillity and a local 'sense of place' within the LLCA.

It is assessed as being of **moderate value**.

Sensitivity to the Development

This LLCA was assessed following field work, as having **low sensitivity** to the Development due its visually contained location. The narrow lanes with dense hedgerows and woodland blocks and parkland features that characterises the local landscape affords moderate levels of enclosure and intimacy within the LLCA, which provides the landscape with the capacity to accept moderate levels of change without harm. There are few long-distance views. The Site itself is a former quarry and landfill operation which operated within the LLCA and is currently partially restored.

Nature and Magnitude of Change

The former use of the Site as a partially restored landfill operation ensures the Development would have little or no adverse effect on key characteristics and sensitivities identified for the LLCA. It would have some limited adverse effect on its immediate setting arising from the introduction of new, uncharacteristic elements (solar panels) extending across the Site, albeit contained by existing and proposed boundary vegetation.

The geographical extent over which these changes would be experienced would be relatively localised and largely limited to the immediate setting of the Site and short sections of adjacent local roads. There are glimpsed views through gaps or thinner sections of vegetation. At Year 1, the magnitude of change is judged to be **small**. At Year 15, the magnitude of effect would diminish i.e., **negligible adverse**.

Level of Effect

At Year 1, considering the moderate landscape sensitivity attributed to the LLCA as a setting for The Broads and the low adverse magnitude of effect predicted, the level of effect would be **minor adverse** and non-significant. At Year 15, with the increased screening from the proposed landscape mitigation, the level of effect would be reduced to **negligible adverse** and non-significant.

Impact Type and Magnitude	**Receptor Value**	**Assessment of Impact**
Year 1: *Small*	*Moderate*	*Minor adverse & non- significant*
Year 15: *Negligible*	*Moderate*	*Negligible adverse & non- significant*

4.9.1.2 Area 4 Aldeby to Burgh St Peter LLCA

This LLCA is south of the Site and forms a long band of grazing marsh between the Site and the River Waveney. The land here is low lying and very vegetated. There is limited public access to the northern side of the river here other than by boat. The landform rises up and the Site is located on a south facing slope that faces the lower lying land adjacent to the River Waveney. There is a tunnel like feel along sections of the lower lying land due to the riverside vegetation including reed beds, willows and carr woodland.

Intrinsic Landscape Value

This LLCA is within The Broads designation and is therefore an intrinsically **high value** landscape.

Sensitivity to Development

However, this LLCA has much farming infrastructure visible, and contains landscape features related to its historic land-use as a productive landscape containing quarry and

waste disposal operations. As a result, it is considered to be only **moderately sensitive** to change in the landscape**.**

Nature and Magnitude of Change

A new feature (solar panels) will be introduced to a restored landfill operation which is partially restored. The main components of the existing landscape character will not be affected by this proposal. The scale of the proposal is large-scale at 11.7ha but will fit within the confines of the existing vegetated boundaries of part of the landfill operation. The nature and magnitude of change from the base-line situation is therefore **small**.

Level of Effect

At Year 1, considering the **small** and reversible adverse magnitude of effect predicted, the level of effect would be **minor adverse** and non-significant. At Year 15, as the landscape takes on a more settled appearance, the level of effect would be reduced to **negligible adverse** and non-significant.

Impact Type and Magnitude	**Receptor Value**	**Assessment of Impact**
Year 1: *Small*	*Moderate*	*Minor adverse & non-significant*
Year 15: *Negligible*	*Moderate*	*Negligible adverse & non-significant*

4.9.1.3 Character of the Site and its Immediate Context

This part of the LVIA considers effects on the character of the Site and its immediate context where the influence of the Development would be greatest i.e., properties, roads, and PROW to the immediate south and west of the Site.

Intrinsic Landscape Value

As noted above, and described in Section 4.4, the Site is located within a partially restored landfill operation and, whilst displaying a rural character it also exhibits characteristics i.e., an artificial landform, that reflect its recent and continuing function. Overall, there is limited scenic beauty attached to the Site, but its lack of built form and open character does contribute to the surrounding rural character. It also exhibits characteristics i.e., an artificial landform, that reflect its recent and continuing function.

Its present value as a landscape is correspondingly **low.**

Sensitivity to the Development

The Site benefits from a high level of containment afforded by tall vegetation to its perimeter and from adjoining blocks of woodland and scrubby heathland. Existing landscape elements and features found on the Site (excluding boundary vegetation) are limited to rough grassland, small areas of scrub planting and boundary hedgerows and these could easily be replaced, or the loss satisfactorily compensated for. There is also very good potential for mitigation and enhancement of the type of change proposed, because of the established vegetation and surrounding vegetation which would enable effective green linkages to be created. This means that the landscape is resilient to change and has a **low sensitivity** to the Development.

Nature and Magnitude of Change

The main effects of the Development would be the addition of solar panels across the Site, together with related infrastructure. There would be a perceived change, as a new element is introduced to the landscape, although the existing use of the Site as a landfill site means that the context of this change is diminished.

The existing rough grassland that covers the Site would be retained (other than where localised removal is required to accommodate sub-stations and extend the access tracks), as would areas of internal scrub vegetation and hedgerows. Similarly, all boundary vegetation which encloses the Site and provides a high level of containment would be retained where possible and appropriately protected. In addition, several enhancements would be provided to improve the biodiversity value of the Development, including additional tree and hedgerow planting with areas of longer grass and scrub development to provide a graded edge of enhanced wildlife value.

Judgments about the magnitude of change on the character of the Site and its immediate setting considered the introduction of the solar panels and associated infrastructure contained by a strong framework of vegetation. These effects are judged to be **small adverse.** Judgments also consider localised enhancements, as described above, which at the Site level are judged to be small beneficial.

Level of Effect

At Year 1, considering the low value and moderate landscape sensitivity attributed to the Site and the low beneficial magnitude of effect predicted, the level of effect would be **negligible adverse** and non-significant. At Year 15, the level of effect would reduce as the landscape becomes more coherent and additional planting matures to less than **negligible adverse or neutral impact,** and non-significant.

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Year 1: *Small*	*Low*	*Negligible adverse & non-significant*
Year 15: *Negligible*	*Low*	*Negligible adverse or neutral effects & non-significant*

4.9.1.4 Assessment of Effects on The Broads National Park

As noted in Section 4.5.4.1 the Site and wider study area is either within The Broads designation or in its setting. There are 15 National Parks within the UK, including The Broads which has equivalent status to a National Park and their primary functions are to:

- conserve and enhance natural beauty, wildlife, and cultural heritage; and
- provide opportunities for the understanding and enjoyment of the special qualities of a National Park.

The existing use of the Site as a partially restored landfill means that it is not currently complementary to The Broads, but this baseline position does not directly influence the intrinsic value or reasons for The Broads designation.

Intrinsic Value of the Landscape

The Broads Local Plan describes the landscape of The Broads as,

"It is a landscape of contrast and surprise, with rivers and broads often concealed from immediate view by carr woodland, or extensive views across marshes to distant woodland and settlements, with the presence of an intervening river often only revealed by the procession of a boat's sail in the middle ground."[23]

It is as such a **high value** landscape.

Sensitivity to Development

[23] The Local Plan for The Broads, The Broads National Park Authority (Adopted 17th May 2019), Section 3.5, page 9. Available online at: https://www.broads-authority.gov.uk/__data/assets/pdf_file/0036/259596/Local-Plan-for-the-Broads.pdf (Accessed 02.10.20)

Although this area is rural in character it already contains large-scale farming infra-structure and there are features in the wider landscape context such as the urban fringe of Lowestoft. The Development would not detract from the existing landscape quality, features and characteristics of The Broads National Park given the extensive tree and vegetation cover surrounding the Site. The immediate landscape context includes College Farm and Eastend Farm in the foreground or adjacent to the Site in views from The Broads. Given the context, The Broads would be considered to have a **moderate sensitivity** to change as is proposed for this Development.

Nature and Magnitude of Change

There would be a small-scale alteration of the aesthetic and perceptual aspects of the landscape with. The magnitude of change arising from the Development within The Broads National Park would be **small** within the designated area (refer to Figure 4.6b) in comparison to the current baseline situation.

Level of Effect

The existing Site boundary vegetation will be enhanced with additional hedgerow planting inter-planted to infill gaps and provide a thicker screen with a graded edge of ruderal and longer grasses for biodiversity and to provide a softened edge to the Development. There would be no discernible deterioration to the existing overall landscape character of The Broads and the existing landscape context. The landscape effects would be **minor adverse,** and non-significant, in Year 1. In Year 15, as the landscape matures and develops a more settled appearance, the level of effect would be reduced to **negligible adverse**, and non-significant.

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Year 1: *Small*	*Moderate*	*Minor adverse & non-significant*
Year 15: *Negligible*	*Moderate*	*Negligible adverse & non-significant*

4.9.2 Summary of Predicted Landscape Effects

Table 4.12: Summary of Residual Landscape Effects: Local Landscape Character

Receptor	Impact Type and Magnitude	Receptor Value	Assessment of Impact
C2 Thurlton Tributary farmland and Parkland LLCA			
Year 1	*Small*	*Moderate*	*Minor adverse*
Year 15	*Negligible*	*Moderate*	*Negligible adverse*
Area 4: Aldeby to Burgh St Peter LLCA			
Year 1	*Small*	*Moderate*	*Minor adverse*
Year 15	*Negligible*	*Moderate*	*Negligible adverse*
Site and its Context			
Year 1	*Small*	*Low*	*Negligible adverse*

Year 15	*Negligible*	*Low*	*Negligible adverse to neutral*
The Broads			
Year 1	*Small*	*Moderate*	*Minor adverse*
Year 15	*Negligible*	*Moderate*	*Negligible adverse*

The main effect on landscape character would be largely associated with the change from a restored landfill site covered with rough grassland contained by an established framework of boundary vegetation, to rough grassland with solar panels and low-level ancillary development within the same context and sparsely populated rural landscape. All existing boundary vegetation would be retained, and appropriately protected and additional tree and hedgerow planting implemented to enhance screening function. Where possible ecological enhancements would be incorporated within the Development proposals to improve the Site's biodiversity value.

The Development would not give rise to unacceptable effects on any landscape-related planning designations. Neither would it have greater impact or harm than the partially restored landfill. Similarly, the Development would not give rise to unacceptable cumulative effects on landscape character due to the nature of the surrounding landscape.

As the table above illustrates, residual effects reduce at the site level as embedded mitigation, and further mitigation and enhancements are put in place and establish. Thus, no harm arises to landscape character at the County (LLCA) level and some benefits as the Site level.

4.10 Assessment of Residual Visual Effects

The following assessment considers the potential for significant effects in relation to the agreed viewpoints, properties and settlements, tourist and recreational destinations including tourist routes as well as main transport routes, as discussed in Section 4.4.

4.10.1 Viewpoint Assessment

Eight viewpoint locations were identified in the visual baseline section (Section 4.4.4) to represent visibility from key visual receptor groups (e.g., residents, recreational walkers, road users, etc.) and orientation.

For each viewpoint, the following information is provided:

- A representative baseline photograph (90-degree horizontal angle of view) orientated in the direction of the Development to show the context of the viewpoint;
- A description of the existing baseline view; and
- A qualitative assessment of the potential visual effects, taking account of the sensitivity of the receptor and the predicted magnitude of change in view.

The location of the viewpoints is shown on Figure 4.5. Baseline photographic panoramas obtained from each viewpoint location in the direction of the Site are illustrated on Viewpoint Figures 4.8a-h.

4.10.1.1 Viewpoint 1 – Common Road looking into the Former Landfill Site Entrance

This viewpoint is located on Common Road a narrow single-track land looking in and along the former and partially restored landfill entrance.

Receptor Value

The receptor value is **high** given that it is in The Broads, and users may be engaged in recreational activity and travelling slowly to appreciate the setting.

Sensitivity to the Development

The road is very enclosed with banks to road-side and dense over-grown hedgerows and scrub on the verge boundary. The view opens at the current Site entrance to the steep man-made slopes of re-formed landform beyond. There is a glimpsed and transient view available as the receptor travels along Common Road past the Site entrance. As a result of the limited views and existing screening, visibility from this point is limited. The receptor thus has a **moderate s**ensitivity to change.

Nature and Magnitude of Change

There will be a glimpsed and partially filtered view of the access track and the solar panels. These would be located on the raised landform's south-facing slope and would be orientated to face the direction of the sun; however, an acute angle view of the panels may be available from this location. It is representative of potential views gained by road users, including horse riders and walkers who would typically be focused on the road ahead due to the narrow lanes. Elsewhere, the height and thickness of field boundary vegetation and roadside vegetation adjoining the lane is likely to prevent or filter any views. On balance, the magnitude of change is judged to be **negligible**.

Level of Effect

There is limited opportunity for mitigation in this location so the level of effect would remain the same. On balance, the level of visual effect is judged to be no more than **negligible adverse,** and non-significant. Refer to Figure 4.8a.

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Year 1: *Negligible*	Road users: *Moderate* Walkers: *Moderate*	*Negligible adverse & non-significant* *Negligible adverse & non-significant*
Year 15: *Negligible*	Road users: *Moderate* Walkers: *Moderate*	*Negligible adverse & non-significant* *Negligible adverse& non-significant*

4.10.1.2 Viewpoint 2 – College Cottages on St Mary's Road

This viewpoint is located on a narrow lane to the south west of Site adjacent to College Cottages. It is representative of views gained by users of the road and residents from the environs of their properties.

Receptor Value

It is located on the northern boundary of The Broads designation. As such it has a **moderate** value. While it is not within The Broads, it lies within its setting.

Sensitivity to the Development

The view is enclosed and mostly limited to an aspect along the single-track lane. There is a view towards the Site (away from The Broads) looking north east across residential driveway to cottages and horse paddocks. The roadside boundary hedgerows are 2m+ tall with a narrow, grassed verge to roadside with intermittent gaps at field entrances. The field boundaries have mature oaks and rear garden boundaries are comprised of a mix of deciduous hedgerows and evergreens. Given the immediate context, this receptor is no more than **moderately** sensitive to the visual change likely to arise if the site is developed as proposed.

Nature and Magnitude of Change

Assuming the field boundary and Site boundary vegetation are maintained at the current height, the former landfill can be glimpsed on the skyline, however the southern edge of the solar panels is located further into landholding and therefore mostly screened. On balance, the magnitude of change is judged to be **small adverse.**

Level of Effect

At Year 1, considering the moderate receptor sensitivity attributed and the small magnitude of change predicted, the level of effect would be **minor adverse,** and non-significant. At Year 15, assuming additional hedge and tree planting is implemented along the Site boundary adjacent to the access track and the current intervening vegetation continues to mature, any potential visibility of the solar panels will be reduced. On balance, the magnitude of effect is judged to be less than **negligible adverse**, and non-significant. Refer to Figure 4.8b.

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Year 1: *Small*	Road users: *Moderate* Walkers: *Moderate* Residents: *Moderate*	*Minor adverse & non-significant* *Minor adverse & non-significant* *Minor adverse & non-significant*
Year 15: *Negligible*	Road users: *Moderate* Walkers: *Moderate* Residents: *Moderate*	*Negligible & non-significant* *Negligible & non-significant* *Negligible & non-significant*

4.10.1.3 Viewpoint 3 – College Farm

This viewpoint is located on the track to College Farm looking north towards Site. It is representative of the general landscape context and potential views available to residents and road users from The Broads designation.

Receptor Value

This viewpoint is situated within The Broads designation and therefore the value of this view to road users and residents is heightened and is assessed accordingly as **high**.

Sensitivity to the Development

The view is an enclosed aspect along lanes with roadside hedgerows to the North and farm access track to the east. There are field boundary hedgerows with scattered trees on the verge boundary with a line of telegraph poles visible. Field boundaries are well maintained at 2m high although there are intermittent gaps and openings at field entrances. Given the context of the setting, this view is no more than **moderately** sensitive to the changes that the development would bring about.

Nature and Magnitude of Change

There are gaps and thinner sections of vegetation which will reveal views to the solar panels on the restored landfill landform, visible above the St Mary's Road boundary hedgerow. College Farm itself is situated within a grouping of farm buildings and any views to Site would be partially screened by intervening built form. The magnitude of change is assessed as **negligible adverse.**

Level of Effect

If extensive field boundary vegetation is retained and allowed to grow this would continue to screen or filter potential views to Site. At Year 1 on balance, the magnitude of effect is judged to be **negligible adverse,** and non-significant. In Year 15 if there is augmented hedgerow planting along the access track and inter-planted within the existing Site

boundary, viewpoints will be increasingly filtered. The magnitude of effect would diminish to **neutral effect,** and non-significant. Refer to Figure 4.8c.

