Rosefield Solar Farm

Environmental Statement

Volume 1
Chapter 3: Proposed Development Description

APFP Regulation 5(2)(a)
Planning Act 2008
Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations 2009

EN010158/APP/6.1
September 2025
Rosefield Energyfarm Limited

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3. Proposed Development Description

3.1. Introduction

3.1.1. This chapter provides a description of the Proposed Development, alongside the proposed construction, operation (including maintenance) and decommissioning activities.

3.1.2. This chapter is supported by the following figures presented in **ES Volume 3, [EN010158/APP/6.3]**:

- **Figure 1.1: Location Plan**;
- **Figure 3.1: Height Parameters**;
- **Figure 3.2: Indicative Solar PV and String Inverter Cross Sections**;
- **Figure 3.3: Indicative ITS Cross-section and Elevation**;
- **Figure 3.4: Indicative Substation Layout**;
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- **Figure 3.13: Indicative Drainage Cross Sections**; and
- **Figure 3.14: Indicative Watercourse and Ditch Crossing Locations**.

3.1.3. This chapter is also supported by a number of other documents such as:

- **Appendix 1 - Green and Blue Infrastructure Parameters** of the **Outline Landscape and Ecological Management Plan (Outline LEMP) [EN010158/APP/7.6]**;
- **Appendix 2 - Landscape and Ecological Mitigation and Enhancements** of the **Outline LEMP [EN010158/APP/7.6]**; and
- **Appendix 3 - Vegetation Removal Parameters** of the **Outline LEMP [EN010158/APP/7.6]**.

3.1.4. The Proposed Development comprises the construction, operation (including maintenance) and decommissioning of Solar Photovoltaic ('PV') development and energy storage, together with associated infrastructure and Grid Connection Cabling Corridor to the National Grid East Claydon Substation, with the details to be defined by the appointed contractor(s) and subject to approval by the Local Planning Authority (Buckinghamshire Council).

3.1.5. The Proposed Development is to connect into the National Grid East Claydon Substation. National Grid Electricity Transmission (NGET) are pursuing works to deliver a replacement substation and have identified a preferred site for this substation to the west of the existing National Grid East Claydon Substation. The final location and timing of the works have not been confirmed by NGET at this stage and so the Proposed Development includes flexibility to account for a connection into either the existing substation or NGET's preferred location for the replacement substation.

3.1.6. All works would be required to be undertaken within the parameters assessed for the Proposed Development. The Proposed Development would be located within the 'Order Limits' (shown in the **Works Plans [EN010158/APP/2.3]**). Land within the Order Limits is known as the 'Site'.

3.1.7. The design of the Proposed Development has evolved throughout the environmental assessment process to avoid, minimise and mitigate (in this order) environmental effects and respond to consultation and engagement feedback, where appropriate. The location of the Proposed Development is shown on **ES Volume 3, Figure 1.1: Location Plan [EN010158/APP/6.3]** and described in **ES Volume 1, Chapter 2: Location of the Proposed Development [EN010158/APP/6.1]**, with the consideration of alternatives and the evolution of the design of the Proposed Development presented in **ES Volume 1, Chapter 4: Reasonable Alternatives Considered [EN010158/APP/6.1]**.

3.1.8. The principal components of the Proposed Development include:

- Solar PV development consisting of:
  - Ground mounted Solar PV generating station. The generating station would include Solar PV modules and mounting structures; and
  - Balance of Solar System (BoSS) which comprises: Inverters; Transformers; Switchgear; Combiner Boxes; acoustic barriers and cabling.
- A project substation (the 'Rosefield Substation') compound comprising: Transformers; Switchgear; reactive power compensation bays; disconnectors; circuit breakers; busbars; control equipment; lightning surge arrestors; building(s) including office, control, functions, material

storage, material laydown areas and welfare facilities; firewalls; fencing and acoustic barriers; a security cabin; parking as well as wider monitoring, maintenance and emergency equipment;

- A Main Collector Compound and two Satellite Collector Compounds comprising: Switchgear; Transformers; ancillary equipment; operation and maintenance and welfare facilities; material storage; material laydown areas; fencing and acoustic barriers; and security cabins;
- Battery Energy Storage System (BESS) compound comprising: batteries and associated Inverters; Transformers; Switchgear, ancillary equipment and their containers; office, control and welfare buildings; fencing and acoustic barriers; monitoring, maintenance and emergency systems; air conditioning; electrical cables; fire safety infrastructure; operation (including maintenance) security facilities; material storage; and material laydown areas;
- Interconnecting Cabling Corridor(s) to connect the Solar PV modules and the BESS to the Satellite and Main Collector Compounds to the Rosefield Substation;
- A Grid Connection Cable Corridor to connect the Rosefield Substation to the National Grid East Claydon Substation via 400kV cabling;
- Ancillary infrastructure works comprising: boundary treatment; security equipment; lighting; fencing; landscaping; internal access tracks; works to facilitate vehicular access; earthing devices; earthworks; surface water management; utility connections and diversions; and any other works identified as necessary to enable the Proposed Development;
- Green and blue infrastructure, recreation and amenity works comprising: landscaping; habitat management; biodiversity enhancement; the creation of three permissive footpaths; and works to permanently divert four PRoW Footpaths in five instances;
- Site-wide operational monitoring and security equipment; and
- Highways infrastructure improvements and safety works comprising: minor junction improvement works; road widening; passing places; and works to facilitate vehicular access to the Site.

3.2. Design commitments, parameters and the Rochdale envelope

3.2.1. The design of the Proposed Development is an iterative process informed by ongoing environmental assessment, consultation, and engagement with statutory and non-statutory consultees.

3.2.2. In accordance with policy requirements, the approach for achieving good design was considered at the outset of the project and a framework for good design was developed. Further details of how the Proposed Development has fulfilled the requirements for good design is set out in the **Design Approach Document [EN010158/APP/5.8]**. This includes the evolution and application of Project Principles, which have been used to inform the planning and design process to date and would continue to inform the design at later stages of the project.

3.2.3. The Project Principles are based on an understanding of the Proposed Development's local context, the people it would affect, and the maximising of potential benefits and outcomes it could deliver. They have been used to drive design related decision making through the evolution of the project and are continually tested and improved in response to further baseline survey work, environmental assessment and stakeholder feedback to deliver the best outcomes for the Proposed Development.

3.2.4. The Project Principles are not secured under the **Draft Development Consent Order (Draft DCO) [EN010158/APP/3.1]**. Instead, the design outcomes are secured via the **Design Commitments [EN010158/APP/5.9]** and other Control Documents (such as the **Outline LEMP**) **[EN010158/APP/7.6]**). This includes embedded mitigation identified through the Environmental Impact Assessment (EIA) process. This DCO Application contains several outline Control Documents which are described in the **Guide to the Application [EN010158/APP/1.2]**. The production of detailed versions of these outline Control Documents would be secured via the Requirements of the **Draft DCO [EN010158/APP/3.1]**.

3.2.5. It is important to note that the exact design details of the Proposed Development cannot be confirmed at this stage but would be, should consent be granted; where the construction tendering process for the design has been completed, and the Local Authority has approved the detailed design in advance of the Proposed Development commencing (or phase thereof). This is to allow for flexibility to accommodate changes in technological advancements. For example, enclosures and/or building sizes may vary depending on the contractor selected, their specific configuration, and plant selection. This is of particular importance to maintaining flexibility due to the rapid pace of change in Solar PV and energy storage technologies, as technology could be adopted at the detailed design stage that does not currently exist. Therefore, sufficient flexibility has been sought for the final design within the DCO Application.

3.2.6. To maintain flexibility in the design, the Applicant intends to use the 'Rochdale Envelope' approach to assess the impacts of the Proposed Development within the maximum and, where relevant, minimum parameters set out in this Environmental Statement (ES). The Planning Inspectorate's Advice Note Nine 'Rochdale Envelope' **[Ref. 3-1]** provides specific guidance to applicants on the degree of flexibility that could be considered appropriate under The Planning Act 2008 ('PA 2008').

