



One Earth Solar Farm

Volume 7.0: Other Documents [EN010159]

Outline Operational Environmental Management Plan

December 2025

Document Reference: EN010159/APP/7.5.5

Revision 06

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
– Reg 5 (2) (q)

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Abbreviations and Acronyms

Term	Meaning
AAC	Areas of Archaeological Constraint
ACoW	Archaeological Clerk of Works
ACM	Asbestos containing materials
AGL	Above ground level
ALC	Agricultural Land Classification
BCT	Bat Conservation Trust
BESS	Battery Energy Storage Systems
BGL	Below ground level
BNG	Biodiversity Net Gain
CCTV	Closed Circuit Television
COSHH	Control of Substances Hazardous to Health
DCO	Development Consent Order
EA	Environment Agency
EIA	Environmental Impact Assessment
ERP	Emergency Response Plan
ES	Environmental Statement
ha	hectares
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
IBC	Intermediate Bulk Containers
ILP	Institute of Lighting Professionals
IR	Infrared
LEMP	Landscape and Ecological Management Plan

Term	Meaning
LGP	Low Ground Pressure
LGV	Light Goods Vehicle
MW	Megawatts
oBSMP	Outline Battery Safety Management Plan
oCEMP	Outline Construction Environmental Management Plan
oDEMP	Outline Decommissioning Environmental Management Plan (including restoration)
OEMP	Operational Environmental Management Plan
oOEMP	Outline Operational Environmental Management Plan
oPRoW MP	Outline Public Rights of Way Management Plan
oSMP	Outline Soil Management Plan
PCS	Power Conversion Systems
PIR	Passive Infra-Red
PPE	Personal Protective Equipment
PRoW	Public Rights of Way
PRoWMP	Public Rights of Way Management Plan
PV	Photovoltaic
RACIM	Responsible, Accountable, Consulted, Informed and Monitor
RAMS	Risk Assessment Method Statement
SMP	Soil Management Plan
SQEP	Suitable Qualified and Experienced Persons
SuDS	Sustainable Drainage Systems
TTM	Temporary Traffic Management

1. Introduction

1.1 Introduction

- 1.1.1 One Earth Solar Farm Ltd (hereafter referred to as the 'Applicant') has prepared this Outline Operational Environmental Management Plan (oOEMP) in relation to an application for a Development Consent Order (DCO) for the construction, operation and maintenance, and decommissioning of the One Earth Farm (hereafter referred to as the 'Proposed Development'). The terminology used in this document is defined in the **Glossary of Terms and Abbreviations [EN010159/APP/7.17]**.
- 1.1.2 This document has been updated at Deadline 3. The document references have not been updated from the original submission. Please refer to the **Guide to the Application [EN010159/APP/1.3.4]** for the list of current versions of documents.
- 1.1.3 The Proposed Development comprises the construction, operation and maintenance, and decommissioning of a solar photovoltaic (PV) array electricity generating facility. The project includes solar PV arrays, Battery Energy Storage Systems (BESS), onsite substations and associated grid connection infrastructure which will allow for the generation and export of electricity to the proposed National Grid High Marnham Substation. The Applicant has secured a connection agreement with National Grid which will allow export and import of up to 740 megawatts (MW) of electricity to the National Grid High Marnham Substation.
- 1.1.4 The purpose of the oOEMP is to provide the framework through which the Operational Environmental Management Plan(s) (OEMP(s)) and relevant preliminary information will be prepared, which in turn detail how environmental measures for the management of operational and maintenance activities will be achieved as part of the Proposed Development. This document does not address construction or decommissioning activities, which are subject to separate environmental management plans: **Outline Construction Environmental Management Plan [EN010159/APP/7.4]** (CEMP) and **Outline Decommissioning Environmental Management Plan [EN010159/APP/7.6]** (DEMP) included in the submission documentation.
- 1.1.5 Likely significant effects have been identified through the Environmental Impact Assessment (EIA) process and are reported in the Environmental Statement (ES). A range of 'standard' or best practice mitigation and operational management measures were accounted for in the assessments, and these will be implemented during the operational and maintenance phase of the Proposed Development. These mitigation measures will help to reduce the impact of the identified likely significant effects in addition to addressing the mitigation of other potential environmental effects. These matters have informed the development of the oOEMP. It also sets out the monitoring activities designed to ensure that such mitigation measures are carried out, and that they are effective.

- 1.1.6 An OEMP will be produced for the Proposed Development in accordance with this oOEMP prior to the date of operational commencement, and it will be produced in accordance with the Requirement in the **Draft DCO [EN010159/APP/3.1]**. It is envisaged that there could be multiple OEMPs, as a result the OEMP(s) being prepared, approved and implemented for specific works or phases of the Proposed Development.
- 1.1.7 The key elements of this oOEMP are:
- > An overview of the Site, Proposed Development and associated operational activities and programme;
 - > Prior assessment of potential environmental impacts (through the EIA);
 - > Proposed design and other mitigation measures to prevent or reduce likely significant effects;
 - > Monitoring and reporting of effectiveness of mitigation measures;
 - > Corrective action procedure; and
 - > Links to other complementary plans and procedures.
- 1.1.8 In summary, this oOEMP identifies how commitments made in the ES will be translated into actions and includes a process from implementing the actions through to the allocation of key roles and responsibilities.
- 1.1.9 The appointed contractor(s) will be responsible for working in accordance with the environmental controls documented in the oOEMP and for the preparation and implementation of the OEMP.
- 1.1.10 This oOEMP has been designed with the objective of compliance with the relevant environmental legislation and mitigation measures set out within the ES.
- 1.1.11 Any additional licences, permits, or approvals that are required will be listed in the OEMP, including any environmental information submitted in respect of them.

1.2 Complementary Plans and Procedures

- 1.2.1 A suite of complementary environmental plans and procedures for the operational phase will be developed alongside the OEMP/have been included within the DCO application and set out proposed mitigation for the operational phase, and further detailed plans will be prepared for further approval.
- 1.2.2 These documents include:
- > **Outline Design Parameters [EN010159/APP/5.9];**

- > **Outline Landscape and Ecology Management Plan [EN010159/APP/7.7];**
- > **Outline Soil Management Plan [EN010159/APP/7.10];**
- > **Outline Battery Safety Management Plan [EN010159/APP/7.11]; and**
- > **Outline Surface Water Drainage Strategy Plans [EN010159/APP/2.6].**

1.3 The Site

- 1.3.1 A description of the Site is included in **ES Volume 1.0, Chapter 3: Description of the Site and Surrounding Area [EN010159/APP/6.3].**

1.4 The Proposed Development

- 1.4.1 A description of the Proposed Development is presented in **ES Volume 1, Chapter 5: Description of the Proposed Development [EN010159/APP/6.5].**

2. Operational Environmental Management

2.1 Introduction

- 2.1.1 This section sets out the general site arrangements for the operational phase of the Proposed Development.

2.2 Operational Activities

- 2.2.1 During the operational phase, activity within the Proposed Development will be minimal and will be restricted principally to vegetation management, equipment maintenance and servicing, replacement and renewal of any components that fail, and monitoring and inspection. It is anticipated that maintenance and servicing would include the inspection, removal, reconstruction, refurbishment or replacement of faulty or broken equipment to ensure the continued effective operation of the Proposed Development. Along the grid connection corridor operational activity will consist of routine inspections (schedule to be determined) and any reactive maintenance such as where a cable has been damaged.
- 2.2.2 It is anticipated that there will be up to 15 full time equivalent permanent staff employed during the operational phase, who will be based at the operations and maintenance hubs at the east and west substations when onsite only. Additional staffing/visitors such as maintenance workers and deliveries will be ad hoc as needed. It is assumed that this will equate to four days of additional worker time per month. It is expected that there typically would only be approximately three people at the east and west substation respectively. For major maintenance activities, these will be coordinated as outlined in Section 2.14 (replacement Schedule)
- 2.2.3 Any operational maintenance activities required to be undertaken on trenchless (e.g. Horizontal Directional Drilling (HDD)) cable sections within the grid connection corridor are expected to be undertaken within existing joint bays installed during construction.
- 2.2.4 Additionally, the cleaning of solar PV panels is anticipated to be undertaken every two years, as detailed in **Section 2.7** later within this document.