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Year 1: *Small*	*Road users: Moderate* *Residents: Moderate*	*Negligible adverse & non-significant* *Negligible adverse & non-significant*
Year 15: *Negligible*	*Road users: Moderate* *Residents: Moderate*	*Negligible & non-significant* *Negligible adverse & non-significant*

4.10.1.4 Viewpoint 4 – Boons Road

This viewpoint is located adjacent to Boon's Heath looking west directly through perimeter fencing and intermittent Site boundary vegetation into land within the red line boundary.

Receptor Value

The location lies within the setting of The Broads. It is considered a receptor of **moderate** value.

Sensitivity to the Development

Boon's Road is a narrow continuation of St Mary's Road that follows the southern Site boundary and extends to the Eastend Farm access. There are views revealed through the perimeter fencing across a short distance of the Site and glimpsed views to The Broads and River Waveney corridor on the lower-lying land to the south. Intervening landform and boundary planting will conceal much of the Development within the red line boundary but intermittent boundary planting on a short section reveals a view through 2m high metal gates and chain link fencing. The sensitivity of this receptor is therefore considered to be **moderate.**

Nature and Magnitude of Change

There would be an oblique and transient view of the solar panels arranged on the landform facing south as the receptor passed the gate opening or gaps in boundary vegetation. The low height and dark hue of the panels would limit their visual impact. The magnitude of change is assessed as **small adverse.**

Level of Effect

In Year 1 the level of effect is assessed as **minor adverse**, and non-significant. At Year 15 if the boundary vegetation is not removed and 'gapped up', views would be increasingly filtered, and the level of effect will reduce to **negligible adverse**, and non-significant. Refer to Figure 4.8d.

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Year 1: *Small*	*Road users: Moderate* *Walkers: Moderate*	*Minor adverse & non-significant* *Minor adverse & non-significant*
Year 15: *Negligible*	*Road users: Moderate* *Walkers: Moderate*	*Negligible adverse & non-significant* *Negligible adverse & non-significant*

4.10.1.5 Viewpoint 5 – Oaklands Farmhouse

This view extends from the entrance to Oaklands Farmhouse at the junction of Taylors Road, Dun Cow Road and Common Road to the south across farmland. It is representative

of the general landscape context and views gained by residents of adjoining properties such as Hope Cottage as well as Oaklands Farmhouse, walkers, and road users of the Site.

Value of the receptor

This viewpoint is located within the setting of The Broads. There are a variety of users, whose activity varies. Three categories of users have been identified: walkers, who would be appreciating the landscape, drivers using the roads for access, and residents. The receptor value varies accordingly, so a value of **moderate** has been assigned to this receptor.

Sensitivity to Change

The outlook encompasses a filtered view through a line of mature oaks towards the former landfill site and land within the blue line boundary. Oaklands Farmhouse and associated barns, outbuildings, and materials are stored in the foreground and therefore form a dominant feature in the view. The restored landfill landform is artificially raised with steep sides rising from the boundary. The receptor is therefore **moderately** sensitive to the change proposed if this development were to be approved and implemented.

Nature and Magnitude of Change

There is a potential long-distance and glimpsed view of the solar panels arranged on the restored landfill landform facing south. Their dark hue and orientation to face south would ensure intervening vegetation and landform would largely screen or filter views. The magnitude of change is assessed as **negligible adverse or neutral**.

Level of Effect

In Year 1 the level of effect is assessed as **negligible adverse,** and non-significant. If the existing boundary vegetation is retained and the landscape continues to mature and becomes more settled, the magnitude of change will reduce further to a **neutral effect,** and non-significant. Refer to Figure 4.8e.

Impact Type and Magnitude	**Receptor Value**	**Assessment of Impact**
Year 1: *Negligible*	*Road users: Low* *Walkers: Moderate* *Residents: High*	*Negligible & non-significant* *Negligible & non-significant* *Negligible & non-significant*
Year 15: *Negligible*	*Road users: Low* *Walkers: Moderate* *Residents: High*	*Neutral & non-significant* *Neutral & non-significant* *Neutral & non-significant*

4.10.1.6 Sequential Viewpoint 6 – The Broads

After consultation additional sequential, and winter panoramic views have been taken to supplement the summer view of viewpoint 6 on Angle's Way PROW on the bank of River Waveney. These additional 12 views are representative of the general landscape context to the south of the Site within The Broads designation and views gained by people taking recreation along the Angle's Way in winter when the filtering effect of vegetation is least effective.

Views are extensive but there is a greater visual relationship to the south and south east which has an open aspect to the urban fringe of Lowestoft. The occasional views to Site from The Broads are mostly glimpsed through gaps or thinner sections of vegetation and are mostly filtered to some degree. Some of these views may not be apparent in the spring/summer.

Value of the Receptor

The receptors affected by the proposals will be walkers, ornithologists and boat users who will be at the water level or the adjacent heavily vegetated bank side. Their primary

purpose will be to visit for recreational purposes. This view is therefore considered to be of **high** visual intrinsic value.

Sensitivity to the Development

There are intermittent and partially filtered glimpsed views across Long Dam Level from Angle's Way. These views have large-scale farming infrastructure south of College Farm and Eastend Farm discernible through vegetation in the foreground or adjacent to Site. Riverside trees and intervening reeds and scrubby vegetation filter views. Notwithstanding its position in the designated landscape, the immediate and visual context means that the receptor has a **moderate** sensitivity to any change in view that is likely to arise if the Development is implemented.

Nature and Magnitude of Change

The intervening reeds and scrubby vegetation will screen the solar panels from most locations although glimpsed views through gaps or thinner sections of vegetation are possible, especially in winter. The magnitude of change is judged to be **small** as although the solar panels will introduce a new feature to the view, there are only intermittent views of the Development and these are partially screened or filtered and there is farming infrastructure already visible in the foreground. The occasional direct views to Site are long-distance and form a component of a panoramic view which is focused primarily on the direction of travel along the riverside, away from the Development site.

Level of Effect

At Year 1, if the current vegetation is retained the level of effect is assessed as **minor adverse,** and non-significant. From Year 15, as additional tree and hedgerow planting along the southern boundary mature the level of effect will diminish i.e., **negligible adverse,** and non-significant. Refer to Figure 4.8f.

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Year 1: *Small*	*High*	*Minor adverse & non-significant verse*
Year 15: *Negligible*	*High*	*Negligible adverse & non-significant*

4.10.1.7 Viewpoint 7 – St Mary's Road

There is a glimpsed winter view from St Mary's Road to the Site.

This view is across a roadside bank and is revealed for a short section before it is screened by a field boundary hedgerow.

Receptor Value

Users here are judged to be mainly drivers for local access. The Receptor is considered to be of **moderate to low** value as part of the local landscape.

Sensitivity to Development

The restored landfill landform is seen emerging above and partially filtered by intervening vegetation. As such, the receptor is considered to have no more than a **moderate** sensitivity to any change in views arising from the Development if implemented.

Nature and Magnitude of Change

It is likely that the red line boundary area is mostly screened, but a glimpse of the solar panels may be possible in winter. However, this view is transient in nature and the solar panels will be orientated to face the south and dark in colour, and this will minimise the visual effect. The magnitude of change is assessed as **negligible adverse.**

Level of Effect

There is limited opportunity for mitigation from this location to the upper slopes of the landform so the level of effect will remain the same from Year 1 to Year 15. The magnitude of effect is judged to be no more than **negligible adverse or neutral,** and non-significant. Refer to Figure 4.8g.

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Year 1: *Negligible*	*Road users: Moderate*	*Negligible adverse & non-significant*
Year 15: *Negligible*	*Road users: Moderate*	*Negligible adverse & non-significant*

4.10.1.8 Sequential Viewpoint 8 – Lily Lane

A winter view is available from Lily Lane to the Site from a section of Lily Lane before it dips down.

Receptor Value

This viewpoint is the setting of The Broads. Typical receptors would be local drivers using the road to travel to and from their homes. As such, this view is assessed as of no more than **moderate value**.

Sensitivity to Change

The landfill landform is just discernible above intervening woodland and is partially filtered. This view will be screened in the spring/summer and comprises a small component of a panoramic view. As such the sensitivity of this receptor to any change in the view arising from the Development proposals is considered to be **low.**

Nature and Magnitude of Change

If the Site is developed as proposed, visibility of it would be limited to an extensively filtered and glimpsed view of the solar panels on the south facing slope is possible. The magnitude of change is thus assessed as **negligible**.

Level of Effect

There is limited opportunity for mitigation from this location to the upper slopes of the landform so the level of effect will remain the same from Year 1 to Year 15. The magnitude of effect is judged to be no more than negligible adverse and non-significant. Refer to Figure 4.8h.

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Year 1: *Negligible*	*Road users: Moderate*	*Negligible adverse & non-significant*
Year 15: *Negligible*	*Road users: Moderate*	*Negligible adverse & non-significant*

4.10.2 Visual Effects on Views from Residential Properties

A landscape visual impact assessment (LVIA) assesses the extent to which a development would result in material harm to the visual amenity of public right of way (PRoW), public highways and publicly accessible open space unless *explicitly requested* by the competent authority to include residential views. The outlook from a residential property is essentially a private matter and is not generally included within the planning balance.

However, eight dwelling receptors have been assessed (College Cottages, College Farm, Hope Cottage, York Cottages, The Hovel, Greenways, Oaklands Farm and Eastend Farm)

as they are located within 0.5km of the Development. Field and garden boundary vegetation filter views from these residential properties and most of these properties in the vicinity of the site have been scoped out of the assessment at the baseline stage based on limited or no theoretical visibility indicated by the augmented ZTV (see Figure 4.6b). There may be potential for patchy and low-level visibility such as winter views or glimpsed views from upper storeys. However, these views will be intermittent and mostly screened by intervening landform and vegetation.

Following detailed analysis, College Cottages were identified with the most potential to be affected. An assessment has also been undertaken for the residential properties to the north of the Site on the edge of the settlement of Aldeby as concerns have been expressed by residents.

4.10.2.1 College Cottages

Receptor Value

Receptor value is assessed as **high** as residents are particularly susceptible to change.

Sensitivity to Change

These properties are located approx. 136m south west of the access track and 240m from the closest panels within the site. In this location the receptor sensitivity of the residential property is assessed as **high**. However, because this property already has a view which contains elements of an industrial nature (i.e., artificial landform, access tracks and pipes protruding from the restored landfill operation), then the visual sensitivity criteria is **medium**.

Nature and Magnitude of Change

There is a potential view to Site with partial or limited intervening screening vegetation. There may be views of the access track and the solar panels on the restored landfill landform although the property is orientated north to south and views will be oblique or partially filtered by garden vegetation. With the proposed additional tree and hedgerow planting to the Site boundary, the assessed visibility would be reduced to a filtered view to Site. There would be an introduction of a new, and uncharacteristic feature to a view that already contains uncharacteristic features (engineered landform, pipes protruding from the landform etc). The magnitude of change is considered to be **small adverse**.

Level of Effect

The level of effect at Year 1, would be **Minor - Moderate adverse,** and non-significant. At Year 15, assuming additional hedge and tree planting is implemented along the Site boundary adjacent to the access track and the current intervening vegetation continues to mature, any potential visibility of the solar panels will be reduced. On balance, the magnitude of effect is judged to be less than **negligible adverse**, and non-significant. Refer to Figure 4.8b.

Impact Type and Magnitude	**Receptor Value**	**Assessment of Impact**
Year 1: *Small adverse*	*High*	*Minor – Moderate adverse & non-significant*
Year 15: *Negligible adverse*	*High*	*Negligible adverse & non-significant*

4.10.3 Visual Effects on Views from Recreational Routes

Of those recreational routes identified in paragraph 4.5.5.2 of the baseline conditions, the augmented ZTV indicates limited or no theoretical visibility of the Development from the small selection of public footpaths and bridleways which pass within approximately 1km to the north of the Site. Actual visibility of the Development is likely to be much less than that indicated by the augmented ZTV when factoring in additional screening by lower height hedgerows, etc, and site investigations revealed a greater level of screening from scrubby vegetation in the local landscape.

Angle's Way a long-distance footpath within The Broads designation and site investigations revealed that this route would have intermittent inter-visibility although most of these views were filtered, refer to Sequential Viewpoints 6, Figure 4.8f (i-xii). This is discussed in paragraph 4.9.5.6.

Receptor Value

Users of regionally promoted recreational routes are judged to be of receptors of **high** intrinsic value as they pass slowly through an area and focus on views of the landscape.

Sensitivity to Change

Taken as a whole, the capacity of recreational routes as receptors to accept the visual changes that would arise if the Development were implemented as proposed, would be considered **moderate**. This takes into account the baseline situation in combination with infrastructure within the surrounding landscape context.

Nature and Magnitude of Change

Angle's Way is in excess of 0.8km from Site and the majority of the intermittent views are glimpsed or filtered through riverside vegetation, such as reeds or trees. The identified views that are revealed contain some farming infrastructure and elements of an industrial nature (i.e., engineered landform). Therefore, it is considered that the magnitude of change is **small adverse**.

Level of Effect

If the existing extensive riverside vegetation is retained and allowed to continue to grow the level of effect for Year 1 is assessed as **minor adverse** and non-significant**.** As the landscape takes on a more settled appearance and gapping up planting within the Site boundary hedgerow matures, any intermittent views will be increasingly filtered and by Year 15 the level of effect will reduce to **negligible adverse** and non-significant.

Impact Type and Magnitude	**Receptor Value**	**Assessment of Impact**
Year 1: *Small*	*High*	*Minor adverse & non-significant*
Year 15: *Negligible*	*High*	*Negligible adverse & non-significant*

4.10.4 Visual Effects on Views from Listed Buildings

Of those listed buildings identified in paragraph 4.5.4.2 of the baseline conditions, the augmented ZTV indicates there is limited inter-visibility with the dispersed and limited number of listed buildings within Burgh St Peter or Aldeby. Screening by intervening buildings and vegetation within built-up areas within settlement ensures little or no views of the Development would be gained.

Oaklands Farm situated approximately 280m north east of the Site is a Grade 2 Listed Building. This viewpoint is appraised at 4.9.4.5 and illustrated on Figure 4.8e.

Receptor Value

As a Listed Building within the setting of The Broads, the receptor value is **high**.

Sensitivity to Change

Residential properties are generally assessed of **high** sensitivity to change as residents experience visual amenity for a long period of time through-out the day and value visual amenity.

Nature and Magnitude of Change

The property is a working farm and has a cluster of outbuildings and barns within its setting. There are also farm materials stacked in a field in the foreground to the view to Site. The aspect is therefore partially filtered by built form and a line of mature oaks and any glimpsed view to the solar panels on the restored landfill landform will be **negligible** in scale.

Level of Effect

In Year 1 and Year 15 the impact type and magnitude of effect will be barely discernible. The level of effect is assessed as **negligible** reducing to **neutral** as the landscape settles and matures. This is non-significant.

Impact Type and Magnitude	**Receptor Value**	**Assessment of Impact**
Year 1: *Negligible*	*High*	*Negligible adverse & non-significant*
Year 15: *Negligible*	*High*	*Neutral & non-significant*

4.10.5 Visual Effects on Views from Transport Routes

Of those key transport routes identified in paragraph 4.5.5.3 of the baseline conditions, the screened ZTV indicates limited and patchy theoretical visibility of the Development from the network of minor roads and lanes in the study area. A small number of these local roads adjoin the Site with some theoretical visibility indicated by the augmented ZTV. These routes are considered in Table 4.13 below, and views from the local road network are also illustrated in Figures 4a-e and 4g-h.

Receptor Value

The roads surrounding the Site are located either within The Broad designation or its setting and are therefore graded as either '**high**' or '**modera**te' value according to their location.

Sensitivity to Change

Users of local (B-class) and minor roads are judged to be of 'moderate' sensitivity as they travel at slower speeds and generally have a greater appreciation of their surroundings. Users of sign-posted scenic routes or transport within designate or valued landscapes are judged to be of '**moderate to high'** sensitivity depending upon their context.

Nature and Magnitude of Change

Views to Site from the surrounding transport network are mostly filtered by road boundary hedgerows. There are glimpsed and transient views revealed through gaps or thinner sections of vegetation. Direct views are available through gateways and entrances to Site. The magnitude of change is considered mostly **negligible** with one assessment of **small adverse** from Boon's Road.

Level of Effect

In Year 1 the level of effect is predominantly appraised as negligible with one assessment of **minor adverse**. As the augmentation of Site boundary vegetation grows and screening function improves, this will reduce to an overall assessment of **negligible adverse** and non-significant.

