



# **Frodsham Solar** **Design Approach Document**

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Prescribed Forms and Procedure) Regulations Regulation 5(2)(q)



## EXECUTIVE SUMMARY

Frodsham Solar Farm (the Proposed Development) is proposed in order to help meet the need for renewable energy generation from secure, UK-based sources, which is required by government policy to address climate change and energy security.

The Proposed Development will comprise the construction, operation (including management and maintenance), and decommissioning of a solar photovoltaic (PV) electricity generating facility (i.e. a solar farm), with a total generating capacity greater than 50 megawatts. Electricity will be exported to the National Grid, via the nearby Frodsham Substation, and will also be exported to local businesses. The operational life of the Proposed Development will be 40 years.

The Proposed Development also provides an opportunity to deliver wide-ranging environmental and social benefits. This will be achieved through enhancement of the landscape and biodiversity, and a programme of enhanced access provision that recognises the latent potential of this dynamic peri-urban landscape with its unique combination of views, natural history and industrial artefacts.

This Design Approach Document explains the design process that has been followed for the Proposed Development. The need to achieve good design is a requirement of government policy and has been an essential part of the project development. The design that is being put forward is underpinned by an overarching Design Vision for the project, beneath which sit Project Design Principles that help to translate the vision into practical design choices and measurable project-specific criteria.

The design of the Proposed Development has evolved and has been refined following technical analysis of the Site and the surrounding area and following input and feedback from stakeholders. The design team has sought to engage proactively with stakeholders and to respond transparently to all matters raised.

The Illustrative Environmental Masterplan presents the output of this design process including the key features and approaches that fulfil the intention of the Project Design Principles, and which deliver a high-quality renewable energy generating facility that also delivers meaningful local environmental and community benefits.





## A BESPOKE RESPONSE

Good design is not simply about aesthetics; rather, it is about creating something that functions effectively, stands the test of time, and can be experienced and appreciated by people in a meaningful way. A well-designed project balances these three elements, integrating robust engineering, practical functionality, and a sensitivity to its surroundings to create a place that works well and is enjoyable to use.

In the context of a ground mounted solar farm development, the design aim is typically to take advantage of the relatively low profile of the infrastructure, and to locate this in such a way that it is to a large extent hidden from view, out of sight from key receptors and screened by existing or new vegetation.

For this particular solar farm proposal, there are unique circumstances that require a somewhat different approach. The Site occupies a dynamic and yet somewhat isolated location within Frodsham Marshes at the edge of the Mersey estuary. It is visible from and in close proximity to residential areas and is passed every day by thousands of people travelling on the adjacent motorway. Whilst there is an established network of public rights of way, these offer limited utility due to poor condition in places and limited connectivity. As a result, the land within the Site is only visited by a limited number of people, despite proximity to Frodsham. The Site has an interesting industrial history, hosts wind turbines, and has dynamic views of uncompromising industry in the context of a dramatic estuary overlooked by a distinctive sandstone escarpment. It also supports an interesting assemblage of wildlife.

A different design response is therefore required, which reflects the unique sense of place, and that unlocks the potential to significantly improve the ability of local communities to access and enjoy the unique landscape resource on their doorstep.

The scale of the Site is such that there is scope to provide generous green infrastructure corridors alongside the solar arrays. Exclusion zones around existing hedgerows, ditches, watercourses and utility corridors, and along the rights of way, will preserve a matrix of habitats, such that the solar farm will not be dominant. Existing and new vegetation will often screen the arrays, but screening is not always the principal objective. Softening and breaking up views is the chief aim, and at times the imperative to maintain the open character of the landscape and preserve long-distance views over the Mersey Estuary and towards the sandstone escarpment is more important than preventing views of solar infrastructure.

The approach proposes a harmonious relationship between infrastructure and environment, with the Proposed Development forming both an important source of sustainable energy and an asset that enhances the landscape and the experience of those who live in and visit the area.





[View of Frodsham Windfarm from River Weaver >](#)





## OUR VISION

The Design Vision for the Proposed Development is :

**“We want to deliver a substantial amount of renewable energy to the National Grid and to local businesses, making a clear contribution towards national renewable energy targets.**

**We want to conserve and enhance the local environment, provide tangible benefit to local communities in the form of better access and recreation opportunities, and to be a responsible neighbour to local people, during the construction, operational and decommissioning stages of the project.**

**We will follow a clear design process from start to finish, reflecting project-specific design principles, demonstrating collaborative interdisciplinary working, engagement with stakeholders and local communities, and delivering good design outcomes that we will commit to delivering”.**





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## 1. THIS DOCUMENT

**1.1.1** This Design Approach Document (DAD) explains how good design principles have shaped Frodsham Solar Farm from its inception through to the final application stage. It outlines the vision, consultation, site constraints/opportunities, and how each stage of the design process led to an outcome that balances functionality, aesthetics, and environmental stewardship.

**1.1.2** The need to achieve good design is a requirement of government policy and has been an essential part of the project development. The design that is being put forward is underpinned by an overarching Design Vision for the project, beneath which sit Project Design Principles that help to translate the vision into practical design choices and measurable project-specific criteria.





## 2. GOOD DESIGN OVERVIEW

### 2.1. Policy Context for Good Design

2.1.1 Achieving “good design” is a requirement of both national and local planning policy. For Nationally Significant Infrastructure Projects, the Overarching National Policy Statement for Energy (EN-1) and National Policy Statement for Renewable Energy Infrastructure (EN-3) emphasize:

- i) High-quality, inclusive design that goes beyond aesthetics to include sustainability, safety, and environmental sensitivity.
- ii) A clear design process from project inception through to operation and decommissioning.
- iii) A demonstration of how the final scheme optimizes benefits and mitigates adverse impacts.

2.1.2 At a local level, relevant planning documents also stress that development should respond positively to the unique characteristics of its setting, incorporate stakeholder feedback, and provide tangible community and environmental benefits.

### 2.2. Planning Inspectorate Advice

2.2.1 Advice regarding ‘good design’ for NSIPs is available from the Planning Inspectorate<sup>1</sup> Advice on Good Design (‘AGD’) (ref). AGD explains why good design is important, what successful good design might look like, and how it might be delivered in applications for NSIPs, and includes the following summary:

<sup>1</sup> Planning Inspectorate, 23 Oct 2024. Nationally Significant Infrastructure Projects: Advice on Good Design. Available online at <<https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-good-design>> Accessed 11 Dec 2024.

**“Achieving good design requires a holistic approach to deliver high quality, sustainable infrastructure that responds to place and takes account of often complex environments. Good design is not primarily about how infrastructure looks, although these considerations (the aesthetics) are important.**

**Achieving high quality, good design outcomes requires an effective, intentional, transparent, deliverable process to be planned, followed and secured. Success in good design comes from a combination of securing both good process and good outcomes.**

**Given the scale and impact of NSIP developments, achieving well-designed project outcomes addressing sustainability and climate change is essential”.**





**2.2.2** AGD emphasises the importance of good design for NSIPs and references the National Policy Statements ('NPS') which set out the requirement to deliver good design and the criteria by which it will be assessed. The DCO Application will be determined based upon its accordance with the requirements of the NPSs (which are discussed in greater detail below).

**2.2.3** AGD is applicable for all types of NSIP, including highways, airports, reservoirs, and renewable energy generating facilities such as solar farms. AGD notes that the extent to which each of the four stages needs to be covered and evidenced will depend on the nature of the infrastructure proposed, as well as the characteristics of the receiving site.

**2.2.4** AGD sets out a four-stage process for the achievement of good design. The Planning Inspectorate expect to see evidence of this process when they examine the DCO Application. The four stages are as follows:

**2.2.5** These four stages are followed in this document and set out in sections 3.0, 4.0, 5.0 and 6.0 respectively.





## 2.3. National Planning Policy

### NPS-EN1 - Overarching National Police Statement for Energy

**2.3.1** Section 4.1 of the Overarching National Policy Statement for Energy (EN-1)<sup>2</sup> ('NPS EN-1') notes that when considering any proposed development, the SoS should take into account its potential benefits and potential adverse effects.

**2.3.2** Applicants are required to mitigate specific effects as far as possible, and any measures proposed by the Applicant to address potential adverse effects should follow the mitigation hierarchy.

**2.3.3** The mitigation hierarchy is a well-established sequential approach to addressing potential environmental effects, as follows (with a solution higher up the hierarchy being preferable):

- i) Avoid.
- ii) Prevent.
- iii) Reduce, and.
- iv) Offset / Compensate.

**2.3.4** Section 4.2 of NPS EN-1 reinforces the need to follow the mitigation hierarchy and emphasises that Applicant's should set out how residual impacts will be compensated for as far as possible.

**2.3.5** NPS EN-1 also notes that where residual effects remain after the mitigation hierarchy has been applied, these are unlikely to outweigh the need for development.

**2.3.6** Paragraphs 4.7.1 to 4.7.4 of NPS EN-1 set out criteria for good design, as follows:

"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.

Applying good design to energy projects should produce sustainable infrastructure sensitive to place, including impacts on heritage, efficient in the use of natural resources, including land-use, and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible. It is acknowledged, however that the nature of energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.

Good design is also a means by which many policy objectives in the NPSs can be met, for example the impact sections show how good design, in terms of siting and use of appropriate technologies, can help mitigate adverse impacts such as noise. Projects should look to use modern methods of construction and sustainable design practices such as use of sustainable timber and low carbon concrete. Where possible, projects should include the reuse of material.

Given the benefits of good design in mitigating the adverse impacts of a project, applicants should consider how good design can be applied to a project during the early stages of the project lifecycle."

**2.3.7** Paragraphs 4.7.5 to 4.7.9 of NPS-EN1 set out how good design should be embedded into a development proposal, including by:

- i) Appointing a project board level design champion.
- ii) Establishing design principles at the outset.
- iii) Considering independent design review.
- iv) Taking opportunities to demonstrate good design in terms of siting relative to existing landscape character, landform and vegetation.
- v) Ensuring sensitive use of materials in associated development.
- vi) Incorporating nature inclusive design.

<sup>2</sup> Department for Energy Security and Net Zero (2024). Overarching National Policy Statement for Energy (EN-1)



NPS-EN3 – Renewable Energy  
Infrastructure

2.3.8 The National Policy Statement for Renewable Energy Infrastructure (EN-3)<sup>3</sup> ('NPS-EN3) in paragraph 2.5.1 makes clear that the good design criteria set out in NPS-EN1 apply to renewable energy infrastructure.

2.3.9 Paragraph 2.5.2 of NPS-EN3 requires that:

“Proposals for renewable energy infrastructure should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/ co-location with other marine and terrestrial uses, and in the design of the project to mitigate impacts such as noise and effects on ecology and heritage”.

2.3.10 Section 2.10 of NPS-EN3 provides specific considerations relating to the design of solar energy development, including factors such as:

- i) Irradiance and site topography.
- ii) Network connection.
- iii) Proximity to dwellings.
- iv) Agricultural land classification and land type.
- v) Accessibility.
- vi) Public rights of way.
- vii) Security and lighting.
- viii) Site layout and appearance.
- ix) Decommissioning.
- x) Biodiversity, ecological and geological conservation, and water management.
- xi) Landscape and visual impact, and residential amenity.
- xii) Glint and glare.
- xiii) Cultural heritage.
- xiv) Construction, including traffic and transport, noise, and vibration.

<sup>3</sup>Department for Energy Security and Net Zero (2024). National Policy Statement for Renewable Energy Infrastructure (EN-3)

NPS-EN5 - Electricity Networks  
Infrastructure

2.3.11 The National Policy Statement for Electricity Networks Infrastructure (EN-5)<sup>4</sup> reiterates in section 2.4 the criteria for good design set out in NPS-EN1. However, Paragraph 2.4.3 of NPS-EN5 is clear 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.”

2.3.12 Whilst NPS-EN5 is drafted with reference to overhead transmission projects greater than 2km in length and thus is not directly relevant to this project with its much shorter proposed connections, given the proposed existence of the overhead SPEN Substation Connection, the above statement remains relevant.

<sup>4</sup>Department for Energy Security and Net Zero (2024). National Policy Statement for Electricity Networks Infrastructure (EN-5)





## Holford Rules and Horlock Rules

**2.3.13** Whilst drafted in the late 1950s and 1990s respectively and not quoted directly in NPSs, the spirit and principles of the Holford Rules and the Horlock Rules are clearly embedded in current policy and remain a directly relevant consideration to good design in EN-5, especially in respect of landscape and visual impact.

**2.3.14** The Holford Rules, which are concerned with the design of overhead transmission lines, are:

- i) Avoid major areas of high amenity value (e.g., National Parks, AONBs).
- ii) Avoid crossing open spaces where the line would be a dominant feature.
- iii) Prefer wooded or treed landscapes where the line can be visually absorbed.
- iv) Follow existing landscape contours and features to minimize contrast.
- v) Prefer straight lines or gentle curves, avoiding frequent changes of direction.
- vi) Use the background of hills or trees to reduce skyline impact.
- vii) Avoid proximity to residential areas and prominent buildings.

**2.3.15** These rules are still referenced in UK infrastructure planning and by bodies like National Grid, especially in routeing and siting studies for new lines.

**2.3.16** The Horlock rules relate to the siting and design of electricity substations and associated infrastructure

**2.3.17** The Horlock Rules emphasize:

- i) Co-location of new infrastructure with existing energy or industrial developments (e.g., power stations or other substations).
- ii) Minimising cumulative landscape and visual effects by clustering infrastructure rather than dispersing it.
- iii) Avoiding designated landscapes where possible, similar to Holford principles.
- iv) Mitigating effects through layout design, landform use, and planting.

## NPPF and PPG

**2.3.18** Section 12 of the National Planning Policy Framework<sup>5</sup> ('NPPF') sets out a series of considerations relating to design of development proposals. Key points include:

- i) Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities.
- ii) Being clear about design expectations, and how these will be tested, is essential for achieving this.
- iii) Effective engagement between applicants, communities, local planning authorities and other interests throughout the process is also essential.
- iv) Design quality should be considered throughout the evolution and assessment of individual proposals. Applicants should, where applicable, provide sufficient information to demonstrate how their proposals will meet the design expectations set out in local and national policy.

**2.3.19** The NPPF is supported by online Planning Practice Guidance<sup>6</sup> ('PPG'). This provides further guidance regarding the subjects of the NPPF policies, including design.

<sup>5</sup>Ministry of Housing, Communities & Local Government (2024). National Planning Policy Framework

<sup>6</sup> Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2016, last updated 27 Feb 2024). Planning Practice Guidance. Available at <https://www.gov.uk/government/collections/planning-practice-guidance> (Accessed 14 Mar 2025)





2.4. Local Planning Policy

Local Plan

2.4.1 Strategic Objective SO12 of the Cheshire West and Chester Local Plan (Part One) Strategic Policies<sup>7</sup> ('Local Plan Part One') sets out the intention to: "Ensure new development is of sustainable and high-quality design that respects heritage assets, local distinctiveness and the character and appearance of the landscape and townscape".

2.4.2 This is supported by the more detailed policies set out in Local Plan Part One, and in Cheshire West and Chester Local Plan (Part Two) Land Allocations and Detailed Policies<sup>8</sup> ('Local Plan Part Two'). Key policies that relate specifically to design are Policy ENV6 of Local Plan Part One, and Policy DM3 of Local Plan Part Two.

2.4.3 Policy ENV6 sets out a series of outcomes that well-designed development should achieve where appropriate. These are:

- i) Respect local character and achieve a sense of place through appropriate layout and design.
- ii) Provide high quality public realm.
- iii) Be sympathetic to heritage, environmental and landscape assets.
- iv) Ensure ease of movement and legibility, with priority for pedestrians and cyclists.
- v) Promote safe, secure environments and access routes.
- vi) Make the best use of high-quality materials.
- vii) Provide for the sustainable management of waste.
- viii) Promote diversity and a mix of uses.
- ix) Incorporate energy efficiency measures and provide for renewable energy generation either on site or through carbon offsetting measures.
- x) Mitigate and adapt to the predicted effects of climate change.
- xi) Meet applicable nationally described standards for design and construction.

2.4.4 Policy DM3 requires that development is expected to achieve a high standard of design that respects the character and protects the visual amenity of the local area.

<sup>7</sup>Cheshire West and Chester Council, adopted 2015. Cheshire West and Chester Local Plan (Part One) Strategic Policies

<sup>8</sup>Cheshire West and Chester Council, adopted 2015. Cheshire West and Chester Local Plan (Part Two) Land Allocations and Detailed Policies





## 2.5. Guidance

### NIC Design Principles

**2.5.1** The Design Principles for National Infrastructure ('NIC Design Principles')<sup>9</sup> is clear as to the importance of the design of infrastructure projects, stating that:

"Design is about how something works and how it looks. It matters for infrastructure projects at every scale, whether the infrastructure is visible and used physically by people, or whether it is hidden and used to provide services to people.

Great infrastructure uses design to solve problems and seeks to maximise the different types of benefits it provides over its whole life. When visible, it should look good too. Projects shape the landscape for decades, even centuries. Generations of people will see them, use them and be affected by them every day.

<sup>9</sup> National Infrastructure Commission Design Group, 2020. Climate People Places Value. Design Principles for National Infrastructure

The design process brings together technical and creative expertise to produce infrastructure which provides good value and works well for climate, people and places. But good design does not just come from designers. Every person working on a project should see design as part of their role. And as well as considering design themselves, every person should also look to work with others to consider how they can improve design together.

Design is as much about process as it is product. Imaginative thinking about design should be embedded at every step of planning and delivery. The principles ensure a good process

leads to a good design outcome".

**2.5.2** The four Design Principles that the NIC says should guide the planning and delivery of major infrastructure projects are set out below. Further project level guidance, published in May 2024 provides more specific direction on how to apply these principles at each stage of a project's life cycle<sup>10</sup> (opposite).

**2.5.3** In addition to the four principles, the NIC Design Group identify that throughout the life of a development proposal, everyone involved should:

- i) appreciate the wider context.
- ii) engage meaningfully.
- iii) continually measure and improve.

<sup>10</sup> National Infrastructure Commission Design Group, May 2024. Project Level Design Principles, Guidance for project leaders on developing project specific design principles

The Design Principles that should guide the planning and delivery of major infrastructure projects are:

### **Climate.** Mitigate greenhouse gas emissions and adapt to climate change.

Seek opportunities to enable the decarbonisation of society through the mitigation of emissions, and allow the project to adapt over time to build resilience.

### **People.** Reflect what society wants and share benefits accordingly.

Design infrastructure for people, not architects or engineers; make it human scale, easy to navigate and instinctive to use, helping to improve quality of life.

### **Places.** Provide a sense of identity and improve our environment.

Provide a strong sense of identity and improve the natural and built environment; make a positive contribution to landscapes within and beyond the project boundary.

### **Value.** Achieve multiple benefits and solve problems well.

Achieve multiple benefits and solve problems well; add value by defining issues clearly from the outset and providing overall direction for everyone working on the project.



## The Mitigation Hierarchy

**2.5.4** The mitigation hierarchy is a structured approach to managing environmental impacts, with avoidance of impacts being preferred, followed by minimisation, then restoration / enhancement and finally offsetting of residual impacts through alternative measures that forms the cornerstone of national planning policy and is supported by the NIC. In this context, while not explicitly stated, the mitigation hierarchy links back to the NIC's Design Principles as follows:

- i) Climate: By avoiding and minimising environmental degradation, projects contribute to climate resilience and carbon neutrality.
- ii) People: Reducing environmental impacts enhances public health and well-being.
- iii) Places: Restoring and offsetting ensure that local landscapes and ecosystems are preserved and enhanced.
- iv) Value: Implementing the hierarchy can lead to long-term economic benefits by reducing remediation costs and fostering sustainable resource use.

**2.5.5** The NIC encourages infrastructure developers to integrate these principles, ensuring that projects deliver multiple beneficial outcomes, including environmental net gain.







# STAGE 1: ASSEMBLE

**Establish the brief,  
assemble the right team,  
and set the design parameters**

## 3. ASSEMBLE

### 3.1. Introduction

**3.1.1** As was explained in the preceding section, AGD sets out a four-stage process for the achievement of good design.

**3.1.2** This Section of the DAD sets out how the Applicant has addressed the first stage (Assemble). It describes the initial project brief, the project team assembled by the client, the design vision and the design principles required to meet the challenge of achieving a thoughtful balance of energy generation, visual mitigation, biodiversity enhancements, and stakeholder priorities.



## 3.2. Project Brief

3.2.1 At the outset of the project, the Applicant identified the following requirements which the Proposed Development would need to fulfil:

i) Purpose.

a) The Proposed Development would be a solar energy generating facility that should optimise the available capacity at the nearby SP Energy Networks Frodsham Substation.

b) The Proposed Development should also achieve multiple beneficial outcomes for society and the environment aside from the core purpose of generating electricity.

ii) Price.

a) The Proposed Development must be commercially viable, optimising use of the available land to achieve maximum energy output via a cost-efficient means of export to the grid or other energy users

iii) Programme.

a) The target grid connection date was to be approximately 2030. (Subsequently an energisation date of 2029 has been agreed with SPEN.)

iv) Planning.

a) The Proposed Development needs to successfully gain consent via the DCO process meeting the requirements set out in relevant planning policy documents and also needs to successfully gain any other consents required in order to begin generating and exporting electricity.





