

Green Hill Solar Farm Draft Design Principles

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1 Introduction

- 1.1.1 The achievement of good design by nationally significant infrastructure projects is a key requirement of national planning policy. Developing the design of a project to reflect the good design criteria in national planning policy is also identified by the Planning Inspectorate as a key activity at the pre-application stage.
- 1.1.2 The Applicant has worked with the design, engineering and environmental consultants to develop the key draft design principles presented in this document. These have been adopted by the Green Hill project design team and will be embedded into the Green Hill Solar Farm ('the Scheme') early, in the pre-application stage.

1.2 Policy Context

- 1.2.1 The requirement to achieve good design is stated in the energy National Policy Statements. The requirements of the Overarching National Policy Statement for Energy (EN-1) ("NPS EN-1") are set out below together with the National Policy Statement for renewable energy infrastructure (EN-3) ("NPS EN-3") and the National Policy Statement for electricity networks infrastructure (EN-5) ("NPS EN-5").
- 1.2.2 NPS EN-3 and NPS EN-5 form part of the suite of energy infrastructure NPSs and, together with EN-1, are the primary decision-making policy documents for the Secretary of State on nationally significant onshore renewable electricity generating stations in England. EN-1, EN-3 and EN-5 are complementary to one another and should be considered together for nationally significant onshore renewable energy

Overarching National Policy Statement for Energy EN-1

- 1.2.3 NPS EN-1 (November 2023) sets out the criteria for good design for energy infrastructure. Paragraph 4.7.1 of NPS EN-1 states that *"The visual appearance of a building, structure, or piece of infrastructure, and how it relates to the landscape it sits within, is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object – be it a building or other type of infrastructure – including fitness for purpose and sustainability, is equally important."*
- 1.2.4 NPS EN-1 sets out that good design can produce sustainable infrastructure, sensitive to place, matched by an appearance that demonstrates good aesthetic as far as possible. NPS EN-1 acknowledges that the nature of energy infrastructure development can limit the extent to which it can contribute to the enhancement of the quality of an area (paragraph 4.7.2).
- 1.2.5 NPS EN-1 provides that good design is a means by which policy objectives can be met including how good design, in terms of siting and use of appropriate technologies can help mitigate adverse impacts, such as noise (paragraph 4.7.3).
- 1.2.6 NPS EN-1 makes clear that given the benefits of good design in mitigating adverse impacts, applicants should consider how good design can be applied to a project during the early stages of the project lifecycle (paragraph 4.7.4).
- 1.2.7 Paragraph 4.7.5 of NPS EN-1 states that *"Design principles should be established from the outset of the project to guide the development from conception to operation"* and that *"Applicants should consider how their design principles can be applied post-consent"*.
- 1.2.8 Paragraph 4.7.6 of NPS EN-1 recognises that whilst there may not be, or there is limited choice in the physical appearance of some energy infrastructure, there may be opportunities to demonstrate good design in terms of siting relative to existing landscape character, land form and vegetation. It goes on to state that the sensitive use of materials in any associated development will help to ensure that the development contributes to the quality of the area, and applicants should, so far as is possible, seek to embed opportunities for nature inclusive design within the design process.
- 1.2.9 NPS EN-1 also states at paragraph 4.7.7 that, *"Applicants must demonstrate in their application documents how the design process was conducted and how the proposed design evolved."*