Table 4.13: Summary of Residual Visual Effects: Transport Routes

Impact Type and Magnitude	Receptor Value	Assessment of Impact
Common Road Year 1: *Negligible* Year 15: *Negligible*	*Moderate* *Moderate*	*Negligible adverse* *Negligible adverse*
Taylor Road/Dun Cow Road Year 1: *Negligible* Year 15: *Negligible*	*Moderate* *Moderate*	*Negligible adverse* *Neutral effect*
St Mary's Road Year 1: *Negligible* Year 15: *Negligible*	*Moderate* *Moderate*	*Negligible adverse* *Negligible adverse*
Boons Road Year 1: *Small* Year 15: *Negligible*	*Moderate* *Moderate*	*Minor adverse* *Negligible adverse*
Lily Lane Year 1: *Negligible* Year 15: *Negligible*	*Moderate* *Moderate*	*Negligible adverse* *Negligible adverse*

4.10.6 Summary of Visual Effects

Table 4.14– Summary of Visual Effects on all Receptors

Receptor	Impact Type and Magnitude	Receptor Value	Assessment of Impact
Viewpoint 1 Year 1 Year 15	*Negligible* *Negligible*	*Moderate*	*Negligible adverse* *Negligible adverse*
Viewpoint 2 Year 1 Year 15	*Small* *Negligible*	*Moderate*	*Minor adverse* *Negligible adverse*
Viewpoint 3 Year 1 Year 15	*Negligible* *None*	*Moderate*	*Negligible adverse* *Neutral effect*
Viewpoint 4 Year 1 Year 15	*Small* *Negligible*	*Moderate*	*Minor adverse* *Negligible adverse*
Viewpoint 5 Year 1 Year 15	*Negligible* *None*	*Moderate*	*Negligible adverse* *Neutral effect*
Viewpoint 6 Year 1 Year 15	*Small* *Negligible*	*Moderate*	*Minor adverse* *Negligible adverse*
Viewpoint 7 Year 1 Year 15	*Negligible* *Negligible*	*Moderate*	*Negligible adverse* *Negligible adverse*
Viewpoint 8 Year 1 Year 15	*Negligible adverse* *Negligible adverse*	*Moderate*	*Negligible adverse* *Negligible adverse*

Receptor	Impact Type and Magnitude	Receptor Value	Assessment of Impact
Residential Properties			
College Cottages (R1)			
Year 1	*Small*	*High*	*Minor adverse*
Year 15	*Negligible*		*Negligible adverse*
Cluster of Properties			
Year 1	*Negligible*	*High*	*Negligible adverse*
Year 2	*Neutral*		*Neutral*
Recreational Routes			
Angles Way			
Year 1	*Small*	*High*	*Minor adverse*
Year 2	*Negligible*		*Negligible adverse*
Listed Buildings			
Year 1	*Negligible*	*High*	*Negligible adverse*
Year 15	*None*		*Neutral effects*
Transport Routes:			
Common Road			
Year 1	*Negligible*	*Moderate*	*Negligible adverse*
Year 15	*Negligible*		*Negligible adverse*
Taylor road/ Dun Cow			
Year 1	*Negligible*	*Moderate*	*Negligible adverse*
Year 15	*None*		*Neutral effect*
St Mary's Road			
Year 1	*Small/Negligible*	*Moderate*	*Minor-negligible adv.*
Year 15	*Negligible*		*Negligible adverse*
Boon's Road			
Year 1	*Small*	*Moderate*	*Minor adverse*
Year 15	*Negligible*		*Negligible adverse*
Lily Lane			
Year 1	*Negligible*	*Moderate*	*Negligible adverse*
Year 15	*Negligible*		*Negligible adverse*

The complete assessment of all visual effects is summarised in Table 4.14 above. All representative and important viewpoints and receptors were considered in the analysis and are accompanied by Photographic Panoramas (see Figures 4.8a-h) in support. These demonstrate that the visual amenity from all of the identified receptors *will not* be materially affected. The effects are mainly assessed as negligible, and non-significant, with only a few receptors experiencing potential minor level effects.

4.11 Summary of Predicted Effects

This LVIA has been carried out to appraise the likely landscape and visual effects associated with the Development located on land east of Common Road, Aldeby, Norfolk. The Site extends to an area of approximately 11.7 ha and relates to a partially restored landfill operation.

The LVIA has recorded and analysed the baseline landscape and visual resources of the Site and surrounding area, identified landscape and visual receptors likely to be affected by the Development and determined the extent to which these would be altered by the Development.

Mitigating measures assumed to be included within the Development proposals to reduce likely levels of adverse landscape and visual effects include the retention and enhancement of existing boundary vegetation, which already provides a high level of localised containment, and new hedgerow planting along the access road.

The LVIA concluded that whilst the Development would give rise to minor to negligible adverse landscape and visual effects, the degree of effects predicted to arise during the operational phase would be largely limited to the Site and a very limited number of receptors. There is little impact on the setting of The Broads to the south.

Following assessment of effects, the proposals are considered to comply with the NPPF, paragraphs 148 & 154 in terms of the acceptability of the level of impacts in relation to the need for sustainable development. The proposals comply as well with Local Plan Policy DM 4.1 regarding the level of impacts.

The comprehensive assessment of both landscape and visual analysis suggests that the impacts will be minor to negligible in all cases. As such, no impact could be considered to rise to the level of harm for this resource and are, therefore, not significant.

4.12 Conclusion

This assessment has set out the landscape and visual impact of the Development, and key landscape and visual attributes and sensitivities. Landscape proposals are suggested which in combination with the existing approved embedded landscape restoration proposal may mitigate these impacts. The previous use of the Site combined with the limited height of the Development and the very high degree of containment afforded by boundary vegetation ensure that effects are small in magnitude and restricted to the Site and its immediate setting.

4.12.1 Landscape Effects

The Site is of low sensitivity, but the surrounding local landscape is assessed as being of high to moderately sensitive to development due to its location within the immediate setting of The Broads. There would be a perceived change to the NCA/ LLCA, but the magnitude of this would be barely discernible as an indirect landscape effect. Impact on the landscape characters of the Thurlton Tributary Farmland with Parkland has been evaluated as negligible adverse and the Aldeby to Burgh St Peter LLCA is assessed as minor adverse reducing to negligible with mitigation.

The Development would not detract from the existing high value landscape quality, features and characteristics of The Broads National Park. The magnitude of change arising from the Development within The Broads National Park would be minor adverse reducing to negligible within the designated area in comparison to the current baseline situation. The Broads are appraised as having the capacity to accept the level of change that a Development of this nature would bring about without harm.

4.12.2 Visual Effects

The nature, scale, and form of the Development would inevitably result in some minor adverse effects on landscape character and on visual amenity as summarised above. However, the previous use of the Site combined with the limited height of the Development and the high degree of containment afforded by existing boundary vegetation and in the surrounding area, ensure that effects are relatively small in magnitude and restricted to the Site and a small number of receptors.

The Development would introduce a new element into the landscape but is not deemed inappropriate in terms of scale or massing for this location. There is farming infrastructure within the Sites environs and the Site itself should be viewed in the context of its previous industrial use as a landfill site following quarrying activity. The Development would form

an incidental component of glimpsed and filtered views from minor lanes and a few isolated properties. There would be a change in view, but this change, with mitigation, is not harmful in this analysis.

A mitigation strategy has been described which aims to provide an enhanced interim restoration to the existing approved landfill restoration scheme. This will visually integrate the Development into the wider landscape and provide a landscape buffer to the limited views from the south. Overall, the predicted landscape and visual effects arising from the Development are regarded as acceptable.

4.13 References

Ministry of Housing, Communities and Local Government (February 2019), National Planning Policy Framework. Available online at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

Planning Practice Guidance for the Natural Environment (Updated July 2019). Available online at: https://www.gov.uk/guidance/natural-environment

South Norfolk Council: Development Management Policies and Policies Map. Available online: www.south-norfolk.gov.uk/residents/planning/planning-policy/adopted-south-norfolk-local-plan/development-management-policies

MAGIC website. Available online at: https://magic.defra.gov.uk/

Natural England 2013, National Character Area Profile 80. The Broads. Available online at: http://publications.naturalengland.org.uk/publication/5331490007154688?category=587130

Landscape Character Assessment of the South Norfolk District (2001). Available online at: https://www.south-norfolk.gov.uk/residents/planning-and-building/planning-policy/landscape-character-assessments#:~:text=Landscape%20Character%20Assessments%20are%20comprehensive%2C%20detailed%20studies%20of,evidence%20to%20support%20the%20emerging%20new%20Local%20Plan

Broads Landscape Sensitivity Study for Renewables and Infrastructure (Final Report, LUC July 2012) Available online at: https://www.broads-authority.gov.uk/__data/assets/pdf_file/0018/185220/LSS-PART-1.pdf

Landscape Character Assessment of the South Norfolk District (2001). Available online at: https://www.south-norfolk.gov.uk/residents/planning-and-building/planning-policy/landscape-character-assessments#:~:text=Landscape%20Character%20Assessments%20are%20comprehensive%2C%20detailed%20studies%20of,evidence%20to%20support%20the%20emerging%20new%20Local%20Plan

The Local Plan for The Broads, The Broads National Park Authority (Adopted 17th May 2019), Section 3.5, page 9. Available online at: https://www.broads-authority.gov.uk/__data/assets/pdf_file/0036/259596/Local-Plan-for-the-Broads.pdf

5 ECOLOGY

5.1 Introduction

This Chapter presents the findings of an Ecological Impact Assessment (EcIA) for the Development. This assessment was undertaken by Arcus Consultancy Services Limited.

This Chapter presents the ecological baseline conditions and potential ecological impacts from the Development, taking into account relevant planning policy and legislation. Further surveys and mitigation have been described, where applicable, in order to provide additional information for assessing potential impacts and to inform recommendations to avoid or reduce such impacts.

This Chapter of the ES is supported by Technical Appendix A5.1: Ecological Supporting information and Figure 5.1 (Phase 1 Habitat Survey) and 5.2 (Waterbody Location Map).

The following key terms are used:

- Ecology Survey Area (ESA) – The area on which the ecology surveys were based, with appropriate areas outside this surveyed where necessary
- The Site – The planning boundary, and area where the Development will occur; and
- The Development – The solar array and associated infrastructure (including, but not limited to: solar panels and mounting racks, switching stations, battery containers, fencing, access tracks, landscaping features).

5.2 Planning Policy and Legislation

5.2.1 The Wildlife & Countryside Act 1981

The Wildlife and Countryside Act 198124, as amended by the Countryside and Rights of Way Act (CRoW) 200025 and the Natural Environment and Rural Communities Act (NERC) 200626, is the main legislation that protects wildlife in Great Britain, and is the mechanism for defining and protecting nationally important Sites of Special Scientific Interest (SSSI). The legislation makes it offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act; intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act; intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection; and
- Pick or uproot any wild plant listed under Schedule 8 of the Act. Schedule 9, Part II of the Act also lists many species for which it is an offence to plant, or otherwise cause to grow, in the wild. Any material containing Japanese knotweed is also identified as controlled waste under the Environmental Protection Act 1990[27] and must be disposed of properly at licenced landfill according to the Environmental Protection Act (Duty of Care) Regulations 1991[28].

[24] Wildlife and Countryside Act 1981. Available from: https://www.legislation.gov.uk/ukpga/1981/69

[25] The Countryside and Rights of Way Act 2000. Available from: https://www.legislation.gov.uk/ukpga/2000/37/contents

[26] Natural Environment and Rural Communities Act 2006. Available from: https://www.legislation.gov.uk/ukpga/2006/16/contents

[27] The Environmental Protection Act 1990. Available from: https://www.legislation.gov.uk/ukpga/1990/43/contents

[28] The Environmental Protection Act (Duty of Care) Regulations 1991. Available from: https://www.legislation.gov.uk/uksi/1991/2839/made

5.2.2 The Conservation of Habitats and Species a Regulations 2017

The Conservation of Habitats and Species a Regulations 2017[29] (the 'Habitat Regulations'), as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019[30], establish the requirements for protecting sites that are internationally important for threatened habitats and species – the National Site Network – and thus the requirement for a 'Habitat Regulations Assessment' of plans or developments with potential to affect them.

The Habitat Regulations also establish the strict protection of some species – European Protected Species – and make it an offence to deliberately capture, kill or disturb certain wild animals, and to damage or destroy a breeding site or resting place of such an animal (even if the animal is not present at the time).

5.2.3 Natural Environment & Rural Communities (NERC) Act 2006

The NERC Act 2006[26] places a duty on local planning authorities to have due regard for biodiversity and nature conservation during the course of their operations, and thus ensures that biodiversity is a key consideration in the planning process. The Act also establishes a list of species and habitats of principal importance for the conservation of biodiversity.

5.2.4 Protection of Badgers Act 1992

Badgers receive strict protection under the Protection of Badgers Act 199231, which prohibits the taking, injuring, selling, possessing or killing of badgers and makes it an offence to ill-treat any badger, damage, destroy, disturb or cause a dog to enter a badger sett.

5.2.5 The Hedgerow Regulations 1997

The Hedgerow Regulations 199732 establishes the legal protection of important countryside hedgerows, principally ancient and species-rich hedgerows. The Hedgerow Regulations also provide arrangements for planning authorities to protect important hedgerows in the countryside by controlling their removal through a system of notification.

5.2.6 National Planning Policy Framework 2019

The National Planning Policy Framework (NPPF) 201933 sets out the Government's requirement for the planning system in England and in doing so establishes the framework within which local planning authorities can develop their own planning policies. The NPPF explicitly addresses the conservation and enhancement of the natural environment, including biodiversity, through paragraphs 174–177.

5.2.7 Biodiversity Action Plans

The UK Biodiversity Action Plan (UK BAP) was developed to fulfil the Rio Convention on Biological Diversity in 1992, to which the UK is a signatory. The UK Post-2010 Biodiversity Framework'[34] succeeds the UKBAP, although the UKBAP priority species and habitats are

[29] The Conservation of Habitats and Species Regulations 2017. Available from: https://www.legislation.gov.uk/uksi/2017/1012/contents/made

[30] The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 Available from: https://www.legislation.gov.uk/ukdsi/2019/9780111179512/contents

[31] Protection of Badgers Act 1992. Available from: https://www.legislation.gov.uk/ukpga/1992/51/contents

[32] The Hedgerow Regulations 1997. Available from: http://www.legislation.gov.uk/uksi/1997/1160/contents/made

[33] National Policy Planning Framework 2019. Available from: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[34] UK Post-2010 Biodiversity Framework. Available from: https://hub.jncc.gov.uk/assets/587024ff-864f-4d1d-a669-f38cb448abdc

retained through the NERC Act 2006. Regional and local BAPs have also been developed for species/habitats of nature conservation importance at regional and local levels.

5.3 Assessment Methodology

The approach taken to assessment methodology follows Chartered Institute for Ecology and Environmental Management (CIEEM) guidance[35] which sets out a recommended process for assessment through the following stages:

- Collation of baseline ecological information through desk study and field surveys;
- Identification and characterisation of ecological impacts from all phases of the proposed Development;
- Incorporation of measures to mitigate identified impacts;
- Assessment of significance of residual impacts following mitigation;
- Identification of appropriate compensation to offset significant residual impacts; and
- Identification of opportunities for ecological enhancement.

5.3.1 Important Ecological Features

The importance of an ecological feature helps to determine whether or not it will be subject to detailed assessment. Ecological features are considered within a defined geographical context (Table 5.1) and only those with at least Local value are considered to be Important Ecological Features (IEFs) requiring assessment. However, legally protected species will be considered as IEFs, even if they are considered to be of Less than Local importance, if a breach of legislation is considered possible.

Table 5.1: Geographic Context of Important Ecological Features (IEFs)

Level of Importance/Sensitivity	Example definitions
Very High (International)	An area within the National Site Network (i.e. a Special Area of Conservation (SAC), Special Protection Area (SPA) or Ramsar site) or a site meeting criteria for such designation. Species in internationally important numbers (> 1 % of biogeographic populations).
High (National)	An area within a designated site of national importance (e.g. a Site of Special Scientific Interest (SSSI)) or a site meeting criteria for such designation. Species present in nationally important numbers (> 1 % UK population). Large areas of priority habitats listed on Annex I of the Habitats Directive and smaller areas of such habitats that are essential to maintain the viability of that ecological resource.
Medium (Regional)	Priority habitats or species in regionally important numbers. Sites not meeting criteria for SSSI selection but of greater than the Local criteria below.

[35] CIEEM (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal.* Chartered Institute of Ecology and Environmental Management, Winchester.

Level of Importance/Sensitivity	Example definitions
Low (Local)	Local Nature Reserves (LNR) and Local Wildlife Sites (LWS) Priority habitats or species in locally important numbers. Areas of habitat or species considered to appreciably enrich the ecological resource within the local context.
Site (Less than Local)	Usually widespread and common habitats and species. Features falling below local importance are not normally considered in detail within the assessment process. Loss of such a feature from within the Development would not be detrimental to the ecology of the local area.