3.3. Project Team

3.3.1 The Applicant has appointed an experienced project team for the Proposed Development. The team covers the required range of different technical disciplines for both the design of large-scale solar energy development, and for the execution of the necessary planning and environmental assessment processes required by large-scale infrastructure development more generally. The project team comprises the following organisations:

Axis

Planning  
EIA Co-ordination  
LVIA

Pinsent Masons

Legal Advisors

Avian Ecology

Ecology  
Ornithology

Cubico

Technical Design Input

Ardent

Land Referencing

Counter Context

Communications

AOC

Cultural Heritage

Amion

Tourism and Recreation

Fichtner

Climate Change

PagerPower

Glint and Glare Assessment

Smith Grant LLP

Ground Conditions  
Construction Dust Assessment

Wardell Armstrong

Civil Engineering

Waterco

Flood Risk  
Drainage and Surface Water

NVC

Noise Impact Assessment

Skyray

Solar Array Design

BTS+T

Battery Safety





### 3.4. Design Vision

**3.4.1** The purpose of the Design Vision is to define the Proposed Development's strategic objectives, and a unified vision and approach for how the Proposed Development will achieve this.

**3.4.2** The Design Vision for the Proposed Development is:

We want to deliver a substantial amount of renewable energy to the National Grid and to local businesses, making a clear contribution towards national renewable energy targets.

We want to conserve and enhance the local environment, provide tangible benefit to local communities in the form of better access and recreation opportunities, and to be a responsible neighbour to local people, during the construction, operational and decommissioning stages of the project.

We will follow a clear design process from start to finish, reflecting project-specific design principles, demonstrating collaborative interdisciplinary working, engagement with stakeholders and local communities, and delivering good design outcomes that we will commit to delivering”.

**“Truly inclusive and accessible design that is sympathetic to the social and community context is important for people. Places should cover boosting a local sense of identity and stewarding the local landscape. For value, it is important to look beyond the site boundary, working with partners to unlock additional value.”**





### 3.5. Design Principles

**3.5.1** In order to achieve the Design Vision, and to achieve 'good design', a series of Design Principles were identified for the Proposed Development.

**3.5.2** The Design Principles were determined by reference to the NIC Design Principles discussed in Section 2.4, and to the specific characteristics of the Site and its surroundings. They were consulted on at an early stage with CWaCC and were also included for comment in the Statutory Consultation (please note that at the Statutory Consultation stage, the Design Principles were referred to as Design Objectives). CWaCC were then asked for their views again post PEIR in the consultation meeting with Officers held in February 2025, as described in section 5.4 of this document.

**3.5.3** As discussed in Section 6.0, the Applicant then broke these Design Principles down into more specific measures. In this document the term 'Design Principles' includes for those measures.

**3.5.4** These Design Principles were used to inform and guide the design process that is described in the subsequent sections of the DAD, and in the design parameters for the Proposed Development which are set out in the **Design Parameters Statement (EN010153/DR/7.1)**.

#### Design Principle 1:

##### Renewable Energy

- Delivery of significant amount of affordable, low carbon, renewable energy to support policy objectives and national targets for reducing carbon emissions to net zero by 2050.

#### Design Principle 2:

##### Landscape and Views

- Develop the proposals in a manner sensitive to their landscape setting, reducing visual impacts from nearby properties, recreational routes and key viewpoints

#### Design Principle 3:

##### Biodiversity and Green Infrastructure

- Protect and enhance green infrastructure within the Site and in doing so create the conditions for enhanced biodiversity locally

#### Design Principle 4:

##### Public Access and Recreation

- Retain, enhance and encourage public access through the life of the proposals, including during construction and decommissioning where feasible.

#### Design Principle 5:

##### Flooding

- Safeguard the surrounding hydrological systems, ensure the Proposed Development is resilient to flooding and will not increase flood risk elsewhere, taking account of the impacts of climate change.

#### Design Principle 6:

##### Heritage

- Develop the proposals so that they are sensitive to the presence of heritage assets, their settings, and the wider historic environment

#### Design Principle 7:

##### Amenity

- Develop all elements of the proposals, including during construction and decommissioning so that they do not adversely affect the amenity or safety of local residents and users of public rights of way.

#### Design Principle 8:

##### Traffic and Transport

- Vehicular access to the Site will be safe and will not adversely affect the local highways network, or the local public rights of way network.



### 3.6. Design Review Panel / Design Champion

**3.6.1** NPS-EN1 recommends that in order to ensure that good design is embedded within a project that a project board level design champion could be appointed and a design panel used to maximise the value provided by the infrastructure

**3.6.2** The Applicant has not appointed a design champion, and nor has it sought an independent review of the design. The rationale for this stance is that the scope of potential design input on a solar development is limited. There is no architectural design input required for a solar energy generating station, with the majority of the design components by their nature standardised rather than bespoke.

**3.6.3** The design responses at this site derive principally from the Site's landscape context and ecological factors. The Applicant's assembled project team includes experienced Landscape Architects and Ecologists amongst a wider team of environmental consultants and was considered suitable to lead on the design.

**3.6.4** In addition, the Applicant has welcomed feedback from the local planning authority, statutory environmental bodies, stakeholders, and members of the public on the design of the project and held a series of design workshops with local interest groups and the local planning authority to help influence the design.

**3.6.5** Feedback on the design of the Proposed Development is summarised within the **Consultation Report (EN010153/DR/5.1)** and later in this document.







# STAGE 2: RESEARCH

**Understand the context,  
explore constraints and  
opportunities**

## 4. RESEARCH

### 4.1. Introduction

**4.1.1** This Section of the DAD sets out how the Applicant has addressed the second stage (Research) of the four-stage good design process recommended by the Planning Inspectorate.

**4.1.2** It discusses firstly how the site and surroundings have been researched and understood as a precursor to design decision making

**4.1.3** It then examines the nature of scheme components and the degree of optionality that exists in their selection and how the design of the Proposed Development has responded to the constraints and opportunities identified



## 4.2. Research - Site Context

### Site Overview

**4.2.1** The Frodsham site is within the Frodsham Marshes, bounded by the Mersey Estuary, the Manchester Ship Canal, and agricultural or industrial land.

**4.2.2** Key existing features include:

- i) Topography: Predominantly flat, low-lying land with embankments.
- ii) Land Use: Agricultural fields, drainage channels, energy infrastructure (nearby wind turbines, substation).
- iii) Access and Movement: Existing private roads, public rights of way crossing the site, the M56 motorway to the south, and local highways.

### Site Selection

**4.2.3** The Site of the Proposed Development has been selected on the basis that it offers a series of significant and in many cases unique benefits from a design point of view, as set out below.

- i) The presence of the operational Frodsham Wind Farm. When considering locations for solar photovoltaic generation, NPS EN-3 is supportive of co-location with onshore wind generation in order to maximise efficiency of land use.
- ii) The Site is positioned within an 'energy corridor' between the Protos Energy Park and other major industrial facilities located to the west, and the Runcorn industrial area to the east. Many of the businesses in these areas are energy intensive and consequently there is a clear opportunity to provide direct power via private wire connection. This allows for improved efficiency (and thus reduced costs), places less reliance on the available grid capacity, and puts less pressure on storage with a BESS.

- iii) The majority of the SADA is under the control of only one or two landowners. Compiling large parcels of land for development can be one of the most challenging and time-consuming aspects of delivering energy infrastructure and therefore straightforward land ownership is clearly beneficial to delivering a large-scale renewable energy project in a timely manner.
- iv) NPS EN-3 is clear that large scale ground-mounted solar deployment should be located mainly on brownfield, industrial and low and medium grade agricultural land. In this case, much of the Site is reclaimed land (subject to deposit of dredgings from the Manchester Ship Canal) and is low grade agricultural land (i.e. it is not Best and Most Versatile), and whilst it may not be suitable for traditional forms of development due to its limited accessibility and its location adjacent to the existing wind farm, it is ideal for the development of a commercial solar array. The topography of the site is relatively flat, also making it well suited.

- v) The area around the Site is generally flat and dominated by large scale infrastructure development. In addition to the Frodsham Wind Farm, the local landscape accommodates the M56 motorway; the Chester to Manchester railway; high voltage above ground power lines; and several other large industrial buildings and associated plant. Consequently, the inclusion of a large scale commercial solar array within the landscape is unlikely to be incongruous to the extent that it would elsewhere, e.g. in a more rural landscape where there was less industrial development.
- vi) The Site is in close proximity to the existing Frodsham SPEN Substation.





**4.2.4** The characteristics of land within the Site are thus well suited for solar energy generation. The Site is located in a context where there is a well-established history of energy generation, including renewable energy. The national electricity transmission and distribution system is well developed locally, and transport links are also well-established.

**4.2.5** A more detailed analysis of the considerations around site selection can be found in **ES Vol 1 Chapter 3: Alternatives and Design Evolution (EN010153/DR/6.1)** and in the Alternative Site Assessment at **ES Vol 2 Appendix 3-1: (EN010153/DR/6.2)**.

**4.2.6** This analysis demonstrates that there are very few appropriate, reasonably available sites where so many favourable factors coincide to enable the realisation of the benefits of utilising the available grid connection for renewable energy generation.

**4.2.7** For these reasons the Site identified by the Applicant presented an ideal opportunity for the delivery of a commercial scale solar project that can be designed in a way to positively respond to its environmental constraints.

The below panoramic image is taken from Frodsham Hill and has been annotated to illustrate the wide diversity of land uses and points of interest in the view





## Description of the Site – the Order Limits

**4.2.8** For this proposal, the Order Limits cover approximately 339.5 hectares of land within Frodsham Marshes and are illustrated on **ES Vol 3 Figure 1-1: Site Location (EN010153/DR/6.3)**. The Order Limits comprise of a series of distinct sub-areas, illustrated on **ES Vol 3 Figure 1-2: Proposed Development Areas (EN010153/DR/6.3)**.

- i) Solar Array Development Area ('SADA')
- ii) Main Site Access
- iii) Non-Breeding Bird Mitigation Area ('NBBMA')
- iv) Skylark Mitigation Area
- v) SPEN Substation Connection
- vi) SPEN Substation Access.

## The Solar Array Development Area ('SADA')

**4.2.9** The SADA is the principal component of the Proposed Development and would contain the proposed solar arrays plus associated equipment, including inverters, substation and battery storage components. It would be located at the eastern end of Frodsham Marshes, between the Mersey Estuary and the M56. The northern boundary of the SADA is formed by the River Weaver, and the north-western boundary by the Manchester Ship Canal, with the Mersey Estuary lying beyond. The western boundary of the SADA is formed by two of the former Manchester Ship Canal Dredging Deposit Cells (Cell 3 and Cell 6). The southern boundary of the SADA is formed by agricultural fields and the M56 motorway.

**4.2.10** The SADA comprises three relatively distinct areas:

- i) The Eastern Cluster of Frodsham Wind Farm: This area forms the western half of the SADA. Six operational wind turbines with a maximum height of 125m to blade tip, are located in this area. The land is part of the former Manchester Ship Canal Dredging Deposit Ground, and includes Cells 1, 2 and 5. The cells have been restored to agricultural land and are now grazed by sheep / cattle. The land in this area lies between approximately 9.5m and 12.5m above ordnance datum (AOD).
- ii) Former agricultural land used by Frodsham Wildfowlers: The

central area of the SADA is former agricultural land which has been left fallow and managed to encourage use by wildfowl. This area is currently used for recreational shooting by Frodsham Wildfowlers. This area of the site is crossed by a series of ditches which have been used to drain and manage water levels on Frodsham Marsh. The land in this area lies at approximately 6m AOD.

iii) Agricultural land: The south-eastern portion of the SADA is agricultural land. It is understood that the land has been used for growing crops and silage. Some areas of the fields appear to have been left fallow and have been colonised with scrub and wet grassland. Hedgerows demarcate boundaries between field units. The land in this area lies at approximately 5m AOD.





### The Main Site Access

**4.2.11** The Main Site Access runs from the west, leaving the public highway via Pool Lane roundabout and turning onto Grinsome Road (a private road). Vehicles would travel east for approximately 1.5km, turning north at Grinsome Road Roundabout, onto Road 1 of Protos. Vehicles would then turn east along Marsh Lane which leads to Frodsham Wind Farm. The Frodsham Wind Farm access tracks provide access to the SADA.

### Non-Breeding Bird Mitigation Area

**4.2.12** The NBBMA comprises an area immediately west of the SADA that has been identified for the creation and management of habitats for wetland birds. It is located on Cell 3 of the Manchester Ship Canal Dredging Deposit Grounds, an area of former farmland that will be turned into a mosaic of wetland features created and managed specifically for SPA birds, but also providing benefit to other birds and wildlife.

**4.2.13** The **outline Non-Breeding Bird Mitigation Strategy (oNBBMS)** which forms Appendix B to the **outline LEMP (oLEMP) (EN010153/DR/7.13)**, developed in consultation with Natural England and the RSPB, promotes creation of shallow wetland scrapes, ponds, and seasonally flooded grassland to provide feeding and roosting opportunities for SPA target species displaced from the solar array area. By improving habitat quality (e.g. maintaining water features year-round, managing vegetation height etc.), this area is intended to enhance the carrying capacity for SPA bird species, offsetting the loss of some feeding habitat under the solar panels

**4.2.14** Cell 3 currently forms part of the mitigation for Frodsham Wind Farm and comprises areas of grassland with some manmade scrapes (shallow areas of water). The proposed modification of and thereafter management of Cell 3 as set out in the **oLEMP (EN010153/DR/7.13)** (and the **oNBBMS** appended to it) provides for the enhancement of the Wind Farm mitigation into an ecological proposition that mitigates the impacts of both schemes.





### Skylark Mitigation Area

**4.2.15** A Skylark Mitigation Area has been identified to mitigate impacts on farmland bird species that rely on open habitats. The identified area is located to the south of the Site on a strip of existing agricultural land running towards the M56 motorway. The mitigation proposed is the creation of meadow grassland and thereafter an ongoing programme of favourable management. This will benefit breeding skylarks through improved habitat quality and greater reliability of habitat on account of dedicated management (as distinct from standard agricultural practice which may not always be favourable).

**4.2.16** Skylarks are considered likely to continue to utilise marginal habitats and areas between solar panels in the SADA for foraging, with larger gaps between panelled areas likely to also remain suitable for nesting.



### SPEN Substation Connection

**4.2.17** The SPEN Substation Connection would make the main grid connection from Frodsham Solar Substation to the to the SPEN Frodsham substation.

Works would include the installation of new 132 kV electrical circuits and is expected to involve both below-ground and above-ground elements (supported on wooden poles) and would pass through the SADA and then over the River Weaver. There would also be works within the SPEN Substation to facilitate the connection.

### SPEN Substation Access

**4.2.18** The SPEN Substation Access is an existing dedicated private access road running northwest from the A56 to the substation complex, parallel to the Weaver Navigation. The access is included in the Order Limits solely to facilitate access to the substation to enable connection works to occur. No physical changes to the access are proposed.





## Land Use

**4.2.19** As described above, the SADA comprises agricultural and former agricultural land. The Main Site Access and the SPEN Substation Access both comprise existing private access roads. The NBBMA comprises existing grazing land and wetland. The Skylark Mitigation Area comprises existing farmland. The SPEN Substation Connection passes through the SADA and would cross over the River Weaver.

**4.2.20** A series of Public Rights of Way (PROW) fall within or cross the Order Limits. The PROW include footpaths and restricted byways, which allow access by walkers, riders and cyclists. National Cycle Route 5 runs along a section of the Main Access Route and along part of the southern edge of the SADA. Public Rights of Way are shown on **ES Vol 3 Figure 1-5: Public Rights of Way (EN010153/DR/6.3)**

**4.2.21** The SADA is crossed by a range of services including above and below ground high voltage electricity transmission lines, high pressure gas pipelines, water distribution mains, telecommunication lines and fuel pipelines which originate at nearby petrochemical plants.

**4.2.22** The closest settlement is Frodsham to the south on the opposite side of the M56, approximately 140m from the SADA at the closest point. To the south-west of Frodsham lies the settlement of Helsby, approximately 2km from the SADA at the closest point. Both Frodsham and Helsby lie at the foot of the northern extent of the Cheshire Sandstone Ridge, which rises to a height of approximately 150m above the two towns. To the north and north-east of the SADA, on the north bank of the River Weaver/Weaver Navigation, is Runcorn.

**4.2.23** There are large areas of industrial development along this section of the River Mersey corridor. The northern bank of the River Weaver/Weaver Navigation is occupied by the INEOS Inovyn Runcorn Site which produces a range of chemicals for industrial use. The INEOS Inovyn Runcorn Site also includes an 800MW gas-fired power station. The Runcorn Energy from Waste Plant operated by Viridor is located further to the north.





**4.2.24** To the west of the SADA is the Western Cluster of Frodsham Wind Farm comprising 13 no. wind turbines that are the same height as those in the Eastern Cluster (125m to tip of blade). Further development is located to the west of the wind farm, and this includes Stanlow Oil Refinery, the Former CF Fertilisers Plant (decommissioned during 2022), the Encirc Glass factory, and a number of facilities at Protos (some existing, some under construction, with further development proposed).

**4.2.25** As set out above, the Manchester Ship Canal forms the northern boundary of the Order Limits and is separated from the Mersey Estuary by Frodsham Score, a 100m-200m wide strip of low-lying marshland. The Mersey Estuary itself is a wide body of water with the northern shore approximately 2.65km from the SADA.

**4.2.26** The majority of the Order Limits are located within land designated as Green Belt. Only the section of the Main Access Road close to Protos lies outside of the Green Belt.

**4.2.27** An Agricultural Land Classification ('ALC') survey has been undertaken for the land within the SADA. This indicated that approximately 16% of the SADA is Grade 3b, approximately 62% is Grade 4, and approximately 22% is non-agricultural. Best and Most Versatile Land ('BMV') is defined by Natural England as land comprising Grades 1, 2 and 3a. Development in the SADA would thus not affect any BMV Land.

**4.2.28** Investigations undertaken in the western part of the SADA as part of the construction of Frodsham Wind Farm did not identify any gross contamination which presents risk to either human health or to controlled waters. The same investigations reported no significant depth of made ground in the central and eastern parts of the SADA, and thus no contamination is anticipated in these areas.

### Summary points affecting design:

**The public access network, existing utility corridors and existing land uses provide a large number of constraints which limit the flexibility of solar array deployment but equally offer opportunities to naturally subdivide and reduce the perceived extent of development**





## Landscape Character and Visual Amenity

**4.2.29** The Frodsham Marshes were once part of a natural coastal transition between the Cheshire sandstone bluffs that sit above Frodsham and Helsby and the saltmarshes and mudflats of the Mersey Estuary. Whilst the marshes were previously contiguous with the estuary, in the late 19th century this changed when the area was embanked, ditched and drained as part of the creation of the Manchester Ship Canal, which opened in 1894. Further modification to the landscape included drainage works to improve the agricultural land and dredging deposit grounds associated with maintenance of navigation in the Ship Canal and Weaver.

**4.2.30** The Weaver viaduct and Cheshire East-West motorway (now known as the M56) were constructed in the late 1960s along the southern edge of the marshes and added a strong visual and physical barrier to movement, restricting access to the marshes from Frodsham and Helsby to a small number of crossing points.

**4.2.31** Frodsham wind farm is a dominant element amongst a host of other major infrastructural influences, including views of large-scale industry to the east and west, the motorway, with its viaduct and overbridges and the 400kv transmission line that runs parallel to it.

**4.2.32** The Site thus sits at the heart of a highly modified area of landscape. Whilst there is still a sense of naturalness in parts of the marsh, this is diluted by man-made features and development. Degraded hedgerows and broken fencing also show this to be a landscape in need of improved management.

**4.2.33** Desk and field-based surveys have been undertaken to gain an understanding of the landscape and visual context into which the Proposed Development would be introduced.





#### 4.2.34 A Landscape Strategy for Cheshire West and Chester Borough<sup>11</sup> ("CWaCC Landscape Strategy")

describes and classifies the landscape of the CWaCC area. The Order Limits are located almost entirely within LCA 4a: Frodsham, Helsby and Lordship Marshes. The western end of the Main Site Access Road extends into LCA 9a: Dunham to Tarvin Plain. LCA4a is where change in the landscape resulting from the Proposed Development would occur and hence is the most relevant LCA for the design process

#### 4.2.35 Key perceptual/visual sensitivities, qualities and values for LCA4a identified by the Strategy are:

- i) The flat landform and long views contribute to the perception of a large scale, exposed landscape.
- ii) Presence of man-made embankments foreshorten views to the north across the Mersey Estuary.
- iii) Important views to and from the Frodsham Sandstone Ridge and Helsby Hill.
- iv) The consistent field pattern through planned enclosure gives the perception of a reclaimed, tamed landscape.
- v) Vegetation-fringed ditches and rough ground and lagoons provide texture in the landscape.
- vi) Parts of the marsh are remote, but the presence of traffic on the M56 motorway brings noise and movement to the area; the presence of birds and proximity to John Lennon Airport also contribute to noise and movement.

vii) Sense of naturalness of the marsh is diluted by man-made features and development.

viii) No prominent skyline, but embankments, pylons and industrial development are visually prominent.

ix) The open character means there is little opportunity for screening any large-scale elements or for mitigating visual impact without the mitigation measures in themselves being highly visible - making it a visually sensitive landscape. There are relatively few sensitive visual receptors in the area, limited to a few residential properties and users of the PRoW network, but in adjacent areas overlooking the marsh there are views from Frodsham and Helsby as well as visitors to the viewpoints at the top of Helsby Hill and the War Memorial above Frodsham.