- 1.2.10 NPS EN-1 sets out that, consideration should be given to taking independent professional advice on the design aspects of a proposal, and design guidance developed by the local planning authority should also be considered (paragraph 4.7.8).
- 1.2.11 NPS EN-1 also gives direction at paragraph 4.7.9 to refer to the technology-specific NPSs where relevant for further advice on good design.
- 1.2.12 In the decision-making process, NPS EN-1 is clear that the SoS needs to be satisfied that energy infrastructure developments are sustainable, and having regard to regulatory and other constraints, are as attractive, durable and adaptable as possible (paragraph 4.7.10).
- 1.2.13 NPS EN-1 sets out at paragraph 4.7.11, “... *the Secretary of State should be satisfied that the applicant has considered both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located, any potential amenity benefits, and visual impacts on the landscape or seascape) as far as possible.*”
- 1.2.14 Paragraphs 4.7.12-4.7.13 of NPS EN-1 set out considerations that the SoS should take into account in the decision-making process. This includes taking into account the ultimate purpose of the infrastructure, bearing in mind the operational safety and security requirements which the design needs to satisfy. Impacts under other relevant policies within EN-1 should also be an important consideration.
- 1.2.15 Section 5.8 of NPS EN-1 sets out the Government’s policies on Flood Risk. Planning policy steers new energy infrastructure to areas with lowest risk of flooding (paragraph 5.8.6). Paragraph 5.8.7 states, “*Where new energy infrastructure is, exceptionally, necessary in flood risk areas (for example where there are no reasonably available sites in areas at lower risk), policy aims to make it safe for its lifetime without increasing flood risk elsewhere and, where possible, by reducing flood risk overall. It should also be designed and constructed to remain operational in times of flood.*”
- 1.2.16 Paragraph 5.8.21 of NPS EN-1 provides that, “*The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account. Where it is not possible to locate development in low-risk areas, the Sequential Test should go on to compare reasonably available sites with medium risk areas and then, only where there are no reasonably available sites in low and medium risk areas, within high-risk areas*”
- 1.2.17 Paragraph 5.8.9 of NPS EN-1 explains that, “*If, following application of the Sequential Test, it is not possible, (taking into account wider sustainable development objectives), for the project to be located in areas of lower flood risk the Exception Test can be applied as defined in <https://www.gov.uk/guidance/flood-risk-and-coastal-change#table2>. The test provides a method of allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.*”
- 1.2.18 Paragraph 5.8.9 of NPS EN-1 states that, “*The Exception Test is only appropriate for use where the Sequential Test alone cannot deliver an acceptable site. It would only be appropriate to move onto the Exception Test when the Sequential Test has identified reasonably available, lower risk sites appropriate for the proposed development where, accounting for wider sustainable development objectives, application of relevant policies would provide a clear reason for refusing development in any alternative locations identified. Examples could include alternative site(s) that are subject to national designations such as landscape, heritage and nature conservation designations, for example Areas of Outstanding Natural Beauty (AONBs), SSSIs and World Heritage Sites (WHS) which would not usually be considered appropriate*”.
- National Policy Statement for renewable energy infrastructure EN-3**
- 1.2.19 Specific guidance on nationally significant solar photovoltaic (PV) projects is provided in section 2.10 of NPS EN-3. Paragraphs 2.10.59-2.10.64 provide the policy detail for the site layout design and appearance for solar Nationally Significant Infrastructure Projects.
- 1.2.20 Direction is given for applicants to consider the criteria for good design set out in NPS EN-1 (paragraph 2.10.59).



- 1.2.21 Paragraph 2.10.60 of NPs EN-3 notes that several factors will be considered by applicants when considering the design and layout of sites, including proximity to available grid capacity to accommodate the scale of generation, orientation, topography, previous land-use, and ability to mitigate environmental impacts and flood risk.
- 1.2.22 NPS EN-3 sets out at paragraph 2.10.60 that, *“For a solar farm to generate electricity efficiently the panel array spacing should seek to maximise the potential power output of the site. The type, spacing and aspect of panel arrays will depend on the physical characteristics of the site such as site elevation.”*
- 1.2.23 NPS EN-3 recognises that a south-facing arrangement of panels may be favoured by applicants in order to maximise output, although other orientations may be chosen (paragraph 2.10.62).
- 1.2.24 NPS EN-3 also recognises that underground or overhead cabling will be required in order to connect the electrical assets of the site (paragraph 2.10.63). For underground cabling, a method statement describing the cabling trench design, installation methodology and details of the operation and maintenance regime is expected to be provided (paragraph 2.10.64).

National Policy Statement for electricity networks infrastructure (EN-5)

- 1.2.25 Section 2.4 of NPS EN-5 sets out policies on the consideration of good design for energy infrastructure. Paragraph 2.4.1 notes that the desirability of good design should be given regard to in the determination of DCO applications, and paragraph 2.4.2 points applicants to consider the criteria for good design set out in section 4.7 of EN-1.
- 1.2.26 Paragraph 2.4.3 of NPS EN-5 states that, *“... the Secretary of State should bear in mind that electricity networks infrastructure must in the first instance be safe and secure, and that the functional design constraints of safety and security may limit an applicant’s ability to influence the aesthetic appearance of that infrastructure.”*
- 1.2.27 Paragraph 2.4.4 of NPS EN-5 sets out that, *“While the above principles should govern the design of an electricity networks infrastructure application to the fullest possible extent – including in its avoidance and/or mitigation of potential adverse impacts...– the functional performance of the infrastructure in respect of security of supply and public and occupational safety must not thereby be threatened.”*