5.3.2 Characterising Ecological Impacts

The assessment will describe the relevant characteristics required to understand the ecological impact and to determine magnitude. These may include the following:

- Positive, negative or neutral – the direction of change in the quality of the IEF;
- Extent – the spatial area over which the impact or effect may occur;
- Duration – defined in qualitative or quantitative terms in relation to changes in ecological characteristics;
- Frequency and timing – the temporal occurrence of an impact may influence its effect;
- Reversibility – an assessment of how an IEF will recover from an effect; and
- Magnitude – a measure of the intensity or size of an effect defined quantitatively, where possible, otherwise qualitatively following the criteria in Table 5.2.

Table 5.2: Magnitude Criteria

Impact Magnitude	Description
High	Changes that will almost always have a negative effect on the integrity of an IEF. They are usually long-term and often permanent/irreversible.
Medium	Negative changes that may in some circumstances be considered to impact the integrity of an IEF. They may be long-term but are generally reversible.
Low	Negative effects that do not usually change the integrity of an IEF. They are often short-term and/or reversible.
Negligible	No perceptible change in the IEF.

5.3.3 Cumulative Effects

Cumulative effects can result from individually not significant but collectively significant actions taking place over a period of time or concentrated in a location. Within EcIA, cumulative impacts are particularly important as many ecological features are exposed to background levels of threat or pressure and therefore may be close to reaching critical thresholds where further impact could cause irreversible decline.

5.3.4 Determining Significance

A significant effect, for the purpose of EcIA, is defined as an effect that either supports or undermines biodiversity conservation objectives for IEFs or for biodiversity in general. Conservation objectives may be specific, broad or wide-ranging, therefore effects can be considered as significant at a wide range of scales from International to Local.

Where identified, significant effects will be qualified with reference to an appropriate geographic scale. It is important to note that the scale of the significance of an effect may not be the same as the geographic context in which the feature is considered important. Within the assessment, the significance of the potential effects on each identified IEF is determined by considering both the importance of each feature and the degree to which it may be affected (the effect magnitude) by the Development.

5.4 Baseline Methods

The following sections describe the methods used to generate an ecological baseline against which the effects of the Development can be assessed.

5.4.1 Desk Study

Natural England's Multi Agency Geographic Information for the Countryside[36] (MAGIC) website was consulted to obtain information about statutory designated sites such as Sites of Special Scientific Interest (SSSI) within 2 km of the ESA. A search for National Site Network sites (Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Ramsar sites) within 5 km of the ESA was also undertaken. MAGIC was also searched for priority habitats and European Protected Species (EPS) mitigation licences.

Local records of features of ecological interest within 2 km of the ESA were requested from Norfolk Biodiversity Information Service (NBIS) including records of non-statutory designated sites (e.g. County Wildlife Sites (CWS)) and notable and protected species.

A review of historic aerial satellite imagery[37] was undertaken to gain an understanding of past land-use.

5.4.2 Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey was conducted in May 2020. The survey included all land within the ESA (shown in Figure 5.1. The aim of the survey was to classify and map habitats according to standard methods[38] and to assess their potential to support notable and protected species. The survey was carried out following the Guidelines for Preliminary Ecological Appraisal[39]. Target Notes (TN) were recorded for features of particular ecological interest and are provided in Technical Appendix 5.1.

5.4.3 Bat Suitability Assessment

During the Extended Phase 1 Habitat Survey, a preliminary assessment of the potential of features within the ESA to support bat roosts and/or provide suitable commuting or foraging habitat was conducted. The bat assessment work and recommendations followed guidelines produced by the Bat Conservation Trust (BCT)[40]. This initial bat assessment informs whether or not further surveys are required to assess the potential effects of the Development on bats.

A ground-level inspection of trees was undertaken to identify Potential Roost Features (PRFs) suitable for roosting bats such as woodpecker holes, spilt limbs and peeling bark. Based on these observations, trees were assigned a level of suitability (negligible, low, moderate or high). Should evidence of bats be recorded or the features assessed to provide suitability for bats, then further surveys may be required.

[36] Multi Agency Geographic Information for Countryside (MAGIC) [Online] Available at: https://magic.defra.gov.uk/home.htm

[37] Google LLC (2020) *Google Earth* [Online] Available at: https://earth.google.com/web/ [Accessed May 2021]

[38] JNCC (2010) *Handbook for Phase 1 habitat survey: a technique for environmental audit*. Nature Conservancy Council.

[39] CIEEM (2017) *Guidelines for Preliminary Ecological Appraisal, 2nd Edition*. Chartered Institute of Ecology and Environmental Management, Winchester.

[40] Collins, J (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd ed.). The Bat Conservation Trust, London.

A visual assessment of habitats to determine their potential to support commuting, foraging or swarming bats, such as good connectivity and linear features. Based on these observations, the Site will be assigned a level of suitability. Should suitable habitat for bats be recorded, then further surveys may be required.

5.4.4 Great Crested Newt Habitat Assessment

During the Extended Phase 1 Habitat Survey, a Habitat Suitability Index (HSI)[41] assessment was carried out on waterbodies (where accessible) within 500 m of the ESA (Figure 5.2). The HSI assessment considers a range of features that affect the suitability of ponds to support great crested newts (*Triturus cristatus;* GCN); e.g. size of pond, extent of shading, abundance of aquatic plants, presence of fish and quality of surrounding habitat. The assessment results in a score that helps to determine the suitability of ponds (see Table 5.3) and the need for further, more detailed surveys.

Table 5.3 Categorisation of HSI Scores

HSI score	Pond suitability
< 0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

5.4.5 Badger Survey

During the Extended Phase 1 Habitat Survey, a thorough inspection of the ESA and surrounding habitat, where access was possible, was carried out. Particular attention was paid to dense areas of vegetation to check for evidence of badger activity, including:

- Presence of holes and setts with evidence of badger, such as prints, discarded bedding, etc.;
- Presence of dung pits and latrines;
- Presence of well-used runs with evidence of badger activity; and
- Presence of other indications of badger activity, such as signs of foraging and footprints.

5.4.6 Ornithological Assessment

During the Extended Phase 1 Habitat Survey, an assessment was made of the potential of the ESA and surrounding habitats (where access was possible) to support breeding or wintering birds of conservation concern; for example, birds listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).

5.4.7 Limitations and Assumptions

There were no known limitations to the survey. The survey was undertaken in fair weather by a suitably experienced ecologist who is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

[41] Oldham, RS., et al. (2000) *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus).* Herpetological Journal 10 (4), 143–155.

5.5 Baseline Results and Determining Importance

5.5.1 Desk Study

5.5.1.1 Designated Sites

The desk study returned records of several statutory and non-statutory designated sites (Table 5.4).

Table 5.4: Designated Sites within 2 km of the ESA

Site	Status	Minimum Distance and Direction (km) from ESA	Description/Reason for Designation and Importance
Statutory designated sites			
Broadland	SPA	0.8 km south	**Internationally important** assemblage of Annex I breeding bird species: • Bittern *Botaurus stellaris* • Marsh harrier *Circus aeruginosus* Internationally important assemblage of wintering/migratory bird species: • Bewick's swan *Cygnus columbianus bewickii* • Whooper swan *Cygnus cygnus* • Wigeon *Anas penelope* • Gadwall *Anas strepera* • Shoveler *Anas clypeata* • Hen harrier *Circus cyaneus* • Ruff *Philomachus pugnax*
The Broads	SAC	0.8 km south	**Internationally important** complex of lakes and ditches supporting a range of habitats and rare species. Annex I habitats that are a primary reason for selection of this site • Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. • Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation • Transition mires and quaking bogs • Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* • Alkaline fens • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) Annex II species that are a primary reason for selection of this site • Desmoulin's whorl snail *Vertigo moulinsiana* • Fen orchid *Liparis loeselii*

Site	Status	Minimum Distance and Direction (km) from ESA	Description/Reason for Designation and Importance
			• Ramshorn snail *Anisus vorticulus* Annex II species present as a qualifying feature, but not a primary reason for site selection • Otter *Lutra lutra*
Broadland	Ramsar	0.8 km south	**Internationally important** wetland comprising a complex mosaic of wetland habitats which support a range of rare species. See also The Broads SAC and Broadland SPA (above).
Barnby Broad and Marshes	SSSI	0.8 km south	**Nationally important** site comprising large and varied area of open water, carr woodland, fen, grazing marsh and dykes. The plant communities are rich in species and the site has an outstanding assemblage of rare and uncommon plants. The mosaic of habitats is also attractive to nesting birds and several rare species breed in the area. Furthermore, there is a considerable entomological interest. Barnby Broad is a small, shallow, man-made lake which is the result of medieval peat-cutting containing few water-plants and diverse marginal vegetation. Mature carr woodland surrounds the Broad with tall fen grassland, undisturbed fen, improved grazing marsh and a range of grassland types. A component of the Broadland SPA and Ramsar site and The Broads SAC.
Stanley and Alder	SSSI	2.4 km west	**Nationally important** site adjacent to the River Waveney forming the only extensive area of regularly flooded alder carr woodland and fen in the Waveney Valley. The site supports a variety of plants characteristic of Broadland. Part of the site has been set aside as a conservation area for otters. The insect fauna is rich in species and the bird breeding community includes a regionally uncommon species. Part of the Broadland SPA and Ramsar site, and The Broads SAC.
Sprat's Water and Marshes, Carlton Colville	SSSI	3.2 km east	**Nationally important** site situated in the Lower Waveney Valley and comprise areas of spring-fed mixed fen, open water, alder carr and wet grazing marsh on deep peat. The northern part A component of the Broadland SPA and Ramsar site and The Broads SAC.
Non-statutory designated sites			
Boon's Heath	CWS	Directly east	**Locally important** site comprising bracken-dominated heath on sandy, gravelly soils. Trees are scattered throughout the site, including some old

Site	Status	Minimum Distance and Direction (km) from ESA	Description/Reason for Designation and Importance
			coppiced oak specimens. The heath is open to the public and is used for recreation.
Wheatacre Marshes	CWS	2.0 km north	**Locally important** area of carr and marshy grassland at the edge of Waveney Valley flood plain.
Grassland at Aldeby Hall	CWS	2.0 km west	**Locally important** species-rich, cattle-grazed, marshy grassland adjacent to the River Waveney within the grounds of Aldeby Hall.

5.5.1.2 Protected Species

A total of 293 protected species records were returned that were within 2 km of the ESA and are dated from 2010 onwards, which were relevant to the habitats present and the Development. The species are protected under UK legislation and/or are listed under the NERC Act 2006 as species of principal importance. Records are summarised in Table 5.5. No EPS mitigation licence applications were identified.

Due to the large volume of bird records, a summary is provided in section 5.5.3.5. Similarly, a large number of records of invertebrate species was returned and are summarised in section 5.5.3.6.

Table 5.5: Protected and Priority Species within 2 km of the ESA

Taxonomic group	Species	Number of records	Date of most recent record	Distance and direction of most recent record from ESA
Mammals	West European Hedgehog	1	01/08/2015	1.8 km east
	Brown Hare	1	26/03/2015	2.0 km north-west
	European Water Vole	1	09/05/2016	1.8 km south-east
Bats	Barbastelle	1	28/09/2016	0.05 km west
	Serotine	2	29/09/2016	0.5 km south
	Daubenton's	2	28/09/2016	0.05 km west
	Natterer's	1	27/09/2016	0.1 km east
	Common Noctule	1	31/07/2016	1.6 km north-west
	Common Pipistrelle	5	29/09/2016	0.5 km south
	Soprano Pipistrelle	5	29/09/2016	0.5 km south
	Nathusius' Pipistrelle	2	29/09/2016	0.5 km south
	Brown Long-eared	3	29/09/2016	0.5 km south

5.5.1.3 Habitats

The western extent of the ESA is identified on MAGIC[36] as 'Open Mosaic Habitats on Previously Developed Land' but is classified with low certainty. This classification may have been appropriate at the time of classification (2003) but since then the Site has been subject to a restoration plan as part of the landfill development and the current Development proposals include complementary habitat management. Consequently, the

Site cannot be considered to support this Priority Habitat because it lacks the associated colonising and successional vegetation; further details of habitats in section 5.5.2).

5.5.1.4 Historic Land Use

Satellite imagery shows the ESA has been a changing mosaic of open cast workings, landfill and rough grassland since 1999. It is now predominately rough grassland reclaiming disturbed land following the cessation of landfill activities.

5.5.2 Phase 1 Habitats

Scientific names are excluded from plant species names in the following sections and only the common names are used. A full list of plant species, including scientific names, is provided in Technical Appendix 5.1.

5.5.2.1 Site Description

The ESA is approximately 26.5 ha and is situated just south-east of Aldeby, South Norfolk. The majority of the ESA comprised bare ground with small sections of short ephemeral/ perennial vegetation. Species-poor semi-improved grassland was present in the south and east of the ESA with a hardstanding compound and associated buildings in the far western extent. The surrounding landscape is predominately agricultural and distinctively flat.

5.5.2.2 Bare Ground

The ESA was dominated by bare ground, due to soil import within the last two years. This habitat is of Less than Local value.

5.5.2.3 Ephemeral/Short-perennial Vegetation

In some areas (TN8, Figure 5.1) where soil had been recently imported it had become colonised by ephemeral/short-perennial vegetation. Grass species present included perennial rye-grass, Yorkshire fog, red fescue and creeping bent. Herb species included locally abundant common ragwort, groundsel, bristly-oxtongue, prickly sow-thistle, ribwort plantain, red dead-nettle, and occasional broadleaved dock and teasel. This habitat is of Less than Local value.

5.5.2.4 Built-up Areas

A compound area was present in the west of the ESA and comprised hardstanding and associated buildings. This habitat is of Less than Local value.

5.5.2.5 Species-poor Semi-Improved Grassland

Species-poor semi-improved grassland was recorded along the southern boundary (TN6, Figure 5.1). The grassland is characteristic of sown grassland with >75% cover of grass species and scattered perennial species in the sward. Grass species included perennial rye-grass, common bent, creeping bent, red fescue and Yorkshire fog, with occasional to locally frequent herbaceous species including dandelion, ribwort plantain, creeping thistle, common mouse-ear, and scattered tussocks of hard rush. In areas showing evidence of disturbance, ruderal species were present, including ribwort plantain, creeping thistle, dandelion, bramble, self-heal and weld. Several earth banks were present to the southern extent where an artificial ditch was present. This habitat is of Less than Local value.

5.5.2.6 Running Water

An artificial ditch was present in the southern extent of the ESA (TN6, Figure 5.1). It drains in a south-easterly direction into a larger butyl-lined drain along the southern boundary.

The water quality was poor and scattered hard rush is present along the banks. This habitat is of Less than Local value.

5.5.2.7 Hedge with Trees

An intact species-poor hedge with trees was recorded on the eastern boundary of the ESA (TN7, Figure 5.1). It was dominated by English elm and hawthorn with occasional blackthorn and field maple. Young trees present included English elm, Scot's pine and pedunculate oak.

Hedgerows are Priority Habitats that appreciably enrich the local landscape, and thus the hedgerow is important at a Local level.

5.5.2.8 Standing Water

Two areas of standing water were recorded. A small attenuation basin (approximate area: 8 x 6 m) in the compound in the west of the ESA (TN1, Figure 5.1) was steep-sided and shallow with turbid water in its base. No aquatic vegetation was present and it is likely to be dry for the majority of the year. The steep banks were vegetated with short ephemeral vegetation and small patches of species-poor semi-improved grassland and bare ground. Species present included: creeping bent, cow parsley, common ragwort, bristly-oxtongue and prickly sow-thistle, with low bramble growing around the tops of the banks.

A second pond (TN3, Figure 5.1) was present in the semi-improved grassland in the south of the ESA, surrounded by a small copse of crack willow and grey willow. The pond was approximately 5 x 10 m in extent and 30 cm deep with a bed of leaf litter. Aquatic vegetation was limited to common reed with locally abundant hard rush around the perimeter.

A dry waterbody (TN5, Figure 5.1) now colonised by grasses and ruderal plants was recorded on the southern boundary of the ESA.

Ponds are Priority Habitats that appreciably enrich the local landscape, but the examples on site are only of value at the Local level.

5.5.2.9 Dense Scrub

Dense scrub (TN2, Figure 5.1) surrounded the concrete compound and was dominated by bramble with locally dominant blackthorn, ash and English elm saplings, the latter showing signs of ash die-back or Dutch elm disease. Occasional dog rose was present with locally abundant alexanders in more open areas. A line of Leylandii cypress trees, 6-8m high, and one young sycamore was recorded at the top of the bank at the southern extent.