#### 4.2.36 The landscape condition of LCA 4a is identified in the Strategy as follows:

"Although much of the area is actively farmed, the degraded hedgerows and broken fencing shows this to be a landscape in need of improved management. Some land to north of Lordship Lane remains in use for canal dredgings and has undergone change as a result of the preliminary works for the permitted windfarm. Wet grassland species have been lost and ditches are eutrophic as a result of the intensive agricultural use of the land".

#### 4.2.37 The overall management strategy for LCA4a identified in the Strategy is:

"...to enhance and restore the conditions of habitats and features of the marshes whilst safeguarding its open character"

<sup>11</sup> Bayou Bluenvironment and The Planning & Environment Studio (2016). A Landscape Strategy for Cheshire West and Chester Borough. Cheshire West and Chester Council. Available at <https://www.cheshirewestandchester.gov.uk/residents/planning-and-building-control/total-environment/local-landscape-character-assessment-landscape-strategy-2016> (Last Accessed 15 July 2024)





4.2.38 More detailed guidelines for landscape management and for built development within LCA4a within the Strategy are:

- i) Encourage recreational development as a means of managing some of the more derelict and degraded areas of the landscape. Encourage use of the area by walkers, cyclists, rowers and horse riders (including provision of picnic facilities and viewing opportunities) whilst safeguarding the nature conservation interest of the area, particularly its importance for birds.
- ii) Maintain the distinctive field pattern that reveals the planned 19th century enclosure of the marsh.
- iii) Seek to restore thorn hedgerows that are falling into decline.
- iv) Maintain and ecologically enhance the ditch system and riparian habitats and land supporting breeding, over wintering and passage birds. Seek opportunities to re-create habitats such as species rich grassland and reed beds.
- v) Increase the biodiversity of intensively managed grassland and arable land – create and link buffer strips along linear features such as hedgerows and ditches to create a continuous network of wildlife corridors.
- vi) Improve water quality by encouraging less-intensive agricultural practices to reduce fertiliser run-off and nutrient levels in the ditches.
- vii) Encourage restoration of derelict industrial land including re-creation of salt-marsh and reintroduction of grazing to maintain the open character of the marsh.
- viii) Consider opportunities to create views across the Mersey Estuary.
- ix) Conserve the 'remote' character of the marshes away from the main transport corridor of the M56.

- x) Retain the open character of the marsh by restricting planting to low growing scrubby species typically found in the local landscape, taking into account the importance of the area for ground nesting birds and wintering/passage birds. Woodland planting /screening using tall or ornamental species is not appropriate in the open marsh.
- xi) Conserve the remaining open, undeveloped areas of the marsh.
- xii) Consider using native scrubby vegetation to screen views of traffic on the north side of the M56 motorway (taller species may be appropriate on the southern side of the motorway adjacent to the Helsby to Frodsham Undulating Enclosed Farmland).
- xiii) Consider views to and from the Frodsham Sandstone Ridge and Helsby Hill when planning any change.

4.2.39 Whilst the above landscape management guidelines do not strictly comprise 'design guidance', they do consist of a very detailed set of prescriptions concerning how the local planning authority considers that the area ought to be taken forward in a sympathetic manner. As such they can be considered to be the type of document that is referred to in the final sentence of paragraph 4.7.8 of NPS-EN1.

4.2.40 The Landscape Sensitivity Study and Guidance on Wind and Solar Photovoltaic Developments<sup>12</sup> ('the Sensitivity Study') identifies which landscapes within the CWaCC area are least sensitive to wind energy and solar energy development.

4.2.41 LCA4a, where the Proposed Development would be located, is identified as having an overall high sensitivity to a 'very large solar farm'.

4.2.42 It is noteworthy for context that no other landscapes within the CWaCC area were identified as being any less sensitive than this to large scale solar development.





**4.2.43** Key conclusions made include that:

A medium, large or very large solar farm could potentially fit into LCA 4a, but being south-facing it would impact on important viewpoints from the Frodsham Sandstone Ridge and Helsby Hill looking northwards over the Mersey Estuary. As part of mitigation, opportunities should be sought to restore hedgerows.

**4.2.44** Key locations which are sensitive to changes in view that could arise as a result of the Proposed Development include:

- i) The public rights of way that run through the Order Limits and other nearby routes which connect to these, including National Cycle Route 5.
- ii) Residential properties at the northern edge of Frodsham.
- iii) Public open spaces within Frodsham.
- iv) Frodsham Hill War Memorial.
- v) The Weaver Navigation.

<sup>12</sup> Bayou Bluenvironment and The Planning & Environment Studio (2016). Landscape Sensitivity Study and Guidance on Wind and Solar Photovoltaic Developments. Cheshire West and Chester Council. Available at <https://www.cheshirewestandchester.gov.uk/residents/planning-and-building-control/total-environment/landscape> (Last Accessed 15 July 2024)

## Summary points affecting design

**The scheme design needs to acknowledge and accommodate a range of landscape characteristics at the Site including the availability of open views. Mitigation of views of proposed infrastructure is capable of being provided by existing vegetation and additional similar vegetation that will assimilate in terms of character and be appropriate to improve habitats. A balance needs to be struck between screening and maintaining open views. Most if not all of the detailed guidelines for management of LCA4a are compatible with development of a solar park. The recommendations of the Landscape Sensitivity Study need to be taken on board.**





Ecology and Biodiversity

- 4.2.45 The Site is located adjacent to the nationally and internationally designated Mersey Estuary. The Frodsham, Helsby and Ince Marshes Local Wildlife Site ('LWS') extends across the majority of the SADA, the whole of the Skylark Mitigation Area, and sections of the Main Access Route. As such, sensitivity to the ecology and biodiversity of the Site and surrounding areas is key to developing an appropriate design.
- 4.2.46 Desk and field-based surveys of the Order Limits and their surroundings have been undertaken to gain information upon habitats and species.
- 4.2.47 The relevant internationally designated sites are the Mersey Estuary Special Protection Area ('SPA') and the Mersey Estuary RAMSAR site.
- 4.2.48 There are also four nationally

designated sites located within approximately 2km of the SADA. These include three Sites of Special Scientific Interest ('SSSI'), including the Mersey Estuary SSSI, and one Local Nature Reserve ('LNR'). A small part of the Mersey Estuary SSSI overlaps the north-western edge of the SADA. These designations are illustrated on **ES Vol 3 Figure 1-3: Planning and Environmental Designations (EN010153/DR/6.3)**.

4.2.49 Eighteen non-statutory Local Wildlife Sites (LWS) designated at local level are located within 2km of the SADA.

4.2.50 The SADA largely comprises areas of neutral grassland, arable land and modified grassland, separated by ditches, watercourses, hedgerows and tree lines. Also present are areas of reedbed, scrub, ponds, woodland and existing tracks/roads.

- 4.2.51 Ecological surveys have confirmed that the SADA supports at least six species of bat (foraging and commuting), water vole, badger, eel, common toad and a range of invertebrate species. The SADA also has the potential to support roosting bats, brown hare, otter, European hedgehog, Western polecat, harvest mouse and reptiles (in low numbers).
- 4.2.52 Ornithological field surveys have confirmed that the SADA supports a range of bird species, including some which are qualifying species for the Mersey Estuary SPA and/or Ramsar, such that it constitutes Functionally Linked Land. A number of other bird species that are not qualifying features of the SPA/Ramsar have also been identified as either breeding within or near to the SADA, or wintering within the SADA.





**4.2.53** There is an opportunity to make a positive contribution to the condition and biodiversity value of the Frodsham, Helsby and Ince Marshes LWS through a combination of enhancement and management. Much of the LWS is currently not actively managed for wildlife – and where this has been undertaken in partnership with development in nearby locations, for example at Protos to the west, this has had very positive outcomes.

### Summary points affecting design:

**The scheme design needs to include measures to protect existing landscape elements that provide ecological interest and habitats and to create new additional habitat features to enhance the interest of the site. Some of these features can be accommodated within the SADA and others need to be located on other adjoining land**





## Cultural Heritage

**4.2.54** As described earlier under the Landscape Character heading, this is a much-altered landscape. The wider area is thought to have had significance in the prehistoric period, with hillforts overlooking the Mersey and the Weaver. Frodsham is a town of Saxon origin which was an important port, particularly for salt exports. The marshes would have been part of a natural estuary coastline prior to construction of the Manchester Ship Canal which largely severed the relationship with the Mersey. The estuarine marshland has been drained to improve it for agriculture but was an unappealing location for settlement and these areas have remained largely unsettled, restricted to a few isolated farms.

**4.2.55** There is a long history of industry utilising the reclaimed marshland and other land adjoining the strategically important Mersey corridor – including the chemical plants at Rock Savage / Weston Point and multiple power stations over time, including most recently the Frodsham wind farm. Transport has been influential also, with the export of goods from Frodsham, and later via the Ship Canal /Weaver navigation. Keeping the waterways clear necessitated dredging deposit grounds which have altered the landscape of the Site. More recently railways, motorways and long-distance utility corridors cross the marshes. It can be seen to be an evolving / dynamic post-industrial historic landscape.

**4.2.56** Desk and field-based surveys of the Order Limits and their surroundings have been undertaken to gain information about cultural heritage and buried archaeology.

**4.2.57** There are no designated heritage assets located within the SADA.

**4.2.58** Non-designated assets within the SADA include historic flood defences, works associated with the construction of the Manchester Ship Canal, evidence of medieval and post-medieval agriculture, and structures dating to the Second World War. Buried peat deposits within the SADA are likely to have some potential for paleoenvironmental evidence to survive.





4.2.59 Within approximately 3km of the SADA, there are a range of designated assets, including:

- i) Six Conservation Areas:
  - a) Frodsham Town.
  - b) Overton, St Lawrence's (Frodsham).
  - c) Weston Village.
  - d) Castle Park (Frodsham)
  - e) Halton Village.
  - f) Higher Runcorn.
- ii) 100 Listed Buildings:
  - a) 2 no. Grade I Listed
  - b) 6 no. Grade II\* Listed
  - c) 92 no. Grade II Listed
- iii) Five Scheduled Monuments.
- iv) One Registered Park and Garden (Castle Park, Frodsham).

4.2.60 The most relevant designated assets are those located in and around Frodsham, particularly those on the south side of the town with views out across the Mersey Estuary.

### Summary points affecting design:

**There is little likelihood of material effects upon designated heritage assets as a result of the physical separation of the scheme from these assets and the presence of the M56 motorway and other contemporary infrastructure. However, there are industrial heritage artefacts within and adjacent to the site and there is an opportunity to enhance access, understanding and interpretation of these.**





## Flood Risk and Hydrology

**4.2.61** The Order Limits are in general low-lying and flat. However, within the SADA there is some notable variation in landform which has arisen due to past use as dredging deposit grounds to dispose of arisings from the Manchester Ship Canal. As a result, the western part of the SADA is between approximately 5m and 8m higher than the central and eastern parts.

**4.2.62** The geology of the SADA comprises superficial Tidal Flat deposits, underlain by bedrock from the Helsby Sandstone Formation, Wilmslow Sandstone Formation and the Chester Formation (all comprising sandstone). The Tidal Flats are Secondary Undifferentiated Aquifers, and the bedrock deposits are Principal Aquifers.

**4.2.63** The SADA is drained by a series of ditches. Several of the larger ditches are designated as Main Rivers, the remainder are Ordinary Watercourses. The River Weaver and the Manchester Ship Canal are separated from the SADA by earth flood embankments along its northern and eastern boundaries.

**4.2.64** Watercourses within the eastern part of the SADA discharge into the River Weaver via Frodsham Pumping Station. Land within the Order Limits to the west of the SADA (including within the NBBMA) discharges into the Manchester Ship Canal via Ince Pumping Station.

**4.2.65** There are three Water Framework Directive Water Body catchments within approximately 1km of the SADA, namely:

- i) Weaver (Dane to Frodsham).
- ii) Peckmill Brook, Hoolpool Gutter at Ince Marshes.
- iii) Manchester Ship Canal.



View across the River Weaver to Rock Savage





**4.2.66** The central and eastern parts of the SADA are located within Environment Agency Flood Zone 3a – an area considered to be at flood risk with a greater than 0.5% annual probability of tidal flooding and/or a greater than 1% annual probability of fluvial flooding. As noted above the SADA is protected by embankments along the River Weaver and Manchester Ship Canal. There is a residual risk of fluvial flooding which would occur should there be a failure of the pumping stations which serve Frodsham Marshes and Ince Marsh or should flood waters overtop the existing flood defences.

**4.2.67** The Environment Agency 'Flood Risk from Surface Water' map indicates that the majority of the Order Limits are at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding. Isolated areas within the Order Limits are identified as having a greater risk of surface water flooding. The area prone to flooding is limited in extent and associated with surface water ponding within isolated low points.

**4.2.68** There are no public sewers crossing the SADA. The SADA is separated from the nearest urban area (Frodsham) by the M56.

**4.2.69** No historical records of groundwater flooding are identified within the Order Limits. The risk of groundwater flooding is very low.

### Summary points affecting design:

**The parts of the Site that have not been artificially elevated by the deposition of dredging deposits are at risk of occasional flooding and the design of infrastructure needs to accommodate this, including accounting for climate change allowances. Drainage ditches are important infrastructure and need to be retained, protected and maintained.**





## Access and Movement

**4.2.70** Further to the previous descriptions of the landscape character and the natural and cultural heritage of the site, this can be seen to be an area with an interesting history, which has been profoundly altered by man-made interventions through time to arrive at the position it is now in.

**4.2.71** The resultant landscape is interesting and dynamic, with multiple influences, but is also somewhat isolated – severed to the north from the estuary by the Manchester Ship Canal and to the south, from Frodsham and Helsby by the motorway. There is nonetheless a fair degree of public use and access, facilitated by a number of public rights of way.

**4.2.72** The site is used in relatively low numbers by local people running, walking and dog walking. Visitors from further afield visit to observe the birds, both on the Site and using the Site to gain vantage points over the adjoining estuary.

**4.2.73** National Cycle Route 5 runs from Ellesmere Port to Frodsham and crosses the marshes to the immediate south of the Order Limits. The condition of the route is variable in quality, with some very poor, heavily potholed sections to the west towards Protos.

**4.2.74** The Cheshire Circuit is a promoted route that connects the northern and southern ends of the Sandstone Trail and the Weaver Way – two strategic long distance walking routes through Cheshire – to create a continuous loop. The northern connection follows existing rights of way though the Order Limits.

**4.2.75** The public right of way network, whilst fairly extensive, does not access all areas equally well. There is a lack of connectivity between some routes, meaning that there are long ‘dead-end’ legs on some paths with no onward route. Path surfacing varies in type and quality, with some paths unsurfaced and seasonally wet, making them difficult to use. Elsewhere there is a good quality of stone track. There is a deficit of good, clear signage and a lack of consistency in the signage that does exist.

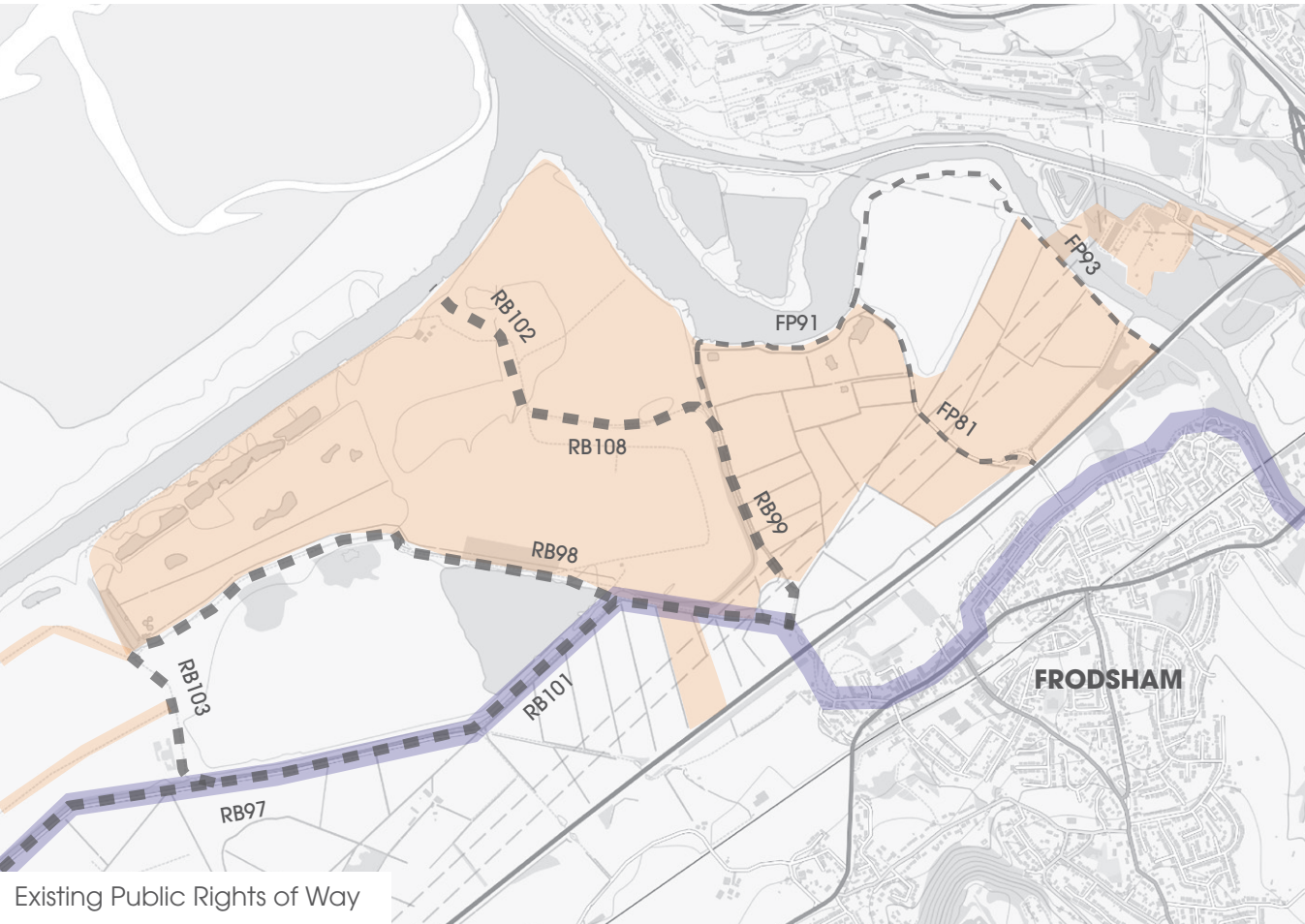




4.2.76 Rights of Way pass through a wide range of situations, including open and enclosed settings, in proximity to a range of infrastructure (turbines, transmission masts) and with views of a range of landscape features (sandstone hills, estuary, river, marsh), habitats and wildlife. Interpretation of these elements could contribute to amenity value.

Legend

Footpath

Restricted Byway

4.2.77 The rights of way on the Site typically all either link directly to the residential areas south of the M56, or they connect with other routes that connect to these residential areas. Connections are made via bridge crossings over or under the motorway.

4.2.78 There is a degree of unauthorised / anti-social use by motorcycles within the Site and there is a fly tipping problem in some areas

4.2.79 The existing public rights of way network is illustrated on **ES Vol 3 Figure 1-5: Public Rights of Way (EN010153/DR/6.3)**.

4.2.80 Public rights of way that run through or along the boundary of the Order Limits include:

- i) Restricted Byway - Ellesmere Port and Neston RB40. This route includes Marsh Lane and Lordship Lane and also forms part of the route of the Main Access Road.
- ii) Restricted Byway RB40.
- iii) Restricted Byway Frodsham RB97.
- iv) Restricted Byway Frodsham RB98.
- v) Restricted Byway Frodsham RB99.
- vi) Restricted Byway Frodsham RB102.
- vii) Restricted Byway Frodsham RB108
- viii) Footpath Frodsham FP81.
- ix) Footpath Frodsham FP91.
- x) Footpath Frodsham FP93.

4.2.81 National Cycle Route 5 follows RB40, a short section of RB97, and a section of RB98.

4.2.82 The Cheshire Circuit follows RB99, RB102, RB108, FP81, FP91 and FP93.

Summary points affecting design:

There is a significant opportunity to consolidate the existing public right of way network by adding in new connections, improving the condition of existing provision and providing waymarking and interpretation. In combination these measures could dramatically improve the access provided to this unique landscape



### 4.3. Research – Design Components

**4.3.1** In addition to gaining a thorough understanding of the Site, it has also been important to gain an understanding of the technical and functional requirements of the Proposed Development, as the choices made in relation to each component will contribute to the overall design.

**4.3.1** A variety of alternative technologies are available when designing a solar and battery storage project. Furthermore, the solar and energy sector is undergoing rapid advancements in technology. As a result, it is anticipated that new technology options may arise during the application process and before construction begins, which could impact the design of the Proposed Development. This necessitates a flexible approach, which is why the ES has adopted a 'Rochdale Envelope' methodology for its assessment.

**4.3.2** As described in **ES Vol 1 Chapter 2: The Proposed Development (EN010153/DR/6.1)**, the parameters of the DCO will maintain a degree of design flexibility to allow the latest technology to be utilised at the time of construction.

**4.3.3** Notwithstanding this, several technological design options have been considered and preferred options taken forward taking into consideration environmental effects and the Proposed Development's objectives and need for optimal functionality. Table 3-1 of **ES Vol 1 Chapter 3: Alternatives (EN010153/DR/6.1)** summarises the main alternative technologies considered by the Applicant at this Site.

**4.3.1** The technical preferred options set out in the Alternatives Chapter are all secured via the Design Parameters Statement (EN010153/DR/7.1)

**4.3.2** The considerations that have influenced the technical design choices within the Proposed Development are not all repeated here.