3.2.7. This approach involves specifying parameter ranges, including details of the maximum, and where relevant, the minimum size (e.g., footprints and height relative to the ground level post-earthworks), technology, and locations of the different elements of the Proposed Development, where flexibility needs to be retained. The Rochdale Envelope approach has been adopted to present a likely worst-case assessment of the potential environmental effects of the Proposed Development.

3.2.8. Establishing the maximum and minimum parameters enables a robust assessment of the likely significant environmental effects to be undertaken within this ES for topics where the nature of the assessment requires a specific level of detail (such as maximum heights, massing, or noise levels) to inform assessments.

3.2.9. These parameters are detailed in the works descriptions below which relate to the works packages in Schedule 1 of the **Draft DCO [EN010158/APP/3.1]** and are detailed in full in the **Design Commitments [EN010158/APP/5.9]**, **Works Plans [EN010158/APP/2.3]** and a number of the Control Documents as listed within the **Guide to the Application [EN010158/APP/1.2]**. These assessment parameters are further supported by but not secured within the following figures presented in **ES Volume 3, Figures [EN010158/APP/6.3]**:

- **Figure 3.1: Height Parameters**;
- **Figure 3.5: Zonal Masterplan**; and
- **Figure 3.10: Existing and Proposed PRoW and Permissive Footpaths**.

3.2.10. To assist further with assessment, Design Commitments have been developed to guide the practical application of the Project Principles for detailed design. These Design Commitments apply within the zonal parameters established by the **Works Plans [EN010158/APP/2.3]** and are set out in the **Design Commitments [EN010158/APP/5.9]**.

3.2.11. To assist with assessment, an indicative cut and fill assessment has been undertaken in order to strike as close to a cut and fill balance as practicable. An indicative cut and fill balance has been achieved across the Site and has served to inform this ES.

3.2.12. The following sections of this chapter describe the different elements of the Proposed Development along with details and parameters to help understand each element's design. Each section should be read in conjunction with the **Design Commitments [EN010158/APP/5.9]** which sets out the maximum and minimum parameters assessed within this ES. The **Works Plans [EN010158/APP/2.3]** show the maximum spatial extent within which each of the below elements could be located. Each environmental factor has assessed the maximum and/or minimum parameters within the Rochdale Envelope to determine the realistic worst-case potential for likely worst-case significant environmental effects and identify suitable mitigation measures.

3.3. Components of the Proposed Development

3.3.1. The Order Limits comprises 675.05 hectares (ha) of land and include the following components. The Proposed Development is described in Schedule 1 of the **Draft DCO [EN010158/APP/3.1]**, where the "authorised development" is divided into work numbers. The work numbers ('Work No.') for those packages are identified below and are referred to throughout this ES and correspond to the areas shown on the **Works Plans [EN010158/APP/2.3]**. There is overlap of Work Nos. in some locations and so the sum of the Order Limits is not equal to the sum of the Work Nos.:

- Work No. 1: Ground Mounted Solar PV Generating Station
- Work No. 2: Rosefield Substation Compound
  - Work No. 2A: Rosefield Substation Compound
  - Work No. 2B: Abnormal Indivisible Load Corridor
- Work No. 3: Satellite Collector Compounds
  - Work No. 3A: Satellite Collector Compounds
  - Work No. 3B: Satellite Collector Compound Transformer
- Work No. 4: Battery Energy Storage System Compound
- Work No. 5: Main Collector Compound
- Work No. 6: Grid Connection Cabling Corridor
- Work No. 7: Interconnecting Cabling Corridor(s)
- Work No. 8: Temporary Construction and Decommissioning Compounds
  - Work No. 8A: Primary Construction Compounds; and
  - Work No. 8B: Secondary Construction Compounds
- Work No. 9: Highways Works (Facilitate access)
- Work No. 10: Green and Blue Infrastructure

3.3.2. The **Draft DCO [EN010158/APP/3.1]** also allows for the following works to occur in connection with and in addition to the Work Nos. set out above within the Order Limits for those work areas. This has been considered within the assessments undertaken in this ES:

- fencing, gates, boundary treatment and other means of enclosure;
- bunds, embankments, trenching and swales;

- works to the existing irrigation system(s) and works to alter the position and extent of such irrigation system(s);
- rain or grey water harvesting and recycling systems;
- roof top solar panels;
- surface water drainage systems, storm water attenuation systems including storage basins, oil water separators, including channelling and culverting and works to existing drainage networks;
- electrical, gas, water, foul water drainage and telecommunications infrastructure connections, diversions and works to, and works to alter the position of, such services and utilities connections;
- works to alter the course of, or otherwise interfere with, non-navigable rivers, streams or watercourses;
- works for the provision of security and monitoring measures such as CCTV columns and CCTV, security cabins, lighting columns and lighting and weather stations;
- improvement, maintenance, repair and use of existing streets, private tracks and access roads;
- laying down, maintenance and repair of new internal access tracks, ramps, means of access, permissive footpaths and roads, crossings of drainage ditches and watercourses, including signage and information boards;
- temporary and permanent public right of way diversions and closures and new and/or improvements to infrastructure (e.g. gates and stiles) along temporarily or permanently diverted public rights or way footpaths;
- landscaping and biodiversity mitigation and enhancement measures including planting;
- tunnelling, boring and drilling works;
- earthworks, site establishments and preparation works including site clearance (including vegetation removal); earthworks (including soil stripping and storage and site levelling) and excavations; the alteration of the position of services and utilities; and works for the protection of buildings and land; and
- other works to mitigate any adverse effects of the construction, maintenance, operation or decommissioning of the authorised development.

3.4. Work No. 1 – Ground Mounted Solar PV Generating Station

3.4.1. The Solar PV development (**Work No. 1**) comprises the electricity generating station for the purposes of Sections 14 (1)(a) and 15 (2) of the PA 2008. **Work No. 1** includes the elements set out below.

Solar PV modules

3.4.2. The Proposed Development consists of Solar PV modules fixed to a mounting structure, known as a 'table'. Individual Solar PV modules consist of a series of bifacial, mono-crystalline cells. Solar PV modules convert sunlight into electrical direct current (DC).

3.4.3. The DC generating capacity of each Solar PV module would depend on advances in technological capabilities at the time of construction. Once Solar PV modules are electrically connected together in groups, they are known as 'strings'. Various factors would help inform the number and arrangement of Solar PV modules, and some flexibility would be required to accommodate future technology developments.

3.4.4. The DCO Application seeks flexibility to allow for different configurations of Solar PV modules. The final elevations of the Solar PV modules would be influenced by various design factors such as local topography, PV module type and configuration. The gap between the rows of PV strings would vary in response to local topography but would have a minimum separation distance of 2.8m.

3.4.5. The minimum height of the lowest part of the Solar PV modules would be 0.8m Above Ground Level (AGL). In flood risk areas, the lowest part of the Solar PV modules would be raised above the flood risk level up to 1.8m AGL. The maximum height of the Solar PV modules would be 3.5m AGL, except in flood risk areas where Solar PV modules would be up to 4.5m AGL.

3.4.6. **ES Volume 3, Figure 3.1: Height Parameters [EN010158/APP/6.3]** illustrates the height parameters for the Solar PV modules across the Site, taking account of flood areas. The **Works Plans [EN010158/APP/2.3]** spatially reflect where panels would be raised up to 4.5m AGL. The **Design Commitments [EN010158/APP/5.9]** together with the **Draft DCO [EN010158/APP/3.1]** secure the maximum and minimum heights of Solar PV modules, including in the flood areas.

3.4.7. The Solar PV modules would typically measure 2.4m in length and 1.3m in width with a depth of 30 - 40mm and consist of a series of photovoltaic cells beneath a layer of toughened glass with an anti-reflective coating.

3.4.8. Solar PV mounting structures are designed to withstand wind and snow loading and other environmental impacts expected during the operational (including maintenance) life of the Proposed Development. Solar PV modules are constructed and tested to withstand wind loading and temperature in some of the harshest environments.

3.4.9. The total number and arrangement of Solar PV modules would depend on the available technology at the detailed design stage. For the purposes of assessment, this ES has assumed approximately 471,000 Solar PV modules would be installed.

3.4.10. **Work No. 1** includes the area beneath the Solar PV modules which would be converted from arable land to grassland managed through a combination of sheep and/or cattle grazing and/or hay/silage production to maintain the field vegetation during the operation (including maintenance) phase of the Proposed Development.