Scrub is a Priority Habitat; however, the extent, setting and character of this habitat within the ESA are too limited for the scrub to classed as Priority Habitat, and it is considered to be of Less than local value.

5.5.3 Protected Species

5.5.3.1 Bats

No trees were identified to have potential to support roosting or hibernating bats. The desk study returned two records of bat roosts (common pipistrelle and long-eared bat) in buildings outside the Site, although the grid references are accurate to only 1 km resolution.

The limited variety of habitats within the ESA, which was dominated by bare ground, do not provide suitable habitat for foraging or commuting bats. Suitable habitats such as hedgerow and scrub were limited in extent with minimal connectivity to habitats outside the ESA. The desk study returned 21 records of nine bat species. The closest record to the ESA was of a Daubenton's bat, 0.05 km northwest.

On this basis the ESA has been classed as having low suitability, and is of Less than Local value, for foraging, commuting and roosting bats.

5.5.3.2 Great Crested Newt

HSI assessment was carried out on one waterbody, P16, within the ESA (Figure 5.2; Photograph 3, Technical Appendix 5.1) and it was classified as 'below average'. The full breakdown of the HSI score is provided in Technical Appendix 5.1.

An attenuation area in the compound in the west of the ESA (TN1, Figure 5.1 and Photograph 1, Technical Appendix 5.1) was considered unsuitable for GCN due to its manmade nature, hardstanding base and steep, bare sides. A puddle of standing water was present at the time of survey; however, no aquatic vegetation was present and dead stalks of perennial species indicated that it was dry for a majority of the year. Due to its clear unsuitability the attenuation area was not subject to HSI assessment.

An additional fifteen ponds and ten ditches were identified within 500 m of the ESA (Figure 5.2). All but one of these waterbodies were located on private land and no access was permitted at the time of survey. Pond 8 was accessible; however, it was dry and therefore scoped out of the assessment.

The two waterbodies in the ESA were both considered unsuitable for breeding GCN. However, other amphibians such as toad (*Bufo bufo*) and common frog (*Rana temporaria*) may utilise these waterbodies.

Terrestrial habitats within the ESA are dominated by bare ground and hardstanding and therefore offered limited foraging and sheltering opportunities for GCN and other amphibians. The copse of trees around the pond (TN3, Figure 5.1) provides limited suitable terrestrial habitat; however, the pond itself is considered unsuitable and the vegetation lacks connectivity to the wider landscape. The desk study returned no records of GCN.

The Site is of Less than Local value for amphibians.

5.5.3.3 Reptiles

The extensive area of bare ground that dominated the ESA is unsuitable for basking, foraging or sheltering reptiles. Anecdotal evidence from an environmental monitoring member of staff indicates that grass snake (*Natrix helvetica*) were historically present along the southern boundary of the ESA, and adder (*Vipera berus*) directly south-east of the ESA. However, the recent soil importation and landscaping has greatly reduced the extent of suitable habitat present within the ESA and disturbance from associated vehicles and machinery remain high. The pond (TN3, Figure 5.1) and surrounding grassland present the most suitable habitat in the ESA; however, they are limited in area and lack connectivity. The desk study returned no records of reptiles.

The Site is of Less than Local value for reptiles.

5.5.3.4 Badger

The ESA provides limited suitable habitat for badgers (*Meles meles)* and no setts or other field signs were identified. It is possible that badgers may commute through the ESA to access more suitable habitats in the surrounding landscape, such as the blocks of woodland to the north and Boon's heath to the east. Due to confidentiality badger records have not been included in the desk study results.

The Site is of Less than Local value for badger.

5.5.3.5 Birds

The dense scrub and hedgerow provide some suitable foraging and nesting habitats for birds. Species of birds observed during the survey included several skylark (*Alauda*

arvensis), red-legged partridge (*Alectoris rufa*) and a pair of mallard (*Anas platyrhynchos)*. oystercatcher (*Haematopus ostralegus*) has been known to breed on bare ground within the ESA, however none were recorded during the walkover.

The desk study returned 289 bird records of 88 species. Of these, 67 were species of conservation concern[42] and accounted for 200 records. The majority of the records were not relevant to the ESA or habitats present.

The desk study returned records of four bird species associated with the Broadland SPA; however, location information is not sufficiently detailed to determine exactly how far the records are from the ESA. Breeding populations of bittern and marsh harrier are qualifying features and non-breeding season populations of Bewick's and whooper swan are also qualifying features. However, there is no suitable habitat within the Site for any of these species. Some qualifying features of the SPA could feasibly occur in the fields immediately to the south, but any presence is likely to be very infrequent.

Castle Marshes Reserve is located approximately 800 m southeast of the Site. The reserve is monitored annually as part of the British Trust for Ornithology's Wetland Bird Survey (WeBS), which provides some measure of use of the wider area by wetland bird species. Data available online[43,44] indicate that relatively few wildfowl are recorded at the Site, with the species composition dominated by greylag goose (*Anser anser*), Canada goose (*Branta canadensis*) and mute swan (*Cygnus olor*). The only designated feature of the SPA recorded in the last five years of available data (2015/16–2019/20) is gadwall, with intermittent observations during the period, including a high count of 14 birds and a 5-year mean of three birds, which is low in the context of the wider SPA population.

The Site is of Local value for birds due to its potential to support a limited range of species of conservation concern.

5.5.3.6 Invertebrates

The desk study returned 192 records of notable invertebrate species, including three mollusc species, one crustacean species, one butterfly species, two dragonfly species, and 36 moth species.

The ESA will support common and widespread invertebrate species, but its lack of naturalness and recent and ongoing disturbance greatly reduces its potential to support notable invertebrates, most of which will be more strongly associated with extensive semi-natural habitats in the surrounding landscape.

The Site is of Less than Local value for invertebrates.

5.6 Embedded Mitigation

During collection of baseline ecological data, ecological constraints were identified and used to inform the design of the Development, particularly the location of built infrastructure and construction works. Negative effects have therefore been avoided or minimised in a number of ways as outlined in the following sections.

5.6.1 Construction Good Practice

Standard good practice mitigation measures (e.g., as available from the Construction Industry Research and Information Association (CIRIA)) will be implemented. Mitigation

[42] Defined as any species listed on one or more of the following: Schedule 1 of the W&C Act, Section 41 of the NERC Act, Red- or Amber-listed birds of conservation concern (Eaton *et al.* 2015)

[43] Frost, T.M., Calbrade, N.A., Birtles, G.A., Hall, C., Robinson, A.E., Wotton, S.R., Balmer, D.E. and Austin, G.E. (2021) *Waterbirds in the UK 2019/20: The Wetland Bird Survey*. BTO/RSPB/JNCC. Thetford.

[44] Contains Wetland Bird Survey (WeBS) data from Waterbirds in the UK 2019/20 © copyright and database right 2021. WeBS is a partnership jointly funded by the BTO, RSPB and JNCC, in association with WWT, with fieldwork conducted by volunteers.

for pollution events is presented in Chapter 8: *Groundwater Risk Assessment* of this EIA Report and is considered sufficient to address associated ecological effects.

An Ecological Clerk of Works (ECoW) or suitably qualified ecologist will be appointed to provide advice in relation to the mitigation recommended in this chapter. The ECoW/Ecologist will present Toolbox talks or prepare induction/site materials (e.g. information posters) about ecological sensitivities, relevant legislation, and the responsibilities of the site workforce.

5.6.2 Location of Works

Existing tracks and access points will be used as far possible thereby reducing habitat loss and disturbance.

Work areas will be clearly demarcated to prevent damage or disturbance to ecological features outside the construction footprint. Where necessary and instructed by the ECoW, the location and type of works may be modified to reduce impacts; this may necessitate the use of alternative construction methods, such as smaller plant, or stockpiling materials in other areas. Any such micro-siting would not qualitatively affect the conclusions of this assessment except to further reduce the magnitude of effects.

5.6.3 Timing of Works

The construction programme will take place over six months. Consideration will be given to changing the timing of certain activities during the working day, week or overall programme to reduce impacts to ecological features at sensitive times of year.

5.6.4 Licences

All necessary licenses and permits relevant to ecological features will be obtained. These may relate the survey of sensitive protected species, development mitigation affecting protected species, and the ecological requirements of other licences. The need for and scope of such licences is covered in other parts of this chapter and EIA Report.

5.7 Assessment of Potential Effects

5.7.1 Designated Sites

The closest designated site to the Site is Boon's Heath CWS, located directly to the east of the Site, separated by St Mary's Road. Boon's Heath is designated due to its bracken-dominated heath on sandy soils, a habitat that is not present within the Site. Additionally, Boon's Heath is open for recreational use so experiences a baseline level of disturbance. Given the restricted and relatively low magnitude impacts arising from the construction of the Development, combined with the lack of clear ecological connectivity between the Site and Boon's Heath, no significant adverse effects are anticipated and no mitigation is required.

All other designated sites are sufficiently distant from, or lack ecological connectivity with, the Site, or are designated due to habitats and species not present within the Site and thus significant adverse impacts are extremely unlikely. Further details on potential impacts to statutory designated sites are detailed in Table 5.6.

Table 5.6: Potential Effects on Statutory Designated Sites

Site	Minimum Distance and Direction (km) from Site	Summary of Qualifying Features	Impact Assessment
Broadland SPA *(International Importance)*	0.8 km south	Internationally important assemblage of Annex I breeding bird species: • Bittern • Marsh harrier Internationally important assemblage of wintering/migratory bird species: • Bewick's swan • Whooper swan • Wigeon • Gadwall • Shoveler • Hen harrier • Ruff	Separated from the Site by Boon's Heath Quarry CWS, arable land interspersed by ditches, the River Waveney, and coastal floodplain and grazing marsh. The Annex I breeding bird species require predominantly reedbed, marsh and wetland habitats for breeding and foraging, none of which are present within the Site or immediately adjacent areas. Similarly, the wintering and migratory bird species primarily require wetland habitats. Some species, notably the two swan species, forage in arable fields and could feasibly do so in fields to the south of the Site. However, their use of this area is likely to be occasional and opportunistic and subject to prevailing land use (e.g. crop type/timings). The wetland habitats located approximately 400 m south-east of the Site, adjacent to the River Waveney, may support some of the qualifying species, although based on a review of available WeBS data use is understood to be low. Given the distance of these habitats from the Site and the screening provided by intervening trees and hedgerows, any birds using this area are unlikely to be disturbed by the construction and operation of the Development. Given the intervening distance and habitats, and the lack of clear functional links, there is very limited opportunity for impact pathways and **no significant adverse effects** are predicted.

Site	Minimum Distance and Direction (km) from Site	Summary of Qualifying Features	Impact Assessment
The Broads SAC *(International Importance)*	0.8 km south	Internationally important complex of lakes and ditches supporting a range of habitats and rare species. Annex I habitats that are a primary reason for selection: • Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. • Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation • Transition mires and quaking bogs • Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* • Alkaline fens • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Additional Annex I habitats present as a qualifying feature: • *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils Annex II species that are a primary reason for selection: • Desmoulin's whorl snail • Fen orchid • Ramshorn snail Annex II species present as a qualifying feature: • Otter	Separated from the Site by Boon's Heath Quarry CWS, arable land interspersed by ditches, the River Waveney, and coastal floodplain and grazing marsh. None of the qualifying habitat features are present within or bordering the Site. Furthermore, the Site has extremely limited potential to support any of the qualifying species given its range of habitats. The site is very unlikely to be functionally linked to the SAC. Given the intervening distance and habitats, there is very limited opportunity for impact pathways; for example, there are no watercourses that could transmit surface water pollution. Given the intervening distance and habitats, and the lack of clear functional links, there is very limited opportunity for impact pathways and **no significant adverse effects** are predicted.

Site	Minimum Distance and Direction (km) from Site	Summary of Qualifying Features	Impact Assessment
Broadland Ramsar *(International Importance)*	0.8 km south	Internationally important wetland comprising a complex mosaic of wetland habitats which support a range of rare species.	As for Broadland SPA and The Broads SAC. **No significant adverse effects** are predicted.
Barnby Broad and Marshes SSSI *(National Importance)*	0.8 km south	Site comprises large and varied area of open water, carr woodland, fen, grazing marsh and dykes. The plant communities are rich in species and the site has an outstanding assemblage of rare and uncommon plants. The mosaic of habitats is also attractive to nesting birds and several rare species breed in the area. Furthermore, there is a considerable entomological interest. A component of the Broads SAC and Broadland SPA and Ramsar. Condition: Favourable Main habitat: lowland neutral grassland.	Separated from the Site by Boon's Heath Quarry CWS, arable land interspersed by ditches, the River Waveney, and coastal floodplain and grazing marsh. None of the notified features are present within or bordering the Site. Furthermore, the Site has extremely limited potential to support any of the associated notable species (i.e. aquatic invertebrates and wetland breeding birds) given its range of habitats. The site is very unlikely to be functionally linked to the SSSI. Given the intervening distance and habitats, and the lack of clear functional links, there is very limited opportunity for impact pathways and **no significant adverse effects** are predicted.
Stanley and Alder SSSI *(National Importance)*	2.4 km west	Adjacent to the River Waveney and form the only extensive area of regularly flooded alder carr woodland and fen in the Waveney Valley. The site supports a variety of plants characteristic of Broadland. Part of the site has been set aside as a conservation area for otters. The insect fauna is rich in species and the bird breeding community includes a regionally uncommon species. A component of the Broads SAC and Broadland SPA and Ramsar. Condition: Unfavourable, recovering Main habitat: lowland fen, marsh and swamp.	Sufficiently distant from the Site with limited ecological connectivity. **No significant adverse effects** are predicted.

Site	Minimum Distance and Direction (km) from Site	Summary of Qualifying Features	Impact Assessment
Sprat's Water and Marshes, Carlton Colville SSSI *(National Importance)*	3.2 km east	Situated in the Lower Waveney Valley and comprise areas of spring-fed mixed fen, open water, alder carr and wet grazing marsh on deep peat. A component of the Broads SAC and Broadland SPA and Ramsar. Condition: Favourable Main habitat: lowland fen, marsh and swamp.	Sufficiently distant from the Site with limited ecological connectivity. **No significant adverse effects** are predicted.

5.7.2 Habitats

The construction of the Development will result in a large extent of temporary disturbance of low value habitats for the installation of panels, as well as small areas of permanent habitat loss for ancillary structures. No habitats of Local value (i.e. ponds and hedgerows) will be adversely affected. No significant adverse impacts to habitats are predicted.

5.7.2.1 Mitigation and Enhancements

Habitat retention, enhancement and creation within the Site (as set out in the Landscape and Biodiversity Enhancement Strategy) will benefit habitats and a range of wildlife. In summary, the measures will include:

- Retaining and/or enhancing grassland under the solar panels;
- Retaining and/or enhancing ruderal, grassland and scrub vegetation around the perimeter, grading into hedgerows and woodland;
- Hedgerow creation and infill hedgerow planting;
- Tree belt planting along access road

These newly created and enhanced habitats will also provide supporting value to nearby designated areas (e.g. Boon's Heath CWS) by providing additional areas into which local populations of sensitive species can disperse. These enhancements have the potential for significant positive impacts to habitats at a site or Local level.

5.7.3 Bats

No potential roost features were identified and no trees will be removed in order to facilitate the Development. Therefore, roosting bats will not be significantly impacted as a result of the Development and no further surveys or mitigation are required.

The construction of the Development, over a period up to six months, will cause the temporary disturbance or loss of most of the habitats in the Site; however, most of these are of low value to bats and disturbance will be phased across the Site such that most parts of the Site will not be subject to a high level of disturbance at a given time.

Longer term, permanent habitat changes will take place during the operational phase, whereupon a variety of habitat enhancements will establish. The panels themselves will provide novel structures and change the microclimate; it is probable that these changes will benefit bats by providing a more heterogeneous landscape which will support more prey. Hedgerow creation and grassland management will provide improved foraging resources with the potential for a significant positive effect on bats.

The Development will not directly harm bats but it has the potential to disturb them through changes to exterior night-time lighting. Lighting can affect bats directly, by altering their flight behaviour, or indirectly, by affecting their prey. Lighting during construction will be very limited in extent and duration and no prolonged night-time working is proposed. Any lighting during the operational phase will be subject to the mitigation and best practice measures outlined below. Consequently, the limited amount of lighting will have no adverse effect on bats. Furthermore, and notwithstanding the limited amount of lighting, the Site will be subject to negligible, if any, night-time disturbance during its operation.

The above minor adverse effects are not significant and are not likely to constitute legal offences.