**4.3.3** The following are instances where site specific considerations and consultee engagement on specific matters have directly influenced the design as submitted:

Flood Risk in the eastern half of the SADA

**4.3.4** The technical preferred options set out in the Alternatives Chapter are all secured via the Design Parameters Statement (EN010153/DR/7.1)

**4.3.5** The considerations that have influenced the technical design choices within the Proposed Development are not all repeated here.

**4.3.6** The following are instances where site specific considerations and consultee engagement on specific matters have directly influenced the design as submitted:

Flood Risk in the eastern half of the SADA

**4.3.7** The positioning of panels in the eastern half of the SADA is influenced by Flood Risk modelling work. The modelling dictates that the lowest edges of the panels must be set at 6.52m AOD or higher in these areas, which in turn has influenced the setting of a maximum height of 4m for the upper edges of the panels in this area. In the western half of the SADA there is no flood risk to consider, but panels will be at least 0.8m above the ground to allow grazing. This will mean that the upper edges will be no higher than 3.5m above ground.





### Glint and Glare effects influencing panel orientation and tilt angle

**4.3.8** There are a number of considerations that will be adopted for specific areas of panels within the SADA related to the potential for glint and glare effects.

### M56 and properties at northern edge of Frodsham

**4.3.9** For some of the areas of panels along the southern edge of the SADA work has been done to identify suitable azimuth angles required to avoid impacts on the M56 and some nearby properties at the northern edge of Frodsham.

**4.3.10** The majority of the solar PV modules in the SADA would be orientated facing directly south. However, further to engagement with National Highways, in order to minimise the potential for reflections to affect drivers on the M56 motorway, the azimuth angle of the solar PV modules will be adjusted in some of the Solar PV Array Areas. It is also proposed to use an anti-reflective coating on the modules, which is a common approach taken to reduce the potential for reflections. There will also be some areas of advanced tree planting between the SADA and the motorway.

**4.3.11** National Highways has agreed that the proposed changes to the panel angles would provide suitable mitigation to road users.

### Aviation

**4.3.12** The tilt angle of panels in parts of the SADA have been adjusted following feedback from Liverpool John Lennon Airport. This is to avoid effects on aircraft in a specific holding pattern which uses Frodsham Hill as a visual reference point.

**4.3.13** ES Vol 2 Appendix 4-3: Glint and Glare Assessment (EN010153/DR/6.2) sets out in detail the assessment of effects on road users and other potentially sensitive receptors to glint and glare and how this has influenced the design.

**4.3.14** The height, pitch and angle commitments referenced above are all secured via the **Design Parameters Statement (EN010153/DR/7.1)**.

### Battery Energy Storage System

**4.3.15** A BESS will be an integral element of the Proposed Development and will be used to store electricity generated by the solar PV arrays at times of low demand and release the electricity at times of peak demand.

**4.3.16** BESS systems can be connected directly to the solar panels which generate electricity in DC (DC coupled). This allows them to be distributed across the Site and can result in lower energy losses as by avoiding the need to convert between AC and DC.

**4.3.17** AC coupled BESS systems allow the BESS units to be located centrally and provide greater flexibility in relation to storing electricity generated from solar panels but also directly charged from the grid.

**4.3.18** The eastern part of the SADA is predicted to be susceptible to occasional flooding. As such the site is not well suited to BESS units being evenly distributed across the site. An AC coupled system has therefore been selected and so the BESS will all be located in one central location. An advantage of this is that a location can be selected which reduces visual effects on receptors, such as footpath users. Currently two alternative locations for the BESS remain under consideration.





### On-site Substation

**4.3.19** The on-site substation will comprise a purpose-built compound housing the electrical equipment required to transform the low-voltage output of the solar array to a higher voltage suitable for export. The components of the substation will include transformers, switchgear and potentially a control room (which could alternatively be located elsewhere) all of which would be arranged within a fenced compound with hardstanding.

**4.3.20** Considerations in terms of where this is located are similar to those of the BESS and include proximity to the point of connection, accessibility by operations personnel, flood risk and visibility from public vantage points.

### Grid Connection

**4.3.21** Electricity generated by the solar array, once collected and stepped up in voltage at the on-site substation, will be exported either to the National Grid via the SPEN Frodsham substation or to a local business via a dedicated grid connection or private wire route.

**4.3.22** This connection can be made by an underground or overhead cable. Considerations for each are as follows

### Underground Cable Route

**4.3.23** High-voltage cables are laid in trenches, typically 1–2 metres deep, with appropriate separation between circuits.

**4.3.24** An unconstrained route would need to be identified, typically following existing field boundaries, tracks, or utility corridors where possible to minimise landscape and ecological impact. Joint bays and inspection chambers would need to be installed periodically for cable maintenance access.

**4.3.25** The route would terminate at the National Grid or Private Operators substation, where final voltage transformation and connection to the wider network would be made.

### Overhead Line Connection

**4.3.26** Typically used where undergrounding is not viable due to cost, distance, or ground conditions. Involves the construction of lattice masts or wooden poles to support conductors, from which cables are suspended.

**4.3.27** Overground connections may have greater degree of landscape and visual impact.

**4.3.28** Due to the likelihood that this connection will be made to the Frodsham Substation, which is on the opposite side of the River Weaver, the presence of many existing underground utility corridors and the relatively low visual sensitivity of this area to this type of infrastructure, the Applicants preference is to make an overhead line connection. It is possible that this may be combined with some localised use of underground cables.





## Ancillary Infrastructure

4.3.29 There will be a need for a number of ancillary elements to be introduced to the Site in order that it can be operated in a safe and secure manner. These include boundary fences of various types as well as security and monitoring measures such as CCTV columns, cameras, lighting columns and lighting, weather stations and communication infrastructure. There will also be a need for localised drainage infrastructure around some elements of the project, including bunds and firewater storage and suppression systems.

## Fencing

4.3.30 There is a requirement for insurance purposes, amongst other reasons for the SADA to be enclosed by fences. There is a range of fencing types that could be deployed, from very robust and highly secure palisade fencing, through weldmesh and to more open agricultural meshes. Each fence type has its merits and demerits, but a key consideration is visual appearance and fit with context. Palisade and Weldmesh fence types are more urban in character whereas the more open meshes appear less incongruous in a more rural setting.

4.3.31 The Applicants strong preference is that the SADA would be enclosed by fencing which would comprise a 2.0m high wire-mesh deer fence. The fencing would be supported on wooden poles. Depending on the insurer's requirements, it may be necessary for fences to be topped with barbed wire as an additional security measure. These fences would be erected at the start of the construction works. Public safety signage would be installed.

4.3.32 An important consideration for the fencing will be its compatibility with wildlife and habitats, with the gauge of the fencing needing to be suitable to allow small birds and mammals to pass through it and with consideration given to mammal gates in appropriate locations.

4.3.33 Fences will be positioned in accordance with the principles shown on the Indicative Environmental Masterplan (doc) and so as to accord with offsets and buffers secured in the oLEMP (EN010153/DR/7.13).

4.3.34 Additional, more robust security fencing, in weldmesh or palisade, up to 2.4m in height, is likely to be required to secure the Frodsham Solar Substation and the BESS.

4.3.35 Wire mesh fencing may also be required along the easement line of some utilities that cross the Site. This is likely to be lower in height (1.2m) and would be subject to agreement with the various statutory undertakers.





## CCTV

**4.3.36** As with boundary fencing, there will be a requirement to install a CCTV system for insurance purposes. On solar arrays typically, post-mounted internal facing closed-circuit television (CCTV) systems are installed around the perimeter fence. CCTV cameras incorporate daytime and night-vision cameras, as well as Perimeter Intrusion Detection Systems, and are mounted on posts up to 4 m high and would be set back from the perimeter fence. No lighting would be required.

**4.3.37** Additionally, dome security cameras are typically installed at higher security locations such as the Substation, and the BESS compound, as well as at entrance points to the Site.

**4.3.38** The cabling for the CCTV would typically share trenches with the onsite cabling linking the solar PV modules to the Field Stations.

## Lighting

**4.3.39** The SADA would not need to be artificially lit, save for in areas where after hours operational access may be required, notably in Substation and BESS compounds where inward-facing security lighting would need to be installed. This would be operated with passive infrared (PIR) detectors or would be turned on manually for maintenance in low light conditions or in the event of an emergency.

## Green Infrastructure

**4.3.40** It was clear to the Applicant from the outset that a successful design would need to follow a landscape-led approach that would reflect the specific constraints and opportunities afforded by the land within the Order Limits. This would include the retention, protection and enhancement of existing vegetation, habitats, and access network, and ensuring that the existing landscape structure and landscape character can be where possible retained and/or enhanced.

**4.3.41** The following buffers have been adopted where practicable, secured via the oLEMP (EN010153/DR/7.13).

- i) A 10m buffer between fencing surrounding solar PV modules and non-tidal watercourses.
- ii) An 8 m buffer surrounding retained ponds and reedbeds.
- iii) A 16m buffer between fencing surrounding solar PV modules and tidal watercourse defence structures.
- iv) A 6m buffer between fencing surrounding solar PV modules and hedgerows / areas of substantial vegetation.
- v) A 10m buffer between fencing surrounding solar PV modules and public rights of way, and
- vi) A 10m buffer from the toe of existing earth bunds surrounding the MSC Dredging Deposit Ground cells to safeguard the stability of these structures.







# STAGE 3: CO-ORDINATE

**Develop the design.  
respond to feedback**

## 5. CO-ORDINATE

### 5.1. Introduction

**5.1.1** This Section of the DAD sets out how the Applicant has addressed the third stage (Co-ordinate) of the four-stage good design process recommended by the Planning Inspectorate. It discusses how the design of the Proposed Development has been refined in order to arrive at the submitted scheme.

**5.1.2** The environmental effects of the Proposed Development are set out, and details of how the design of the Proposed Development relates to the mitigation hierarchy are provided . Specific individual mitigation measures are also described.



## 5.2. Early Design Development

**5.2.1** Early design work, including the identification of constraints and opportunities took place during 2022 and early 2023. This was informed by a combination of desk-based assessment and field visits to the Order Limits and the surrounding area.

**5.2.2** The outcomes of this process were to gain an appreciation of:

- i) the Order Limits and their context as set out in section 4 of this DAD.
- ii) constraints upon development as set out in section 4 of this DAD
- iii) opportunities for environmental enhancements
- iv) specific design issues that would need to be addressed in the DCO Application.

**5.2.3** Early-stage technical design work on the engineering components of the project (solar arrays, inverter positions, substation position etc) was undertaken by Sky ray informed by preliminary constraints mapping provided by the environmental team.

**5.2.4** Initial items that were noted to be important considerations that would inform the design were proximity to the wildlife interests on the Mersey estuary; the many on-site linear habitat features including ditches and hedgerows; the public rights of way that cross and border the Site; the potential for flooding of lower lying areas; and the presence of major utility corridors

**5.2.5** Cheshire West and Chester Council's detailed guidelines for landscape management of LCA4a: Frodsham, Helsby and Lordship Marshes were noted to be particularly helpful in providing a framework for bringing forward proposals in a manner that is sympathetic to the prevailing landscape character.





### 5.3. Design Evolution 1 – Non-Statutory Consultation

#### EIA Scoping

**5.3.1** The early design stage activities described above, formed part of wider preliminary project activities which culminated in the preparation of a formal Environmental Impact Assessment ('EIA') Scoping Report ('the Scoping Report') **ES Vol 2 Appendix 1-1: Frodsham Solar Scoping Report (May 2023) (EN010153/DR/6.2)** which was submitted to the SoS in May 2023. No layout drawing was included at this stage.

**5.3.2** The Scoping Report provided an introduction to the Proposed Development, explaining what is proposed, and reflecting the progress of the design at the time of submission. It also provided details of what the Applicant proposed to include in the Environmental Statement ('ES') that will form part of the DCO Application in relation to each technical environmental discipline. It also identified matters proposed to be scoped out (i.e. not included in the ES).

**5.3.3** A formal response to the Scoping Report ('the Scoping Opinion') **ES Vol 2 Appendix 1-2: Planning Inspectorate Scoping Opinion (July 2023) (EN010153/DR/6.2)** was received from The Planning Inspectorate (on behalf of the SoS) in July 2023. This included responses from a range of consultee bodies, some of which fed into further consultation (discussed below).

#### Phase One Consultation

**5.3.4** In parallel with the formal Scoping process, a first phase of community consultation was undertaken on our early-stage proposals. The consultation ran for a six-week period from Thursday 1st June to Thursday 13th July 2023. Five in person events were held at venues in Frodsham, Runcorn and Elton and there was also an online community webinar. A total of 230 people attended the events.

**5.3.5** Attendees were presented with a mixture of open and closed (multiple choice) questions. The responses are documented in detail within section 9 of the **Consultation Report (EN010153/DR/5.1)**.

**5.3.6** Key observations from this information that were pertinent to informing the design were that Local Ecology and Biodiversity was by some distance the most popular response to the question "Which aspects of the Project are most important to you?". The next most popular response was Recreation and Access, followed by Landscape and Visual.

**5.3.7** Matters raised in reply to open questions are set out in Table 9.3 of the **Consultation Report (EN010153/DR/5.1)**, along with the Applicant's response. Again, concerns about Ecological interest on the site, the ability to continue to access the area and landscape impacts were prominent alongside concerns about traffic, flooding and cultural heritage

**5.3.8** These findings from the phase one consultation fed into the process of identifying the Design Principles, with Principles 2, 3 and 4 reflecting the three most popular topics from the closed questions and Principles 5,6,7 and 8 all having relevance to the answers provided to open questions.





## Post-EIA Scoping

5.3.9 Following receipt of the Scoping Opinion and the Phase One Public Consultation Events further engagement was undertaken with stakeholders over the course of the pre-application process in order to discuss matters arising, including matters relevant to the design of the Proposed Development.

5.3.10 Engagement was carried out with the following organisations:

- i) Cheshire West and Chester Council ('CwaCC').
- i) Canal and River Trust ('CRT').
- ii) Historic England.
- iii) Environment Agency.
- iv) Natural England.
- v) Frodsham Town Council.
- vi) National Highways.
- vii) Cheshire Wildlife Trust
- viii) RSPB

5.3.11 The following key themes were raised during this process:

- i) The need to focus on the impacts on the ecology and biodiversity value of the Order Limits, in particular the presence of the Mersey Estuary SSSI, SPA and Ramsar site.
- ii) The presence of public rights of way across the Site and the desire for increased access via additional paths and improvements to existing paths.
- iii) The visual impacts of the Proposed Development, noting views from the Sandstone Trail, Frodsham / Overton Hill and Helsby Hill
- iv) Impacts from glint and glare on users of the M56.
- v) Concerns about impacts of increased traffic on Frodsham, Ince and Elton.
- vi) Concerns raised about the historic use of the land and the potential for contamination to be present.
- vii) The potential for the Site to flood and the need for a Flood Risk Assessment to consider impacts.

5.3.12 The design continued to evolve to reflect the outcomes of this engagement and to reflect the outcomes of new and ongoing technical studies. Principal changes to the design were:





Inclusion of NBBMA

5.3.13 The land for the creation of a NBBMA was identified and added into the Order Limits as part of a strategy to provide adequate mitigation for potential adverse effects on the Mersey Estuary SSSI, SPA and RAMSAR site. This significant element of green infrastructure provision aligns with Design Principle 3.

5.3.14 The NBBMA will be located on deposit ground Cell 3, an area already managed as mitigation for Frodsham Wind Farm. It predominantly comprises neutral grassland. Areas of neutral grassland located towards the south and west of this area also contain scattered scrub and tall forbs. Also present are a number of ponds, ditches, reedbeds, broadleaved woodland, unsealed tracks, and farm buildings and associated built-up areas and gardens.

5.3.15 Current conditions in the Cell 3 mitigation area are not optimal since the site dries out seasonally. It was identified that higher quality managed habitat which supports a higher number and increased diversity of SPA species could be achieved through the re-engineering of the cell to retain water. This would enable the site to sustain permanent wet scrapes and wet pasture, with the latter increasing the abundance and accessibility of invertebrate species which form the primary food source for most wader species. Other positive interventions could include the installation of perimeter boundary measures to exclude predators and the introduction of island features for safe roosting.

5.3.16 The NBBMA will, through the design interventions proposed, deliver mitigation in accordance with the **outline non-breeding bird mitigation strategy (oNBBMS)** which has a key focus on providing foraging habitats for curlew, lapwing and golden plover. The **oNBBMS** can be found at Appendix B to the **oLEMP (EN010153/DR/7.13)**

Inclusion of Skylark Mitigation Area

5.3.17 Further to understanding that a skylark population was likely to be displaced by the Proposed Development, an area of land was identified for inclusion in the Order Limits to mitigate this. The proposed Skylark Mitigation area is located to the south of the Site on a strip of existing arable farmland running towards the M56 motorway. The intent is to take this area out of arable production and manage the area as neutral grassland.



Omission of INEOS Inovyn Deposit Ground and private wire connection

5.3.18 Having entered dialogue with INEOS to better understand the constraints on this parcel of land that was indicated at the northeast corner of the SADA it was decided to remove this area from the Order Limits.

5.3.19 Reasoning included several factors including the presence of sensitive service connections, the expected timescales for establishing baseline data on the Deposit Ground and the likely complexity of any interaction with that baseline, and anticipated difficulties in developing a design which would not conflict or constrain operations on INEOS Inovyn's site. As such both the private wire connection to INEOS Inovyn Runcorn Works and the development of a solar PV array on the INEOS Inovyn Dredging Grounds were dropped from the Proposed Development





Addition of connections via permissive paths

5.3.20 In order to address the landscape strategy guidance published by CWaCC for LCA4a, which encourages measures to increase recreational use of the area, an exercise was undertaken to see whether added value could be introduced to the design. The idea was to examine whether any of the tracks (some existing, some proposed) needed for the construction and operation of the Proposed Development could serve the additional purpose of extending and enhancing the access network.

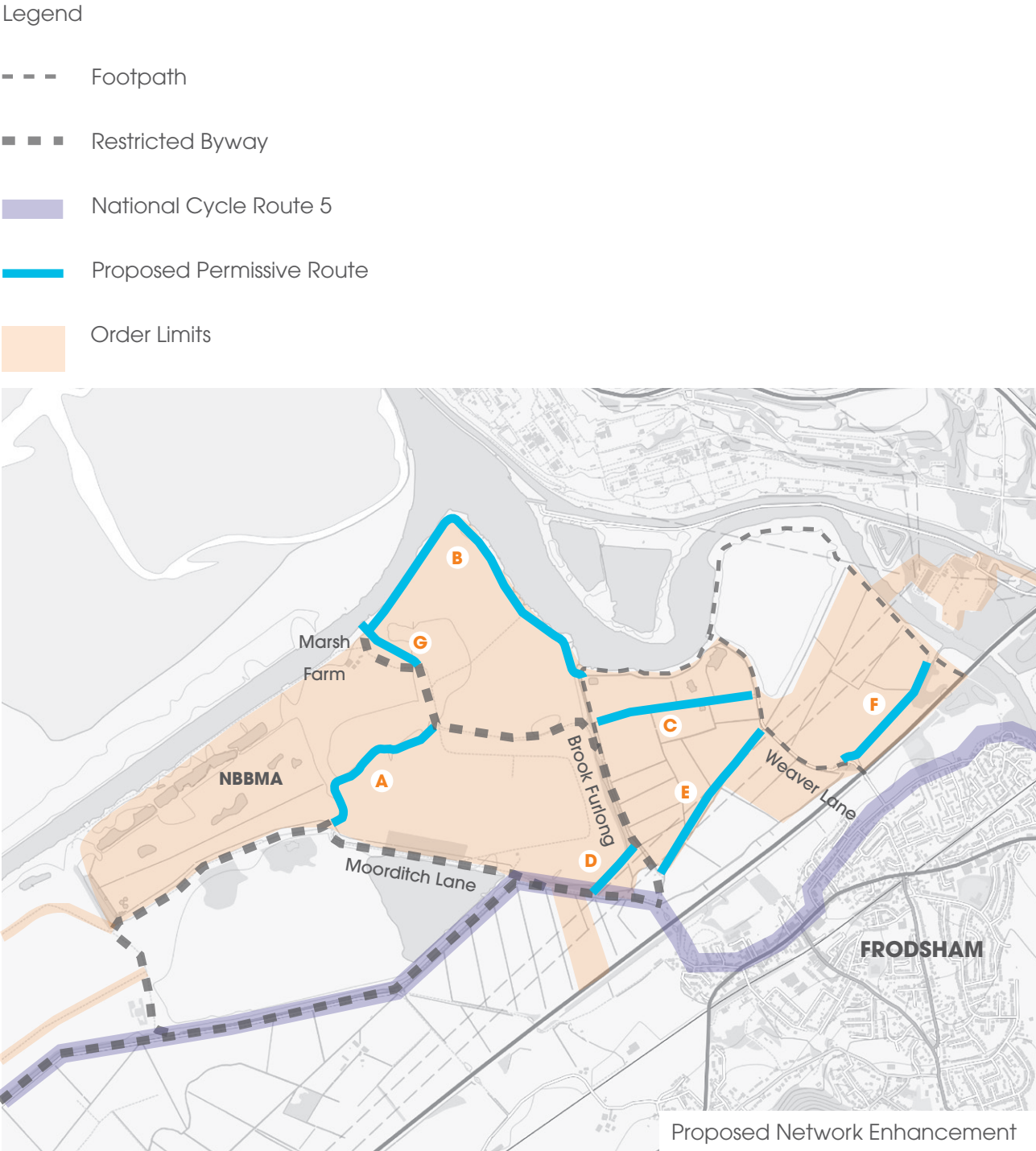
5.3.21 The result of this exercise was the inclusion of four proposed permissive paths (Routes C,D,E and F) within the SADA which provide direct links across land to connect up existing public rights of way. These are shown on the diagram below and are also shown on the Illustrative Environmental Masterplan contained in Appendix A of the oLEMP (EN010153/DR/7.13).