2.3 Roles and Responsibilities

- 2.3.1 Key roles and responsibilities during the operation phase in managing environmental impacts will likely include, but are not limited to:

> Site Manager – Overall responsibility for activity onsite.

- > Environment Manager - Responsible for the overall management of environmental aspects on site, ensuring environmental legislation and best practices are complied with, and environmental mitigation and monitoring measures identified are implemented. The Environmental Manager will oversee environmental monitoring on-site and carry out regular environmental site inspections, reporting and responding to any incidents or non-compliance. The Environment Manager will liaise with relevant environmental bodies and other third parties as appropriate.
- > Flood Warden – There will be a dedicated responsibility to be prepared for, and manage, the response to flood incidents.
- > Health and Safety Manager – Responsible for the monitoring and controlling of health and safety compliance and related rules and regulations on-site.

2.3.2 The roles and responsibilities for different tasks are listed in **Table 2-1** using a RACIM (Responsible, Accountable, Consulted, Informed and Monitor) system.

2.3.3 These roles and responsibilities are indicative and will be confirmed in the OEMP(s).

Table 2-1: Project roles and environmental responsibilities

Process Task	Role ¹		
	Site Manager	Environmental Manager	Health and Safety Manager / Flood Warden
Developing and maintaining the OEMP	A	R	C
Monitor environmental aspects through review of operation method statement, identify and control issues	A	R	R
Monitoring operations to ensure any necessary environmental issues and control measures are in place; ensuring they are effectively communicated, appropriate and implemented on site	A	R	C
Ensuring the work is performed by trained and qualified staff, and providing training where necessary	A	R	C

¹ RACIM Details

R – Responsible: The individual(s) who perform an activity responsible for action/implementation – although usually only one, R's can be shared.

A – Accountable: The individual who is ultimately accountable including yes/no decision and power of veto – only one (A) can be assigned.

C – Consulted: The individual(s) to be consulted prior to a final decision being made of action taken – two-way communication.

I – Informed: The individual(s) who need to be informed after a decision is made or action is taken – one-way communication.

M – Monitor: Monitor the delivery of the proposed development on behalf of third parties and report on compliance.

Process Task	Role ¹		
	Site Manager	Environmental Manager	Health and Safety Manager / Flood Warden
Ensuring the adequate resources are allocated for environmental management	R	M	I
Ensuring that all relevant environmental documentation and information (including permission, consents, permits and assessments) is communicated	R	M	C
Regular site inspections and maintaining a record of environmental performance, and reporting performance and monitoring environmental performance	C	M	R
Following good practice and minimising impact on the environment	A	M	R
Understanding project environmental obligations and mitigation measures	A	M	R
Liaison with local authority, other statutory bodies, members of the public, press and the media	A	M	R
Supporting all site staff with environmental management including reviewing and commenting on method statements and risk assessments	R	M	R
Ensuring that the environmental policy of the Applicant is delivered	A	M	R

Process Task	Role ¹		
	Site Manager	Environmental Manager	Health and Safety Manager / Flood Warden
Providing information on waste management/reduction procedures to relevant staff	A	M	R

2.4 Operational Programme

- 2.4.1 The design life of the Proposed Development is 60 years with decommissioning to commence 60 years after final commissioning (currently anticipated to be 2030 to 2090).
- 2.4.2 During the operational phase the Proposed Development will be monitored 24/7. Any maintenance activities will be programmed between 08:00 to 18:00 Monday to Friday where practicable, to avoid the need for artificial lighting, although occasional weekend working may be required. Night-time working is not generally expected but may occur at times, such as for emergency repairs or maintenance, and if needed to clean the panels.

2.5 Control of Light

- 2.5.1 The general principles of the lighting design in the operational phase are set out below.
- 2.5.2 During operation, the solar PV areas will not require artificial lighting other than during temporary periods of maintenance/repair. All routine maintenance activities, except panel cleaning, will be scheduled for daylight hours as far as is practicable, and therefore it is anticipated that focused task specific lighting should only be required in the event of emergency works/equipment failure requiring night-time working or panel cleaning operations.
- 2.5.3 As further described in **Section 2.7**, it is estimated that the solar PV panels would be cleaned every two years. The panels would be cleaned at night or early morning when they are cool. The current preferred solution for cleaning operations would be lit by tractor mounted lighting which is akin to that used during night-time arable harvesting operations which are currently undertaken within the Site.
- 2.5.4 As they are containerised units, the Power Conversion Systems (PCS) may also contain internal artificial lighting (to be manually activated when needed), but light spillage would be minimal (through doorway when the entrance to the PCS is open).
- 2.5.5 It is anticipated that the compound for the two grid connection substations will have inward facing Passive Infra-Red (PIR) controlled security lighting installed at each corner of the compound. As for the solar PV areas, all routine maintenance activities will be scheduled for daylight hours as far as is practicable, and focused task specific lighting should only be required in the event of emergency works/equipment failure requiring night-time working.
- 2.5.6 It is anticipated that there will be internal lighting within the control buildings for the substations, but that light spillage from these would be minimal (through open

doorway only), outside task specific and fixed 'general' lighting may be required in winter periods (early mornings and evenings) to meet safety requirements. Outside of core working hours PIR controlled lights (motion sensors) will be used.

- 2.5.7 At the operations and maintenance hub at the east and west substation, task specific and fixed 'general' lighting may be required in winter periods (early mornings and evenings) to meet safety requirements. Outside of core working hours PIR controlled lights (motion sensors) will be used. The buildings will be fitted with internal lighting, but light spillage would be minimal (through open doorway and the windows of the offices only).
- 2.5.8 Lighting will be directional with care to minimise potential for light spillage beyond the Site particularly towards houses, live traffic, and habitats, and will be designed with reference to the Institute of Lighting Professionals (ILP) Guidance Notes (in particular GN-8/23: Bats and Artificial Lighting at Night (Ref. 2) which was produced in collaboration with the Bat Conservation Trust (BCT), and GN-1: Reduction of Obtrusive Light (Ref. 3) in so far as it is reasonably practicable
- 2.5.9 This includes the implementation of measures such as:
- > Lights will be of the minimum brightness and/or power rating capable of performing the desired function;
 - > Light fittings will be used that reduce the amount of light emitted above the horizontal (reduce upward lighting);
 - > Light fittings will be positioned correctly, inward facing and directed downwards;
 - > Direction of lights will seek to avoid spillage onto neighbouring properties, habitats, highway, or waterway; and
 - > PIR controlled lights (motion sensors) will be used except where temporary focused task specific lighting is required.

2.6 Operational Traffic and Access

- 2.6.1 Heavy Goods Vehicle (HGV) movements are anticipated to be low across the 60-year operational period. It is expected that most deliveries will be by Light Goods Vehicle (LGV) or car.
- 2.6.2 In the event of large-scale replacements of components being required, it is anticipated that the procedure will be done gradually over a period of time to minimise the number of HGVs movements to the site.
- 2.6.3 A small number of private vehicles for the three permanent staff and ad hoc maintenance workers and visitors will also use the local road network along with light goods maintenance and delivery vehicles when required.

- 2.6.4 Accesses into the site installed during the construction phase (either new accesses or modified/extended existing accesses) will remain in place during the operational phase.
- 2.6.5 It is anticipated that any components which are removed (replaced) will be transported to the Proposed Development's storage facilities by LGV. Once a sufficient volume of waste has been accumulated to make a 'load' for transport off-site, it is anticipated that these movements will also be undertaken by LGV (i.e., not HGV).
- 2.6.6 Parking provisions will be provided on hardstanding at the operations and maintenance hub at the east and west substations and within solar PV areas, likely adjacent/part of PCS. Within the cable corridors parking will be off the carriageway.
- 2.6.7 Further details on transport and access are presented in **Table 3-8**.