5.7.3.1 Mitigation

New lighting should be designed in line with good practice[45] to ensure the Site is able to provide continued undisturbed foraging and commuting habitats for bats. Should lighting be required (during both construction and operation), the following measures should be considered:

- Motion-sensitive security lighting and avoidance of floodlighting;
- Avoidance of lighting with ultra-violet (UV) components in areas where lighting is required for public safety purposes. UV light is particularly disruptive to bat behaviour;
- Use of flat-glass protectors on luminaires to help reduce light spill above angles greater than 70° from the vertical plane; and
- Avoiding light spill on to surrounding habitats by using accessories such as shields, louvres, hoods and cowls.

5.7.4 Great Crested Newt

The waterbodies in the ESA are unsuitable for GCN and the terrestrial habitats offer very limited foraging and sheltering opportunities for GCN (and other amphibians). No other ponds within 500 m of the Site (which held water) were accessible at the time of survey and so the status of GCN in these is unknown. Nonetheless, the ponds within and nearest the Site, which will not be impacted by the Development, were assessed and the nearest off-site ponds are separated by at least 150 m and lack aquatic or terrestrial habitat connectivity to the Site. Consequently, it reasonable to conclude the impacts to GCN, either through habitat disturbance or direct harm, are unlikely and not significant, given the temporary, reversible and limited extent of construction, as well as the past and ongoing history of disturbance on the Site.

The Landscape and Biodiversity Enhancement Strategy includes measures that will benefit amphibians by retaining, creating and enhancing foraging and sheltering habitats, and the long-term, operational effects of the Development on amphibians are likely to be positive.

5.7.4.1 Mitigation

The aim of mitigation is to safeguard GCN and other amphibians during construction and to adhere to good practice to reduce the likelihood of legal offences. Non-licenced 'Reasonable Avoidance Measures' (RAMs) will be sufficient to mitigate the low level of impact/risk associated with works affecting specific high-value GCN habitats which, for this Site are limited to hedgerows, scrub and some areas of grassland.

- The workforce will receive a briefing (either written or verbal) about GCN and their obligations with respect to the species;
- Works (principally vegetation clearance) with the potential to impact high-value habitats will only take place if absolutely necessary and during the seasonal period when GCN are active; usually from April through to September, although this is weather- and temperature-dependent
- To minimise the risk to nesting birds, clearance is recommended to be completed in either April or August/September as the risk of nesting bird presence will be reduced. Clearance activities can be undertaken from May to July, however this will require additional consideration to nesting birds. See section 5.7.7.1 for further details.

[45] Institute of Lighting Professionals (ILP) and Bat Conservation trust (BCT) (2018) *Bats and Artificial Lighting in the UK.* Available from: https://cdn.bats.org.uk/pdf/Resources/ilp-guidance-note-8-bats-and-artificial-lighting-compressed.pdf?mtime=20181113114229&focal=none

- An Ecologist will identify and search suitable habitats for GCN before works that may affect them start; the timing of the search in relation to works will be determined by the ecologist based on the prevailing situation (e.g. type of works and habitat);
- If GCN are considered to be absent, works will be undertaken and supervised by an Ecologist; and
- In the unlikely event that GCN are encountered during initial searches or during works, then works will stop immediately and the approach revised. A licence from Natural England may be required to facilitate further works.

5.7.5 Reptiles

The Site has limited potential to support reptiles and so no further surveys have been undertaken. However, reptiles have been recorded in the local area and small patches of some habitats may support common reptiles either occasionally or in low numbers. In the absence of mitigation, ecological effects will be not significant but there is potential that the Development will cause harm or disturbance to reptiles during its construction which may constitute a legal offence.

The long-term, operational effects of the Development on reptiles are likely to have a positive effect because terrestrial habitat quality will be improved.

5.7.5.1 Mitigation

The RAMs adopted for great crested newt will be sufficient to safeguard reptiles during construction. Similarly, the habitat creation and enhancements outlined for GCN will also benefit reptiles in the long term.

5.7.6 Badger

In the absence of mitigation, there is potential that the Development will cause harm or disturbance to commuting badgers (and other terrestrial mammals) during the construction phase of the Development. Such effects would not amount to significant adverse ecological effects but may constitute legal offences.

5.7.6.1 Mitigation

In order to prevent harm to badgers, the following good practice measures should be implemented during construction:

- Cover excavations overnight to prevent animals falling into them. Inspect excavations daily for the presence of animals before recommencing work on them;
- Any deep (> 80 cm) excavations that are to be left open overnight should include a means of escape for any animals that may fall in;
- Where possible, works should be limited to the hours from dawn to one hour before sunset;
- The creation of large stock piles of earth should be avoided as these may be attractive for badgers and other animals;
- Store building materials above ground on pallets; and
- Should any new mammal burrows be identified, works in the area will need to stop and a suitably experienced ecologist contacted for advice.
- Mammal gates will be installed in perimeter fencing to allow the free movement of badgers and other small mammals.

5.7.7 Birds

It is anticipated that the Site and immediate surrounds will support small numbers of breeding birds, including some widespread species of conservation concern. Any impacts on species associated with the hedgerows and boundary habitats are expected to be low

and temporary for the duration of the construction phase; however, skylark may breed or forage in small numbers within the limited grassland areas of the Site. The planned improvements to the grassland under and between the panels has the potential to provide good habitat for nesting and foraging; however, the limited and unpublished evidence of use of solar sites by skylark is mixed[46,47]. Although one study suggest skylark do not nest between panels[47], the study has many methodological limitations and acknowledges that many of the study sites are not being maintained according to the management plan. Recent research funded by the RSPB has suggested that skylark do hold territory and are likely to nest within many solar developments[48]. As such, it is anticipated that skylark will continue to use the Site during the operational phase, and the habitats created will offer enhanced opportunities (for foraging and/or nesting) compared to the current baseline condition, which is dominated by bare ground.

Consequently, no significant adverse effects to breeding birds are anticipated. However, without mitigation, and depending on the time of year that works are carried out, it is possible that construction works will negatively impact breeding birds through direct harm and disturbance, including to nests. Such impacts may also constitute a legal offence.

As discussed in section 5.7.1, use of the wider area by wetland species, including those associated with the nearby designated Sites, is understood to be low, both in absolute numbers and in the context of the SPA populations. No direct effects are predicted and, given the low numbers and irregular presence, combined with the screening offered by distance and intervening habitats, visual and aural disturbance during construction is expected to be negligible.

The long-term, operational effects of the Development on birds are likely to be positive because the Landscape and Biodiversity Enhancement Strategy includes measures that will benefit birds by maintaining and enhancing foraging, sheltering and nesting habitats.

5.7.7.1 Mitigation

Mitigation will include, but not be limited to, the following:

- To ensure compliance with the Wildlife and Countryside Act 1981 (as amended), any work involving vegetation clearance during the peak bird nesting season (March to late August inclusive, or earlier/later if weather conditions are particularly mild) must be avoided. To minimise the risk of adverse effect to reptiles and amphibians, clearance is recommended to be completed in either April or September as the risk of nesting bird presence will be reduced and herptiles will be fully active.
- If any clearance works to nesting habitats, are required during the nesting season, then pre-construction checks for nesting birds would need to be carried out by a suitably experienced ecologist no more than 48 hours prior to the works commencing.
- If any nesting birds are found to be present, an appropriate buffer zone would be implemented, within which works are excluded, for the duration of the breeding attempt. Any active nests will need to be left *in situ* until a suitably experienced ecologist confirms that birds have stopped using them.
- In the unlikely event that any birds listed under Schedule 1 of the Wildlife and Countryside Act 1981[49] (as amended), are found to be nesting on Site, an ecologist will need to be contacted for further advice.

[46] Natural England (2016) *Evidence review of the impact of solar farms on birds, bats and general ecology.* Available online at: http://publications.naturalengland.org.uk/publication/6384664523046912

[47] Montaq, H., Parker, G. & Clarkson, T. (2016) *The effects of Solar Farms on local biodiversity: A comparative study*. Clarkson and Woods and Wychwood Biodiversity.

[48] https://community.rspb.org.uk/ourwork/b/biodiversity/posts/bird-use-of-solar-farms-interim-results

[49] https://www.rspb.org.uk/birds-and-wildlife/advice/wildlife-and-the-law/wildlife-and-countryside-act/schedules/

5.7.8 Invertebrates

Aquatic invertebrates are attracted away from local waterbodies to solar panels due to their similar reflective appearance. Unsuccessful, abortive egg-laying on solar panels, in place of successful breeding in ponds, could impact local invertebrate populations, although the risk of this is considered low given the availability of large and expansive wetland habitats in the area.

The long-term, operational effects of the Development on invertebrates are likely to be positive because of the general improvement in habitat quality and availability.

5.8 Assessment of Residual Effects

With the full adoption of mitigation measures proposed, residual adverse effects for all IEFs will be not significant. Furthermore, the Development has the potential to generate a net positive impact over its lifetime due to minor positive effects on several IEFs at a site and Local scale.

5.9 Cumulative Effects

Given the very limited potential of the Development to cause significant adverse ecological effects, combined with the limited number of nearby developments, it is reasonable to conclude that cumulative adverse effects are very unlikely and not significant.

5.10 Summary

A range of studies has been undertaken to establish the baseline ecology of the Site. The results of the studies have informed the design of the Development and helped to avoid or reduce potentially adverse ecological effects. An EcIA has been undertaken to identify IEFs and to assess the ecological impact of the Development on them. A summary of effects is presented in Table 5.7.

Table 5.7: Summary of Effects

Receptor	Potential Effects	Significance of Effect	Mitigation Proposed	Residual Significance
Designated Sites	Disturbance or harm of qualifying/interest features.	Not significant	None	Not significant
Habitats	Direct loss and disturbance.	Not significant	Retain, create and enhance habitats.	Significant Positive (Site/Local)
Bats	Habitat loss/disturbance. Direct disturbance.	Not significant	Sensitive lighting design. Habitat enhancements.	Significant Positive (Site/Local)
Great Crested Newt	Habitat loss/disturbance. Direct disturbance/harm.	Not significant	Reasonable Avoidance Measures. Habitat enhancements.	Significant Positive (Site/Local)

Receptor	Potential Effects	Significance of Effect	Mitigation Proposed	Residual Significance
Reptiles	Habitat loss/disturbance. Direct disturbance/harm.	Not significant	Reasonable Avoidance Measures. Habitat enhancements.	Significant Positive (Site/Local)
Badger	Direct harm.	Not significant	Good site management.	Not significant
Birds	Habitat loss/disturbance. Direct disturbance/harm.	Not significant	Sensitive timing (seasonal) Nesting bird checks.	Not significant

5.11 Statement Of Significance

The survey, desk studies and subsequent assessment that have been carried out confirmed the following:

- There are several designated sites in the surrounding area, including the internationally important Broads SAC and Broadlands SPA and Ramsar.
- The Site has a limited range of low value habitats, all of which are the result of recent and ongoing landfill operations.
- The Site had limited potential to support protected and priority species; specifically, reptiles, GCN, badger and bats.
- The Site may support a limited range of breeding birds, including some of conservation concern.

In the absence of mitigation, the construction phase of the development has the potential to adversely affect some sensitive ecological features. These effects would be not significant but may, in some cases, constitute legal offences. However, with the implementation of mitigation, no significant adverse ecological impacts or legal offences are predicted during construction. The habitat management prescriptions will compensate for the minor effects of habitat loss/disturbance and, in the long term, provide benefits to the ecological features considered in the assessment, which will constitute a net gain in biodiversity.

5.12 References

CIEEM (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal.* Chartered Institute of Ecology and Environmental Management, Winchester.

CIEEM (2017) *Guidelines for Preliminary Ecological Appraisal, 2nd Edition*. Chartered Institute of Ecology and Environmental Management, Winchester.

Collins, J (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd ed.). The Bat Conservation Trust, London.

Google LLC (2020) *Google Earth* [Online] Available at: https://earth.google.com/web/

Institute of Lighting Professionals (ILP) and Bat Conservation trust (BCT) (2018) *Bats and Artificial Lighting in the UK.*

JNCC (2010) *Handbook for Phase 1 habitat survey: a technique for environmental audit*. Nature Conservancy Council.

Montaq, H., Parker, G. & Clarkson, T. (2016) *The effects of Solar Farms on local biodiversity: A comparative study*. Clarkson and Woods and Wychwood Biodiversity.

Multi Agency Geographic Information for Countryside (MAGIC) [Online] Available at: https://magic.defra.gov.uk/home.htm

Natural England (2016) *Evidence review of the impact of solar farms on birds, bats and general ecology.* Available at: http://publications.naturalengland.org.uk/publication/6384664523046912

Oldham, RS., et al. (2000) *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus).* Herpetological Journal 10 (4), 143–155.

Shotton, R. (2018) *Bird use of solar farms – interim results* [Blog post]. Available at: https://community.rspb.org.uk/ourwork/b/biodiversity/posts/bird-use-of-solar-farms-interim-results

6 TRAFFIC AND ACCESS

6.1 Introduction

This Chapter of the ES evaluates the effects of vehicle movements associated with the Development. This assessment was undertaken by Arcus Consultancy Services Limited.

Construction of the Development will involve the installation of ground mounted solar PV array and associated infrastructure including inverters, a switching compound as well as fencing, security cameras, cabling, storage containers and access tracks. Vehicle movements to the Site will likely consist of heavy goods vehicles delivering materials and components, light goods vehicles and cars.

This Chapter of the ES is supported by Technical Appendix A6.1: Transport Statement.

This Chapter includes the following elements:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Baseline Conditions;
- Assessment of Potential Effects;
- Mitigation and Residual Effects;
- Cumulative Effect Assessment;
- Summary of Effects; and
- Statement of Significance.

6.2 Legislation, Policy and Guidance

The following guidance, legislation and information sources have been considered in carrying out this assessment.

6.2.1 Legislation

The following legislation documents are of particular relevance to the assessment:

- The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017[50] (SI 2017/571).

6.2.2 Policy and Guidance

The following policy and guidance documents are of particular relevance to the assessment:

- PPG: Environmental Impact Assessment, last updated 6th March 2014[51];
- Institute of Environmental Management and Assessment (IEMA) Guidelines for the Environmental Assessment of Road Traffic[52]; and
- National Planning Policy Framework (2019)[53].

6.3 Assessment Methodology and Significance Criteria

6.3.1 Scope of Assessment

The key issues for the assessment of potential access, traffic and transportation effects relating to the Development are, for the construction phase:

- Traffic generation;

[50] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017. Available at: http://www.legislation.gov.uk/uksi/2017/571/contents/made. Accessed on 20/05/2021.

[51] https://www.gov.uk/guidance/environmental-impact-assessment. Accessed on 20/05/2021

[52] Institute of Environmental Management and Assessment (1993). Guidelines for the Environmental Assessment of Road Traffic. Institute of Environmental Management and Assessment

[53] https://www.gov.uk/government/publications/national-planning-policy-framework--2. Accessed on 20/05/2021

- Accidents and safety;
- Driver delay;
- Pedestrian and Cyclist amenity;
- Severance;
- Noise and vibration;
- Hazardous loads;
- Pedestrian delay;
- Visual effects; and
- Air quality.

6.3.2 Elements Scoped Out of Assessment

6.3.2.1 Operational Traffic

Vehicle movements to the site during the operation of the Development will comprise activities associated with inspection, monitoring and general site up-keep. It is anticipated that such visits will occur up to once per week on average and be via van or other similar sized vehicles.

Operational traffic is therefore expected to be minimal and negligible in terms of existing traffic flow levels on routes within the vicinity of the Development. Assessment of operational traffic has therefore been scoped out of this assessment.

6.3.2.2 Decommissioning Effects

Traffic and transport effects associated with decommissioning of the Development are expected to comprise removal of all solar PV array infrastructure including modules, mounting structures, cabling, switching stations and battery containers. These would be removed from the Site and recycled or disposed of in accordance with good practice and market conditions at that time.

Traffic associated with decommissioning of the Development will be the same or less than that experienced during construction. It is not possible to accurately forecast baseline traffic flow levels 40 years into the future. For the above reasons, further work would be undertaken at the time of decommissioning to determine if significant transport effects might be experienced.

6.3.2.3 Visual Effects

The movements of HGVs are not considered visually intrusive as it is an everyday occurrence. The assessment of visual effects of operational traffic has therefore been scoped out of this assessment.

6.3.2.4 Cyclist Amenity

A tentative threshold for judging the significance of changes in cyclist amenity is described as instances where total traffic flow or its Heavy Goods Vehicles (HGV) component halves or doubles. Currently, there are no formal cycle facilities on the surrounding road network and majority of cycling occur on the road. We assume that that temporary increases in HGV traffic are not uncommon on the surrounding road network, therefore the assessment of the impact of construction traffic on cyclist amenity has been scoped out of this assessment.

6.3.2.5 Noise

Environmental impacts arising from HGV movements will include vibration, noise and highway safety risks, but these will be temporary during the construction phase and when the site is operational would have a negligible highway impact. Therefore, the assessment of the impact of construction traffic noise has been scoped out of this assessment.