1.3 Purpose of the design principles

- 1.3.1 In response to the requirement set out in EN-1, a set of design principles has been established for the Scheme to:
- Provide a framework for development of the design in the pre-application stage. The design principles will be secured in the Development Consent Order (“DCO”) and applied to the detailed design of the Scheme post-consent.
 - Inform the local community of the design development ahead of the statutory consultation.
 - Form part of the consultation materials alongside the Preliminary Environmental Information Report and consulted upon as part of the statutory consultation.
 - Inform the Design and Access Statement, submitted as part of the DCO application.
 - Be referenced in the Planning Statement and NPS Accordance Table to demonstrate how the applicant has complied with the requirement to achieve good design, as set out in EN-1, EN-3 and EN-5.

1.4 Documents reviewed

- 1.4.1 In order to provide coherent design principles that reflect national and local requirements, and in addition to requirements set out in EN-1, a number of other documents have been reviewed, as follows:
- Design Principles for National Infrastructure (National Infrastructure Commission, 2020)
 - National Design Guide (Ministry of Housing, Communities and Local Government, 2021)



National Model Design Code (Ministry of Housing, Communities and Local Government, 2021)

1.4.2 The key themes of the above documents have been identified and fed into the development of the design principles.

1.5 Status of design principles

1.5.1 It should be noted that the design principles may be further refined during the pre-application stage as a result of responses made to the statutory consultation, discussions with statutory consultees and key stakeholders and/or the outcome of environmental assessments.



2 Design Principles

2.1.1 The design principles are as follows:

- The design of the Scheme will be 'Landscape Led' exploring the intrinsic character and beauty of the surrounding countryside.
- Adherence to the mitigation hierarchy to reduce impacts and control any adverse effects on the environment throughout the lifecycle of the project from construction through to operation and maintenance and decommissioning.
- The Scheme will deliver a minimum 10% net gain for biodiversity through strategic habitat creation and enhancement measures.
- The Scheme design will retain a degree of flexibility to enable it to adapt over time, be functional and fit for purpose, and respond to innovative and new technologies as well as building resilience to climate change.
- The Scheme will be carefully designed to minimise where practicable impacts on amenity from air quality, traffic and noise effects and safeguard the health and safety of local residents by securing suitable control measures during construction, operation and maintenance and decommissioning of the Scheme.
- The design of the Scheme will be sensitive to above and below ground heritage assets and their setting, by locating infrastructure at a suitable distance and through appropriate landscape screening.
- The Scheme will be sensitive to existing land uses where practicable and maximise opportunities to strengthen green and blue infrastructure.
- The Scheme will seek to minimise the effects of the development on Public Rights of Way (PRoW) by incorporating measures to maintain, and where practicable, explore opportunities to improve the local PRoW network.

2.2 Landscape-led design

The design of the Scheme will be 'Landscape Led' exploring the intrinsic character and beauty of the surrounding countryside.

2.2.1 The design development of the Scheme recognises the need for careful siting, design and mitigation, and the importance of an iterative approach to design to ensure appropriate design solutions are reached.

2.2.2 This iterative approach will lead to a layout that minimises harm to the landscape through the appropriate siting and layout of infrastructure, design (including colours and materials), and through the development of an Environmental Masterplan that utilises, retains and enhances existing natural features such as hedgerows, woodland, watercourses and terrain to help screen the proposed infrastructure, minimise adverse landscape and visual effects and provide Biodiversity Net Gain (BNG).

2.2.3 The Environmental Masterplan is being designed to build upon and positively respond to the aims and management guidelines of published Landscape Character Assessments to provide a Scheme that is sympathetic to local character and setting, helping to protect and enhance the landscape through design. The Scheme will provide net gains for biodiversity, including the establishment of coherent ecological networks.

2.3 Mitigation Hierarchy

Adherence to the mitigation hierarchy to reduce impacts and control any adverse effects on the environment throughout the lifecycle of the project from construction through to operation and maintenance and decommissioning.