3.4.11. The detailed design stage would confirm the extent of the **Work No.1** area within the maximums shown on the **Works Plans [EN010158/APP/2.3]**. The Works Plans retain flexibility for areas of **Work No. 1** to also be used for ancillary works such as fencing, Interconnecting Cable Corridor(s) and/or habitat creation. This flexibility is secured by the overlapping of Work Nos. such as, but not limited to, **Work Nos. 6** and **10** as shown on the **Works Plans [EN010158/APP/2.3]**.

Mounting structure

3.4.12. The Solar PV modules would typically be mounted on a steel structure supported by helical or driven piled vertical posts or screw piles, known as the mounting structure, as shown indicatively in **Plate 3.1** and **Plate 3.2**.

3.4.13. The mounting structure of the Solar PV modules would be designed to face southwards on a fixed platform. The Solar PV modules would be angled at a tilt of between 10 to 30 degrees from horizontal to optimise daylight absorption.

3.4.14. Depending on local ground conditions, the posts would be fixed into the ground up to a depth of 3m below ground level (BGL) using either helical or driven piled vertical posts. Site ground conditions would determine the appropriate post-anchoring system and depth. The **Design Commitments [EN010158/APP/5.9]** also include an option for some mounting structures to be supported by ballasted or shallow concrete foundations, for example, to avoid piling depths (if required) due to ground conditions, to reduce the impact on areas of archaeological sensitivity or to adapt the design of substructure works around existing underground utilities (if required).

3.4.15. **ES Volume 3, Figure 3.2: Indicative Solar PV and String Inverter Cross Sections [EN010158/APP/6.3]** provides an illustrative example of the Solar PV modules and the String Inverter arrangements (String Inverters are described further in this chapter).

Plate 3.1 Example of a Solar PV module and mounting structure

Plate 3.2 Example of a typical mounting structure

3.4.16. **Table 3.1** provides the basis for the assessment of the Solar PV modules and mounting structures.

Table 3.1: Solar PV module and mounting structure parameters

Component	Parameters	Securing mechanism
Solar PV modules		
Module type	Bifacial with an anti-reflective coating.	**Design Commitments [EN010158/APP/5.9]**
Module colour	The Solar PV modules would be dark blue or black in colour, held with a metallic frame structure.	
Maximum height (AGL, post-earthworks)	3.5m, except in flood areas which would be 4.5m.	**Works Plans [EN010158/APP/2.3]**, **Draft DCO [EN010158/APP/3.1]** and **Design Commitments [EN010158/APP/5.9]**
Minimum height (AGL, post-earthworks)	0.8m, except in flood areas which would be up to 1.8m.	
Slope of Solar PV modules from the horizontal	At a fixed angle of 10 to 30 degrees and be sloped towards the south.	**Design Commitments [EN010158/APP/5.9]**
Minimum separation distances between rows	2.8m.	
Mounting structure		
Maximum depth of foundations (BGL, post-earthworks)	3m.	**Design Commitments [EN010158/APP/5.9]**
Foundation type	Helical or driven piles or ballasted or shallow concrete foundations or footings or screw piles.	
Mounting structure material	Steel.	

Balance of Solar System (BoSS) including Inverters, Transformers, Switchgear, Combiner Boxes and cabling

3.4.17. The Inverters (String and/or Central), Transformers, Switchgear, Combiner Boxes and cabling comprise the BoSS which is required to manage the electricity generated by the Solar PV modules.

3.4.18. Cabling is required to connect the Inverters, Transformers, Switchgear and Combiner Boxes and would either be laid under or above ground. Cables would be laid above ground in cable ducts if, for example but not limited to, archaeological sensitivity dictates that below ground cabling is unsuitable.

3.4.19. The BoSS equipment could either be located as Independent Outdoor Equipment within the same outdoor compound or as a containerised Inverter and Transformer Station (ITS). Independent Outdoor Equipment would see the BoSS equipment be located amongst the Solar PV modules as shown in **Plate 3.4**. **Plate 3.8** shows how a containerised ITS would combine the Central Inverters, Transformers and Switchgear.

3.4.20. There are several possible arrangements for the BoSS components; therefore, flexibility is required with the optionality presented in the design in relation to:

- the use of Central and/or String Inverters; and
- the locating of equipment as Independent Outdoor Equipment within the same outdoor compound or as containerised Inverter and Transformer Stations (ITS).

3.4.21. To ensure climate resilience, most BoSS equipment would be located within fields suitable for the Solar PV modules and would be located outside of Flood Zone 2 and 3 areas. String Inverters are an exception to this and could be located within Flood Zone 2 and 3 areas but would be elevated above the flood level in these instances.

3.4.22. Each factor assessment chapter of this ES includes a section explaining which BoSS configuration option is taken forward for assessment and why that option represents the realistic worst-case of the BoSS options set out here. This approach ensures that the likely worst-case effects are reported in the ES. The **Design Commitments [EN010158/APP/5.9]** document secures that the constructed effects of the optionality taken forward during the detailed design stage cannot be worse than what is assessed in this ES.

3.4.23. As the design of the Proposed Development develops, the BoSS configuration would be determined based on environmental and technical factors.

Inverters

3.4.24. Inverters are required to convert the DC electricity generated by the Solar PV modules into AC electricity, which allows the electricity generated to be compatible with the National Grid. Inverters are sized to manage the characteristics of the DC electricity output from the Solar PV modules and, where required, Combiner Boxes.

3.4.25. There are two different options for Inverters, being String and/or Central Inverters, which could be used as part of the BoSS within the parameters of **Work No. 1**. The ES has assessed these two options for Inverters to maintain flexibility within the DCO Application, and it is assumed that both String and Central Inverters would likely be used across the Site. The assessment of each Inverter type is considered in more detail in the aspect chapters in **ES Volume 2, Chapters 6 to 16 [EN010158/APP/6.2]**.

Combiner Boxes

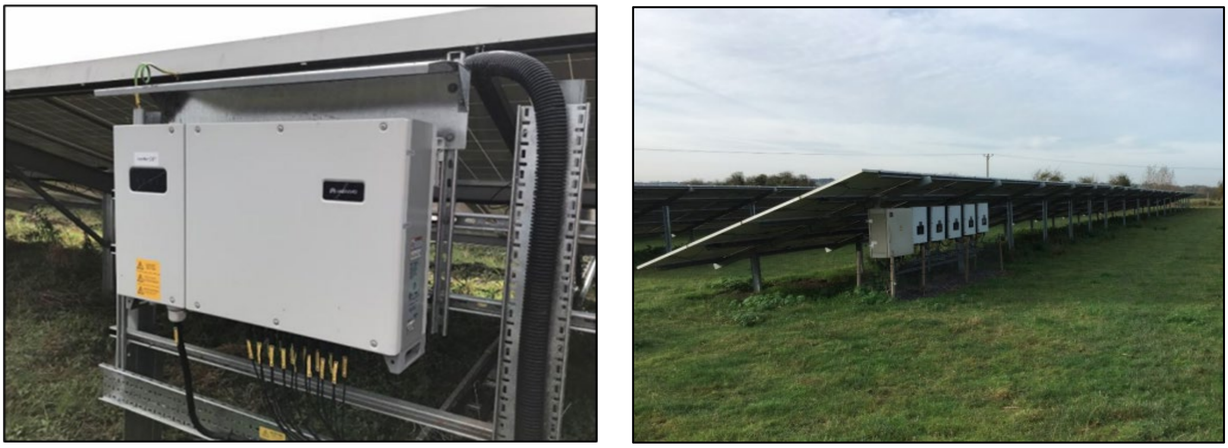
3.4.26. Combiner Boxes are required to consolidate and manage the output of multiple Solar PV modules and serve to simplify connections between the PV strings and Inverters.

String Inverters

3.4.27. String Inverters are small enough to be mounted underneath the Solar PV modules, as shown in **Plate 3.3** and **ES Volume 3, Figure: 3.2 Indicative Solar PV and String Inverter Cross Sections [EN010158/APP/6.3]**. String Inverters would be sited within the footprint of the Solar PV Generating Station.