2.7 Panel Cleaning

- 2.7.1 The panel cleaning requirements for the Proposed Development can only be accurately determined once operational; therefore, this oOEMP assumes a two-year cleaning cycle.
- 2.7.2 Panel cleaning would be achieved using a tractor mounted cleaning system with a rotating 'car-wash' type brush. It is anticipated that water would be brought to Site in 1 m³ (intermediate bulk containers (IBC)). Individual IBCs would be mounted on the rear of the tractor to provide water supply during cleaning.
- 2.7.3 Panels would be cleaned at night or early morning when they are cool, as applying cold water to warm panels can lead to thermal shock and the risk of micro-cracks to the panel surface. Cleaning operations typically commence at sunset and finish prior to the panels heating up in the morning.
- 2.7.4 As the use of cleaning products (chemicals) can damage panels and void manufacturer's warranties, no cleaning products would be used, only clean deionised water.
- 2.7.5 Dry-cleaning would not be employed as the action of the dry brush and any dust present on the panel surface would likely result in the formation of micro-scratches. Such scratches would likely attract/harbour more dirt on the panel surface decreasing efficiency and potentially voiding manufacturer's warranties.

2.8 Management of Vegetation Planting

- 2.8.1 An **Outline Landscape and Ecology Management Plan [EN010159/APP/7.7]** has been prepared and submitted as part of the DCO Application. The oLEMP

provides an outline for delivering the landscape strategy and the successful establishment and future management of proposed landscape works associated with the Proposed Development. It sets out the short and long-term measures and practices that will be implemented to establish, monitor, and manage landscape and ecology mitigation and enhancement (biodiversity net gain) measures embedded in the design.

2.8.2 The oLEMP sets out the measures proposed:

- > To mitigate the effects of the Proposed Development on landscape, biodiversity, and heritage features;
- > To enhance the biodiversity, landscape, and green infrastructure value of the Order Limits; and
- > To secure compliance with relevant national and local planning policies.

2.8.3 A Landscape and Ecology Management Plan (LEMP) will be prepared in accordance with the oLEMP and will be submitted to and approved by the relevant local planning authority prior to construction, as secured through a requirement in the DCO. This will include provisions in respect of on-going maintenance and management of the landscape and ecology.

2.9 Recovery, Recycling and Disposal of Waste

2.9.1 Details of the waste strategy are presented in the **Site Waste Management Plan [EN010159/APP/7.12]**.

2.9.2 The Applicant is committed to 100% reuse and recycling of solar panels during operation.

2.9.3 The Contactor will separate the main waste streams on-site, prior to transport to an approved, licensed third party waste facility for recovery, recycling or disposal.

2.9.4 Waste Duty of Care will be ensured with respect to all waste generated on Site. All waste to be removed from the Order Limits will be undertaken by fully licensed waste carriers and taken to suitably licensed waste management facilities and managed in line with the requirements of the Waste (England and Wales) Regulations (2011) and the Hazardous Waste (England and Wales) Regulations (2005) (as amended). The Scheme will apply the waste management hierarchy, in priority order: prevention, preparation for reuse, recycle, other recovery and disposal.

2.9.5 To ensure the cumulative generation of waste is managed appropriately, the Applicant commits to working collaboratively to:

- > Share data and reporting on waste types and volumes to support regional waste planning and avoid overburdening local waste infrastructure;

- > Engage with the host authorities and waste planning bodies to ensure consistency with regional waste management strategies and capacity constraints; and
- > Review and update waste mitigation measures regularly through continued dialogue with other developers post-consent.

2.10 Water Supply

- 2.10.1 During operation self-contained portable welfare units which store foul/wastewater for collection/emptying by specialist licenced contractors will be deployed on an ad hoc basis (e.g., if required by maintenance crews) at the further reaching sites where the use of the facilities at the operations and maintenance hub is not feasible.
- 2.10.2 Water for panel cleaning will be brought to Site in 1m³ IBC or filled at a water supply at the maintenance facilities.

2.11 Security

- 2.11.1 The Applicant should ensure security risk management threat assessments are undertaken for the Site during its development, construction, operation, and ultimately decommissioning phases. These security risk management threat assessments are to be conducted by suitably qualified and experienced persons (SQEP) and will determine security risks.
- 2.11.2 The Applicant recognises, and embraces, the symbiotic relationship between safety and security. The security arrangements to be present at the Site will therefore contribute to the overall safety of all who will, or may, enter the site. The security arrangements will be SQEP reviewed at identified epochs commensurate to the security risk rating and will further assess any changes in the security risk management threat assessments.
- 2.11.3 The solar PV site perimeter fence will enclose the operational areas of the Proposed Development. The fence will be a stock proof mesh-type security fence with wooden posts up to 2m in height.
- 2.11.4 Post mounted internal facing closed circuit television (CCTV) systems will be installed around the perimeter of the operational areas of the solar PV site. The wooden mounting posts will be directly driven into the ground using a standard post driver. There will be no excavation of foundations or 'concreting in' of posts. The power supply and communication (fibre optic) cables to the cameras will be underground.
- 2.11.5 The perimeter CCTV system will be mounted on CCTV towers approximately 4m high. These CCTV cameras will have fixed, inward-facing viewsheds and will be aligned to capture only the Proposed Development fence and the area inside the fence, thereby not capturing publicly accessible areas. The poles will be

positioned at every change in direction to the fence, and the anticipated spacing is every 50m along straight sections. The CCTV will use thermal imaging and infrared (IR) lighting to provide night vision functionality meaning that no visible lighting will be needed for security.

- 2.11.6 The grid connection substations and BESS compounds will be securely fenced with galvanised palisade security fencing. The fencing would be at a maximum height of 2.4 m. There would be a perimeter fence around both grid connection substation compounds, with a secure gated access point. Additional internal fencing would be erected around each of the grid connection substation compounds to allow works to be undertaken in one substation without having to shut down the other.
- 2.11.7 The operations and maintenance hub will be manned throughout the day, night-time security will be provided by CCTV (as above).

2.12 Responding to Environmental Incidents and Emergencies

- 2.12.1 An Emergency Response Plan (ERP) will be developed in consultation with the relevant local authority emergency planning officer, emergency services including the local fire service, as well as the Environment Agency (EA) in relation to responding to flood warnings and events.
- 2.12.2 The plan will detail the procedures for responding to incidents and emergencies on site, and any reporting.

2.13 In the event of Period of Extended Outage

- 2.13.1 The Applicant must provide notice to the relevant planning authority once any part of the authorised development stops generating electricity for a continuous period of 12 months for non-maintenance reasons ("Period of Extended Outage"). When giving such notice the Applicant must provide details of the steps it is taking to rectify the issue along with an expected timeframe for when generation is predicted to re-commence operation. The Applicant agrees to keep the relevant planning authorities updated following the Period of Extended Outage until the re-commencement of operation.
- 2.13.2 In the event that the equipment/plant is still inoperative after an additional period of 24 months from the first Period of Extended Outage (resulting in a continuous period of 36 months of outage), subject to paragraph 2.13.3, the Applicant must submit a decommissioning environmental management plan to the relevant planning authority for that part of the authorised development and decommissioning of that part of the authorised development must take place in accordance with the approved plan.
- 2.13.3 Paragraph 2.13.2 does not apply if:

- > it was a force majeure event;
- > the outage occurred as a result of National Grid undertaking any activities to High Marnham Substation and/or the transmission network; or
- > the relevant planning authority agree otherwise (acting reasonably), including where the relevant planning authority agree otherwise following decommissioning commencing pursuant to an approved decommissioning environmental management plan.