5.3.22 A further exercise was to then look at whether it was feasible to provide connections around the perimeter of two parts of the SADA.

5.3.23 The first (Route B) would extend public access along the River Weaver and Manchester Ship Canal, enabling a continuous waterside route all the way from where the Weaver flows beneath the motorway viaduct. This path would also connect to the current 'dead-end' of Restricted Byway 102 that terminates at a wharf on the Ship Canal close to Marsh Farm to create a meaningful circular route.

5.3.24 The second perimeter route (Route A) would run along the northern edge of the SADA to link two restricted byways – 102 and 98. This route will benefit from being at the edge of Deposit Ground no.5 on slightly elevated ground such that it will benefit from views looking north and west into the NBBMA and north over the estuary

5.3.25 Finally, it is proposed to divert the northernmost section of existing Restricted Byway 102 onto the existing stone track to Marsh Farm. This is the route in current use, with the current official alignment of RB102 not evident on the ground. The route crosses a marshy field and the proposal is that a route across a part of the marshy area would be reinstated – using a combination of gravel footpath and boardwalk as a seventh permissive route – Route G.





**5.3.26** The full list of permissive routes, with start and finish points is as follows:

**Route A:**

Approximately 845m length of path linking Brook Furlong and Moorditch Lane.

**Route B:**

Approximately 1.77km length of path running along the River Weaver, linking the terminus of the public byway at Frodsham Marsh farm with Brook Furlong and with public footpath Frodsham FP 81.

**Route C:**

Approximately 750m length of path linking restricted byway Frodsham RB 99 with public footpath Frodsham FP81.

**Route D:**

Approximately 255m length of path linking Moorditch Lane and Brook Furlong.

**Route E:**

Approximately 805m length of path linking Brook Furlong and public footpath Frodsham FP81.

**Route F:**

Approximately 710m length of path linking public footpath Frodsham FP81 and public footpath Frodsham FP93.

**Route G:**

Between approximately 150m and 225m of path on boardwalks within the wetland habitat areas to be created at Marsh Farm.

**5.3.27** This proposed access provision aligns primarily with Design Principle 4 but also with Design Principle 2 – by providing increased access to the Landscape.

**5.3.28** As set out in the oLEMP (EN010153/DR/7.13) the Applicant has refined the public access proposals by specifying the anticipated users of each new permissive path and incorporating appropriate design measures for those users. In practice, this means the design of paths across the site will take into account whether they will be used by walkers, cyclists, horse riders, etc., and features (such as surfacing, width, gates or signage) will be tailored accordingly to ensure safe and accessible use.

**5.3.29** Permissive paths A, B, D and F will be maintained for pedestrian access only and will comprise a corridor up to 2m wide. Surfacing would comprise either close-mown grass, gravel or boardwalks, to suit the conditions along specific sections of each route.

**5.3.30** Permissive paths C and E will be maintained for cycle and equestrian access (in addition to pedestrian access) and will comprise a corridor up to 3m wide. A gravel surface will be provided which will be suitable for all intended users.

**5.3.31** Within the wetland habitat areas to be created to the east of Marsh Farm, timber boardwalks carrying permissive path G will run into the wetland from the adjacent public right of way. The boardwalks shall be of sufficient width to allow two people to pass safely.





## Bird Screens

**5.3.32** Discussion about the proposed additional footpaths within the Project Team prompted concerns from the ecologists that the enhanced access could be detrimental to birds due to disturbance. This was particularly applicable to those sections of path that overlook open water or open areas of land, including the NBBMA. The solution to this concern was the inclusion of bird screening measures, similar to those found within bird reserves, to enable people to walk along the exposed sections of banks without flushing birds and thus delivering concurrently on Design Principles 3 and 4.



Bird screen example.

## Glint and Glare

**5.3.33** Preliminary measures (in advance of any detailed modelling) to mitigate possible adverse effects resulting from glint and glare, were introduced through the inclusion of new planting / fencing along the south-eastern boundary of the SADA. This aligns with Design Principle 7.

## Landscape character modifications

**5.3.34** During this phase of design development there was ongoing examination of which areas within the SADA might need to be maintained free of development in order to retain important vegetation cover and drainage features, to maintain and enhance existing visual screening and to enhance biodiversity. This also included identification of areas where open views should be maintained in recognition of the prevailing open landscape character of the Mersey Estuary and the clear guidance provided for area LCA4a. These modifications align with Design Principles 3 and 4.





### Visitor Car Park

5.3.35 A potential visitor car park location was identified and marked on the masterplan, to support what may be required if an enhanced access network leads to increased use of the area for recreation. This supports Design Principle 4.

### Flood risk response

5.3.36 Based on preliminary understanding of flood risk it was decided that all electrical infrastructure located within Flood Zone 3, would be raised to a base height of 6.34m AOD, to mitigate against flood events disrupting the operation of the Proposed Development in accordance with Design Principle 5.

5.3.37 The outcome of this process was the design included as part of the Statutory Pre-Application Consultation ('SPAC') process. The information in the PEIR was prepared to provide information to enable consultees to understand the likely environmental effects of the Proposed Development and thus inform their responses as part of the statutory consultation process.



M56 Viaduct





## 5.4. Design Evolution 2 – Statutory Consultation

### Statutory Pre-Application Consultation

**5.4.1** The PEIR was submitted in October 2024, and the SPAC process ran from 7th November 2024 until 19th December 2024.

**5.4.2** As part of the SPAC process, a second series of information events was held by the Applicant to explain and discuss the Proposed Development with local communities.

### Phase Two Consultation

**5.4.3** As was the case in the phase one consultation, five in person events were held at venues in Frodsham, Runcorn and Elton and there was also an online community webinar. A total of 127 people attended.

**5.4.4** Attendees were again presented with a mixture of open and closed (multiple choice) questions. The responses are documented in detail within section 9 of the **Consultation Report (EN010153/APP/5.1)**

**5.4.5** Key observations from this information that are pertinent to informing the design were that Local Ecology and Biodiversity was again the most popular response to the question “Which aspects of the Project are most important to you?”. The next most popular response was Landscape and Visual, followed by Climate Change.

**5.4.6** Matters raised in reply to open questions are set out in **Table 9.4 of the Consultation Report**. Again, concerns about Ecological and Ornithological interest on the site, and whether sufficient provision is included in the design to accommodate it was a key theme. Changes to views and landscape character remained a concern. Interest was expressed in the proposed access improvements and in the detail of how these would come forward, with suggestions for specific desirable improvement forming a distinct component of the responses.

### Statutory consultation responses

**5.4.7** Statutory consultation responses of relevance to design in response to the PEIR included:

- i) The most conservative design flood event should be used to determine the base level of structures (Environment Agency)
- ii) Tree planting within the buffer zones of flood defences (8m for fluvial, 16m for tidal) may affect the stability of the defences, so if planting is deemed necessary root protection barriers should be used. (Environment Agency)
- iii) Flood compensation will be required (Environment Agency)
- iv) Compensatory habitat for otters and water voles will be required (Environment Agency)
- v) Structures and planting should avoid utility easements and reflect any statutory safety clearances. (various utility services owners)



### Targeted Follow Up Meetings

**5.4.8** Following on from several conversations with stakeholders during the public information events it was clear that there would be merit in exploring the topic of public access to the site in a more targeted and in-depth manner. It was apparent that whilst there are multiple user groups in the local community who could potentially benefit from the project in specific ways allied to their specific needs or interests, the common thread to all was the nature of site access.

**5.4.9** This is important as getting the accessibility of the Site right is key to delivering positively on Design Principle 4 and achieving the multiple beneficial social and environmental outcomes that could flow from this. As such it was felt that we needed to better understand the views of the relevant groups.

**5.4.10** Stakeholders were contacted during December 2024, and a series of workshop style meetings were subsequently held in January 2025. Invitees were representatives of three different groups of stakeholders:

- i) local elected representatives
- ii) wildlife interest groups
- iii) active travel interest groups

**5.4.11** A further meeting was organised to discuss the same topics with officers from CWaCC.

**5.4.12** The three community stakeholder meetings were held at Frodsham Library on 10th January 2025. The meeting with CWaCC officers was held on 22nd January at The Portal in Ellesmere Port.

**5.4.13** The meetings had a deliberate focus on understanding people's thoughts on the nature of current public access to the Site and how it might be improved.

**5.4.14** All of the meetings began with an explanation of some draft proposals which included for providing new permissive paths to expand and improve the connectivity of the network, the possibility of a small carpark and the idea of bird screening measures along paths overlooking sensitive bird areas

### Meeting 1 – Local elected representatives

**5.4.15** This meeting was attended by two Councillors representing both CWaCC as ward councillors for Frodsham and also Frodsham Town Council (Cllr Sumner and Cllr Garvey), by Cllr Copeman (CWAaCC Helsby ward) and by Cllr Holman (Frodsham Town Council).

**5.4.16** Topics discussed included:

- i) the potential for the site to draw visitors – a destination for tourism or educational trips
- ii) the pros and cons of carparking provision at the site - notably with respect to whether on site provision might reduce visitor spend in the town and also the general point about supporting reliance on cars as a transport mode
- iii) the desirability of creating more cycling opportunities
- iv) can existing linkages into the site be improved
- v) the possibility of there being some provision for visiting educational groups or organised community events such as an outdoor classroom space or visitor centre – potentially co-located with the control centre for the solar park

vi) opportunities to improve the current condition of specific sections of path – notably the NCN5 and RB98 – the latter as a potential branch / feeder of NCN5 and a means of access to the NBBMA

vii) concerns about keeping up maintenance of paths

viii) the potential for littering to increase and the need to think about litter bins and who will empty them

ix) the differing needs of the different user groups e.g. birders, fishermen

x) the desirability of including interpretation about the site history and wildlife

xi) it would be good to explore whether bees could be kept on the site, working with local beekeepers – and to explore whether proposed species mixes on the site were beneficial to biodiversity

xii) the community benefit fund – how will it be used? Could it contribute to offsite improvements?

xiii) some quite specific measures including installation of a bike parking area near to the NBBMA viewing area

**5.4.17** Notes of the meeting were circulated to attendees to ensure that they fairly reflected the discussions held and can be read in the **Consultation Report Appendices (EN010153/DR/5.2)**



## Meeting 2 – Wildlife and Birders

**5.4.18** This meeting was attended by representatives of Cheshire Wildlife Trust, the BTO Wetland Bird Survey and the Cheshire and Wirral Ornithological Society

**5.4.19** Topics discussed included:

- i) the proposed viewing point over the NBBMA on the proposed adjacent permissive path was seen as beneficial, as was the provision of access along the top of the deposit ground above the Ship Canal – which will provide a good vantage point across the estuary for bird observation
- ii) there was support for the use of bird screening measures, but caution expressed about longevity and vandal resistance. It was noted that the profile of the land alongside the Weaver is such that topography should shield path users from the birds – so screens will not need to be continuous
- iii) the lack of parking currently was noted and so there was support for some car parking provision. A layby along Moorditch Lane was suggested as an alternative to the indicated car park
- iv) It was felt that signage and interpretive information would be helpful as part of making the site seem more cared for and may also address perceptions of site safety
- v) Signage encouraging responsible behaviour by dog walkers would be welcomed e.g. “Please keep dogs on leads to prevent wildlife disturbance”
- vi) A concern was that enhanced access could increase anti-social use – vandalism, motorcycling, fly tipping
- vii) Whilst not specifically access related, there was a preference to see the extent of solar panels reduced in extent near the southern boundary on the Wildfowlers land
- viii) Could other mitigation measures be incorporated within the Skylark mitigation area?
- ix) It was seen to be desirable if an external body such as RSPB or the Wildlife Trust had the opportunity to manage the NBBMA and possibly other areas within the site

**5.4.20** Notes of the meeting were circulated to attendees to ensure that they fairly reflected the discussions held and can be read in the **Consultation Report Appendices (EN010153/DR/5.2)**

## Meeting 3 – Access Interest Groups

**5.4.21** This meeting was attended by representatives of Cycling North Cheshire, the Ramblers Association and the Festival of Walks. Cllr Holman, who had earlier attended Meeting 1, also attended as he has an active interest in this subject

**5.4.22** Topics discussed included:

- i) the design should consider the ability to provide access to different users, including disabled. It was recommended that LTN1/20 should be consulted
- ii) There was extensive discussion about the appropriateness of there being a hierarchy of access provision, with more formal ‘urban’ type treatments closer to the town and with less formal, ‘rural’ levels of provision further into the site. The principal manifestation of this provision is found in the surface treatment of the paths. It was accepted that it would not be appropriate to extend formally edged, metalled paths to many areas and that to do this would take away from the character of the area and the experience of the user. More remote, distant paths with simpler or no formal surfacing and which may become seasonally muddy were agreed to be appropriate
- iii) A key theme was to ensure that there are interconnected routes both within the site and in respect of connections beyond the Site

**5.4.23** In subsequent correspondence, prior to circulation of meeting notes, the group of attendees of Meeting 3 set out what they had interpreted the outcomes of the meeting to be in an e-mail. There was clearly some misunderstanding of what the intended purpose of the meeting was and its place in the DCO process. For example, the e-mail referred to ‘definitive verbal agreements’ having been established and to ‘some positions being taken by Cubico/Axis where agreement was not achieved’. An e-mail response (the correspondence is included in the **Consultation Report Appendices (EN010153/DR/5.2)**) on behalf of the Applicant reiterated that the purpose of the meeting was to gather views so that these could be considered, rather than to reach agreements. The following specific clarifications were made:



- i) No commitment was made to all new permissive paths being open to cyclists, horse riders and walkers. Rather it was stated that we would be looking to introduce a hierarchy of routes with different levels of access
- ii) No commitment was made to install tarmac routes for the disabled, on routes closer to the town, but we did agree to look to provide disabled access to certain areas of the site, noting that there are limitations on access at times within the open countryside generally. In terms of surface material, it had in fact discussed that the paths created would be likely made from unbound materials – and that tarmac paths were unlikely to be provided. It had however been agreed that best practice guidance documents should inform this element of the access provision.

- iii) The group had correctly pointed out that no commitment was being made to upgrade NCN5. The sections of NCN5 which fall within the Order limits would be improved at the completion of the construction works by infilling of potholes etc. However, those sections which fall outside the Order Limits would not be in our control.
- iv) Similarly, the group correctly pointed out that no commitment was made to upgrade any of the access routes which link directly into the Site, including Weaver Lane, Moorditch Lane (part of NCN 5) and Brook Furlough. As with NCN5, it had been discussed that the project could only deliver improvements to the condition of these routes where they fall within the Order Limits. In relation to connecting routes, it had been suggested that a third party such as Frodsham Town Council could look to utilise the community benefit fund to improve the links.

- v) It was suggested that the Applicant had not agreed to take account of a range of factors which could result in the routes being made more pleasant such as providing effective screening of the panels effectively and opening views to distant hills. It was explained that this must have been a misunderstanding since we had in fact explained that there was a need to balance provision of screening with maintaining a more open character and to ensure that the characteristic long-distance views possible from the site would not be lost e.g. views of the estuary, views of the Frodsham escarpment.
- vi) The Applicant also clarified that discussion around the difficulty of screening the Proposed Development from Frodsham Hill was related to the height and position of the viewpoint and the ineffectiveness of any feasible screening measures rather than an unwillingness to attempt to mitigate.

**5.4.24** Notes of the meeting were circulated to attendees to ensure that they fairly reflected the discussions held and can be read in the **Consultation Report Appendices (EN010153/DR/5.2)**





## Meeting 4 – CWaCC Officers

**5.4.25** This meeting was attended by the Planning Case Officer, the Landscape Officer, the Ecologist and Footpath Officer from Cheshire West and Chester Council. On the basis that this meeting happened some two weeks following the first three meetings, there was sharing of the outcomes of those meetings at the start of the session, along with the same briefing about the nature of the emerging access proposals and purpose of the meeting.

**5.4.26** Topics discussed included:

- i) Whether the indicated permissive footpaths would be retained beyond the life of the development – the answer to which was that whilst the paths would be available for the 40-year life of the development, provision for making them permanent through this submission was unlikely to be possible
- ii) Limiting any additional disturbance to wildlife that could result from the access routes themselves
- iii) It was seen as positive to have recognised clear routes rather than allowing routes to be determined by 'desire lines'

- iv) Signage could be used to deter anti-social behaviour
- v) Pros and Cons of car parking provision were discussed. It was considered unlikely that visitors would park in Frodsham and walk from there to the site. On the other hand, car parking provision could encourage anti-social use
- vi) The addition of the Skylark mitigation area was welcomed
- vii) It was noted that some of the existing paths were very difficult to negotiate in winter conditions (from direct experience during a CWaCC site visit). This would need to be addressed
- viii) There was some discussion about the LVIA both in terms of landscape character (the balance between screening and maintaining open views) and effects from Frodsham Hill. There was also a query about the colour of the solar panels used in generating photomontages – these were noted to be a blue shade which may not be representative of contemporary panels.

- ix) There was discussion around the added social value brought about by introducing access opportunities and how this might be weighed against the changes in the amenity experienced. i.e. currently the site is used by very few people – if there is a reduction in the amenity of views but there is a large increase in the numbers of people enjoying the landscape and views, there should be a net benefit

- x) There was some discussion around relevant standards and precedents in relation to footpath surfacing and the extent to which universal access can be provided
- xi) There was some discussion about the location of the BESS and the rationale of locating it in a place that is well screened from routes on Site was explained (albeit visible from Frodsham Hill), together with the other factors such as flood risk





Final Design Evolution

5.4.27 Following review of all consultee responses, the Applicant’s engagement activities (including the aforementioned workshops), the completion of outstanding assessment work, and following through with further design development that flowed from these inputs, the design presented at SPAC stage was developed into the version that now forms part of the DCO Application submission.

5.4.28 Principal changes to the PEIR layout that are now included in the submitted design were:

- i) The raising of all electrical infrastructure located within Flood Zone 3, to a base height of 6.52m AOD, to mitigate against flood risk. This results in the height of the proposed solar PV arrays rising to 4.0m above ground level.
- ii) A refinement of the route of one of the proposed internal access roads to avoid disruption to an adjacent watercourse.
- iii) Changes to the landscape design proposals in order to achieve a minimum 10% Biodiversity Net Gain (BNG), with a focus on maximising the retention of existing habitats, notably reedbeds and other neutral grassland.

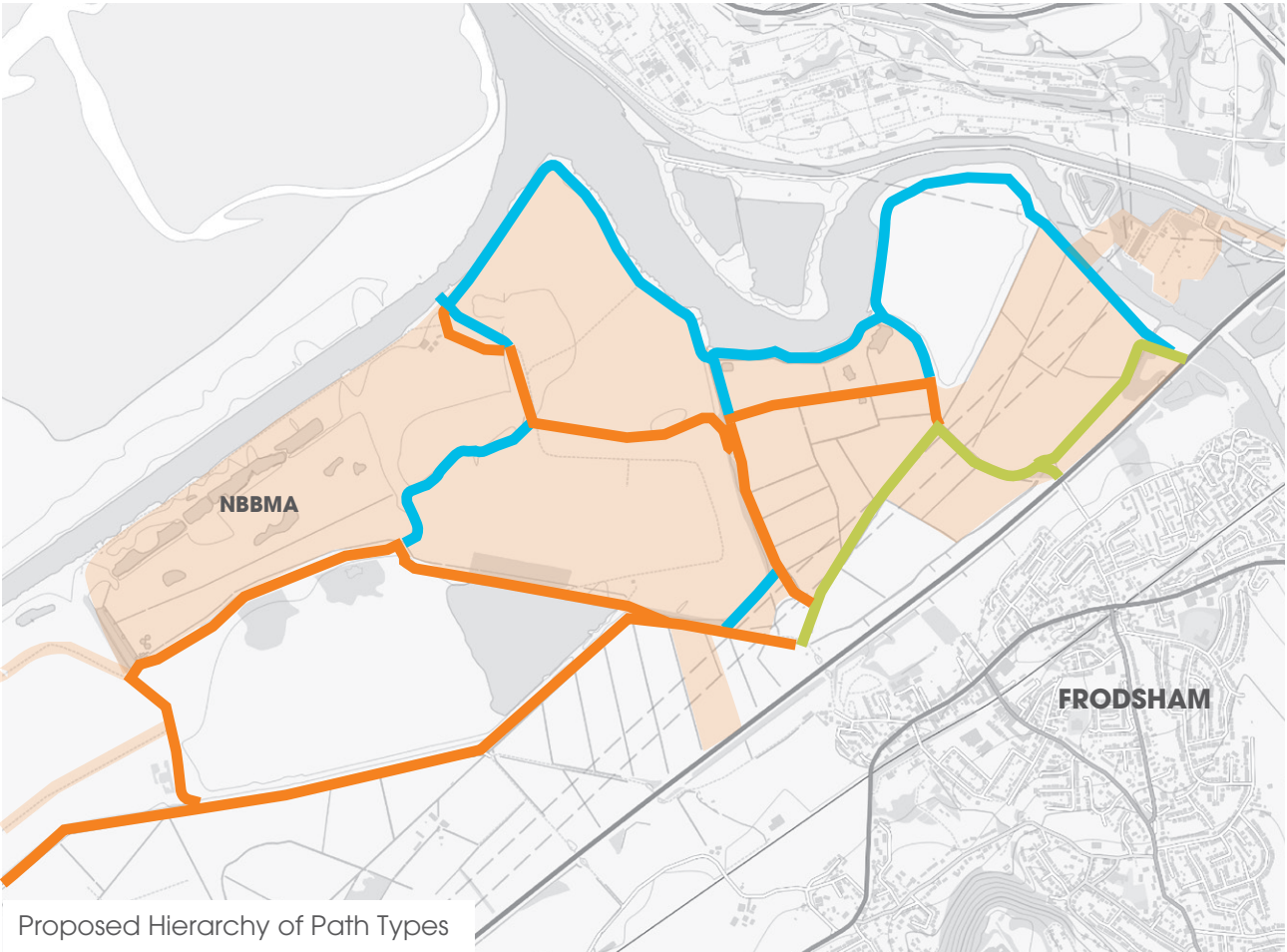
- iv) Adjustments to the nature of the proposed tree planting along existing and proposed footpath corridors. Guidance for the detailed design stage is that the planting should vary in character, and whilst it should seek to screen or partially screen infrastructure it should be intentionally less dense in some sections to maintain an open character and include gaps at strategic points to preserve specific long-range views.
- v) The refinement of the access proposals to identify a proposed hierarchy of routes suited to both the range of anticipated user groups and their differing needs and to the context that the routes will exist within. As illustrated on Figure 1 within the oLEMP (EN010153/DR/7.13) and in the diagrams here more formally designed routes suitable for all users are concentrated closer to Frodsham (these would be a mix of metalled and good quality gravel surfaces); with intermediate activity routes extending beyond these (typically gravel surfacing). More distant, less frequented, less formalised routes are proposed in the areas furthest from Frodsham – these would often be unsurfaced grass paths, but in places gravel or boardwalk treatments may be required due to localised conditions. This hierarchy of path provision is set out in more

- detail in the oLEMP (EN010153/DR/7.13).
- vi) An indicative distribution of interpretation boards across the site, and what the content of each board could be, has also been developed. These are shown on the Illustrative Environmental Masterplan contained in Appendix A of the oLEMP (EN010153/DR/7.13).