3.4.28. Where used, String Inverters convert the DC electricity of the PV strings into AC. String Inverters require Combiner Boxes to consolidate multiple PV strings.

Plate 3.3 Typical String Inverter



3.4.29. **Table 3.2** provides the basis for the assessment of the String Inverters.

Table 3.2: String Inverter parameters

Component	Parameters	Securing mechanism
Mounting Approach	To the mounting structure, below the Solar PV modules.	**Design Commitments [EN010158/APP/5.9]**
Colour	Grey or white.	

Central Inverters

3.4.30. Where used, Central Inverters would be interspersed amongst the Solar PV modules alongside Combiner Boxes, Transformers and Switchgear, either outside as Independent Outdoor Equipment, or inside a containerised ITS.

3.4.31. Central Inverters (like String Inverters) are required to convert the electricity collected by the Combiner Boxes into alternating current (AC), which then allows the electricity generated to be compatible with the National Grid.

Transformers

3.4.32. Transformers are required to increase the voltage of the AC electricity converted by the Inverters across the Site before it reaches the Satellite and Main Collectors and, subsequently, the Rosefield Substation.

3.4.33. Transformers would be interspersed amongst the Solar PV modules alongside either String Inverters or Central Inverters and Combiner Boxes and Switchgear, either outside as Independent Outdoor Equipment, or inside a containerised ITS.

Switchgear

3.4.34. Switchgears are the combination of electrical disconnect switches, fuses, or circuit breakers to control, protect, and isolate electrical equipment. Switchgear is used to de-energise equipment to allow work to be done and clear faults downstream.

3.4.35. Switchgear would be interspersed amongst the Solar PV modules alongside either String Inverters or Central Inverters and Combiner Boxes and Transformers, either outside as Independent Outdoor Equipment, or inside a containerised ITS.

Independent Outdoor Equipment

3.4.36. Independent Outdoor Equipment comprises Combiner Boxes, standalone Central Inverters, Transformers and Switchgear. The equipment would be located amongst or, in the case of Combiner Boxes, under the Solar PV modules as shown in **Plate 3.4**.

3.4.37. Each compound of Independent Outdoor Equipment (which contain standalone outdoor Central Inverters, Transformers and Switchgear) would typically have a maximum gross external footprint of 80m² in plan with each of these components having a height of up to 3m (AGL). To ensure that unacceptable noise impacts do not arise, acoustic barriers with a height of up to 3.5m (AGL) would be provided for where it is not possible, through detailed design, to locate the Central Transformers of the Independent Outdoor Equipment away from noise sensitive receptors. Each Independent Outdoor Equipment compound would therefore have a maximum height of up to 3.5m (AGL).

3.4.38. The Independent Outdoor Equipment is anticipated to sit on compacted hardcore material or concrete pad foundations or, where loading and ground conditions allow, screw piles.

Plate 3.4 Typical Independent Outdoor Equipment (left to right: Switchgear, Transformer, Central Inverter)

3.4.39. **Plate 3.5** shows a typical standalone Central Inverter (forming part of Independent Outdoor Equipment). **Table 3.3** provides the basis for the assessment of standalone Central Inverters when used as Independent Outdoor Equipment.

Plate 3.5 Typical Outdoor Centralised Inverter

Table 3.3: Standalone Central Inverter parameters

Component	Parameters	Securing mechanism
Maximum height (AGL, post-earthworks)	3m.	**Design Commitments [EN010158/APP/5.9]**
Mounting/foundations	Mounted on adjustable legs or metal skids on concrete pads or concrete columns or compacted hardcore material, surrounded by permeable hardstanding or screw piles.	
Colour	Grey, green or white.	

3.4.40. **Plate 3.6** shows a typical standalone Transformer as part of Independent Outdoor Equipment. **Table 3.4** provides the basis for the assessment of standalone Transformers when used as Independent Outdoor Equipment.

Plate 3.6 Typical Outdoor Transformer

Table 3.4: Standalone Transformer parameters

Component	Parameters	Securing mechanism
Maximum height (AGL, post-earthworks)	3m.	**Design Commitments [EN010158/APP/5.9]**
Mounting/ foundations	Mounted on adjustable legs or metal skids on concrete pads or concrete columns surrounded by permeable hardstanding or screw piles.	
Colour	Grey or green.	

3.4.41. **Plate 3.7** shows a typical standalone Switchgear when used as part of Independent Outdoor Equipment. **Table 3.5** provides the basis for the assessment of standalone Switchgears when used as Independent Outdoor Equipment.

Plate 3.7 Typical Standalone Switchgear

Table 3.5: Standalone Switchgear parameters

Component	Parameters	Securing mechanism
Maximum height (AGL, post-earthworks)	3m.	**Design Commitments [EN010158/APP/5.9]**
Mounting/foundations	Mounted on adjustable legs or metal skids on concrete pads, concrete columns, or foundation slab, or compacted hardcore material, surrounded by permeable hardstanding or screw piles.	
Colour	Grey, green or white.	

3.4.42. **Table 3.6** provides the basis for the assessment of the combined Independent Outdoor Equipment.

Table 3.6: Independent Outdoor Equipment parameters

Component	Parameters	Securing mechanism
Maximum envelope (per group of Independent Outdoor Equipment)	Height: 3.5m (AGL, post-earthworks). Footprint: 80m^2 gross external in plan.	**Design Commitments [EN010158/APP/5.9]**
Mounting/foundations	Mounted on adjustable legs or metal skids on concrete pads, concrete columns, or foundation slab, or compacted hardcore material, surrounded by permeable hardstanding or screw piles.	
Colour	Grey, green or white.	
Other Infrastructure (falling within the Independent Outdoor Equipment maximum envelope)		
Maximum height of acoustic barriers	Height: 3.5m (AGL, post-earthworks).	**Design Commitments [EN010158/APP/5.9]**

Inverter Transformer Stations (ITS)

3.4.43. An ITS combines Central Inverter(s), Transformer(s), and Switchgear into a single containerised unit. **ES Volume 3, Figure 3.3: Indicative ITS Cross-section and Elevation [EN010158/APP/6.3]** provides a plan showing the ITS' illustrative elevation within the maximum parameters.

3.4.44. Each ITS is typically the size of a shipping container and would typically have a maximum gross external footprint of 25m^2 in plan and up to 3.5m (AGL) in height.

3.4.45. The ITS would be mounted on concrete pad, columns, foundations, or plinths or compacted hardcore material placed on metal skids or, where loading and ground conditions allow, screw piles and would be painted grey or green.

3.4.46. To ensure that unacceptable noise impacts do not arise, acoustic barriers with a height of up to 3.5m (AGL) would be provided where it is not possible, through detailed design, to locate an ITS away from noise sensitive receptors.

3.4.47. **Plate 3.8** below shows a typical ITS whilst **Table 3.7** provides the basis for the assessment of the ITS.

Plate 3.8 Typical Inverter Transformer Station

Table 3.7: Inverter Transformer Station parameters

Component	Parameters	Securing mechanism
Maximum envelope per Inverter Transformer Station	Height: 3.5m (AGL, post-earthworks). Footprint: 25m^2 gross external in plan.	**Design Commitments [EN010158/APP/5.9]**
Mounting/foundations	Mounted on adjustable legs or metal skids on concrete pads, concrete columns, or foundation slab, or compacted hardcore material, surrounded by permeable hardstanding or screw piles.	
Colour	Grey or green.	
Other Infrastructure (falling within the Inverter Transformer Station maximum envelope)		
Maximum height of acoustic barriers	Height: 3.5m (AGL, post-earthworks).	**Design Commitments [EN010158/APP/5.9]**

3.5. Work No. 2 – Rosefield Substation Compound

3.5.1. A new single Rosefield Substation would be located within Parcel 3 across Fields E11 and/or E20 as shown in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured by **Works Plans [EN010158/APP/2.3]** under **Work No. 2A**. The Rosefield Substation compound would include main step-up Transformers, Switchgear, reactive power compensation bays, disconnectors, circuit breakers, busbars, control equipment, lightning surge arrestors, building(s) including office, control, functions, material storage and material laydown areas, welfare facilities, firewalls, fencing and acoustic barriers and a security cabin and parking as well as wider monitoring, maintenance and emergency equipment.