2.13.4 For the purpose of paragraph 2.13.3 a 'force majeure event' means an event or circumstance which is beyond the reasonable control of the Applicant which will include but is not limited to an act of God, war, civil disturbance, statutory prohibition, disruption to or issues with supply chains, Government intervention, order or act of Government or local/public authority, acts of terrorism, fire, lightning, flood, adverse weather conditions, prevention of access to any site as a consequence of any local, regional or national restriction on movement in consequence of a health emergency, or otherwise to prevent the spread of any communicable disease, explosion, accident, theft, vandalism or national strike action.

2.14 Replacement Schedule

2.14.1 During the operational phase of the Proposed Development, various solar infrastructure components will likely require replacement as shown in **Table 2-2** based on replacement rates for similar schemes and based on the design life of the components. As components approach their design life, there will be an evaluation to determine if the components require maintenance and/or replacing. It is not anticipated that wholesale maintenance or replacement would be required but rather it would be programmed in stages to maintain the electrical export to the National Grid.

2.14.2 Every 12 months from the date of final commissioning and before undertaking the replacement of components for the year ahead, the Applicant will submit a planned replacement schedule for the components identified in Table 2-2 for the year ahead to the relevant planning authorities, excluding unforeseen circumstances that require replacement throughout the year. Unforeseen circumstances that require replacement throughout the year are considered to include activities that are needed to be undertaken for operational failure, health, safety or environmental reasons in response to an event or circumstance which happens unexpectedly. As part of the replacement schedule, the Applicant will also inform the relevant planning authority when a Proposed Development component is no longer operational and requires final decommissioning.

2.14.3 The annual planned replacement schedule must include the following details as a minimum:

- > The extent and nature of the scheduled replacement (including waste estimates and proposed waste management routes);

- > Details of any trees that requires removal and if they are proposed to be replaced;
- > Details of transport requirements;
- > The proposed timing of such replacement; and
- > Confirmation that the environmental effects that are likely to arise as a result of such replacement and the environmental controls to be implemented are not materially worse than those reported in the ES.

2.14.4 The Applicant will further notify the relevant planning authorities of any replacement that has been undertaken as a result of unforeseen circumstances. Such notification shall be given as soon as practically possible but no later than 14 days from the unforeseen circumstances occurring. Such notification shall include details of the extent and nature of the replacement.

2.14.5 Excluding unforeseen circumstances and unless otherwise agreed with the relevant planning authorities, the Applicant will not undertake replacement activities outside of the planned replacement schedule.

Table 2-2 Indicative Design Life of Scheme Components

Scheme Component	Indicative Design Life
Solar Panels (PV Modules)	25-40 years
Inverters	10-20 years
Racking and Mounting Systems	Replacement not anticipated
Above Ground Electrical Wiring and Cabling	25-30 years
Transformers	Replacement not anticipated
Monitoring and Control Systems	10-20 years
Batteries	5-15 years
Meteorological Sensors	5-15 years
Substation Equipment	Replacement not anticipated
Communication Equipment	10-20 years

3. Mitigation and Monitoring

3.1 Purpose

- 3.1.1 This section of the oOEMP sets out the mitigation measures to be included as a minimum in the oOEMP. It also sets out monitoring requirements and the responsible party identified for each mitigation measure or monitoring requirement. This section will be updated and expanded upon as part of the preparation of the oOEMP.
- 3.1.2 The overall responsibility for the impacts mentioned in **Table 3-1** to **Table 3-15** will be with the Applicant (who will be the Operator of the Proposed Development). Specific responsibilities will be confirmed in the oOEMP.
- 3.1.3 For the impacts mentioned in, the overall responsibility will also be with the Applicant and specific responsibilities will be confirmed in the oOEMP, Sustainable Drainage Systems (SuDS) Maintenance Schedule, and Flood Management Plan.

Table 3-1: Climate Change

Potential Impact	Mitigation Measure	Monitoring
Greenhouse gas emissions from the operational maintenance activities required during operation of Proposed Development.	<p>Use of thermal/IR CCTV system to avoid permanent lighting and reduce energy demand of the Proposed Development (see Section 2.11).</p> <p>Establish, monitor, and manage landscape and ecology mitigation and enhancement (Biodiversity Net Gain (BNG)) measures embedded in the design, secured through ES Volume 2.0, Chapter 6: Biodiversity [EN010159/APP/6.6], which has been submitted as part of the DCO Application.</p> <p>Regular maintenance of the Proposed Development will be conducted to optimise the efficiency of the Proposed Development infrastructure.</p> <p>Operating the Proposed Development in such a way as to minimise the creation of waste and maximise the use of alternative materials with lower embodied carbon, such as locally sourced products and materials with higher recycled content; and</p> <p>Switching off vehicles and plant when not in use and ensuring vehicles conform to current EU emissions standards.</p> <p>In addition, adaptation measures to reduce the effect of projected temperature increases on electrical equipment over the course of the Proposed Development's design life have been considered.</p> <ul style="list-style-type: none"> • PV PCS will have a cooling system installed to control the temperature and allow the PCS to operate efficiently in warmer conditions. • The PV modules and transformers have a wide range of acceptable operation temperatures, and it has been determined that increasing temperatures will not adversely affect their operation. <p>Consideration will also be given to the UKCP18 climate change projections outlined in ES Volume 2.0, Chapter 14: Carbon and Climate Change [EN010106/APP/6.14], and the resilience of the Proposed Development's infrastructure to these, through the detailed design process.</p>	N/A

Table 3-2: Buried Heritage

Potential Impact	Mitigation Measure	Monitoring
Potential for impact upon buried heritage deposits/features	<p>An Archaeological Clerk of Works (ACoW) will be appointed for the Maintenance Phase who will be reviewing and overseeing all the proposed works on Site. The ACoW will be notified of any development works during the Decommissioning phase that fall outside areas previously disturbed by Construction-phase groundworks. If such works are expected to affect known archaeological remains identified during evaluation or are expected to have a high magnitude of impact in areas where no remains were identified, they will be notified to the Archaeological Advisory Teams to the LPAs and Historic England. Any additional evaluation or mitigation required will be limited to the proposed works beyond the original construction footprint and must be agreed with Archaeological Advisory Teams to the LPAs and Historic England prior to the undertaking. Requirements will be set out in the Archaeological Mitigation Strategy and compliance with measures regularly recorded via an appropriate method to be determined in the DEMP.</p> <p>Areas of Archaeological Constraint (AAC) will be defined within the layout of the Proposed Development to protect and preserve significant buried heritage remains. The areas defined will be demarcated by fencing to prevent accidental entry and damage during operation and maintenance of the Proposed Development. A programme of monitoring of the condition of the fencing and land within each AAC throughout operation and maintenance of the Proposed Development will be agreed by the Applicant and Operator of the Proposed Development.</p> <p>Any area of buried heritage value, including but not limited to AAC, will be protected during operation and maintenance.</p>	<p>Outline Written Scheme of Investigations – cover the allowances and role of the ACoW for the Maintenance phase.</p> <p>Specific requirements and frequency of the monitoring will be confirmed in the OEMP.</p> <p>An Archaeological Clerk of Works (ACoW) will be appointed for the Operation and Maintenance Phase who will be reviewing and monitoring all works on Site. Requirements will be set out in the Archaeological Mitigation Strategy and compliance with measures regularly recorded via an appropriate method to be determined in the OEMP.</p>

	<p>The Archaeological Clerk of Works (ACoW) will be notified of any development works during the Maintenance and Decommissioning phases that fall outside areas previously disturbed by Construction-phase groundworks. If such works are expected to affect known archaeological remains, identified during evaluation, or Areas of Archaeological Constraints (AAC), or are expected to have a high magnitude of impact in areas where no remains were identified, they will be assessed and any required evaluation or mitigation will be discussed with the Archaeological Advisory Teams to the LPAs and Historic England.</p>	
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Table 3-3: Ecology