5.4.29 The outcome of this process is the final design that is the subject of the DCO Application and is described below.

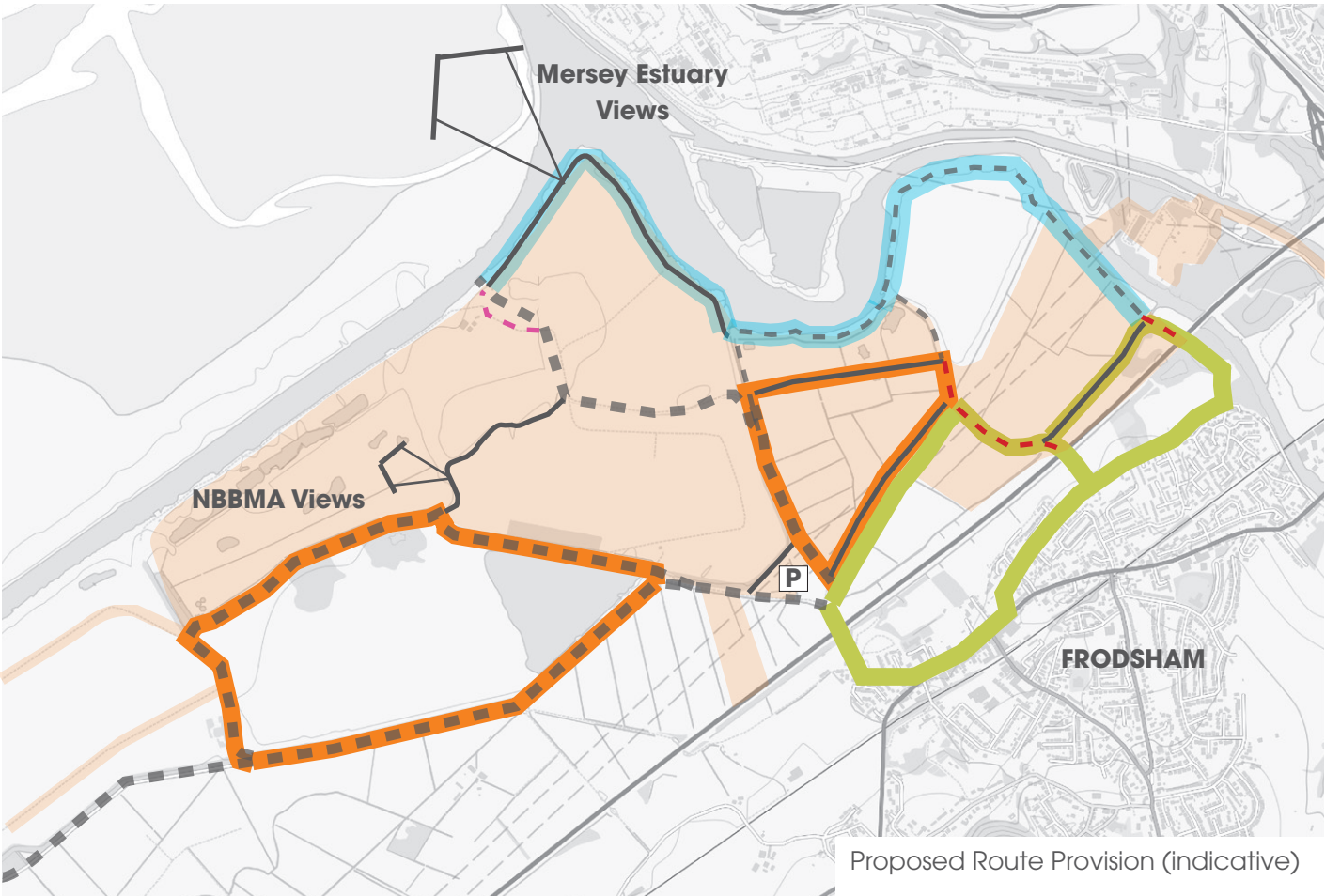
Legend

Mixture of metalled and good quality gravel surface

Unbound gravel surfaces



- Legend
- Cycle/Equestrian loop
  - Continuous waterside trail
  - Access for All
  - Permissive footpath
  - Public footpath
  - Restricted Byway
  - Footpath changed to Bridleway
  - PRoW Diversion
  - Parking Provision
  - Order Limits





## 5.5. Design Evolution 3 – Submission Layout

**5.5.1** Having worked through the steps in the design process discussed above, the Applicant has arrived at the submission scheme.

**5.5.2** The scheme is illustrated on the Indicative Operational Site Layout **ES Vol 3 Figure 2-2: Indicative Operational Site Layout (EN010153/DR/6.3)** and on the Illustrative Environmental Masterplan contained in Appendix A of the oLEMP (EN010153/DR/7.13)

**5.5.3** The key elements of the design embodied within the scheme are described below.

### The Proposed Development

**5.5.4** The Proposed Development is described in detail in ES Vol 1 Chapter 2: The Proposed Development (EN010153/DR/6.1) and is summarised below.

**5.5.5** The Proposed Development comprises solar PV panels capable of generating more than 50MW of electricity, with a BESS facility and on-site Frodsham Solar Substation. The Proposed Development includes two potential locations for the BESS and Frodsham Solar Substation, with the decision as to which location will ultimately be brought forward to be made during the detailed design phase.

**5.5.6** The solar PV panels would be mounted in a linear arrangement on metal frames which would be fixed in position using suitable anchors and with the panels facing south. The solar PV panels, BESS and Frodsham Solar Substation would be connected to one another by below ground cables. Supporting infrastructure would include transformers, inverters, switchgear, security fencing, pole mounted CCTV cameras, internal access roads and a fire suppression system. The BESS and Frodsham Solar Substation would also require security lighting and fire suppression systems.

**5.5.7** The Main Site Access would follow existing private roads and tracks, and would join the public highway network at Pool Lane Roundabout

**5.5.8** Electricity would be exported to the national grid via a combination of above and below ground cabling running to the Frodsham SPEN Substation. This would include an above ground cable crossing the River Weaver. Above ground cabling would be supported on wooden poles.

**5.5.9** Electricity would also be exported directly to local businesses via separate underground private wire connection(s) which would follow the route of the Main Site Access.

**5.5.10** Works to retain, enhance, and create new green infrastructure would be carried out, and there would be a commitment to maintain this for the life of the Proposed Development. This would include the following:

- i) Protection of retained existing vegetation during construction, followed by enhanced management.
- ii) Planting of native species hedgerows, areas of scrub and individual trees.
- iii) Sowing new areas of grassland.
- iv) Creation of open water habitats and reedbeds.
- v) Undertaking improvements to existing public rights of way, installation of new permissive paths to provide circular routes and access to new areas.
- vi) Provision of wayfinding signs for the new access route network.
- vii) Development of a visitor car park.

viii) Erection of a number of interpretation boards with content to include information on local biodiversity, cultural heritage assets, renewable energy generation and climate change.

ix) Provision of infrastructure such as screen fences and hides to limit disturbance to birds by people walking along new access routes.

x) Creation and management of the Skylark Mitigation Area.

xi) Creation and management of the NBBMA.

### Illustrative Environmental Masterplan

**5.5.11** The Illustrative Environmental Masterplan contained in Appendix A of the oLEMP (EN010153/DR/7.13) illustrates the Proposed Development and incorporates features and approaches set out in the DAD. It incorporates the design outcomes described below (where these can be illustrated graphically on a plan or in section) to achieve each of the Project Design Principles (which were discussed in Section 3.0).





5.6. Design Outcomes and Environmental Effects

Design Outcomes

5.6.1 Following the design process described in Section 5.0 above, the Proposed Development has incorporated a series of measures intended to mitigate against adverse environmental effects, and a series of enhancement measures that improve the baseline environment. Details of these measures are set out in the ES and below. These are secured via the limits of deviation provided for by the **Works Plans (EN010153/DR/2.3)**, the **Design Parameters (EN010153/DR/7.1)**, and the various management plans referred to below, as summarised in the **Commitments Register (EN010153/DR/7.2)**.

5.6.2 The majority of the design outcomes of the Proposed Development, including mitigation and enhancement measures, can be grouped in three categories, as set out below.

5.6.3 Each design outcome is annotated with how the mitigation hierarchy applies in terms of addressing potential environmental effects, using the four levels in the hierarchy as follows:

- i) Avoid.
- ii) Prevent.
- iii) Reduce.
- iv) Offset / Compensate.

5.6.4 An additional category 'Enhance' is considered to apply where the design will provide qualities that do not currently exist at the site.

Protection of Green Infrastructure

5.6.5 Design outcomes that will protect the existing site features that contribute to its landscape character and ecological interest include:

5.6.6 Provision and maintenance of undeveloped buffers around water features and retained vegetation to protect the features themselves and the species that use them, to maintain and enhance existing visual screening, and to enhance biodiversity. Specifically, there will be:

- i) A 6m buffer maintained between the proposed boundary fence line of the Proposed Development and any existing hedgerow or areas of substantial vegetation cover (except where minor removal is required for access). **AVOID**
- ii) An 8m buffer will be maintained between the proposed boundary fence line and any retained ditch, pond or reedbed. **AVOID**
- iii) Other development-free areas to be maintained to provide visual screening, and to retained and enhance existing vegetation cover. **AVOID**
- iv) Proactive beneficial management of existing vegetation including hedgerows and grassland as an integral component of achieving a positive biodiversity net gain position **PREVENT**





Introduction of new Green Infrastructure

5.6.7 Design outcomes that will mitigate change brought about by the scheme or enhance it to the benefit of landscape and ecological interest through the introduction of new green infrastructure components include:

- i) Replacement of any unsuitable existing watercourse crossings with new open span crossings which would provide betterment both in terms of flood conveyance and ecology. **REDUCE**
- ii) Introduction of new native planting to mitigate against potential glint and glare effects **PREVENT**
- iii) Introduction of new tree and hedgerow planting along existing and proposed public access routes, to extend and improve wildlife corridors whilst partially screening and softening views of the SADA infrastructure. Importantly to include strategic gaps, areas of less dense vegetation and lower height sections where necessary to preserve existing long-range views towards the Mersey Estuary and to the landform of Frodsham Hill. **REDUCE**

- iv) Introduction of new habitats or amended habitat condition as required to achieve a minimum 10% biodiversity net gain, with a focus on this being complementary to maximising retention of existing habitats. **COMPENSATE**
- v) Undertaking work within the NBBMA that will provide mitigation against potential adverse effects on the Mersey Estuary SSSI, SPA and RAMSAR site, including:
  - a) The whole area to be fenced from predators and proactively managed as a grassland for SPA species
  - b) Management of water levels to create c. 9.5ha of wet grassland,
  - c) Creation of new scrapes and islands, and management of existing scrapes. **COMPENSATE**
  - vi) Creation of a Skylark Mitigation Area within the Order Limits, to provide replacement habitat for that lost to the SADA. **COMPENSATE**

- vii) The introduction of additional habitat creation measures including:
  - a) A minimum of 2 no. barn owl nest boxes, 2 no. kestrel boxes, and 30 no. nesting boxes for other species.
  - b) 60 no. bat boxes, including a minimum of 5 no. hibernation boxes and 5 no. maternity boxes.
  - c) 10 no. reptile/amphibian refugia.
  - d) 20 no. hedgehog boxes.
  - e) 10 no. insect hotels.

COMPENSATE





Creation of an Integrated Access network

5.6.8 Design outcomes that will facilitate the achievement of an integrated access network include:

- i) Ensuring that there is no interruption or loss of any existing routes by ensuring that no permanent development coincides with any public rights of way. **AVOID**
- ii) The introduction of new permissive paths which link with existing public rights of way and thus enhance connectivity. **ENHANCE**
- iii) Creation of a hierarchy of routes with differing status through the Order Limits, to include a series of 'loops' that can be accessed by multiple user groups, some longer trails that can be used by walkers, cyclists and horse riders and new routes for walkers. **ENHANCE**
- iv) Changes will be introduced to the legal status of some sections of existing public footpath to allow for their use by multiple users (i.e. horse riders and/or cyclists). **ENHANCE**
- v) Introduction of new signage and wayfinding devices along existing and proposed routes to improve legibility and useability of the network. **ENHANCE**

- vi) Introduction of interpretive sign boards describing elements of the historic and contemporary interest features of the site, to improve the appeal of the site to visitors **ENHANCE**
- vii) Implement improvements to the surfacing of some existing routes. **REDUCE**
- viii) Creation of a new visitor car parking area located on or close to Moorditch Lane. **ENHANCE**
- ix) Provision of facilities to lock cycles at appropriate locations. **ENHANCE**
- x) The introduction of bird hide type screens along some sections of new paths to prevent disturbance to birds by movement of people along the horizon. These screens will have a dual-purpose design to also provide opportunities for bird watching **PREVENT / ENHANCE**





Other Design Outcomes

5.6.9 Other design outcomes that do not fall directly fall into the above categories, but which provide important control measures to address potential environmental effects include:

- i) Construction work will be designed in such a way as to avoid, as far as is possible, use of public rights of way by construction traffic **AVOID**
- ii) Construction traffic will be restricted to defined routes, banksmen will be used to control traffic, and specific manoeuvring and drop-off areas will be provided. **PREVENT**
- iii) No new lighting will be introduced along existing boundary features in order to protect wildlife. **AVOID**
- iv) All new structures are to be sited and designed so as to avoid flood risk. **AVOID**
- v) All structures within Flood Zone 3 raised to a base height of 6.52m AOD. **AVOID**

- vi) There will be an 8m buffer between the proposed SADA security fence lines and fluvial flood defence structures, and a 10m buffer between the proposed SADA security fence line and non-tidal watercourses. Any planting within these buffers will require root protection barriers. **AVOID**
- vii) There will be a 16m buffer between the proposed SADA security fence lines and tidal flood defence structures. Any planting within these buffers will require root protection barriers. **AVOID**
- viii) A project-specific archaeological mitigation strategy to be developed. **PREVENT**
- ix) Noise levels during construction will be subject to a control regime. **PREVENT**

Design Parameters

5.6.10 The NPS guidance discussed in Section 2.0 acknowledges that there will be some uncertainty regarding the details of the design and layout of individual projects, given the timescales involved, and the rapidly evolving nature of technology. As such, a degree of flexibility is required.

5.6.11 The Proposed Development has followed a maximum design scenario approach ('the Rochdale Envelope'). The Proposed Development has been designed to fit within a series of parameters, which are set out in the **Design Parameters (EN010153/DR/7.1)**.

5.6.12 As explained further in the ES, this enables the potentially significant environment effects of the Proposed Development to be identified and assessed based upon the maximum worst-case extent of development allowed by the parameters, whilst retaining flexibility for the detailed design.

Summary of Effects

5.6.13 The environmental effects of the Proposed Development, reflecting the design outcomes discussed above, including all incorporated mitigation measures intended to avoid, reduce, remediate, or compensate for adverse effects, and all proposed enhancement measures, are described and assessed in the ES. A summary is provided in **Chapter 14. ES Vol 1 Chapter 14: Summary of Environmental Effects (EN010153/DR/6.1)**

5.6.14 The ES identifies that even with the proposed mitigation and enhancement measures, there would be some residual significant adverse effects remaining. These are discussed in Table 1 overleaf, with a description of the design response, and explanation as to why the effects cannot be further mitigated.

5.6.15 As was set out in Section 2.2 of this document, NPS EN-1 notes that where residual effects remain after the mitigation hierarchy has been applied, these are unlikely to outweigh the need for development of critical national priority such as the Proposed Development.





Table 1 - Residual Significant Adverse Environmental Effects

Environmental receptor and type of effect	Description of Effect	Design Response	Explanation for remaining significant adverse effect
<b>Construction and Decommissioning Stage:</b>			
<b>Effects on the landscape character of CWaCC landscape character area (LCA) 4a:</b> Frodsham, Helsby and Lordship Marshes	The presence of construction activities would represent a noticeable change to the existing character due to the scale of the operations and the contrasting appearance of these influences.	A series of measures are included in the <b>outline Construction Environmental Management Plan (oCEMP) [EN010153/DR/7.5]</b> to limit potential adverse landscape effects during construction.	Whilst mitigation measures would seek to limit any disturbance, construction activities would nevertheless temporarily affect the character of the LCA
<b>Visual effects upon Viewpoint 17:</b> Public footpath within draft Order Limits	Construction would introduce new features and activity at short range, which would contrast with the existing features that make up the view	A series of measures are included in the <b>oCEMP [EN010153/DR/7.5]</b> to limit potential adverse visual effects during construction.	Whilst mitigation measures would seek to limit any disturbance, construction activities would nevertheless temporarily affect the nature of views available at short range from this location.
<b>Visual effects upon Viewpoint 18:</b> Restricted byway leading to Marsh Farm	Construction would introduce new features and activity at short range, which would contrast with the existing features that make up the view	A series of measures are included in the <b>oCEMP [EN010153/DR/7.5]</b> to limit potential adverse visual effects during construction.	Whilst mitigation measures would seek to limit any disturbance, construction activities would nevertheless temporarily affect the nature of views available at short range from this location.
<b>Visual effects upon Viewpoint 20:</b> Restricted byway, Cross Lane	The viewpoint is located along the Main Access Road, and the movement of construction traffic would be very prominent here.	The <b>oCEMP [EN010153/DR/7.5]</b> includes measures to control traffic movement during construction, and to protect the amenity of users of public rights of way.	Construction would necessitate the frequent but intermittent movement of traffic along Cross Lane, which would result in an obvious change in the experience of users.
<b>Visual effects upon Viewpoint 21:</b> Restricted byway, Straight Length	The viewpoint is located along the Main Access Road, and the movement of construction traffic would be very prominent here.	The <b>oCEMP [EN010153/DR/7.5]</b> includes measures to control traffic movement during construction, and to protect the amenity of users of public rights of way.	Construction would necessitate the frequent but intermittent movement of traffic along Straight Length, which would result in an obvious change in the experience of users.
<b>Visual effects upon Viewpoint 23:</b> Public footpath adj. to River Weaver	Construction would introduce new features and activity at short range, which would contrast with the existing features that make up the view	A series of measures are included in the <b>oCEMP [EN010153/DR/7.5]</b> to limit potential adverse visual effects during construction.	Whilst mitigation measures would seek to limit any disturbance, construction activities would nevertheless temporarily affect the nature of views available at short range from this location.
<b>Visual effects upon Viewpoint 25:</b> Public footpath adj. to River Weaver	Construction would introduce new features and activity at short range, which would contrast with the existing features that make up the view	A series of measures are included in the <b>oCEMP [EN010153/DR/7.5]</b> to limit potential adverse visual effects during construction.	Whilst mitigation measures would seek to limit any disturbance, construction activities would nevertheless temporarily affect the nature of views available at short range from this location.
<b>Effects upon the ecology of Frodsham, Helsby and Ince Marshes Local Wildlife Site (LWS).</b>	Construction activities and the use of land on a temporary basis would result in loss of habitat, as well as disturbance due to noise, vibration, lighting, dust and run off.	A series of measures are included in the <b>oCEMP [EN010153/DR/7.5]</b> to address potential ecological effects during construction. Post-construction, the implementation of the Illustrative Environmental Masterplan contained in Appendix A of the <b>oLEMP [EN010153/DR/7.13]</b> (and subsequent detailed design) and associated management/monitoring would result in significant benefits for the LWS, thereby offsetting adverse construction stage effects.	Whilst mitigation measures would seek to limit any disturbance, construction activities are nevertheless expected to temporarily affect the function of the LWS as a wildlife corridor.