3.5.2. The buildings within the Rosefield Substation compound may also include roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems. These elements have not been factored into the assessments as the Proposed Development is not committing to or relying upon roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems.

3.5.3. The maximum footprint of the entire Rosefield Substation compound would be 60,000m² in plan with a height up to 15m (AGL). For the purposes of assessment, this ES has assumed that, as a worst-case, the entire compound would see development be up to a height of 15m (AGL) to provide flexibility for the location of equipment within the compound.

3.5.4. The Rosefield Substation includes up to seven main Transformers to step up the voltage of the electricity generated across the Site. Each Transformer would sit on a concrete base with a low boundary wall. Firewalls of up to 9m height would be installed around each Transformer. Each main Transformer would be up to 235m^2 in plan (gross external) with a height of up to 15m (AGL).

3.5.5. To ensure that unacceptable noise impacts do not arise, acoustic barriers along the boundary of the Rosefield Substation with a height of up to 5m (AGL) would be provided for where it is not possible, through detailed design, to locate noise generating equipment away from noise sensitive receptors. Further acoustic barriers would be required to enclose the main Transformers within the Rosefield Substation.

3.5.6. The building(s) within the Rosefield Substation compound would have a maximum gross external footprint of 1,200m² in plan with a height of up to 7m (AGL). It is possible that, at the detailed design stage, several smaller buildings may be required instead of a single building. These smaller buildings would occupy a footprint no greater than that of the single building arrangement.

3.5.7. An emergency back-up diesel generator would be located within the Rosefield Substation compound and would provide critical power provision in the highly unlikely event that both the National Grid and local electricity supplies are unavailable. This would have a maximum gross external footprint of 18m^2 in plan with a height of up to 3m (AGL).

3.5.8. A security cabin would be located at the main gate to the Rosefield Substation. This would have a maximum gross external footprint of 35m^2 in plan with a height of up to 4m (AGL).

3.5.9. The Rosefield Substation compound would be secured using a metallic or green-coloured palisade security fence or a monitored pulse fence and wire mesh fence, both of which are explained further below.

3.5.10. **Table 3.8** provides the basis of the assessment for the electrical infrastructure and ancillary buildings within the Rosefield Substation compound.

Table 3.8: Rosefield Substation and Ancillary Buildings parameters

Component	Parameters	Securing mechanism
Rosefield Substation compound		
Maximum envelope	Height: 15m (AGL, post-earthworks where the Finished Platform Level (FPL) is to be 90m AOD in Fields E11 and E20). Footprint: 60,000m^2 in plan.	**Design Commitments [EN010158/APP/5.9]**
Rosefield Substation Electrical Infrastructure (falling within the Rosefield Substation compound)		
Maximum number of main Transformers (including plinth)	7.	**Design Commitments [EN010158/APP/5.9]**
Maximum envelope of each main Transformer (including plinth)	Height: 15m (AGL, post-earthworks). Footprint: 235m^2 gross external in plan.	
Maximum height of Busbar System (AGL, post-earthworks)	15m.	
Maximum height of lightning surge arrestors (AGL, post-earthworks).	15m.	

Component	Parameters	Securing mechanism
Building(s), Equipment and Security Cabin (falling within the Rosefield Substation compound)		
Building(s) maximum envelope	Height: 7m (AGL, post-earthworks). Footprint: total/combined 1,200m^2 gross external in plan.	**Design Commitments [EN010158/APP/5.9]**
Emergency back-up generator maximum envelope	Height: 3m (AGL, post-earthworks). Footprint: 18m^2 gross external in plan.	
Security cabin maximum envelope	Height: 4m (AGL, post-earthworks). Footprint: 35m^2 gross external in plan.	
Maximum height of acoustic barriers along the boundary of the Rosefield Substation Compound	Height: 5m (AGL, post-earthworks).	

3.5.11. **ES Volume 3, Figure 3.4: Indicative Substation Layout [EN010158/APP/6.3]** provides a plan showing the illustrative layout of the Rosefield Substation.

Abnormal Indivisible Load (AIL) Corridor

3.5.12. The Proposed Development includes an AIL Access Corridor which would be exclusively available to and for a small number of AIL deliveries (being loads which are in excess of The Road Vehicles (Construction & Use) Regulations 1986) **[Ref. 3-2]**.

3.5.13. The AIL Access Corridor is secured under **Work No. 2B** of the **Works Plans [EN010158/APP/2.3]**; since the AIL Access Corridor relates to the equipment requirements of the Rosefield Substation.

3.5.14. **Work No. 2B** extends over Fields SA55 and SA56 and the eastern extents of Fields E10 and E11 and provides the extents within which the AIL track could be constructed.

3.5.15. The constructed AIL track would become a single and permanent access off East Claydon Road and would principally facilitate construction-phase

AIL movements. The track would become permanent into the operation (including maintenance) phase.

3.5.16. The AIL track, which is to be built within the AIL Access Corridor, would require a crossing over Claydon Brook. This crossing is indicatively shown in **ES Volume 3, Figure 3.11: Indicative Location of Internal Access Tracks [EN010158/APP/6.3]** and **ES Volume 3, Figure 3.14: Indicative Watercourse and Ditch Crossing Locations [EN010158/APP/6.3]**. Watercourse crossings would be via clear span bridge or culverts with crossings designed to ensure appropriate flood flows are maintained.

3.5.17. The AIL track's interaction with East Claydon Road is captured under **Work No. 9** of the **Works Plans [EN010158/APP/2.3]** and is shown indicatively in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]**.

3.5.18. **Table 3.9** provides the basis for the assessment of the AIL access track.

Table 3.9: AIL Access Corridor parameters

Component	Parameters	Securing mechanism
Maximum running width	8m.	**Design Commitments [EN010158/APP/5.9]**
Material	Permeable material (assumed to be compacted gravel) or temporary plating.	
Watercourse crossing	Clear span bridge or culverts with crossings designed to ensure appropriate flood flows are maintained.	

3.6. Work No. 3 – Satellite Collector Compounds

3.6.1. The Proposed Development would include Satellite Collector Compounds, as **Work No. 3**, to consolidate the electricity generated by the Solar PV modules and export it to the Main Collector Compound, as well as manage the underground Interconnecting Cabling Corridor(s) across the Site, and/or provide local maintenance facilities.

3.6.2. Two Satellite Collector Compounds are proposed with one being located in Field B23 (South) in Parcel 1 and the other being located in Field D8, D9 or/and D17 in Parcel 2, as shown in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured by **Works Plans [EN010158/APP/2.3]**.

3.6.3. The Satellite Collector Compounds include auxiliary Transformers, maintenance building(s) and/or containers, security, welfare cabin(s), fencing and acoustic barriers. The Satellite Collector Compounds may also include step-up Transformers, Switchgear, and a control room. The Transformers and Switchgear would either be contained within an indoor unit or be located within a separate outdoor fenced area.

3.6.4. The maintenance building(s) and/or containers, security and welfare cabin(s) and control room are assumed to be single story and may include roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems. These elements have not been factored into the assessments as the Proposed Development is not committing to or relying upon roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems.

3.6.5. To ensure that unacceptable noise impacts do not arise, acoustic barriers with a height of up to 3.5m (AGL) would be provided for where it is not possible, through detailed design, to locate the Transformers of the Satellite Collector Compounds away from noise sensitive receptors.

3.6.6. All Transformers within the Satellite Collector Compound in Field B23 (South) in Parcel 1 would be locationally limited within a subarea of **Work No. 3** as shown on the **Works Plans [EN010158/APP/2.3]** as **Work No. 3B**. This is to ensure that this equipment within this Satellite Collector Compound would not give rise to unacceptable noise impacts. All other infrastructure within this Satellite Collector Compound could be located within the full extent of **Work No. 3** (being **Work No. 3A** and **3B**) as shown on the **Works Plans [EN010158/APP/2.3]**.

3.6.7. All infrastructure (including all Transformers) within the Satellite Collector Compound in Field D17 could be located within the full extent of **Work No. 3** (being **Work No. 3A** and **3B**) as shown on the **Works Plans [EN010158/APP/2.3]**.