6.3.2.6 Air Quality

Current guidance[54] on matters relating to air quality advises that significant impacts to local air quality may be found in the following cases:

- Where the road alignment will change by 5 m or more; or
- Daily traffic flows will change by 1,000 Annual Average Daily Traffic flow (AADT) or more; or
- Heavy Duty Vehicle flows will increase by 200 AADT or more; or
- Daily average speed will change by 10 km/hr or more; or
- Peak hour speed will change by 20 km/hr or more.

Given that the assessment of the expected volume of construction traffic, none of the above criteria have been met or exceeded. In addition, due to the temporary nature of the increase in vehicles using the proposed access route, any effects on local air quality will be short term and reversible. Therefore, the assessment of the impact of construction traffic on air quality has been scoped out of this assessment.

6.3.3 Study Area

The Development would cover an area of approximately 11.7 hectares (ha) and would have a capacity of approximately 7 MW. The Development is located on the closed and capped Aldeby Landfill site situated off Common Road, Aldeby, located approximately 1.2 km to the south-east of Aldeby and 400 m south of Burgh St Peter (centred on National Grid Reference TM 46609 92690).

There are no public roads located within the Site. Access would be via the existing landfill site access point off Common Road to the west, providing connectivity to Rectory Road and the A143 via Dun Cow Road. The existing access road within the site boundary has been utilised by HGVs throughout the operation of the landfill site and is therefore suitable for use by construction vehicles. This minimises the requirement for new access junctions or tracks to be constructed, except for a small section of track to reach the solar array.

Full details of the access arrangement, including routing to Site are presented in the Transport Statement (Technical Appendix A6.1)

6.3.4 Baseline Survey Methodology

No baseline traffic flow data was available for the sections of road which make up the route. Due to current restrictions brought about by COVID-19 it is believed that any data generated through the commissioning of traffic counts may be invalid and as such would be deemed unusable within the scope of this document.

6.3.5 Methodology for the Assessment of Effects

The magnitude of the effect of increase in traffic flow is a function of the existing traffic volumes on routes and the percentage increase in flow as a result of the Development.

An initial screening exercise was undertaken to identify routes where an adverse effect could potentially occur. The IEMA Guidelines (1993) suggest two broad principles:

- Rule 1 – include road links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles is predicted to increase by more than 30%); and
- Rule 2 – include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

[54] Design Manual for Road and Bridges – LA 105 Air Quality [Online] Available at: https://www.standardsforhighways.co.uk/prod/attachments/10191621-07df-44a3-892e-c1d5c7a28d90?inline=true. (Accessed on 20/05/2021)

Where the predicted increase in traffic flow is lower than these thresholds, the significance of the effects can be considered to be low or not significant with no further detailed assessments warranted. Consequently, where the predicted increase in traffic flow is greater than these thresholds, the potential effects are considered to be potentially significant and are assessed in greater detail.

The IEMA Guidelines (1993) are intended for the assessment of environmental effects of road traffic associated with major new developments giving rise to traffic generation, as opposed to short-term construction. In the absence of alternative guidance and as the traffic generation during the operational phase is very low, these guidelines have been applied to assess the short-term construction phase of the Development.

Where existing traffic levels are generally low (e.g., rural roads and some unclassified roads), any increase in traffic flow may result in a predicted increase that would be higher than the IEMA Guidelines (1993) thresholds. In these situations, it is important to consider any increase in terms of overall traffic flow in relation to the capacity of the road, before making a conclusion on whether the effect is significant as defined under the EIA Regulations.

Any change in traffic flow which is greater than the thresholds set out in the IEMA Guidelines (1993) would be subject to further analysis. The magnitude of potential impacts will be identified through consideration of receptor sensitivity against the degree of predicted change to baseline conditions, the duration and reversibility of this change and professional judgement.

6.3.5.1 Sensitivity of Receptors

The sensitivity of the baseline conditions, including the importance of environmental features on or near to the Site or the sensitivity of potentially affected receptors, will be assessed in line with best practice guidance, legislation, statutory designations and / or professional judgement.

Table 6.1 details the framework for determining the sensitivity of receptors.

Table 6.1: Framework for Determining Sensitivity of Receptors

Sensitivity	Description
High	Receptors of greatest sensitivity, would include: People whose livelihood depends upon unrestricted movement within their environment including commercial drivers and companies who employ them, local residents, schools and colleges. Accident hotspots would also be considered.
Medium	Receptors with sensitivity, would include: People who pass through the area habitually, but whose livelihood is not wholly dependent on free access. Would also typically include: congested junctions, community services, parks, businesses with roadside frontage, and recreation facilities.
Low	Receptors with some sensitivity, would include: People who occasionally use the road network. Would also typically include: public open spaces, nature conservation areas, listed buildings, tourist attractions, residential roads with adequate footway provision and places of worship.
Negligible	Receptors with very low sensitivity, would include: People not sensitive to transport effects. Would also refer to receptors that are sufficiently distant from the affected roads and junctions.

6.3.5.2 Magnitude of Change

The magnitude of potential effects will be identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

The criteria for assessing the magnitude of an effect are presented in Table 6.2: Framework for Determining Magnitude of Change.

Table 6.2: Framework for Determining Magnitude of Change

Sensitivity of Receptor	Definition
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, has low environmental value, or local importance.
Negligible	The receptor is resistant to change and is of little environmental value.

6.3.5.3 Significance of Effect

The sensitivity of the asset and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 6.3 summarises guideline criteria for assessing the significance of effects.

Table 6.3: Framework for Assessment of the Significance of Effects

Magnitude of Change	**Sensitivity**			
	High	**Medium**	**Low**	**Negligible**
High	Major	Moderate	Moderate	Minor
Medium	Major / Moderate	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations, and are shaded in light grey in Table 6.3.

6.3.6 Assumptions and Limitations of Assessment

A worst-case scenario has been assumed in which all traffic associated with the Development will pass each traffic count location identified in the study. Whilst all HGV traffic will use the defined route to site, no specific routes will apply for light traffic (i.e., cars and vans) and therefore their choice of route will be determined by their origin and is likely to be distributed across a variety of routes. The effect of increased traffic on the identified route is therefore likely to be lower than estimated in this assessment.

6.4 Baseline Conditions

The Transport Statement (Technical Appendix A6.1) provides further details of the baseline conditions including existing highway infrastructure and a Road Traffic Collision Assessment.

As per Guidelines, particular groups of locations which may be sensitive to changes in traffic conditions should be identified. The Guidelines suggest, for example, the people, home, school and the elderly may be sensitive to changes in traffic conditions. A desktop search was undertaken for the route to site within the Study Area.

A number of sensitive receptors have been identified on the proposed access route. There are a number of residential and commercial properties that front onto both sides of the carriageway, particularly on Dun Cow Road and Common Road.

Aldeby Business Park and Burgh St Pete post office are located on Common Road. Given that there are no footways on Common Road, visitors may use the route for part of their journey to and from the post office.

6.5 Assessment of Potential Effects

6.5.1 Anticipated Construction Development Traffic

The Transport Statement (Technical Appendix A6.1) provides further details on the construction programme and the anticipated construction traffic associated with the Development. The construction period is expected to run for approximately 4 months.

Table 6.4 shows an indicative construction programme and schedule of HGV deliveries.

Table 6.4: Anticipated Construction Programme

Activity	Month				
	1	2	3	4	Total
Mobilisation	30				30
Access Track Upgrade	10	10			20
Switching station, Cabling etc		22			22
Frames and Inverters		8			8
Panel Installation			50	10	60
Demobilisation				30	30
Staff	1,040	2,080	2,080	2,080	8,320
Fuel	2	2	2	2	8
Total (All Vehicles)	1,082	2,122	2,132	2,122	7,458
Total (HGV Only)	42	42	52	42	
Average Total Traffic per Day*	42	82	82	42	
Average HGV Traffic per Day*	2	2	2	2	

*ASSUMES 26-DAY WORKING MONTH

The Development is expected to be constructed over a 4-month period. Approximately 7,458 two-way vehicle movements are expected to occur during this period for staff, and to deliver construction materials and components.

As indicated in Table 6.4, the peak month of construction is expected to occur in Month 3 where there are 2,132 two-way movements, which consists of 2,080 car movements and 52 HGV movements. Assuming a 26-day working month, this would equate to a maximum

of 82 two-way vehicle movements per day which would consist of 80 car movements and 2 HGV movements on average.

As detailed in the assessment methodology, where considering increases in traffic on roads it is important to consider the overall and residual capacity of the road in question. It is acknowledged that Dun Cow Road and Common Road are single track roads, and although there is no traffic count information available, it is anticipated that the maximum movement of 2 HGVs per day will not exceed the IEA significance thresholds due to the nature of these roads.

Staff will be also be encouraged to car share, so it is anticipated that the figure for car or van movements is likely to be considerably lower than the above estimates in practice. Furthermore, it should be noted that deliveries associated with HGV movements will be distributed throughout the working day. Additionally, the predicted increase is temporary and would cease following completion of the short-term construction of the Development.

The effect of construction on traffic generation on Dun Cow Road and Common Road is considered to result in a negligible magnitude of change on a receptor of medium sensitivity. Thus, the effect of increased traffic on this route is considered negligible and not significant as per the EIA Regulations.

6.5.2 Accidents and Safety

As detailed in Section 4.4 of the Transport Statement, the RTC assessment identified one 'serious' and one 'fatal' RTC were recorded in total within this study area and no 'slight' RTCs were recorded. No 'trends' or hotspots have been noted which would otherwise indicate the road to be unsafe.

It has been concluded that these roads are operating within acceptable safety parameters at present and in the absence of identifiable trends in RTCs or known accident hotspots, an increase in overall traffic flow or HGV composition is not sufficient to affect a change in safe operation of the road network. Hence, the temporary increase in overall traffic and HGVs for the duration of the construction of the Development will not result in an adverse effect in respect to accidents and safety.

The effect of construction on accidents and safety is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on accidents and safety is considered minor and not significant as per the EIA Regulations.

6.5.3 Pedestrian Amenity

Pedestrian amenity, fear and intimidation can be affected by changes to traffic flow and composition. Rectory Road does not have pedestrian footways, except where they pass through settlements, while Dun Cow Road Common Road does not have footways at all.

HGV (a maximum movement of 2 HGVs per day) traffic levels are not predicted to increase above the relevant thresholds of significance throughout construction on sensitive receptors along the proposed construction route.

It is acknowledged that it is likely that staff and visitors to the post office and business park will walk on, and may cross, the delivery route on the way to and from these facilities. However, the predicted increase in traffic is not of a magnitude to cause a disruption to the status quo. That notwithstanding, drivers of all delivery vehicles to be made aware during induction of the presence of these facilities within these settlements.

The effect of construction on pedestrian amenity is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on pedestrian amenity is considered minor and not significant as per the EIA Regulations.

6.5.4 Driver Delay

All roads within the Study Area are operating significantly below capacity and are predicted to continue to do so during construction of the Development. It is acknowledged that Dun Cow Road and Common Road are single track roads with no passing places however the number of existing vehicles using this road is minimal and therefore negligible in terms of traffic increase.

The effect of general increase in traffic on driver delay is considered to result in a low magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on driver delay, in the absence of mitigation, is considered moderate and significant in terms of the EIA Regulations.

In accordance with the EIA Regulations, Section 6.6.1 of this Chapter details mitigation measures which are to be adopted to reduce this effect to not significant.

6.5.5 Severance

Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. Dun Cow Road and Common Road are the only routes within the Study Area which passes through parts of the settlement of Burgh St Peter and have the potential to be affected by severance.

During construction of the Development, it is anticipated that a maximum movement of 2 HGVs per day will occur on these roads, however, it is assumed that temporary increases in HGV traffic are not uncommon. Additionally, the change in traffic is temporary, fully reversible and would only occur during construction hours.

The effect of construction on severance is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on severance is considered minor and not significant as per the EIA Regulations.

6.5.6 Hazardous Loads

Fuel will be regularly transported to the Site over the duration of construction of the Development. All fuel will be transported by suitably qualified contractors, and all regulations for the transportation and storage of hazardous substances will be observed. No other hazardous substances in significant quantities are expected to be transported to Site.

The effect of the transportation of hazardous substances is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of hazardous load is considered minor and not significant as per the EIA Regulations.

6.6 Mitigation and Residual Effects

6.6.1 Mitigation Measures

A significant effect was identified in Section 6.5.4 relating to driver delay, that Dun Cow Road and Common Road are single track roads with no passing places.

The Transport Statement (Technical Appendix A6.1) provides further details of the traffic management procedures which require to be implemented during the construction phase in order to minimise delays to existing drivers on these roads. Due to the extremely low number of vehicles associated with the operational phase of the Development, and this will not include HGVs as standard, no traffic management procedures are proposed for the operational phase.

It is proposed to implement a temporary one-way system on Dun Cow Road and Common Road during construction. Additionally, temporary traffic lights would be installed at the

Dun Cow Road/Common Road junction in order to control access to the final section of Common Road towards the Site entrance.

The following specific measures are provided as an outline of how the route could be managed:

- Common Road to temporarily become one-way (southbound) from the Beccles Road Junction to Dun Cow Road Junction;
- Dun Cow Road to become temporarily one-way (northbound) from the Common Road junction to Rectory Road/Beccles Road;
- Temporary traffic lights to be located at the Dun Cow Road/Common Road/ Lily Lane Junction to control traffic on Common Road between this junction and the site entrance junction.

The above measures are recommended; however, the final details of the traffic management procedures will be provided prior to the commencement of construction. These will be developed by the Principal Contractor or their appointed traffic management sub-contractor and would be agreed in consultation with Norfolk County Council Highways department prior to installation. It is anticipated that a number of temporary traffic regulation orders (TTROs) would be required in order to implement the proposed measures.

6.6.2 Residual Effects

If the above mitigation measures are implemented for the duration of construction, the effect of increased traffic on driver delay will be reduced to minor and therefore assessed as not significant in terms of the EIA Regulations.

6.7 Cumulative Effect Assessment

No cumulative solar farm developments, or other major applications for which construction timescales may overlap with that of the Development, have been identified in the area.

On that basis, and given that any such developments would be subject to appropriate planning conditions, no cumulative assessment of traffic effects has been undertaken.

6.8 Summary of Effects

An assessment has been made of the potential for significant effects of the Development. This assessment identified potential significant traffic and transport effects (in terms of the EIA Regulations) on any receptors during the construction of the Development.

By applying the mitigation measures outlined in Section 6.6.1 mainly through following best practice guidelines during construction and implementation of a Temporary Traffic Management Plan, the magnitude of residual effects of the Development, both alone and in combination with other schemes, are assessed as being minor magnitude, and thus not significant in terms of the EIA Regulations.

6.9 Statement of Significance

Effects are considered to be significant for the purposes of the EIA Regulations where the effect is classified as being of 'major' or 'moderate' significance. A moderate effect was identified for driver delay on Dun Cow Road and Common Road in Burgh St Peter. Mitigation measures were identified in Section 6.6.1 of this ES Chapter and the residual effects following implementation of these mitigation measures are predicted to be minor and thus not significant in terms of the EIA Regulations.

6.10 References

Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Available online at: http://www.legislation.gov.uk/uksi/2017/571/contents/made

Guidance of Environmental Impact Assessment. Available online at: https://www.gov.uk/guidance/environmental-impact-assessment

Institute of Environmental Management and Assessment (1993). Guidelines for the Environmental Assessment of Road Traffic. Institute of Environmental Management and Assessment

Ministry of Housing, Communities and Local Government (February 2019), National Planning Policy Framework. Available online at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

Design Manual for Road and Bridges – LA 105 Air Quality [Online] Available at: https://www.standardsforhighways.co.uk/prod/attachments/10191621-07df-44a3-892e-c1d5c7a28d90?inline=true.

7 HYDROLOGY AND HYDROGEOLOGY

7.1 Introduction

This Chapter assesses potential effects of the Development on the hydrological and hydrogeological environment and is based on the findings of the Flood Risk and Groundwater Risk Assessments undertaken.

This Chapter of the ES is supported by:

- Technical Appendix 7.1 Flood Risk Assessment (FRA); and
- Technical Appendix 7.2 Groundwater Risk Assessment.

A description of the Development, is provided in Chapter 2: The Development.

7.2 Legislation

The EIA Regulations establishes in broad terms what is to be considered when determining the effects of development proposals on hydrology and hydrogeology. The following other legislation, guidance and information has been considered in carrying out this assessment.