Environmental receptor and type of effect	Description of Effect	Design Response	Explanation for remaining significant adverse effect
<b>Operational Stage:</b>			
Effects on the landscape character of CWaCC LCA 4a: Frodsham, Helsby and Lordship Marshes	The Proposed Development would result in a notable change in the character of that part of the LCA within and in close proximity to the Solar Array Development Area. This part of the LCA is already influenced strongly by the presence of large-scale built infrastructure development, but this influence would increase perceptibly due to both the physical extent of the solar farm and its visibility from locations within and outside the LCA	A series of landscape and biodiversity enhancements would be implemented together with extensive access improvement, waymarking and interpretation, as shown on the Illustrative Environmental Masterplan contained in Appendix A of the <b>oLEMP [EN010153/DR/7.13]</b>	The proposed landscape and biodiversity enhancements would have a beneficial effect upon character.  Whilst the ability to access this landscape would be greatly improved and whilst this would be an area displaying positive characteristics, the identified adverse effects upon character resulting from introducing the solar arrays within this part of the LCA would remain.
Visual effects upon Viewpoint 18: Restricted byway leading to Marsh Farm	The Proposed Development would be introduced at short range. The new solar PV modules and associated structures would be prominent in all directions from the Viewpoint. The experience of users of the byway would change from one of travelling through an open area of large-scale pasture grassland with wind turbines and other infrastructure to one of travelling through a solar farm	Solar PV panels would be set back from the restricted byway and proposed mitigation measures including hedgerow and tree planting on both sides of the restricted byway which forms the route. This mitigation will partially screen and soften immediate views of structures over time and improve the amenity of the route.	Whilst mitigation measures would over time improve the amenity of users, the central location of the viewpoint within the SADA means that the Proposed Development would remain a prominent addition that introduces notable change from baseline in all directions
Visual effects upon users of sections of restricted byways Frodsham RB102 and Frodsham RB108 located within the SADA.	The Proposed Development would be introduced at short range. The new solar PV modules and associated structures would be prominent. The experience of users of the byway would change from one of travelling through an open area of large-scale pasture grassland with wind turbines and other infrastructure to one of travelling through a solar farm	Solar PV panels would be set back from the restricted byway. Proposed mitigation measures include hedgerow and tree planting on both sides of the farm track which forms the route. This mitigation will partially screen and soften immediate views of structures over time and improve the amenity of the route.	Whilst mitigation measures would over time improve the amenity of users, the location of the viewpoint within the SADA means that the Proposed Development would remain a prominent addition that introduces notable change from baseline in all directions





# STAGE 4: SECURE

Ensure the design is  
deliverable

## 6. Secure

### 6.1. Introduction

**6.1.1** This Section of the DAD sets out how the Applicant has addressed the fourth stage (Secure) of the four-stage good design process recommended by the Planning Inspectorate.



## 6.2. DCO

**6.2.1** Should the SoS decide to grant the DCO Application, the DCO itself will define the Proposed Development.

**6.2.2** Schedule 1 of the DCO will define the development that is consented, including the numbered Works packages shown on the Works Plans that comprise the Proposed Development and their limits of deviation.

**6.2.3** Schedule 2 of the DCO will set out 'Requirements' that define how the Proposed Development must be built, operated and maintained. These will include a requirement that the Proposed Development must accord with the Design Parameters Document and the Design Principles (unless otherwise agreed with the local planning authority), and that the detailed design must be approved by CWaCC (which when put forward, must include a statement of how the Design Principles have been complied with).

**6.2.4** A **Draft DCO (EN010153/DR/3.1)** is included as part of the DCO Application.

## 6.3. Documents, Strategies and Plans

**6.3.1** The DCO Application includes a series of documents, strategies and plans that explain how the Applicant will ensure that the Proposed Development is built, operated, and decommissioned in a way that accords with the Design Principles. These are:

- i) An outline **Construction Environmental Management Plan (oCEMP) (EN010153/DR/7.5)** which explains how the Applicant would manage and report the potential environmental effects of the Proposed Development during the construction period.
- ii) An outline **Operational Environmental Management Plan (oOEMP) (EN010153/DR/7.5)** which explains how the Applicant would manage and report the potential environmental effects of the Proposed Development once it becomes operational.
- iii) An outline **Decommissioning Environmental Management Plan (oDEMP) (EN010153/DR/7.7)** which explains how the Applicant would manage and report the potential environmental effects of the Proposed Development during the decommissioning period.
- iv) An outline **Public Rights of Way**

**Management Plan (EN010153/DR/7.9)** which describes how the public rights of way running through the Order Limits will be managed by the Applicant for the construction and operational phases.

- v) An outline **Soils Management Plan (EN010153/DR/7.10)** which sets out how the Applicant would manage any soil and other materials that need to be excavated to ensure that these can be reused post-construction.
- vi) An outline **Landscape and Ecology Management Plan (oLEMP) (EN010153/DR/7.13)** which explains the strategy for the implementation and management of proposed landscape and ecological mitigation and enhancement works, including the measures required to achieve a minimum 10% biodiversity net gain, as shown on the Illustrative Environmental Masterplan contained in Appendix A of the **oLEMP (EN010153/DR/7.13)**.
- vii) An outline **Drainage Strategy** (section 11 of Appendix 9-1 of Volume 3 of the Environmental Statement) **(EN010153/DR/6.2)** which describes the proposed measures to be implemented in respect of surface water drainage and how these will be managed.



6.4. Detailed Design

6.4.1 As was set out in Section 4.0, whilst NPS-EN1 recommends that a project board level design champion could be appointed and a design panel used to maximise the value provided by the infrastructure, the Applicant has not appointed a design champion, and nor has it sought an independent review of the design.

6.4.2 The rationale for this stance is that the scope of potential design input on a solar development is limited. There is no architectural design input required for a solar energy generating station, with the majority of the design components by their nature standardised rather than bespoke.

6.4.3 The design responses at this site derive principally from the Site’s landscape context and ecological factors. The Applicant’s assembled project team includes experienced Landscape Architects and Ecologists amongst a wider team of environmental consultants and was considered suitable to lead on the design.

6.4.4 In addition, the Applicant has sought and welcomed feedback from the local planning authority, statutory environmental bodies, stakeholders, and members of the public on the design of the project and held a series

of design workshops with local interest groups and the local planning authority to help influence the design.

6.4.5 In taking forward the detailed design, which will need to be approved by the local planning authority, and which will need to align with the parameters and principles being secured by the DCO Requirements, we do not anticipate a departure from the approach adopted to this point. Cheshire West and Chester Council and the other key stakeholders are experienced in dealing with projects of this nature in this context, given the amount of other development that has recently come forward in the area.

6.5. Project Design Principles

6.5.1 As discussed in section 3.0; in order to achieve the Design Vision, a series of Project Design Principles have been developed. The Table below sets out each Project Design Principle, broken down into more specific measures, and relates each of these to the NIC Design Principles discussed in Section 2.0. The **draft DCO** requires that the detailed design of the Proposed Development must comply with these design principles and measures.

6.5.2 This table has been duplicated at Appendix A to this Design Approach Document to allow for further scrutiny during Examination, as required.



Table 2 - Project Design Principles

Project Design Principle	Measures to Achieve the Project Design Principle	NIC Design Principles			
		Climate	People	Places	Value
<b>Design Principle 1: Renewable Energy</b>  Delivery of significant amount of affordable, low carbon, renewable energy to support policy objectives and national targets for reducing carbon emissions to net zero by 2050	a. Provide 147MW of installed renewable energy capacity				
	b. Provide approximately 100MW of battery storage capacity				
	c. Explore and where feasible provide private wire connections to local businesses				
	d. Provide interpretative material to enhance public knowledge of the benefits of renewable energy, reflecting the presence of historic, current and future energy generation infrastructure locally				
	e. The embodied carbon of materials and components will be factored into the procurement process, and where reasonably practicable lower-carbon or locally sourced materials will be selected, in order to minimise the Proposed Development's lifecycle greenhouse gas emissions.				
<b>Design Principle 2: Landscape and Views</b>  Develop the proposals in a manner sensitive to their landscape setting and reflecting the value placed on the landscape by local communities, reducing visual impacts from nearby properties, recreational routes and key viewpoints	a. Retain and enhance the open character of Frodsham Marshes, where feasible				
	b. Retain and enhance existing vegetation cover that defines character and provides visual screening				
	c. Undertake new planting of trees, scrub and hedgerows which is consistent with character and to provide further screening				
	d. Contain development within established field boundaries to retain landscape pattern				
	e. Provide generous development-free buffers alongside existing landscape features				
	f. Provide long-term management and maintenance of the landscape of the Order Limits				
	g. Retain open vistas looking across Frodsham Marshes and the wider estuary, where feasible				
	h. Give consideration to impacts upon the long-range views from Frodsham War Memorial and Helsby Hill				
	i. Consider, and seek to mitigate where possible, adverse impacts upon users of public rights of way and other routes within and close to the Order Limits				
	j. Consider, and seek to mitigate where possible, adverse impacts upon views from properties, with particular reference to those located at closer distances such as at the northern edge of Frodsham				
	k. Consider potential impacts arising from glint and glare and mitigate if adverse effects are identified				



Project Design Principle	Measures to Achieve the Project Design Principle	NIC Design Principles			
		Climate	People	Places	Value
<b>Design Principle 3: Biodiversity and Green Infrastructure</b>  Protect and enhance green infrastructure within the Order Limits and in doing so create the conditions for enhanced biodiversity locally	a. Achieve a minimum of 10% increase in habitat and hedgerow units, and no net loss in watercourse units				
	b. Manage, maintain and increase vegetation cover within the Order Limits for the lifespan of the Proposed Development				
	c. Provide mitigation associated with potential impacts on the Mersey Estuary SSSI, SPA and RAMSAR site				
	d. Retain and enhance existing site features, and introduce development-free buffers around hedgerows, ditches and other features of biodiversity value. Buffers will be a minimum of 5m around hedgerows and a minimum of 10m around watercourses				
	e. Reduce impacts on valuable habitat features through good design, e.g. minimising culvert crossings, avoidance of impacts on high value habitat, best practice construction methods				
	f. Enhance ecological connectivity, both within the Order Limits and with features outside its boundary. Create and/or enhance wildlife corridors				
	g. Provide interpretative material to explain the ecology of the Order Limits to visitors				
<b>Design Principle 4: Public Access and Recreation</b>  Retain, enhance and encourage public access through the life of the proposals, including during construction and decommissioning where feasible	a. Create new permissive pathways to link up existing routes, filling gaps in the existing network and creating loops where possible, to enhance appeal to users and to improve connectivity				
	b. Provide wayfinding signage and information about the variety of routes available within the Order Limits and in respect of onward connections. Information to consist of both physical signage on site and published material to provide guidance to potential visitors				
	c. Design and install interpretative material along access routes, providing information regarding the social and natural history of the Order Limits and its present use for generating energy				
	d. Provide and signpost potential formal public car parking area(s) if parking demand evidences a need for it				
	e. Construction/decommissioning activities to be planned and implemented in such a way as to limit the need for any temporary closures and/or diversions to public rights of way				



Project Design Principle	Measures to Achieve the Project Design Principle	NIC Design Principles			
		Climate	People	Places	Value
<b>Design Principle 5: Flooding</b>  Safeguard the surrounding hydrological systems, ensure the scheme is resilient to flooding and will not increase flood risk elsewhere, taking account of the impacts of climate change	a. Ensure key electrical infrastructure (e.g. substations, transformers, inverters) are designed and located to minimise impacts from potential flooding				
	b. Ensure that all infrastructure is located at a minimum 10m offset distance from watercourses save for cable and access crossings				
	c. Avoid impacts on existing flood defences				
	d. Maintain the existing drainage regime at the site to minimise flood risk on site and in the surrounding area				
<b>Design Principle 6: Cultural Heritage</b>  Develop the proposals so that they are sensitive to the presence of heritage assets, their settings, and the wider historic environment	a. Retain established boundary features as evidence of historic land use pattern				
	b. The square brick hollow towers within the Order Limits, which relate to the historic use of the site for the deposit of dredgings from the Manchester Ship Canal would be subject to a programme of recording (likely a photographic survey) if they require demolition. Any which do not need to be lost / damaged to facilitate the Proposed Development will be retained				
	c. Maintain views from the Order Limits (and their surroundings) to heritage assets located on the higher ground				
	d. Retain the legibility of the flat topography within the Order Limits and views to the river in views from the higher ground				
	e. Provide interpretative material explaining the relationship between the Order Limits and the surrounding historic landscape				



Project Design Principle	Measures to Achieve the Project Design Principle	NIC Design Principles			
		Climate	People	Places	Value
<b>Design Principle 7: Amenity</b>  Develop all elements of the proposals, including during construction and decommissioning so that they do not adversely affect the amenity or safety of local residents and users of public rights of way.	a. Consider all infrastructure elements at the design stage and whether it is possible to enhance the amenity of the Order Limits through minor adjustments or rationalisation – e.g. avoidance of unnecessary signage or excessively large areas of hardstanding				
	b. Ensure that all temporary works are removed where not required for the operational Proposed Development				
	c. Develop a Construction Environmental Management Plan to ensure that all construction activities are managed sensitively and in accordance with all statutory requirements and recognised good practice				
	d. Ensure that CCTV uses infra-red technology to minimise potential impacts from lighting				
	e. All lighting would be 'on-demand' only and would only be switched on during maintenance works, or in the event of an emergency or security breach				
<b>Design Principle 8: Traffic and Transport</b>  Vehicular access to the Order Limits will be safe and will not adversely affect the local highways network, or the local public rights of way network.	a. Access from the public highway network to utilise existing access tracks suitable for use by HGVs to minimise the need for new access tracks				
	b. An appropriate Order Limits speed limit (e.g. 10mph) will be imposed on site roads, recognising that many of the access routes are also used by pedestrians and cyclists				
	c. Existing field access points would be used wherever possible				



## 6.6. Commitments

**6.6.1** Detailed versions of each of the documents, strategies and plans discussed in Section 6.3 (with the exception of the Design Parameters Statement and the Works Plan) will be prepared and implemented as a requirement of the DCO. Each will need to be submitted to and approved in writing by the local planning authority prior to development commencing.

## 6.7. Engagement

**6.7.1** Following the grant of the DCO, the Applicant will continue to engage with key stakeholders and the local community during the detailed design process, the construction period, and the operational life of the Proposed Development.

**6.7.2** A Community Liaison Group (CLG) will be set up and funded by the Applicant and will meet on a regular basis (frequency to be agreed at commencement). The CLG will be established prior to the start of construction, will comprise representatives of relevant stakeholder groups and act as a forum for community engagement.

**6.7.3** A designated Community Liaison Officer will be appointed to lead the CLG and will issue regular construction updates, facilitating dialogue and addressing any issues raised by the community throughout the construction phase.

**6.7.4** The CLG will continue to operate throughout the operational and decommissioning phases of the Proposed Development, likely at a reduced frequency, to allow interest groups to be kept informed of any major maintenance activities or works planned at the site, and to allow the local community to raise any concerns.



# CONCLUSION

## 7. CONCLUSION

**7.1.1** There is a clear and urgent need for new renewable energy infrastructure in the UK to help address the climate change emergency, meet Net Zero 2050 targets, and bolster national energy security. The Proposed Development will make a significant contribution toward these objectives by delivering a large-scale source of clean, low-carbon electricity.

**7.1.2** By enabling delivery of 147 MW of new renewable generation capacity in 2030, the Proposed Development would play an important part in fulfilling these national policy objectives and in supporting the North West region's transition to a low-carbon future. It will also improve energy resilience by providing domestically generated power and enhancing the diversity of the energy mix. A comprehensive account of the need and benefits of the project is set out in the Planning Statement (EN010153/DR/5.6), demonstrating that the Proposed Development is both necessary and urgent in the context of national policy and will deliver substantial public benefits in terms of renewable energy generation and carbon reduction.

**7.1.3** The information included within this Design Approach Document and reflected across the DCO Application demonstrates compliance with the criteria for 'Good Design' and comprehensive alignment with NPS EN-1, the Overarching National Policy Statement for Energy.

**7.1.4** Our approach complies with NPS EN-1, which states that 'Design principles should be established from the outset of the project to guide the development from conception to operation'.

**7.1.5** The Proposed Development has had regard to good design from its earliest stages, adopting the approach to Good Design advocated by the NIC and as expressed in National and Local policy – as set out in Section 2.0.

**7.1.6** Project Design Principles were developed, aligned to a clear Design Vision as set out in Section 3.0, which flowed from an understanding of the characteristics of the site and surrounding area – explained in Section 4.0.

**7.1.7** The Design Approach Document has demonstrated that all four steps advocated in the NIC guidance have been followed.

**7.1.8** Fundamentally the project design is underpinned by landscape character, ecological sensitivity and use of the site by the local community. It addresses the very clear recommendations made by Cheshire West and Chester Council within its landscape character assessment: A Landscape Strategy for Cheshire West and Chester Borough.

**7.1.9** Character Area LCA4a Frodsham, Helsby and Lordship Marshes is the landscape that the Proposed Development will sit within. It is part of a distinctive landscape which retains its underlying structure – a transition from sandstone hills to estuary - but which has also been greatly altered and impacted by human activity, including the construction of the Manchester Ship Canal and the M56 motorway, both of which have to a large extent severed it from adjoining areas. Its condition is described within the landscape character assessment as degraded and in need of improved management:

**7.1.10** The overall management strategy for LCA4a identified in the Strategy is:

**“...to enhance and restore the conditions of habitats and features of the marshes whilst safeguarding its open character”**

**7.1.11** More detailed guidelines for landscape management are provided in the Strategy and these have been a core reference point in developing the design.

**7.1.12** Central elements to the guidelines are the promotion of access, the promotion of nature conservation and the preservation of views. The design responds positively on all three fronts, providing:

- i) a greatly enhanced and much more interconnected access network which will be waymarked and supported with interpretation materials to inform users about the rich natural and cultural history of the site and surrounding area, and its evolving role in the generation of energy over time
- ii) dedicated mitigation for wildlife through green infrastructure retention, enhancement and management to provide mitigation for potential adverse effects on the Mersey Estuary SSSI, SPA and Ramsar site
- iii) a balanced solution to mitigation of visual impact, with care being taken to preserve characteristic views across the Mersey estuary and to the distinctive landform of the Frodsham Sandstone Ridge and Helsby Hill

**7.1.13** The assessment of the impacts of the Proposed Development set out in the Environmental Statement, is based on an in depth understanding of the site and surrounding area. The commitments made in the DCO to embed the Design Principles into the future detailed design will secure good design outcomes and minimise impacts when the project is delivered.

**7.1.14** The renewable energy infrastructure that is required to deliver the much-needed 147MW of renewable energy has a clear functional appearance, aesthetic and purpose. The Design Principles address the visual appearance of the project principally through influencing its spatial extents, and through the treatment of the landscape fabric that extends through and around it, providing a strong and attractive context.

**7.1.15** The Proposed Development embeds nature inclusive design, throughout the Order Limits but particularly through provision of the NBBMA, which will create the only managed wetland nature reserve anywhere around the Mersey Estuary SPA. The Mersey appears to be the only major estuary in the UK currently without an adjacent wetland reserve and therefore the NBBMA would represent a significant strategic benefit in this location.

**7.1.16** This DAD sets out the measures that will be taken to enhance and contribute to the quality of the area alongside delivery of a significant amount of renewable energy in a location where it can readily be utilised. It demonstrates the approach to securing a scheme that is appropriate and responsive to prevailing landscape character. It will provide a basis for greatly expanded access and recreation for the local community alongside providing enhancements to habitats that will support the wildlife of the Mersey estuary.

**7.1.17** This integrated approach to design is controlled through to delivery by the suite of documents referenced in Section 6.0

**7.1.18** The below tables set out the manner in which the Proposed Development:

- i) Addresses each of the Good Design issues set out in Annex A of AGD (Table A)
- ii) Performs against the Landscape Character Guidance for LCA4a (Table B)
- iii) Performs against Local Plan policy ENV6 (Table C)
- iv) Performs against the Horlock and Holford Rules (Table D)



Table A - Advice on Good Design: Annex A Compliance

Issue	Considerations	How has this been addressed by the Applicant
<b>Design Approach Document</b>	Is a DAD provided?	This document is the DAD
	Does the DAD address the brief, the design process, the design principles, and beneficial outcomes?	The brief, design process, design principles and outcomes are all described in Sections 3.0-5.0
	If a DAD is not provided, where are the design process and design principles set out?	
<b>Analysis, Research</b>	How has the development site been analysed to inform a good design approach?	Refer to Section 4.0 and 5.0 for details of the Applicant's site analysis, and for details of engagement with stakeholders and local communities that provided further context Refer to Section 5.0 for details of key outcomes that influenced the design
	What are the main conclusions from this analysis that inform the design at this stage and as it develops?	The main conclusions arising from consideration of the local policy, stakeholder feedback and national policy drivers are that, in the context of the Site, the provision of meaningful ecological mitigation alongside access improvements will deliver multiple beneficial outcomes for the local and wider community.
<b>Response</b>	What are the main significant adverse effects of the proposed development and how are they addressed to enable good design?	Localised likely significant adverse environmental effects have been identified during the construction and operational phases. Effects relate to locally designated wildlife sites, the landscape in the immediate vicinity of the Site, and visual effects upon users of PRow within the Site. These have been addressed by provision of ecological mitigation and enhancements to the access network such that there would also be significant beneficial environmental effects in relation to ecology and biodiversity, and material benefits to access and recreation alongside the reduction in atmospheric greenhouse gas emissions delivered by the renewable energy provision. Mitigation measures have been identified to mitigate and control environmental effects during the construction, operation and decommissioning phases of the Proposed Development. These are secured by requirements of the DCO, should this be granted.
<b>Vision</b>	What is the vision for the completed development and its surroundings? Where is it set out?	The Design Vision is set out in the preface to this document and then again in Section 3.0
	Set out the narrative, how the vision will achieve sustainability, create a new place and hold the design together?	
<b>Skills</b>	What professional disciplines and skill sets are being and will be working on the design of the project?	Refer to Section 3.0 for details of the Applicant's multi-disciplinary team
	Is there a design champion designated for this project, and if so, who is it and what are their skills?	The Applicant has not appointed a design champion. The rationale for this stance is that the scope of potential design input on a solar development is limited, with the majority of the design components standardised rather than bespoke. The design responses at this site derive principally from the sites landscape context and ecological factors. The Applicant's project team includes experienced Landscape Architects and Ecologists considered suitable to lead on the design. In addition, the Applicant has welcomed input from key stakeholders on the design of the project and held a series of design workshops with local interest groups and the local planning authority to help influence the design.