Potential Impact	Mitigation Measure	Monitoring
Disturbance to protected and notable species and associated habitat from artificial lighting.	<p>During operation, the solar PV areas will not require artificial lighting other than during temporary periods of maintenance/repair. All routine maintenance activities, except panel cleaning, will be scheduled for daylight hours as far as is practicable, and therefore it is anticipated that focussed task specific lighting should only be required in the event of emergency works/equipment failure requiring night-time working or panel cleaning operations (Section 2.4).</p> <p>Section 2.5 details the control of light during the operational period and Section 2.5.3 discusses lighting during panel cleaning.</p> <p>Where lighting is required during operation, it will conform to best practice guidelines with respect to minimising light spill into adjacent habitats and prevent disturbance to bats and other species.</p>	N/A
Impacts on aquatic habitats/species and water-dependent nature conservation sites	<p>Outline Surface Water Drainage Strategy Plans [EN010159/APP/2.6] have been developed and include measures to manage surface water runoff from the grid connection substations and BESS compound areas during operation. The incorporation of SuDS measures will reduce the likelihood and severity of potential pollution incidents to reduce or eliminate adverse effects for aquatic and riparian species and habitats. A detailed Surface Water Drainage Strategy for the grid connection substations and BESS compounds (based on the detailed design and infiltration testing data) will be developed post-consent.</p>	<p>Regular recording of compliance in a logbook. The OEMP will detail the frequency.</p> <p>The OEMP will include a regular schedule for visual inspection of the panels and all other equipment.</p>



Potential Impact	Mitigation Measure	Monitoring
Reduction in habitat connectivity	The solar PV site perimeter fence design (stock proof mesh-type security fence with wooden posts) will include gaps at the base to allow mammals that may use retained habitats, including, badger, brown hares and hedgehog, to pass underneath at strategic locations, thereby retaining connectivity across the Proposed Development.	Monitored by Environmental Manager during operation to ensure mitigation measures remain in place.
Reduction in habitat quality	Habitats within the Site will be managed to achieve BNG targets (as detailed in ES Volume 3.0, Appendix 6.10: Biodiversity Net Gain Assessment [EN010159/APP/6.21]) and to provide suitable habitat for a range of protected and notable species during the operational phase of the Proposed Development. Habitat management principles are outlined in the Outline Landscape and Ecology Management Plan [EN010159/APP/7.7] and will be confirmed in the LEMP. This includes management and monitoring of artificial bird and bat habitat boxes, and any wetland features created for wading birds. Grassland will be managed by mowing/strimming.	Monitoring requirements, frequency and responsibility is outlined in Outline Landscape and Ecology Management Plan [EN010159/APP/7.7] and will be confirmed in the LEMP.

Table 3-4: Water Environment

Potential Impact	Mitigation Measure	Monitoring
Impacts on surface water and groundwater quality (which inherently includes impacts on surface water and groundwater abstractions) from run-off, firefighting events, and the potential for accidental spillages from new permanent hardstanding and maintenance activities.	<p>Watercourse buffers will be 10m from solar array infrastructure (except in the case of open-cut cable installation and access tracks that cross the watercourse). A minimum buffer of 16m from the River Trent will be implemented with will reduce the risk of pollutants entering the watercourse directly. For small channel watercourses/agricultural drainage channels this would be measured from the top of bank as required by Internal Drainage Boards (IDBs). For larger watercourses with channel widths typically greater than 3m, this would be measured from the water's edge / channel extents under normal flow conditions.</p> <p>The current arable fields are treated with fertiliser and pesticides. During the life of the project the use of such chemicals will be ceased which will lead to beneficial impacts on the water environment.</p> <p>Panels will be cleaned with clean deionised water only, which avoids the use of chemicals which may otherwise have entered the water environment (see Section 2.7).</p> <p>Should any herbicide or other spray chemical be needed in small volumes, a method statement, operating procedure or similar will be prepared prior to the work commencing. This will include measures to protect ground and surface water, including working in dry weather and not in high winds, and maintaining appropriate buffers from watercourses. Application of chemicals would only be carried out by suitably competent personnel using products approved for UK use with adherence to manufacturer's instructions. Further details are outlined in the oLEMP. [EN010159/APP/7.7]</p> <p>The proposed drainage strategies for the BESS compound areas and Substations include SuDS to provide appropriate treatment following rainfall events. Furthermore, these areas and the SuDS features serving them would include an impermeable lining to prevent infiltration to the ground as well as automatic penstock valves (with a manual backup) at the outlets to ensure that any runoff generated during a polluting event (e.g. fire) would be isolated and prevented from discharging to surrounding watercourses. Any polluted runoff will be contained and removed from the Site for treatment.</p>	<p>Regular recording of compliance in a logbook. The OEMP(s) will detail the frequency.</p> <p>The OEMP(s) will include a regular schedule for visual inspection of the panels and all other equipment, including the surface water drainage network.</p> <p>Water quality monitoring will be required during the operational period. Details of this monitoring will be set out within the OEMP post-consent, as well as the Water Management Plan.</p> <p>Fire water run-off will be tested before being released. Detailed testing requirements will be set out in the BSMP and OEMP post-consent.</p>

Potential Impact	Mitigation Measure	Monitoring
Potential impact of fluvial or pluvial flooding.	<p>Large areas of the Site are shown to be within Flood Zones 2 and 3, indicating a medium to high probability of flooding from rivers and the sea. This flooding is considered to originate and be predominantly associated with the River Trent which flows through the centre of the Site, however as set out previously, there are several ordinary watercourses within the Site which are hydraulically connected to the River Trent.</p> <p>Within flood zones, the PCS will be mounted on stilts at least 300mm above the design flood level to allow flood water to move beneath the PCS', should there be a flood event. The stilts will be pile driven, up to 3m below ground level (BGL). Within the areas of potential flooding, the height of the PCS' will not exceed 6m above ground level (AGL).</p> <p>The minimum height of the lowest part of the mounting structure for solar panels will be 0.7m AGL outside areas of potential flooding and up to 1.8m AGL in areas of potential flood. Further information is in the hydrology chapter, found in ES Volume 2.0, Chapter 7: Hydrology and Hydrogeology [EN010159/APP/6.7].</p> <p>It will be ensured that the base of the flood panels located in the design flood extent can be reasonably raised to be 1.8m AGL. Considering a 300mm freeboard (i.e. gap between the flood level and base of the panels), the depth of flooding that has been used to inform where panels can be located is 1.5m.</p> <p>In general, it is proposed that solar panels will not be located in areas where flood depths exceed 1.5m to ensure that the solar array will remain operational in flood conditions. There are however some localised positions where this is not feasible, namely to the far eastern boundary of the Site and on the western banks of the River Trent. Although in these locations, the depth of flooding will be greater than 1.5m, many of the panels set at 1.8m AGL will still be above the flood level but will have a freeboard of less than 300mm.</p> <p>The Grid connection substations and battery units will be located in an area outside of the fluvial and pluvial design flood extents, as well as the indicative breach extent to offer an additional level of resilience to the most sensitive infrastructure.</p>	The Flood Management Plan will include a schedule of post-flood / recovery actions, including the visual inspection of infrastructure.