3.6.8. The maximum envelope of each Satellite Collector Compound is 2,500m² in plan, with the maximum height of the equipment within each Satellite Collector Compound being 6m (AGL).

3.6.9. The locational restriction on Transformers in the Satellite Collector Compound in Field B23 (South) in Parcel 1 may see the Transformers being located separately to the rest of the Satellite Collector Compound's infrastructure and so this Satellite Collector Compound may be split into two or more smaller compounds. The in-plan areas of the smaller compounds would not sum to exceed the maximum envelope of each Satellite Collector Compound, as detailed above.

3.6.10. Each factor assessment chapter of this ES includes a section explaining which Satellite Collector Compound configuration option is taken forward for assessment and why that option represents the realistic worst-case design of the Satellite Collector Compound. This approach ensures that the likely worst-case effects are reported in the ES. The **Design**

Commitments [EN010158/APP/5.9] document secures that the constructed effects of the optionality taken forward during the detailed design stage cannot be worse than what is assessed in this ES.

3.6.11. The proposed buildings and/or containers would be grey or painted green in colour and be sensitive to the local environment.

3.6.12. The Satellite Collector Compounds would be secured using a metallic or green-coloured palisade security fence or a monitored pulse fence and wire mesh fence, both of which are explained further below.

3.6.13. **Table 3.10** provides the basis for the Satellite Collector Compounds assessment.

Table 3.10: Satellite Collector Compound parameters

Component	Parameters	Securing Mechanism
Maximum envelope	Height: 6m (AGL, post-earthworks). Footprint total/combined: 2,500m^2 in plan.	**Design Commitments [EN010158/APP/5.9]**
Foundations	Mounted on concrete pad foundations or plinths.	
Colour	Grey or green.	
Other Infrastructure (falling within the Satellite Collector Compound maximum envelope)		
Maximum height of acoustic barriers	Height: 3.5m (AGL, post-earthworks).	**Design Commitments [EN010158/APP/5.9]**
Colour of acoustic barriers	Grey or green	

3.7. Work No. 4 – Battery Energy Storage System (BESS)

3.7.1. The Proposed Development would include BESS as **Work No. 4**, located within the BESS compound. The BESS is designed to store energy generated by the Solar PV modules. It does this by allowing excess electricity generated from **Work No. 1** to be stored in the batteries of **Work No. 4** and then be discharged to the Grid, when required. The BESS may also import surplus energy from the Grid when the energy available across the Grid exceeds demand.

3.7.2. **Plate 3.9** shows an example of an operational BESS set within a compound whilst **Plate 3.10** shows an example of a BESS compound under construction.

Plate 3.9: Example of an operational BESS Compound

Plate 3.10: Example of the construction of BESS Compound

3.7.3. The drainage is to be consolidated at a single location in Parcel 2 encompassing Fields D8 and/or D9. Since the final location of the BESS compound has not been fixed, both Fields D8 and D9 are being considered for the siting of the BESS, as shown as shown in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]**.

3.7.4. It is assumed, for assessment purposes, that the BESS would be constructed within the entire **Work No. 4** area (which applies to Fields D8 and D9) and is shown on the **Works Plans [EN010158/APP/2.3]** to the extent of the parameters captured within the **Design Commitments [EN010158/APP/5.9]**.

3.7.5. The BESS would be constructed in accordance with the National Fire Chiefs Council (NFCC) 'Grid Scale Battery Energy Storage System planning – Guidance for FRS' **[Ref. 3-3]** to ensure the safe construction and operation of the BESS. This guidance document sits alongside the safety provisions and measures designed into the BESS compound and are outlined in the **Outline Battery Safety Management Plan (Outline BSMP) [EN010158/APP/7.9]**.

3.7.6. A BESS typically comprises container-sized units that house the BESS batteries and associated equipment. The main components would be mounted on a compacted hardcore, reinforced concrete foundation slab or concrete piles or, where loading and ground conditions allow, screw piles. The dimensions and quantities would depend on the number, size and weight of the BESS chosen at detailed design stage. BESS units may also include an externally mounted noise reduction kit which, for the purposes of assessment, has been factored into the maximum height of BESS units.

3.7.7. The remaining surface of the BESS compound would be made up of permeable compacted gravel. The spacing of the BESS units is aimed at avoiding the overheating of adjacent units by another in the unlikely event of a unit fire.

3.7.8. The BESS units typically comprise an enclosure for BESS electro-chemical components and associated equipment, including Transformers, Inverters, Switchgear, power conversion systems, monitoring and control systems, Heating, Ventilation and Air Conditioning (HVAC) systems, electrical cables and fire safety equipment.

3.7.9. Each BESS unit typically requires a HVAC system to ensure the efficiency of the batteries, which are integrated into the units. This may involve an external HVAC system for the containerised unit and would either be located on the top of or be attached to the side of the unit. If the HVAC system uses air to heat and cool, the system would have a fan built into it that is powered by auxiliary power from an incoming supply from the Grid.

3.7.10. On a precautionary basis, firefighting water storage tanks would be provisioned within the BESS compound to provide a water supply for firefighting. The provision of firefighting water storage tanks takes account of best practice guidance at this time but, in recognising that BESS technology is advancing at pace, this provision may not reflect best practice guidance at the detailed design stage. However, the realistic worst-case assumption taken forward is for there to be a combined 450m^3 of water stored across the BESS compound for firefighting purposes.

Additional used firefighting water storage tank(s) could be used to contain all spent firefighting water which may be contaminated.

3.7.11. In addition to the BESS units, a control room, staging area, Switchgear, Transformer skids, welfare facility, fencing and acoustic barriers, security and monitoring equipment, security cabin and parking would be located within the BESS compound.

3.7.12. Further to the BESS noise reduction kits and to ensure that unacceptable noise impacts do not arise, acoustic barriers with a height of up to 3.5m (AGL) would be provided for around BESS units where it is not possible, through detailed design, to locate BESS units away from noise sensitive receptors.

3.7.13. The building(s) within the BESS compound may also include roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems. These elements have not been factored into the assessments as the Proposed Development is not committing to or relying upon roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems.

3.7.14. An emergency back-up diesel generator would be located within the BESS Compound and would provide critical power provision in the highly unlikely event that both the National Grid and local electricity supplies are unavailable. This would have a maximum gross external footprint of 12m^2 in plan with a height of up to 3m (AGL).

3.7.15. The BESS compound would be secured using a metallic or green-coloured palisade security fence or monitored pulse fence and wire mesh fence, both of which are explained further below.

3.7.16. **Table 3.11** provides the basis of assessment for the BESS units and ancillary buildings and infrastructure within the BESS compound.

Table 3.11: BESS Compound parameters

Component	Parameters	Securing mechanism
BESS Compound		
Maximum envelope	Height: 6m (AGL, post-earthworks where the FPL is to be 97m AOD in Field D8 and 98m AOD in Field D9). Footprint: 105,000m^2 in plan.	**Design Commitments [EN010158/APP/5.9]**
Electrical Infrastructure		

Component	Parameters	Securing mechanism
Maximum height of BESS units (inclusive of noise reduction kits and HVAC system)	4.5m (AGL, post-earthworks).	**Design Commitments [EN010158/APP/5.9]**
BESS unit colour	Grey, green or white.	
Foundations	Mounted on either compacted hardcore, reinforced concrete foundation slab or concrete piles or screw piles.	
Ancillary Buildings, Equipment and other Electrical Infrastructure (within the footprint of the BESS Compound)		
Maximum height of Switch Room(s)	6m (AGL, post-earthworks).	**Design Commitments [EN010158/APP/5.9]**
Emergency back-up generator maximum envelope	Height: 3m (AGL, post-earthworks). Footprint: $12m^2$ gross external in plan.	
Maximum height of acoustic barriers	Height: 3.5m (AGL, post-earthworks).	

3.8. Work No. 5 – Main Collector Compound

3.8.1. The Proposed Development includes a Main Collector Compound which is expected to either be located close to or co-located with the Rosefield Substation in Parcel 3. The configuration of the Main Collector Compound is subject to optionality where Field E22 is the preferred location of the Main Collector Compound, but it may also be located in/across Fields E11, E20 and/or E21 as shown in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured by **Works Plans [EN010158/APP/2.3]**. The final design of the Main Collector Compound would not occupy all of Fields E22, E21, E20 and/or E11 but, for the purposes of assessment, it has been assessed as being constructed in any of these four Fields.