- Water Framework Directive (2000/60/EC)[55] as implemented in England via the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The Water Framework Directive (WFD) establishes a framework for the protection, improvement and sustainable use of all water environments;
- The Groundwater Directive (GWD) (2006/118/EC)[56] as implemented by the Groundwater (Water Framework Directive) (England) Direction 2016;
- The Groundwater Daughter Directive to WFD (2006/118/EC) as implemented Environmental Permitting (England and Wales) Regulations 2016;
- The Bathing Water Directive (2006/7/EC)5 as implemented by the Bathing Water Regulations 2013;
- Flood and Water Management Act 2010; and
- Land Drainage Act 1991.

7.3 Consultation

Norfolk County Council advised that the planning application, in particular the Environmental Impact Assessment, should include a Hydrological / Hydrogeological Risk Assessment to assess the impact of the Development on groundwater and surface water quality and resources.

7.4 Assessment Methodology and Significance Criteria

The significance of the potential effects of the Development has been classified by professional consideration of the sensitivity of the receptor and the magnitude of the potential effect.

The groundwater risk assessment and FRA are based on a source-pathway-receptor methodology, where the sensitivity of the receptors and the magnitude of potential change upon those receptors identified within the study areas outlined in Section **Error! Reference source not found.**.

The classification of receptors in the context of flood risk relates to the land use vulnerability classification within the NPPF and land uses potentially affected by the proposed Development. Potential receptors are therefore assessed as future occupiers or users of

[55] European Parliament (2000). "Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy" ("The Water Framework Directive"). [online] Available at: http://ec.europa.eu/environment/water/water-framework/index_en.html [Accessed 28/05/2021].

[56] https://www.eea.europa.eu/policy-documents/groundwater-directive-gwd-2006-118-ec

the Development and occupiers or users of surrounding land which could be affected by the changes to flood risk vulnerability associated with the Development. As such the vulnerability of the receptors is defined independently of the source of flood risk.

The NPPF considers the vulnerability of different land uses as a result of the potential impacts of flooding at given development type. Both the flood risk from and to the proposed Development should be considered.

7.4.1.1 Sensitivity of Receptors

The sensitivity of the baseline conditions, including the importance of environmental features on or near to the Site or the sensitivity of potentially affected receptors, is assessed in line with best practice, guidance, legislation, statutory designations and / or professional judgement.

Table 7.1 details the framework for determining the sensitivity of receptors.

Table 7.1: Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
Very High	▪ A large, medium or small waterbody with an EA Quality classification of 'High'. ▪ The hydrological receptor and downstream environment has no capacity to attenuate natural fluctuations in hydrochemistry and cannot absorb further changes without fundamentally altering its baseline characteristics / natural processes. ▪ Local groundwater constitutes a valuable resource because of its high quality and yield. Aquifer classified by the British Geological Survey (BGS) as 'highly productive aquifer' and is of regional importance. Statutorily designated nature conservation sites dependent on groundwater. ▪ The hydrological receptor will support abstractions for public water supply or private water abstractions for the production of mass-produced food and drinks. ▪ The hydrological receptor will support abstractions for any public water supply, or private water abstractions which supply more than 25 people and / or 100 livestock (at any given point in the year) and/ or is used for the mass-production of food and drinks. ▪ The hydrological receptor is of high environmental importance or is designated as European or international importance, such as a SAC, Special Protections Areas (SPA) or Wetland of International Importance (Ramsar) with an Assessed condition of 'Favourable'. ▪ The receptor acts as an active floodplain or other flood defence, in accordance with NPPF. ▪ The receptor is designated 'Highly Vulnerable' land use as per Table 2 of Ministry of Housing, Communities & Local Government's Guidance on Flood Risk and Coastal Change.
High	▪ A large, medium or small waterbody with an EA Quality classification of 'Good'. ▪ A Site of Special Scientific Interest (SSSI) or hydrological receptor is of high environmental importance designated as European or international importance, such as a SAC, SPA or Ramsar with an Assessed condition of 'Unfavourable'. ▪ The hydrological receptor and downstream environment will have limited capacity to attenuate natural fluctuations in hydrochemistry and cannot absorb further changes without fundamentally altering its baseline characteristics / natural processes. ▪ Aquifer of local importance. Groundwater body is classified by the BGS as a 'moderately productive aquifer', with moderate yield from

Sensitivity of Receptor	Definition
	secondary fractures and near-surface weathering. Exploitation of local groundwater is not far-reaching. Local areas of nature conservation known to be sensitive to groundwater effects. ▪ The hydrological receptor supports abstractions for private water supply for up to 25 people and / or 100 livestock (at any given point in the year). ▪ The receptor is designated 'More Vulnerable' land use as per Table 2 of Ministry of Housing, Communities & Local Government's Guidance on Flood Risk and Coastal Change.
Medium	▪ A large, medium or small waterbody with a EA water quality classification of 'Moderate'. ▪ The hydrological receptor and downstream environment will have moderate capacity to attenuate natural fluctuations in hydrochemistry but cannot absorb certain changes without fundamentally altering its baseline characteristics / natural processes. ▪ Aquifer of limited value (less than local) and is classified by the BGS as a 'low productivity aquifer' as water quality does not allow potable or other quality sensitive uses. Exploitation of local groundwater is not far-reaching. Local areas of nature conservation known to be sensitive to groundwater effects. ▪ The hydrological receptor does not act as an active floodplain or other flood defence but is considered to provide some degree of natural flood management (e.g. peat soils). ▪ The hydrological receptor is of local environmental importance (such as Local Nature Reserves (LNR)). ▪ The receptor is designated Less Vulnerable' land use as per Table 2 of Ministry of Housing, Communities & Local Government's Guidance on Flood Risk and Coastal Change.
Low	▪ A large, medium or small waterbody with an EA Quality classification of 'Poor' or 'Bad'. ▪ The hydrological receptor and downstream environment will have capacity to attenuate natural fluctuations in hydrochemistry but can absorb any changes without fundamentally altering its baseline characteristics / natural processes. ▪ Poor groundwater quality and / or very low permeability make exploitation of groundwater unfeasible. Changes to groundwater not expected to affect local ecology. ▪ The hydrological receptor does not support abstractions for public water supply or private water abstractions. ▪ The hydrological receptor does not act as an active floodplain or other flood defence. ▪ The hydrological receptor is not of regional, national or international environmental importance. ▪ The hydrological receptor is not designated for supporting freshwater ecological interest. ▪ The receptor is designated 'Essential Infrastructure' or 'Water Compatible' land use as per Table 2 of Ministry of Housing, Communities & Local Government's Guidance on Flood Risk and Coastal Change.
Negligible	▪ The receptor is resistant to change and is of little environmental value.

7.4.1.2 Magnitude of Change

The magnitude of potential change will be identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

The criteria for assessing the magnitude of an effect are presented in Table 7.2.

Table 7.2: Framework for Determining Magnitude of Change

Magnitude of Effects	Definition
High	▪ A short or long-term major shift in hydrochemistry or hydrological conditions sufficient to negatively change the ecology of the receptor. This change will equate to a downgrading of an EA Quality classification by two classes e.g. from 'High' to 'Moderate'. ▪ A sufficient material increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with NPPF paragraphs 155 to 165). ▪ A major (greater than 50 %) or total loss of a geological receptor or peat habitat site, or where there will be complete severance of a site such as to fundamentally affect the integrity of the site (e.g. blocking hydrological connectivity). ▪ A major permanent or long-term negative change to groundwater quality or available yield. ▪ The yield of existing supplies may be lost or major long-term or short-term reduction in quantity and/ or deterioration in quality. ▪ A major permanent or long-term negative change to geological receptor, such as the alteration of pH or drying out of peat. ▪ Changes to groundwater quality or water table level that will negatively alter local ecology or will lead to a groundwater flooding issue.
Medium	▪ A short or long term non-fundamental change to the hydrochemistry or hydrological environment, resulting in a change in ecological status. This change will equate to a downgrading of an EA Quality classification by one class e.g. from 'High' to 'Good.' ▪ A moderate increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with NPPF paragraphs 155 to 165). ▪ Changes to the local groundwater regime that may slightly affect the use of the receptor. ▪ The yield of existing supplies may be reduced or quality slightly deteriorated. ▪ Fundamental negative changes to local habitats may occur, resulting in impaired functionality.
Low	▪ A detectable non-detrimental change to the baseline hydrochemistry or hydrological environment. This change will not result in a downgrading of the EA Quality classification. ▪ A marginal increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with NPPF paragraphs 155 to 165).

Magnitude of Effects	Definition
	▪ A detectable but non-material effect on the receptor (up to 5 %) or a moderate effect on its integrity as a feature or where there will be a minor severance or disturbance such that the functionality of the receptor will not be affected. ▪ Changes to groundwater quality, levels or yields do not represent a risk to existing baseline conditions or ecology.
Negligible	▪ No perceptible changes to the baseline hydrochemistry or hydrological environment. ▪ No change to the EA Quality classification. ▪ No increase in the probability of flooding onsite and offsite. ▪ A slight or negligible change from baseline condition of geological resources. ▪ Change hardly discernible, approximating to a 'no change' in geological condition.

7.4.1.3 Significance of Effect

The sensitivity of the asset and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 7.3 summarises guideline criteria for assessing the significance of effects

Table 7.3: Framework for Assessment of the Significance of Effects

Magnitude of Effect	Sensitivity of Resource or Receptor				
	Very High	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations, and are shaded in light grey in the above table.

7.4.2 Cumulative Assessment Methodology

A cumulative effect is considered to be an additional effect on hydrological resources arising from the Development in combination with other proposed developments (either under construction, consented but not built or at application stage) likely to affect the hydrological environment. At distances greater than 10 km, it is considered that schemes are unlikely to contribute to a cumulative hydrological effect due to attenuation and dilution over distance of potentially polluting chemicals. Operational developments are not considered to contribute a cumulative hydrological effect.

Therefore, for the purposes of the assessment of potential cumulative effects on the immediate catchment and hydrological regime, only proposed developments within approximately 10 km of the Development have been considered. These developments have been identified through consultation with the relevant local authorities and statutory consultees.

The methodology followed to assess the cumulative effects is the same as that used for the Development in isolation.

7.4.3 Assessment Limitations

All data considered necessary to identify and assess the potential significant effects resulting from the Development was available and was used in the assessment reported in this Chapter. No localised hydraulic or hydrological modelling has been carried to inform the Flood Risk Assessment.

No site walkover was carried out as part of both the FRA and the groundwater risk assessment.

No information was made available on the ground conditions or groundwater levels at the existing landfill site. No information has been provided on the final capping depth at the time of reporting and this is subject to planned geophysical surveys.

7.5 Baseline

The baseline conditions for the Site are summarised within Section 1 within Technical Appendix 7.1 FRA and Section 3 within Technical Appendix 7.2 Groundwater Risk Assessment and are not repeated here.

7.6 Receptors Scoped Out

For the purpose of the assessment of flood risk, the receptor vulnerability focuses on the Development, with the vulnerability of receptors elsewhere to be defined should there be potential for offsite flood risk impacts.

7.7 Embedded Mitigation

7.7.1 Embedded Design

The potential of any increase in surface water runoff and thus potential increase in vulnerability at receptors elsewhere has been considered in the design of the Development. The FRA outlines the implementation of native wildflower mix beneath the base of PV arrays to limit the potential of a concentration of surface water along the base of the racking system.

The design of the Development has considered the sensitive nature of the Site. The Groundwater Risk Assessment outlines two design options for the panel foundations (short piled anchor system or ballasted system). The short piled anchor system design option will only be selected where there is sufficient capping depth to ensure that the capping is not penetrated. This consideration will ensure the integrity of the existing landfill cap will not be compromised and no pollutant pathways are created through the proposed infrastructure.

7.7.2 Good Practice

Good practice will be followed in all aspects of construction, operation and decommissioning specifically through a Pollution Prevention Plan (PPP) which will be incorporated into a final Construction Environmental Management Plan (CEMP) as part of any required planning conditions ahead of construction. The PPP will set out measures to be employed to avoid or mitigate potential pollution for all phases of the development, and will also include an Incident Plan to be followed should a pollution event occur. This plan will be produced following consultation and agreement with EA and all appropriate personnel working on the construction site to be trained in its use. The Construction Project Manager will have specific responsibility for implantation of the CEMP.

Method statements will also be applied, which will follow the principles laid out in relevant CIRIA guidance and the principles of the archived EA Pollution Prevention Guidelines (PPGs).

7.8 Assessment of Effects

The assessment of potential effects is considered in full detail in Section 2 within Technical Appendix 7.1 and Section 5 within Technical Appendix 7.2. A summary is provided for each assessment below.

7.8.1 Flood Risk Assessment

The FRA assesses the effect of the Development on flood risk for the following sources:

- Fluvial;
- Pluvial;
- Tidal;
- Groundwater; and
- Reservoirs.

The Development does not result in an increase in flood risk elsewhere and thus at receptors elsewhere, which are therefore scoped out of the assessment within this chapter.

The existing landfill Development is a 'More Vulnerable' land use and thus a receptor of Medium sensitivity, in accordance with Table 7.1. The Development sits upon the capped areas of the Site and is classed as 'Essential Infrastructure' which shall be unoccupied, apart from ad-hoc maintenance personnel and is therefore a receptor of Low sensitivity.

The site-specific Flood Risk Assessment assesses flood risk from all identified sources as Negligible to Low with no increase in flood risk as a result of the Development. This equates to a Negligible change of magnitude (Table 7.2) and therefore a Negligible residual effect.

This is not significant in terms of the EIA regulations.

7.8.2 Groundwater Risk Assessment

The Groundwater Risk Assessment was undertaken to assess the impact of the Development on hydrological and hydrogeological receptors.

The River Waveney is identified as a receptor with a 'Moderate' EA Quality classification and is therefore attributed a Medium sensitivity in accordance with Table 7.1.

Groundwater underlying the Site is classified as a 'moderately productive aquifer' of the wider Anglian groundwater body, which is therefore classified as High sensitivity in accordance with Table 7.1.

Potential pollutant pathways to the groundwater from the Development are from the supporting structures for the emplacement of the solar panels creating new routes for leachate to reach offsite receptors. As discussed in Section 2.3 of TA7.2 the short pile anchor system requires at least 800 mm of soil above the capping layer, while the ballasted system comprises concrete 'shoes' that are at ground level, as shown in Plate 1.

Plate 1: Typical concrete 'shoe' ballast system[57]

The short pile anchor system will only be used where the final depth of soil above the capping is sufficient, which will be determined through a geophysical survey.

Embedded measures to manage chemical and sediment pollution are detailed in Section 5.3.1 and Section 5.3.2 respectively in TA7.2. These are aligned with good practice which will be followed through construction, operation and decommissioning through a Pollution Prevention Plan (PPP) included within the Construction Environmental Management Plan (CEMP).

As a result of these measures the Development will not create any additional pollutant pathways at Aldeby landfill and will have a Negligible magnitude of change (Table 7.2). Given the Medium (surface water) and High (groundwater) sensitivity of receptors, the residual effects are assessed as Negligible and Minor respectively.

This is not significant in terms of the EIA regulations.

7.9 Summary

This chapter has identified no likely significant adverse effects, following the embedded mitigation measures (outlined in Section 7.7).

Table 7.4 below summarises the predicted effects of the Development on hydrology and hydrogeology resources.

Table 7.4 Predicted Effects

Receptor	Potential effect	Significance of Effect	Mitigation Proposed	Residual significance
Watercourses drains, near-surface water	Chemical pollution	Negligible	None – good practice summarised in Section 5.3.1 of TA7.2	Negligible

[57] Thorne Solar Farm, Doncaster (L. Nevins 2016)

Receptor	Potential effect	Significance of Effect	Mitigation Proposed	Residual significance
Watercourses drains, near-surface water	Sediment pollution	Negligible	None – good practice summarised Section 5.3.2 of TA7.2	Negligible
Groundwater	Chemical pollution	Minor	None – good practice summarised in Section 5.3.1 of TA7.2	Minor

7.10 References

British Geological Survey, GeoIndex Onshore (2020). [Online]. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.256551694.46037445.1622052202-1501197580.1579020610

Coal Authority, Interactive Map Viewer (2020). [Online]. Available at: https://mapapps2.bgs.ac.uk/coalauthority/home.html

DEFRA, MAGIC (n.d.). [Online]. Available at: https://magic.defra.gov.uk/

Department for Communities and Local Government, Technical Guidance to the NPPF, (2012). [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/6000/2115548.pdf

Ministry of Housing, Communities & Local Government, Revised National Planning Policy Framework (2019). [Online]. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

Ministry of Housing, Communities & Local Government, Flood Risk and Coastal Change Guidance (2014). [Online]. Available at: https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification

National Library of Scotland, Map Finder (n.d.) [Online]. Available at: https://maps.nls.uk/geo/find/#zoom=15&lat=52.47633&lon=1.62805&layers=298&b=1&z=0&point=52.47455,1.62797

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