2.3.1 The Scheme design will follow the mitigation hierarchy, seeking firstly to avoid impacts to sensitive receptors. Where this is not practicable, unavoidable impacts will be mitigated or, as a last resort,



compensated for. Adherence to the mitigation hierarchy as a fundamental principle will reduce the potential for the Scheme to result in significant adverse effects on sensitive receptors where practicable.

- 2.3.2 Multipurpose mitigation measures, such as landscape planting that will screen the Scheme, and provide a net gain in biodiversity, will be embedded into the scheme design. Modifications to the scale and layout of the Scheme will also be considered together with the introduction of appropriate mitigation measures in order to reduce likely significant adverse effects and comply with planning policy.
- 2.3.3 Where appropriate, additional mitigation will be identified during the design process to further protect, enhance or record any receptors where residual effects remain. Furthermore, opportunities for enhancement will also be maximised within the Scheme, additional to any requirement for avoidance, mitigation and compensation.

2.4 Net Gain

The Scheme will deliver a minimum 10% net gain for biodiversity through strategic habitat creation and enhancement measures across the Sites.

- 2.4.1 Net gain will be calculated and demonstrated through the use of the most up-to-date Biodiversity Metric tool. As is typical for ground-mounted solar projects, the Scheme can be expected to deliver biodiversity net gain, through the reversion of intensively managed agricultural land to a grassland habitat underneath and around solar panels, which is sensitively managed to maximise ecological value.
- 2.4.2 As part of the design process, a range of additional habitat creation and enhancement measures will also be identified. Measures will seek to strengthen existing habitat networks and maximise benefits to local wildlife, with a focus on protected species and those targeted for conservation action. This will ensure the Scheme will deliver the minimum target of 10% biodiversity net gain, which is expected to become a legal requirement for nationally significant infrastructure projects from November 2025.

2.5 Flexibility, resilient resources, climate change

The Scheme's design will retain a degree of flexibility to enable it to adapt over time, be functional and fit for purpose, and respond to innovative and new technologies as well as building resilience to climate change.

- 2.5.1 Flexibility is an important part of good design as it allows the Scheme to adapt over time. Retaining a degree of flexibility will ensure there is sufficient scope to undertake value engineering and take account of innovation and technological advancements, given the pace of development in the solar industry.
- 2.5.2 Development of the scheme design will take account of local conditions, thereby contributing to building climate change resilience, by addressing the potential effects of temperature changes, increased flood risk and more frequent and extreme weather events.

2.6 Site layout design

The layout of the Scheme will be carefully designed to minimise impacts where practicable to amenity from air quality, traffic and noise effects and safeguard the health and safety of local residents by securing suitable control measures during construction, operation and maintenance and decommissioning of the Scheme.

- 2.6.1 The design of the Scheme will be informed by the process of environmental assessment and the inclusion of mitigation measures to minimise, where practicable, any impacts to the amenity of the local communities located nearby. Control documents will be prepared to control and manage the environmental and transport impact to communities during construction, operation and maintenance and decommissioning of the Scheme.



2.7 Heritage

The design of the Scheme will be sensitive to above and below ground heritage assets and their setting, by locating infrastructure at a suitable distance and through appropriate landscape screening.

- 2.7.1 The Scheme's design will include suitable setbacks and buffers, such as screening and planting, in appropriate locations between solar infrastructure and heritage assets, in order to minimise harm to heritage assets and their setting.
- 2.7.2 The Scheme will seek to minimise harm through the avoidance of below ground archaeological assets where practicable which will be identified through geophysical surveys and targeted trial trenching.

2.8 Land Use

The Scheme will be sensitive to existing land uses where practicable and maximise opportunities to strengthen green and blue infrastructure.

- 2.8.1 Reinforcement and enhancement of existing green and blue infrastructure is a key objective of the Environmental Masterplan including for example, improved tree line connections, reinforced native tree and hedgerow planting, improved ecological corridors, and connecting isolated trees to existing features and proposed planting areas.

2.9 Recreation and access

The Scheme will seek to minimise the effects of the development on Public Rights of Way by incorporating measures to maintain and, where practicable, explore opportunities to improve the local footpath network.

- 2.9.1 The Scheme design will recognise and consider local priorities for recreation and access, including measures to minimise disruption to PRoW during construction and operation and maintenance and decommissioning where practicable. Enhancement measures for walkers, cyclists and horse riders will be explored. This may include enhancements to local walking routes, including permissive paths to provide longer and circular walks.