Potential Impact	Mitigation Measure	Monitoring
	<p>A Flood Management Plan would be put in place to outline the procedure for signing up to flood alerts and warnings from the EA and to identify actions (e.g. clearing debris, checking infrastructure for damage, etc.) to aid in recovery should the site flood.</p>	
<p>Potential impacts on the rate and volumes of surface water run-off entering local watercourses and increasing the risk of flooding.</p>	<p>For the solar array, it is proposed that rainfall hitting the panels will simply discharge to the retained natural ground beneath, therefore having little to no effect when compared to the greenfield scenario. It is however proposed that SuDS will be incorporated wherever possible within the solar development, to provide multi-functional benefits associated with water quantity, quality and biodiversity.</p> <p>Outline Surface Water Drainage Strategy Plans [EN010159/APP/2.6] have been developed and includes measures to manage surface water runoff from the grid connection substations and BESS infrastructure during operation, where large areas of impermeable surfacing is proposed. The incorporation of a surface water drainage strategy will reduce the likelihood and severity of potential pollution incidents and flooding affecting downstream areas. A detailed Surface Water Drainage Strategy for the Grid connection substations will be developed post-consent, although this will be informed by the outline strategy which includes the following parameters:</p> <ul style="list-style-type: none"> Discharge will be made from the Site in line with the drainage hierarchy. Where discharges are to be made to the surrounding watercourse, they will be restricted to the Qbar greenfield rate. Attenuation features in the form of basins are to be designed to attenuate flows for all events up to and including the 1 in 100 year plus climate change storm event. The basins will include an area below the outlet level to allow for water to be retained within the basin for biodiversity purposes. The drainage network will be tanked, with penstock valves located at the basin outlets to ensure that any runoff generated during a polluting event (e.g. fire) would be isolated before being removed from the Site. 	<p>The OEMP will include a detailed SuDS Maintenance Schedule that sets out maintenance tasks and their frequency. The detailed schedule will be based on the principles set out in Table 4-10 (Indicative SuDS Maintenance Schedule) of the Flood Risk Assessment.</p>

Potential Impact	Mitigation Measure	Monitoring
Potential impacts on hydrology as a result of the Proposed Development. This may also have a subsequent effect on aquatic habitats and water-dependent nature conservation sites.	<p>Works to the watercourses as a result of the Proposed Development have been kept to a minimum.</p> <p>As above, bridging over watercourses to facilitate access will be kept to a minimum and any openings required will be sized accordingly to ensure there would be no constraint to flows.</p>	
Impacts towards potable water	If at detailed design, it is confirmed that potable water demand at the construction or operational stage is in excess of 20m ³ /day, then a Water Resource Assessment will be produced in consultation within Anglian Water.	
Impacts as a result of culverts	The location and details of any proposed culverts is to be confirmed at detailed design and their design progressed in consultation with the Environment Agency, Lead Local Flood Authority and Internal Drainage Board as necessary.	

Table 3-5: Landscape and Visual Amenity

Potential Impact	Mitigation Measure	Monitoring
Lighting on residential, Public Rights of Way (PRoW) and road receptors	The control of lighting in the operational phase of the development is presented in Section 2.5 and will prevent nuisance light to residential, road and PRoW receptors.	Daily checks of operational areas will note any instances where lighting requires adjustment.



Potential to impact on residential and road receptors	New and existing hedgerows will be managed and maintained and allowed to increase in height to approximately 3m, with a width of 2-3m.	Monitoring of planting is provided in Outline Landscape and Ecology Management Plan [EN010159/APP/7.7]
Potential visual heritage impacts associated with the Proposed Development	Control of lighting and noise during operational phase to minimise intrusion in the context of heritage assets.	Monitoring of planting is provided in Outline Landscape and Ecology Management Plan [EN010159/APP/7.7]

Table 3-6: Noise and Vibration

Potential Impact	Mitigation Measure	Monitoring
Noise and vibration from operational equipment.	<p>A commitment that noise at sensitive receptors will be no higher than the levels presented in ES Volume 2.0, Chapter 15: Noise and Vibration [EN010159/APP6.15]. This will be achieved by the implementation of the embedded mitigation measures summarised as follows:</p> <ul style="list-style-type: none"> • Plant selection; and • Design Location and orientation of Field Station Units / Field Substations, and the Grid connection substations to minimise noise at receptors. <p>Plant that will be used in the Proposed Development has not yet been finalised. Where practicable quieter plant than that considered in EIA will be incorporated into the final design. Quieter plant would be the most effective way of controlling noise emissions. Operational noise is controlled by Requirement 16 of the DCO.</p>	Noise monitoring will be undertaken during commissioning. The OEMP(s) will detail the frequency.

Potential Impact	Mitigation Measure	Monitoring
	<p>Low frequency noise can be very difficult to predict with a high level of certainty and similarly hard to identify and resolve if present. This is because it can be generated by the unexpected interactions between system components and can be amplified by the geometry of the site and receptor buildings. The issue of low frequency noise will be considered during the detailed design post consent for the Grid connection substations and eliminated through design, or appropriately mitigated (isolation and attenuation measures).</p> <p>The BESS equipment and substations will be located at a distance of at least 300m from residential properties and will be designed to result in a maximum rating level during night-time hours at residential properties of 35 dB(A).</p> <p>The technical specifications for the BESS and substation equipment is to include a noise report, to demonstrate that the design of the plant and equipment meets the 35 dB(A) noise limit.</p>	

Table 3-7: Socio-Economics and Land Use

Potential Impact	Mitigation Measure	Monitoring
Disruption to users of Public Rights of Way (PRoW)	<p>An Outline Public Rights of Way Management Plan [EN010159/APP/7.14] (oPROW MP) is presented with the DCO Application and considers the management of PRoW during operation. This will be updated, and measures incorporated into the OEMP. The oPROW MP states:</p> <ul style="list-style-type: none"> The existing PRoW which passes through or run adjacent to the Site are expected to be unaffected during the operational phase. It is not expected that any Temporary Traffic Management (TTM), PRoW diversions or closures will be required and the majority of vehicles accessing the Site will be maintenance vehicles/LGV and will be nominal in number. The Proposed Development will retain the existing links to adjacent PRoW routes and highways as at present. The operational phase of the Proposed Development will include the following mitigation measures: 	Monitoring any permissive routes to enhance the current PRoW network during the operation. To be confirmed in the OEMP.

Potential Impact	Mitigation Measure	Monitoring
	<ul style="list-style-type: none"> Maintaining access to all existing PRow within the Site, with no diversions or closures (any PRow temporarily diverted during the construction phase will be reinstated prior to the operational phase); and Controlling areas where the internal maintenance route crosses any existing PRow (such as by providing gates), permitting only operational traffic to utilise these internal routes within the solar PV areas. Operational traffic would give-way to other users when utilising the crossing points. Visibility will be maximised between operational vehicles and other users, with warning signage provided if required. <p>A minimum width has been incorporated into the Proposed Development design for PRow within or directly adjacent to the solar PV array. The PRow will also be buffered from the perimeter fencing, with fencing being installed a minimum distance of 20m either side of the centre of the PRow where solar infrastructure lies to both sides (creating a 40m wide corridor between the fence lines), or 15m if solar infrastructure is to one side only. There will be a further 5m from the perimeter fence to the solar PV panels. This will avoid the perception of being channelled into narrow passages between solar PV arrays.</p>	
Disruption to local residents, businesses and community facilities	<p>Primary mitigation measures are embedded within the Proposed Development, as set out in the respective chapters, to reduce operational effects (such as noise, air quality, transport, and landscape and visual) which in turn will mitigate the effects on the local community and existing facilities from a socio-economic and land use perspective.</p> <ul style="list-style-type: none"> Measures to mitigate the effects of visual impacts from operational are outlined in Table 3-5; Measures to mitigate the effects of operational noise are outlined in Table 3-6; and Measures to mitigate the effects of operational traffic are outlined in Table 3-8. 	N/A

Table 3-8: Transport and Access

Potential Impact	Mitigation Measure	Monitoring
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Vehicle movements during operation	<p>Refer to Section 2.6 for information on operational traffic and access.</p> <p>During the operational period, the following embedded design mitigation measures are proposed:</p> <ul style="list-style-type: none"> • Operational staff will be directed to take the most direct route to the Site using 'higher' order roads, such as A and B classified roads or the Strategic Road Network; • HGV movements are anticipated to be low across the 60-year operational period; • Ensuring operational staff park within the solar arrays during operation as to limit impact on the local road network; • Accesses into the site installed during the construction phase (either new accesses or modified/extended existing accesses) will remain in place during the operational phase; • Measures to mitigate disruption to users of PRow are presented in Table 3-7: Socio-Economics and Land Use. 	N/A
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Table 3-9: Human Health

Potential Impact	Mitigation Measure	Monitoring
Potential to affect local residents and local land users	<p>The Proposed Development has been designed to avoid any requirements for PRoW to be closed or diverted during the operational phase, with additional Permissive Paths provided within the solar PV array during the operational phase.</p> <ul style="list-style-type: none"> Further details with respect to specific embedded mitigation measures relevant to minimising amenity impacts associated with traffic, noise and air quality are set out in Table 3-7: Socio-Economics and Land Use, Table 3-8: Transport and Access; and Table 3-13: Waste Table 3-13: Waste. 	The Health and Safety Manager will monitor the use of the PRoW around the site and ensure these can be safely accessed and used during the operational phase of the Proposed Development.