Issue	Considerations	How has this been addressed by the Applicant
<b>Developing the design</b>	Describe the approach to good design and explain how the design has (and will continue) to evolve.	Approach to design is described in Sections 2.0 to 4.0. Sections 5.0 explains the design evolution
	How is any required flexibility being addressed?	The Design Parameters allow for flexibility in design.
	What design choices have (and will be) made?	Design choices are discussed in Sections 4.0 and 5.0
	What are the emerging design principles and how have the principles directly informed decision making?	Design Principles are set out in Section 3.0. Table B in Section 6.4 of the DAD sets out more detailed measures, reflecting decisions made to ensure that the Design Principles can be delivered
	Is there a hierarchical approach to elements of the proposal (for example in designing major and less important bridges in a highways scheme)?	No - a hierarchical approach has not been applied to the Design of the Proposed Development
	Have digital techniques, including algorithms and AI been used in design development? If so, explain the tools and data used.	Digital models have been used to predict the theoretical visibility of the Proposed Development, likely glint and glare from solar panels, and potential flood risk. The outcomes arising from these models have all fed into the design process.
	Is there a coherent narrative of how the approach to design has evolved?	Refer to Section 5.0 for details of how the design evolved.
	Where are design outcomes set out?	Design outcomes are described in Section 5.0
	Will additional value beyond the site boundary be incorporated?	The Proposed Development will via the proposed improvements to access within the Order Limits, provide a wider benefit to local communities by enhancing the recreational value and connectivity of Frodsham Marshes (including as part of longer journeys).
<b>Independent design review</b>	Has the design development been the subject of an independent design review?	No. Reasoning for this is set out in section 3.6. The design was subject to review by the Applicant's own team through the design process and was also subject to review and targeted design workshops with key stakeholders, focussed on the delivery of wider social and environmental benefits As such, there has been considerable consultation and review undertaken, and it is not considered an additional formal review would add additional value of note.
	If so, what were the main comments and how has the design responded to them?	The targeted workshop meetings and key outcomes flowing from them are documented in Section 5.4
	Is it the intention to include design reviews post-consent? If so, how are these secured?	The detailed design will need to be developed post consent and ultimately approved by Cheshire West and Chester Council – as such it is anticipated that there will be a degree of design discussion with officers incorporated into the development of the design so as to ensure that approval can be forthcoming.



Issue	Considerations	How has this been addressed by the Applicant
<b>Delivery</b>	How will the final design be delivered? Will there be a design management plan, a design guide or a design code? If not, why are they not required?	Design will be delivered via a series of detailed documents, strategies and plans, which are set out in Section 6.3. Cheshire West and Chester Council will approve the detailed design of the Proposed Scheme, which must be brought forward in compliance with the Design Principles and the Design Parameters Document (unless otherwise agreed by Cheshire West and Chester Council).
	Is there a design consultation plan to engage the community following consent of the DCO?	A Community Liaison Group would be funded by the Applicant, which would meet regularly to discuss the construction, operation and decommissioning of the Proposed Development. It is not considered necessary for this Group to be involved in detailed design given the nature of the Proposed Development. Key ecological stakeholders will be involved in the development of the NBBMA.
	Is there an agreed process for post-consent decisions with local planning authorities and others, where required?	Detailed versions of each of the documents, strategies and plans discussed in Section 6.3 (with the exception of the Design Parameters Statement and the Works Plan) will be prepared and implemented as a requirement of the DCO. Each will need to be approved in writing by the local planning authority prior to development commencing, as will the detailed design of the Proposed Development  As set out where relevant in the outline plans, provisions would be made in the detailed documents discussed in Section 6.3 and 6.5 for regular review of different elements of the Proposed Development, including for example, the management and maintenance of the landscape and ecological proposals.
<b>Place</b>	How is placemaking being addressed?	The approach to harnessing the sense of place of the Frodsham Marshes is explained in the narrative preface to this document "A Bespoke Response" The desired outcome will be achieved as set out in Section 5.0 through conserving and extending existing green infrastructure, achieving a balance between screening the solar arrays and keeping views open, and significantly enhancing access provision.
	How will this be a distinctive place and how will the community benefit from it?	The scale of the Order Limits is such that there is scope to provide generous green infrastructure corridors alongside the solar arrays. Exclusion zones have been provided around key features, preserving habitats and public amenity. Long-distance views out of the Order Limits have been preserved. Existing access will be enhanced, providing clear benefit to local communities.
	Describe what the quality of place outcome will be, how this relates to the vision and how it will be secured?	The design process promotes a harmonious relationship between infrastructure and environment, with the solar farm providing an important source of sustainable energy but also delivering enhancements to the natural environment and to public amenity which enhances the landscape and the experience of those who live in and visit the area. The Design Principles set out in Section 3.0 provide a series of design measures that relate to the NIC Design Principles and to the overarching Design Vision for the Proposed Development.
<b>People</b>	What consultation has taken place with statutory and local authorities, communities and people with an interest in the land?	Details of consultation are set out in Section 5.0.
	How will their views be incorporated in the design evolution and where will this be set out?	Section 5.0 also describes how the design has evolved following consultation and engagement

Issue	Considerations	How has this been addressed by the Applicant
<b>Integrated design approach</b>	Explain how an integrated, holistic approach to the project's design will be achieved	Sections 3.0-5.0 describe the design approach and process followed.
	Where is it shown in the documentation? Is there a masterplan?	The design is illustrated on the Illustrative Environmental Masterplan contained in Appendix A of the <b>oLEMP [EN010153/DR/7.13]</b>
	How will this be secured?	The design will be secured by the detailed documents, strategies and plans, which are set out in Section 6.3, and which will be a requirement of the DCO.
<b>National Policy Statements (NPSs)</b>	How have the requirements for good design in the relevant NPS (or NPSs) been met?	Sections 3.0-5.0 describe the design process, which reflects the requirements of the NPSs Table E in this Appendix sets out the response to requirements set out in EN3
<b>Design Principles</b>	Set out the good design principles being applied to the project	Design Principles, which flow from the NIC Design Principles, are set out in Section 3.0
	Are the design principles structured or grouped logically?	Each of the Design Principles, broken down to identify measures that will achieve them is set out in a table in Section 6.4.
	How will they be developed prior to consent?	It is a requirement of the DCO that the information provided to the local planning authority to discharge the detailed design must show how it complies with the Design Principles.
	How will they be illustrated and secured?	
<b>National Infrastructure Commission (NIC) 'principles'</b>	Is there a response to the NIC's four principles of good design?	Yes – see Table 2 in Section 6.0 which identifies which of the NIC's four principles of good design is applicable in respect of each of the measures that sit beneath each of the project Design Principles.
	If not, what design principles have been adopted?	
	What process has been used to develop and embed project level design principles?	



Table B - Performance against Landscape Character Guide

	Detailed guidelines for landscape management and for built development within LCA4a	Scheme performance against guideline
1	Encourage recreational development as a means of managing some of the more derelict and degraded areas of the landscape. Encourage use of the area by walkers, cyclists, rowers and horse riders (including provision of picnic facilities and viewing opportunities) whilst safeguarding the nature conservation interest of the area, particularly its importance for birds.	The Proposed Development will retain and enhance all existing access routes, add new permissive connections, add waymarking for a range routes that suit different user groups and interpretive signage to add educational value to visits. In so doing the project will encourage increased recreational use, alongside proactive habitat creation that will help to conserve wildlife on the site.
2	Maintain the distinctive field pattern that reveals the planned 19th century enclosure of the marsh.	Field boundaries will be retained (and enhanced in places), thus maintaining the distinctive pattern
3	Seek to restore thorn hedgerows that are falling into decline.	Proposed Development achieves objective, committing to beneficially manage all existing hedges within the Order Limits
4	Maintain and ecologically enhance the ditch system and riparian habitats and land supporting breeding, over wintering and passage birds. Seek opportunities to re-create habitats such as species rich grassland and reed beds.	As set out in the oLEMP, the scheme includes numerous measures that will in combination achieve this objective
5	Improve water quality by encouraging less-intensive agricultural practices to reduce fertiliser run-off and nutrient levels in the ditches.	The Proposed Development is expected to improve water quality during the operational period by reducing chemical loads, as it will eliminate the use of fertilisers, insecticides, and herbicides currently applied to the agricultural land. Additionally, halting ploughing activities may positively impact water quality by decreasing soil erosion and sediment runoff into nearby watercourses.
6	Encourage restoration of derelict industrial land including re-creation of salt-marsh and reintroduction of grazing to maintain the open character of the marsh.	Proposed Development achieves objective in part – notably in the NBBMA
7	Consider opportunities to create views across the Mersey Estuary.	Proposed Development achieves objective by introducing new permissive paths on elevated land overlooking the Mersey
8	Conserve the 'remote' character of the marshes away from the main transport corridor of the M56.	Whilst the improved access may reduce perception of remoteness, landscape scale relationships and character will remain – partially met
9	Retain the open character of the marsh by restricting planting to low growing scrubby species typically found in the local landscape, taking into account the importance of the area for ground nesting birds and wintering/passage birds. Woodland planting /screening using tall or ornamental species is not appropriate in the open marsh.	The Proposed Development recognises that a balance needs to be struck between screening new infrastructure and maintaining open character and views. On this basis the scheme respects the guideline
10	Conserve the remaining open, undeveloped areas of the marsh.	Proposed Development will see some open areas developed but open areas will remain
11	Consider using native scrubby vegetation to screen views of traffic on the north side of the M56 motorway (taller species may be appropriate on the southern side of the motorway adjacent to the Helsby to Frodsham Undulating Enclosed Farmland).	Proposed Development achieves objective
12	Consider views to and from the Frodsham Sandstone Ridge and Helsby Hill when planning any change.	The Proposed Development has been developed cognisant of the views from these elevated vantage points, which are wide reaching panoramas overlooking a complex landscape with many man-made influences. The proposed design will ensure that views to the distinctive landform of the hills from the marshes are preserved

Table C - Performance against policy ENV6

Policy ENV6: Outcomes that well-designed development should achieve:		Scheme performance against outcomes
1	Respect local character and achieve a sense of place through appropriate layout and design.	The design process promotes a harmonious relationship between infrastructure and environment, with the solar farm sitting within retained green infrastructure and delivering enhancements to the natural environment and to public amenity which are consistent with character, enhance the landscape and benefit the experience of those who live in and visit the area.
2	Provide high quality public realm.	Enhancements to the public access network, including improved existing PRow, additional permissive routes, waymarked circular routes and interpretation will sit alongside pro-actively managed green infrastructure including existing and new vegetation which together will create a much-improved public realm.
3	Be sympathetic to heritage, environmental and landscape assets.	The design approach adopted has been sensitive to the character of the landscape and key views in particular alongside biodiversity improvements. Heritage matters have also been considered
4	Ensure ease of movement and legibility, with priority for pedestrians and cyclists.	A scheme of access improvements, which will include legible signage of routes is central to the scheme proposals
5	Promote safe, secure environments and access routes.	The detailed design will include consideration of public safety including intervisibility of routes and clear signage
6	Make the best use of high-quality materials.	Material selection in the detailed design will include consideration of embodied carbon, waste minimisation and quality / durability
7	Provide for the sustainable management of waste.	Construction and procurement will follow current good practice
8	Promote diversity and a mix of uses.	The scheme design provides a hierarchy of access routes intended to provide access to all and to preserve a full range of access experiences
9	Incorporate energy efficiency measures and provide for renewable energy generation either on site or through carbon offsetting measures.	The project is a renewable energy generating station in itself. Procurement of the main project and access improvements will consider embodied carbon in material use
10	Mitigate and adapt to the predicted effects of climate change.	The eastern part of the array will be installed with equipment elevated above predicted flood levels which make allowance for climate change.
11	Meet applicable nationally described standards for design and construction	The design has followed a process which accords with National design guidance as documented in this document



Table D - Performance against Horlock and Holford Rules

The Horlock and Holford Rules set out guidelines for design or electricity transmission and substation infrastructure respectively		Scheme performance against guidelines
Horlock Rules		
1	Avoid major areas of high amenity value (e.g., National Parks, AONBs).	Proposed transmission route avoids high value landscape areas
2	Avoid crossing open spaces where the line would be a dominant feature.	The existing area is dominated by existing 400kv transmission masts and is adjacent to a motorway
3	Prefer wooded or treed landscapes where the line can be visually absorbed.	The area is not wooded, but includes established mature vegetation which will assist in this respect
4	Follow existing landscape contours and features to minimize contrast.	Site is generally flat, advice to follow existing features is noted
5	Prefer straight lines or gentle curves, avoiding frequent changes of direction.	This is achieved for the Proposed Development.
6	Use the background of hills or trees to reduce skyline impact.	Not considered relevant
7	Avoid proximity to residential areas and prominent buildings.	Motorway sits between site and residential areas
Holford Rules		
1	Co-location of new infrastructure with existing energy or industrial developments (e.g., power stations or other substations).	Substation is proposed to be co-located with BESS and an existing wind farm
2	Minimising cumulative landscape and visual effects by clustering infrastructure rather than dispersing it.	As above, clustering is proposed
3	Avoiding designated landscapes where possible, similar to Holford principles.	Designated landscapes are avoided. Views are available from Frodsham Hill, which is located in a candidate National Landscape, but these views already consist of a dynamic assemblage of man-made infrastructure. Substation would be a very small component in such views
4	Mitigating effects through layout design, landform use, and planting.	Substation site has been chosen which will be hidden from view from on-site PRoW due to topography

Appendix A



Project Design Principle	Measures to Achieve the Project Design Principle	NIC Design Principles			
		Climate	People	Places	Value
<b>Design Principle 1: Renewable Energy</b>  Delivery of significant amount of affordable, low carbon, renewable energy to support policy objectives and national targets for reducing carbon emissions to net zero by 2050	a. Provide 147MW of installed renewable energy capacity				
	b. Provide approximately 100MW of battery storage capacity				
	c. Explore and where feasible provide private wire connections to local businesses				
	d. Provide interpretative material to enhance public knowledge of the benefits of renewable energy, reflecting the presence of historic, current and future energy generation infrastructure locally				
	e. The embodied carbon of materials and components will be factored into the procurement process, and where reasonably practicable lower-carbon or locally sourced materials will be selected, in order to minimise the Proposed Development's lifecycle greenhouse gas emissions.				
<b>Design Principle 2: Landscape and Views</b>  Develop the proposals in a manner sensitive to their landscape setting and reflecting the value placed on the landscape by local communities, reducing visual impacts from nearby properties, recreational routes and key viewpoints	a. Retain and enhance the open character of Frodsham Marshes, where feasible				
	b. Retain and enhance existing vegetation cover that defines character and provides visual screening				
	c. Undertake new planting of trees, scrub and hedgerows which is consistent with character and to provide further screening				
	d. Contain development within established field boundaries to retain landscape pattern				
	e. Provide generous development-free buffers alongside existing landscape features				
	f. Provide long-term management and maintenance of the landscape of the Order Limits				
	g. Retain open vistas looking across Frodsham Marshes and the wider estuary, where feasible				
	h. Give consideration to impacts upon the long-range views from Frodsham War Memorial and Helsby Hill				
	i. Consider, and seek to mitigate where possible, adverse impacts upon users of public rights of way and other routes within and close to the Order Limits				
	j. Consider, and seek to mitigate where possible, adverse impacts upon views from properties, with particular reference to those located at closer distances such as at the northern edge of Frodsham				
	k. Consider potential impacts arising from glint and glare and mitigate if adverse effects are identified				

Project Design Principle	Measures to Achieve the Project Design Principle	NIC Design Principles			
		Climate	People	Places	Value
<b>Design Principle 3: Biodiversity and Green Infrastructure</b>  Protect and enhance green infrastructure within the Order Limits and in doing so create the conditions for enhanced biodiversity locally	a. Achieve a minimum of 10% increase in habitat and hedgerow units, and no net loss in watercourse units				
	b. Manage, maintain and increase vegetation cover within the Order Limits for the lifespan of the Proposed Development				
	c. Provide mitigation associated with potential impacts on the Mersey Estuary SSSI, SPA and RAMSAR site				
	d. Retain and enhance existing site features, and introduce development-free buffers around hedgerows, ditches and other features of biodiversity value. Buffers will be a minimum of 5m around hedgerows and a minimum of 10m around watercourses				
	e. Reduce impacts on valuable habitat features through good design, e.g. minimising culvert crossings, avoidance of impacts on high value habitat, best practice construction methods				
	f. Enhance ecological connectivity, both within the Order Limits and with features outside its boundary. Create and/or enhance wildlife corridors				
	g. Provide interpretative material to explain the ecology of the Order Limits to visitors				
<b>Design Principle 4: Public Access and Recreation</b>  Retain, enhance and encourage public access through the life of the proposals, including during construction and decommissioning where feasible	a. Create new permissive pathways to link up existing routes, filling gaps in the existing network and creating loops where possible, to enhance appeal to users and to improve connectivity				
	b. Provide wayfinding signage and information about the variety of routes available within the Order Limits and in respect of onward connections. Information to consist of both physical signage on site and published material to provide guidance to potential visitors				
	c. Design and install interpretative material along access routes, providing information regarding the social and natural history of the Order Limits and its present use for generating energy				
	d. Provide and signpost potential formal public car parking area(s) if parking demand evidences a need for it				
	e. Construction/decommissioning activities to be planned and implemented in such a way as to limit the need for any temporary closures and/or diversions to public rights of way				



Project Design Principle	Measures to Achieve the Project Design Principle	NIC Design Principles			
		Climate	People	Places	Value
<b>Design Principle 5: Flooding</b>  Safeguard the surrounding hydrological systems, ensure the scheme is resilient to flooding and will not increase flood risk elsewhere, taking account of the impacts of climate change	a. Ensure key electrical infrastructure (e.g. substations, transformers, inverters) are designed and located to minimise impacts from potential flooding				
	b. Ensure that all infrastructure is located at a minimum 10m offset distance from watercourses save for cable and access crossings				
	c. Avoid impacts on existing flood defences				
	d. Maintain the existing drainage regime at the site to minimise flood risk on site and in the surrounding area				
<b>Design Principle 6: Cultural Heritage</b>  Develop the proposals so that they are sensitive to the presence of heritage assets, their settings, and the wider historic environment	a. Retain established boundary features as evidence of historic land use pattern				
	b. The square brick hollow towers within the Order Limits, which relate to the historic use of the site for the deposit of dredgings from the Manchester Ship Canal would be subject to a programme of recording (likely a photographic survey) if they require demolition. Any which do not need to be lost / damaged to facilitate the Proposed Development will be retained				
	c. Maintain views from the Order Limits (and their surroundings) to heritage assets located on the higher ground				
	d. Retain the legibility of the flat topography within the Order Limits and views to the river in views from the higher ground				
	e. Provide interpretative material explaining the relationship between the Order Limits and the surrounding historic landscape				

Project Design Principle	Measures to Achieve the Project Design Principle	NIC Design Principles			
		Climate	People	Places	Value
<b>Design Principle 7: Amenity</b>  Develop all elements of the proposals, including during construction and decommissioning so that they do not adversely affect the amenity or safety of local residents and users of public rights of way.	a. Consider all infrastructure elements at the design stage and whether it is possible to enhance the amenity of the Order Limits through minor adjustments or rationalisation – e.g. avoidance of unnecessary signage or excessively large areas of hardstanding				
	b. Ensure that all temporary works are removed where not required for the operational Proposed Development				
	c. Develop a Construction Environmental Management Plan to ensure that all construction activities are managed sensitively and in accordance with all statutory requirements and recognised good practice				
	d. Ensure that CCTV uses infra-red technology to minimise potential impacts from lighting				
	e. All lighting would be 'on-demand' only and would only be switched on during maintenance works, or in the event of an emergency or security breach				
<b>Design Principle 8: Traffic and Transport</b>  Vehicular access to the Order Limits will be safe and will not adversely affect the local highways network, or the local public rights of way network.	a. Access from the public highway network to utilise existing access tracks suitable for use by HGVs to minimise the need for new access tracks				
	b. An appropriate Order Limits speed limit (e.g. 10mph) will be imposed on site roads, recognising that many of the access routes are also used by pedestrians and cyclists				
	c. Existing field access points would be used wherever possible				