3.8.2. The Main Collector Compound would serve to manage the underground Interconnecting Cabling Corridor(s) from across the Site and is shown indicatively in **Plate 3.11**. The Main Collector Compound would connect all the underground cabling from the Independent Outdoor Equipment and/or ITS and the two Satellite Collector Compounds.

3.8.3. The Main Collector Compound would also receive underground cables which connect to the BESS. Further underground cabling would connect the Main Collector Compound to the Rosefield Substation to facilitate the export and import of electricity to/from Grid.

3.8.4. The maximum envelope of the Main Collector Compound is 25,000m² in plan with a maximum height of 6m (AGL). Equipment and buildings are expected to sit on shallow concrete pad foundations or, where loading and ground conditions allow, screw piles. This footprint does not include the circuit trenches, tunnelling (i.e., horizontal directional drilling (HDD) which is explained further below) or possible above ground cabling that would route cables from the Solar PV modules, BESS, Satellite Collector Compounds and Rosefield Substation into the Main Collector Compound.

3.8.5. The Main Collector Compound would contain security and welfare cabin(s), control building(s), switchrooms (containing Switchgear), storage containers and other electrical equipment such as static compensation devices, auxiliary Transformers, fencing and acoustic barriers. The Transformers and Switchgear would either be contained within an indoor unit or be located within a separate outdoor fenced area.

3.8.6. To ensure that unacceptable noise impacts do not arise, acoustic barriers with a height of up to 3.5m (AGL) would be provided for where it is not possible, through detailed design, to locate the Transformers of the Main Collector Compound away from noise sensitive receptors.

3.8.7. Buildings and structures within the Main Collector Compound may include roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems. These elements have not been factored into the assessments as the Proposed Development is not committing to or relying upon roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems.

3.8.8. The Main Collector Compound would be secured using a metallic or green-coloured palisade security fence or monitored pulse fence and wire mesh fence, both of which are explained further below.

3.8.9. The colour of the equipment within the Main Collector Compound would be either grey, green, white, and/or metallic.

3.8.10. The proposed buildings and/or containers would be grey or painted green in colour and rendered to suit local building styles, be sensitive to the local environment and would seek to reflect agricultural development.

Plate 3.11: Example of a Collector Compound

3.8.11. **Table 3.12** provides the basis of the assessment for the electrical infrastructure and ancillary buildings and structures within the Main Collector Compound.

Table 3.12: Main Collector Compound parameters

Component	Parameters	Securing mechanism
Maximum envelope	Height: 6m (AGL, post-earthworks where the FPL is to be 92m AOD in Fields E22 and E21 or as per the FPLs of the Rosefield Substation compound in Fields E20 and E11). Footprint: 25,000m^2 in plan.	**Design Commitments [EN010158/APP/5.9]**
Colour	Grey, green, white, and/or metallic.	
Other infrastructure (falling within the Main Collector Compound maximum envelope)		
Maximum height of acoustic barriers	Height: 3.5m (AGL, post-earthworks).	**Design Commitments [EN010158/APP/5.9]**
Colour of acoustic barriers	Grey or green	

3.9. Work No. 6 – Grid Connection Cabling Corridor

3.9.1. The electricity generated by the Proposed Development would be exported via 400kV underground cabling from the Rosefield Substation

(**Work No. 2**) to the National Grid East Claydon Substation via **Work No. 6**. The Grid Connection Cabling Corridor forms a connection between the Rosefield Substation and the National Grid East Claydon Substation and would include some above-ground infrastructure, such as cable sealing ends and disconnectors, within the envelope of the National Grid East Claydon Substation to provide connection into the Grid.

3.9.2. The Grid Connection Cabling Corridor to the National Grid East Claydon Substation would comprise 400kV cables buried within trenches, with each circuit and associated trench being up to 6m in width and approximately 1.5m in depth (BGL). To avoid overheating, the Grid Connection Cabling within the trench would have an approximate separation distance of 0.5 – 1m between them, as shown on **ES Volume 3, Figure 3.6: Indicative Cable Trench Sections [EN010158/APP/6.3]**.

3.9.3. When referring to cables and circuits, the distinction between these two terms is that cables relate to the physical cables that are laid in the trenches whilst a circuit may be made up of one or more physical cables laid together to connect different elements, as shown on **ES Volume 3, Figure 3.6: Indicative Cable Trench Sections [EN010158/APP/6.3]**.

3.9.4. The Grid Connection Cabling Corridor working width would be up to 25m to account for the inclusion of the cables, a two-lane haul road for construction access, space for temporary storage of topsoil and subsoil and working space between these features. The cables and associated trench would seek to run alongside the two-lane haul road, where practicable, to avoid wider excavation.

3.9.5. Where the Grid Connection Cabling Corridor crosses hedgerows, the maximum working width would reduce to 12.5m to minimise the removal and post-construction reinstatement of hedgerow.

3.9.6. Jointing bays would be required along the Grid Connection Cabling Corridor to connect the lengths of cable and to help with any maintenance and replacement requirements, should a fault develop.

3.9.7. Jointing bays comprise of a main jointing pit (where the Grid Connection Cabling is joined) and a smaller link box which provides for connections between the cable screens. A small fibre optic chamber, adjacent to the link box, may also be required if fibre optic communications are necessary.

3.9.8. It is anticipated that the Grid Connection Cabling Corridor would need to be joined every 400 - 800m in a jointing bay. Each jointing bay is recessed into the ground and is approximately 5.5m in width, 20m in length and up to 2.5m in depth (BGL).

3.9.9. Jointing bays would be buried underground, typically comprising concrete chambers with concrete or metal inspection covers being flush with or below ground level. For example, the jointing bay may have concrete slab floors or one or more concrete chambers and may include concrete roof slabs to facilitate maintenance access.

3.9.10. The proposed Grid Connection Cabling Corridor is shown in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured by **Works Plans [EN010158/APP/2.3]** and runs north from the Rosefield Substation, located in Fields E11 and E20, towards the National Grid East Claydon Substation which lies in the adjacent Field SA54.

3.9.11. The Grid Connection Cabling Corridor includes Fields SA51 - SA53, SA57 - SA59, Fields E10 and E20 and land to the east of Fields E10 and E11 to provide flexibility in the locating of **Work No. 6** to adapt to the final configuration of National Grid's proposed works.

3.9.12. National Grid are proposing works at the East Claydon Substation which are yet to be confirmed in detail but would form a separate planning application that would be pursued by National Grid. According to National Grid, a replacement substation in East Claydon is being sought and will be applied for via the Town & Country Planning Act 1990 (TCPA).

3.9.13. The total length of the underground Grid Connection Cabling is still to be determined. However, it is assumed that the Grid Connection Cabling Corridor would extend from the Rosefield Substation as directly as practicable to the National Grid East Claydon Substation.

3.9.14. **Table 3.13** provides the parameters for the assessment of the Grid Connection works.

Table 3.13: Grid Connection Infrastructure parameters

Component	Parameters	Securing mechanism
Minimum separation distances between 400kV cabling	0.5m.	**Design Commitments [EN010158/APP/5.9]**
Maximum dimensions for cables	Width: 6m. Depth: 1.5m (BGL, post-earthworks), except where cabling would need to cross under roads, utilities, watercourses or ditches where depths may be greater. In these cases, cabling would be laid at least: • 1.5m below roads; • 0.5m below utilities; and	

Component	Parameters	Securing mechanism
	• 2m below the bed of watercourses and ditches.	
Maximum dimensions of cable trenches	Width: 6m. Depth: 1.5m (BGL, post-earthworks).	**Outline Construction Environmental Management Plan (CEMP) [EN010158/APP/7.2]**
Maximum construction working widths	25m, except where hedgerows are crossed which would be 12.5m.	
Maximum dimensions of jointing bays	Width: 5.5m. Length: 20m. Depth: 2.5m (BGL post-earthworks)	**Design Commitments [EN010158/APP/5.9]**

3.10. Work No. 7 – Interconnecting Cabling Corridor(s)

3.10.1. Lower voltage cabling is required to connect the Solar PV modules to the Inverters and the Inverters to the Transformers. Cabling would be laid underground, except and where:

- Cabling connects Solar PV modules and String Inverters;
- Solar PV modules are located in flood risk areas;
- archaeological sensitivity dictates that below ground cabling is unsuitable; and
- where a statutory undertaker's utility does not allow for cabling to be buried.