Table 3-10: Soils and Agricultural Land

Potential Impact	Mitigation Measure	Monitoring
The Proposed Development has the potential to impact soil resources in terms of disturbance and damage.	<p>Soil movement is not expected, but where localised small scale maintenance operations require excavations, etc, these works would be managed through a Risk Assessment Method Statement (RAMS), Operating Procedure or similar which would include measures for the sustainable management of soil resources.</p> <p>The following main rules should be observed during all soil handling tasks:</p> <ul style="list-style-type: none"> No trafficking/driving of vehicles/plant or materials storage to occur outside designated areas; No trafficking/driving of vehicles/plant on reinstated soil (topsoil or subsoil); Only direct movement of soil from donor to receptor areas (no triple handling and/or ad hoc storage); No soil handling to be carried out when the soil moisture content is above the lower plastic limit; Soils should only be moved under the driest practicable conditions, and this must take account of prevailing weather conditions; 	Maintenance works would be audited against the RAMS/Operating Procedure

Potential Impact	Mitigation Measure	Monitoring
<p>The Proposed Development has the potential to result in a loss of soil resources, including related biosecurity effects.</p> <p>Lowering of Agricultural Land Classification (ALC) grade (reduction in land quality)</p>	<ul style="list-style-type: none"> No mixing of topsoil with subsoil, or of soil with other materials; Soil only to be stored in designated soil storage areas; Plant and machinery only work when ground or soil surface conditions enable their maximum operating efficiency; All plant and machinery must always be maintained in a safe and efficient working condition; Daily records of operations undertaken, and site and soil conditions should be maintained; Low ground pressure (LGP) models or tracked vehicles should be used where practicable; Soils (topsoil and subsoil) to be reinstated in sequence to recreate the soil profile; and Arisings and temporary stockpiles will be placed away from watercourses and drainage systems, whilst surface water would be directed away from stockpiles to prevent erosion. <p>The specific mitigation measures would take account of soil type – drawing upon the available survey data for the Site and the Soil Management Plan (SMP) produced at the construction phase following the Outline Soil Management Plan [EN010159/APP/7.10].</p> <p>The appropriate management of soil resources will maintain soil volumes and quality to prevent loss/lowering of ALC grade.</p> <p>The loss of soil resource is considered as the main cause of disease and pathogen transfer, due to the transfer of soil (and incorporated seed/spore bank) from infected to uninfected areas.</p> <p>UK Government's website advertising current occurrences and imposed restrictions with regards to animal and plant diseases should be checked both post-construction and at regular intervals throughout operation. The Applicant will also subscribe to the Animal Disease Alert Subscription Service. All restrictions will be adhered to and may include additional biosecurity measures being implemented such as restricted movements within prevention zones and additional measures around the disinfection of plant and equipment (including boots and manual tools).</p> <p>Where vehicle movements are required over soils, these will be managed by measures detailed in the oSMP to prevent damage to soil structure.</p> <p>The land will be returned to the landowner(s) after decommissioning.</p>	

Potential Impact	Mitigation Measure	Monitoring
Potential operation and maintenance impacts soils receptors.	<p>Measures to manage any potential impacts to soil and agricultural land during the operation and maintenance phase includes the identification of areas that may be more susceptible to damage, the handling and movement of soils, and maintaining the physical properties of the soil.</p> <p>Maintenance will be subject to periodic visits, including replacement of damaged parts or cleaning and maintenance of the Solar PV panels. Established tracks will be used during these activities and therefore any impacts will be minimised. The cleaning of Solar PV panels will be undertaken with water only (no chemicals will be used).</p> <p>Where practicable, the timing of works will be managed carefully to consider weather conditions. Movement of maintenance vehicles during operation and maintenance will be limited and will follow access tracks that have been established during the construction phase.</p> <p>During the operational phase soil from some areas will continue to be managed in segregated stockpiles (for example soil from the substation, BESS and access tracks, which will remain in situ until decommissioning of the solar farm).</p>	The operation and maintenance phase of works will be audited by an appropriately qualified person against the requirements detailed in the oSMP

Table 3-11: Ground Conditions

Potential Impact	Mitigation Measure	Monitoring
Potential for risks to human health associated with waste generation, land contamination, airborne contamination, and groundwater contamination. The discovery of ground contamination during works.	<p>Best practice avoidance and mitigation measures include:</p> <ul style="list-style-type: none"> All workers will be required to wear Personal Protective Equipment (PPE) such as dust masks as applicable; Containment measures will be implemented, including drip trays, bunding or double- skinned tanks of fuels and oils; all chemicals would be stored in accordance with their Control of Substances Hazardous to Health (COSHH) guidelines, whilst spill kits would be provided in areas of fuel/oil storage; All plant and machinery will be kept away from surface water bodies wherever possible, checked regularly and, where necessary, the use of drip trays would be employed. Refuelling and delivery areas will be located away from surface water drains; An emergency spillage action plan will be produced, which staff would have read and understood, and provisions made to contain any leak/spill; 	Regular recording of compliance in a logbook. The OEMP will detail the frequency.

Potential Impact	Mitigation Measure	Monitoring
	<ul style="list-style-type: none"> Should any potentially contaminated ground, including isolated 'hotspots' of contamination and/or potential deposits of asbestos containing materials (ACM), be encountered, the contractor(s) will be required to investigate the areas and assess the need for containment or disposal of the material. The contractor(s) will also be required to assess whether any additional health and safety measures are required; To further minimise the risks of contaminants being transferred and contaminating other soils or water, construction workers will be briefed as to the possibility of the presence of such materials; In the event that contamination is identified, appropriate remediation measures would be taken to protect construction workers, future site users, water resources, structures and services; and Arisings and temporary stockpiles will be placed away from watercourses and drainage systems, whilst surface water would be directed away from stockpiles to prevent erosion. <p>•</p> <p>In line with the requirements of the CEMP, if during the carrying out of activities during the operational phase of the authorised development, contamination not previously identified is found to be present, no further work (unless otherwise agreed in writing with the relevant planning authority) must be carried out on the area(s) on which the contamination has been found until a remediation strategy detailing how such contamination must be dealt with has been submitted to and approved by the relevant planning authority. Remediation work would not commence until agreement had been reached with the planning authority regarding the intended scope of work.</p> <p>Groundworks personnel will be briefed to maintain vigilance for visual and olfactory signs of contamination, particularly in areas of historical mineral extraction, and to be aware of the need for the application of the discovery protocol as outlined below.</p> <p>If unexpected contamination is discovered during the operational phase of the authorised development, the following process would be enacted:</p> <ul style="list-style-type: none"> Works in the immediate area of contamination would be halted immediately and the Environmental Manager/ECOW would be notified. 	

Potential Impact	Mitigation Measure	Monitoring
	<ul style="list-style-type: none"> Any contaminated material would be replaced back into the excavation or onto a membrane to prevent further spread, in line with best practice avoidance and mitigation measures described below. A suitably qualified geo-environmental consultant would be appointed by the Contractor to undertake investigation in accordance with Land Contamination: Risk Management process and BS 10175:2011+A2:2017 (investigation of potentially contaminated sites), the results of which would be used to develop a suitable remediation strategy, the scope of which would be agreed with the relevant planning authority. The approved remediation strategy would then be implemented with a verification report produced and submitted to the relevant planning authority to demonstrate compliance with the remediation strategy. 	
Potential operation and maintenance impacts to land receptors.	<p>Measures will be put in place to mitigate against erosion, procedures to prevent disturbance of contaminated land, and emergency procedures to manage accidental spillages and leaks in order to minimise any risk to land, soil and groundwater.</p> <p>The procedures for managing firewater associated with any incidents at the location of the BESS include measures for preventing the release of polluted water, where water is used as the suppressant; incorporating an appropriate drainage design to collect firewater used in cooling adjacent units; and provision of sufficient capacity to ensure that there is no runoff of firewater.</p> <p>Maintenance will be subject to periodic visits, including replacement of damaged parts or cleaning and maintenance of the Solar PV panels. Established tracks will be used during these activities and therefore any impacts will be minimised. The cleaning of Solar PV panels will be undertaken with water only (no chemicals will be used).</p> <p>Where practicable, the timing of works will be managed carefully to consider weather conditions. Movement of maintenance vehicles during operation and maintenance will be limited and will follow access tracks that have been established during the construction phase.</p> <p>During the operational phase soil from some areas will continue to be managed in segregated stockpiles (for example soil from the substation, BESS and access tracks, which will remain in situ until decommissioning of the solar farm).</p>	The operation and maintenance phase of works will be audited by an appropriately qualified person against the requirements detailed in the oSMP



Potential Impact	Mitigation Measure	Monitoring
Potential to impact on ground or groundwater due to washing of the solar PV array	OEMP to confirm that no chemicals will be used in washing the solar PV array. Only water will be used.	Maintenance personnel will be instructed in the acceptable cleaning methodology/materials and supervised by the Environmental Manager.

Table 3-12: Glint and Glare

Potential Impact	Mitigation Measure	Monitoring
Potential to impact on ground-based receptors (residential, PRoW, rail waterways and road)	New and existing hedgerows will be managed and maintained and allowed to increase in height to approximately 3m, with a width of 2-3m.	Monitoring of planting is provided in Outline Landscape and Ecology Management Plan [EN010159/APP/7.7]

Table 3-13: Waste

Potential Impact	Mitigation Measure	Monitoring
Impacts of waste to the surrounding environment. Potential to impact on sensitive receptors (humans, wildlife, and controlled waters) if not stored and managed appropriately	<p>During operation, the Proposed Development will aim to prioritise waste prevention, followed by preparing for reuse, recycling and recovery and lastly disposal to landfill as per the waste hierarchy.</p> <p>All management of waste will be in accordance with the relevant regulations and waste will be transported by licensed waste hauliers to waste management sites which hold the necessary regulatory authorisation and/or permits for those wastes consigned to them.</p>	A register of waste loads leaving the Site would be maintained to provide a suitable audit trail for compliance purposes and to facilitate monitoring and reporting of waste types, quantities, and management methods.

Table 3-14: Major Accidents and Disasters

Potential Impact	Mitigation Measure	Monitoring
Potential to affect operational staff and the environment	<p>All works will be undertaken in accordance with relevant Health and Safety legislation and guidance. Details of fire, police, emergency services and hospitals will be publicised and included in the site induction.</p> <p>Furthers risks of major accidents and disasters are covered in the following tables: Table 3-4: Water Environment and Table 3.8: Transport and Access</p>	Regularly updated in line with health and safety guidance. Updates to be conducted by the Health and Safety Manager.

Table 3-15: Utilities

Potential Impact	Mitigation Measure	Monitoring
Potential to affect existing above and below ground utility infrastructure	<p>Measures in relation to safe working beneath overhead lines will be in place at all stages of the Proposed Development, for example measures set out in National Grid's technical guidance note 287 (Third-party guidance for working near National Grid Electricity Transmission equipment) such as ensuring adequate clearances are in place when plant and equipment is being moved beneath the overhead lines.</p> <p>Due to the nature of the Proposed Development no impacts to below ground utility infrastructure are expected during operation, however, should maintenance works require excavations, measures in relation to safe working near buried utilities, particularly gas pipelines, will be in place. For example, mitigation set out in National Grid and Northern Gas Networks guidance documents for third parties working in the vicinity of high-pressure gas pipelines and associated installations.</p> <p>The Applicant will also comply with protective provisions included in the DCO with respect to any interaction with utilities.</p>	N/A

4. Implementation and Operation

4.1 Roles and Actions required

- 4.1.1 The OEMP will set out all roles, responsibilities and actions required in respect of implementation of the measures described in this oOEMP, including:
- > An organogram showing team roles, names and responsibilities;
 - > Training requirements for relevant personnel on environmental topics;
 - > Information on-site briefings and toolbox talks that will be used to equip relevant staff with the necessary level of knowledge to follow environmental control procedures;
 - > Measures to advise employees of changing circumstances as work progresses;
 - > Communication methods;
 - > Document control;
 - > Monitoring, inspections and audits of site operations; and
 - > Environmental emergency procedures.

5. Monitoring and Reporting

5.1 Monitoring

- 5.1.1 Monitoring and reporting will be undertaken for the duration of the operational phase to demonstrate the effectiveness of the measures set out in the OEMP and related construction controls and allow for corrective action to be taken where necessary.
- 5.1.2 As part of the monitoring process a designated Environmental Manager will observe site activities and report any deviations from the OEMP in a logbook, along with the action taken and general conditions at the time. In addition, the Environmental Manager will conduct regular walkover surveys which will be documented and arrange regular formal inspections to ensure the requirements of the OEMP are being met.
- 5.1.3 The Environmental Manager would also act as day-to-day contact with relevant local authorities and other regulatory agencies, such as the Environment Agency.

5.2 Records

- 5.2.1 The Environmental Manager will retain records of environmental monitoring and implementation of the OEMP. This will allow provision of evidence that the OEMP are being implemented effectively. These records will include:
- > Results of routine site inspections by Environmental Manager/Project Manager;
 - > Environmental surveys and investigations;
 - > Environmental Action Schedule;
 - > Environmental equipment test records;
 - > Licences and approvals; and
 - > Corrective actions taken in response to incidents, breaches of the approved OEMP or complaints received from a third party.
- 5.2.2 The OEMP will be updated if it is necessary to add additional control measures, with a full review as required. Existing control measures and mitigation will not be amended without prior agreement with the local authorities.

6. References

- Ref. 1 HMSO (2008) The Planning Act 2008, Available at:
https://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf.
- Ref. 2 Institute of Lighting Professionals and the Bat Conservation Trust (2023) Guidance Note 8 Bats and artificial lighting at night. Available at:
<https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/>
[Accessed 3 October 2023].
- Ref. 3 Institute of Lighting Professionals and the Bat Conservation Trust (2021) Guidance Note 1 for the reduction of obtrusive light. Available at:
<https://theilp.org.uk/publication/guidance-note-1-for-the-reduction-of-obtrusive-light-2021/> [Accessed 3 October 2023].
- Ref. 4 HMSO (2005) Hazardous Waste Regulations 2005. Available at:
http://www.legislation.gov.uk/uksi/2005/894/pdfs/uksi_20050894_en.pdf
- Ref. 5 HMSO (2011) Waste (England and Wales) Regulations 2011. Available at:
http://www.legislation.gov.uk/uksi/2011/988/pdfs/uksi_20110988_en.pdf.
- Ref. 6 Gov.uk (2003). The Road Vehicles (Authorisation of Special Types) (General) Order 2003. Available at:
<https://www.legislation.gov.uk/uksi/2003/1998/contents/made> [Accessed 09 October 2023].



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