3.10.2. In these instances, cabling would be contained within suspended ducts or fixed cable trays which would be: fixed no higher than the bottom edge of Solar PV modules; mounted under the Solar PV modules and be fixed to the mounting structures.

3.10.3. Combiner Boxes would be required to rationalise cabling between the Solar PV modules and the Central Inverters. Where required, these would be similar in size to String Inverters and would be mounted to the mounting structures beneath the Solar PV modules. Cabling from Combiner Boxers would then be routed in buried ducts to Central Inverters at the ITS or Independent Outdoor Equipment locations. Combiner Boxes would not be required where String Inverters are used.

3.10.4. Multiple Interconnecting Cabling Corridor(s) would be required across the Proposed Development. The width of these Interconnecting Cable Corridor(s) would vary depending on the number of circuits in each, up to a maximum width of 35m. Circuit spacing within trenches is expected to be between 0.5 - 1m to avoid overheating as shown on **ES Volume 3, Figure**

3.6: Indicative Cable Trench Sections [EN010158/APP/6.3]. The overall widths of cabling and associated trenches would be confirmed at the detailed design.

3.10.5. The widest trenches would be limited to areas with large numbers of circuits, typically adjacent to the Rosefield Substation, Main Collector Compound or along Interconnecting Cable Corridor(s) connecting Parcels 1, 2 and 3. The cables are expected to be laid at a depth of 1.5m BGL, except in areas where utility, road, or ditch crossings may be required.

3.10.6. Higher voltage electrical cables are required between the Ground-mounted Solar PV Generating Station (**Work No. 1**), onwards to the Satellite Collector Compounds (**Work No. 3**) and/or onwards to the Main Collector Compound (**Work No. 5**) and then to the Rosefield Substation (**Work No. 2**). Cables could also be installed directly between the Ground-mounted Solar PV Generating Station (**Work No. 1**) and the Main Collector Compound (**Work No. 5**).

3.10.7. The final Interconnecting Cable Corridor(s) of the Proposed Development would become fixed at the detailed design stage, after the DCO has been granted.

3.10.8. It is anticipated that Interconnecting Cable Corridor(s) would run alongside internal access tracks, where practicable, but would otherwise be located within agricultural land between the Parcels. These Interconnecting Cable Corridor(s) would also be required to cross the adopted highway (within the extent of **Work No. 7** as shown on **Works Plans [EN010158/APP/2.3]**) in order to connect the Proposed development up to the Rosefield Substation.

3.10.9. Any Interconnecting Cable Corridor(s) which cross adopted highways would be perpendicular to the highway as far as practicable. The Interconnecting Cabling Corridor(s) would be contained within **Work No. 7** as shown on **Works Plans [EN010158/APP/2.3]**. The flexibility to locate both electrical and other cable types (e.g., optical fibre cables) within **Work No. 7** is required to ensure that the Proposed Development could be implemented as efficiently as possible.

3.10.10. It is anticipated that the working widths for the Interconnecting Cabling Corridor(s) between Parcels 1 and 2 would be up to 25m in width and up to 50m in width between Parcels 2 and 3 as shown **ES Volume 3, Figure 3.6: Indicative Cable Trench Sections [EN010158/APP/6.3]** and **ES Volume 3, Figure 3.7: Indicative Cable Crossings and Cable Corridors [EN010158/APP/6.3]**.

3.10.11. The working widths take account of the inclusion of the cables and associated trenches, a two-lane haul road for construction and maintenance access, space for temporary storage of topsoil and subsoil and working space between these features.

3.10.12. The requirement for two-lane haul roads would be exclusive to the Interconnecting Cabling Corridor(s) between Parcels and the construction phase of the Proposed Development. The location of these haul roads would be within the Construction Cabling Access Corridors which are shown on **ES Volume 3, Figure 3.9: Indicative Construction and Operational Access [EN010158/APP/6.3]**.

3.10.13. Open-cut trenching methods would be used for the majority of the Interconnecting Cable Corridor(s). However, specialist trenchless techniques (such as HDD) may be required where the Interconnecting Cable Corridor(s) crosses assets such as Claydon Road, environmental receptors (including watercourses and ditches), and other existing below-ground utilities infrastructure.

3.10.14. If HDD is used, Interconnecting Cabling Corridor(s) would cross existing below-ground utility infrastructure perpendicular to the alignment of the utility infrastructure as far as practicable. The Interconnecting Cable Corridor(s) crossings would be above or below the existing below-ground utility infrastructure, in line with the requirements of the relevant Statutory Undertakers.

3.10.15. Optical fibre cables are anticipated to be installed together with the electrical cabling within the Interconnecting Cable Corridor(s). These cables allow for the monitoring of the infrastructure during the operation (including maintenance) phase of the Proposed Development. The optical fibre cables would be installed within the same trenches as the electrical cabling.

3.10.16. The existing above and below-ground utilities across the Proposed Development are not intended to be altered. The offsets to these assets have been discussed with the relevant Statutory Undertakers as part of the design process and are accounted for within **Work No. 1**, as set out on the **Works Plans [EN010158/APP/2.3]**. However, if diversions are required, these would be carried out in accordance with the Protective Provisions between the Applicant and relevant Statutory Undertaker within the made DCO.

3.10.17. **Table 3.14** provides the basis for the assessment of the Interconnecting Cabling Corridor(s).

Table 3.14: Interconnecting Cabling Corridor(s) parameters

Component	Parameters	Securing mechanism
Maximum width of cabling	1.5m for single cable circuits. 35m for multiple cable circuits.	**Design Commitments [EN010158/APP/5.9]**
Minimum circuit spacing within trenches	0.5m.	
Maximum construction working widths	25m between Parcels 1 and 2. 50m between Parcels 2 and 3.	**Outline CEMP [EN010158/APP/7.2]**
Maximum depth of cable trenches (BGL, post-earthworks)	Depth: 1.5m (BGL, post-earthworks), except where cabling would need to cross under roads, utilities, watercourses or ditches where depths may be greater. In these cases, cabling would be laid at least: • 1.5m below roads; • 0.5m below utilities; and • 2m below the bed of watercourses and ditches.	

3.11. Work No. 8 – Temporary Construction and Decommissioning Compounds

3.11.1. During the construction phase, three Primary Construction Compounds would be provided on-Site (**Work No. 8A**), with three Secondary Construction Compounds (**Work No. 8B**) being provided at different locations throughout the Solar PV development. The locations of the Primary and Secondary Construction Compounds are shown respectively as **Work No. 8A** or **Work No. 8B** on the **Works Plans [EN010158/APP/2.3]** and have been indicatively identified in **ES Volume 3, Figure 3.8: Indicative Location of Primary and Secondary Construction Compounds [EN010158/APP/6.3]**.

3.11.2. A Primary and Secondary Construction Compound would be located in each of Parcels 1, 2 and 3. Each Primary Construction Compound would be no greater than 25,000m^2 in plan. The Primary Construction Compound within Parcel 2 may be split but the in-plan areas of the split Primary Compound would not cumulatively be greater than 25,000m^2 in plan. Each Secondary Construction Compound would be no greater than 1,250m^2 in plan.

3.11.3. Each Primary Construction Compound would be located at or as close to access points and tracks as practicable within the Order Limits to minimise the extent of ground disturbance outside of the Solar PV development.

3.11.4. A dedicated construction car park would be located within and/or adjacent to each Primary Construction Compound with some parking, where required, at Secondary Construction Compounds.

3.11.5. For the purposes of assessment, the ES has assumed that the temporary Primary and Secondary Decommissioning Compounds would reflect the Primary and Secondary Construction Compounds in both location and in plan dimensions.

3.11.6. As part of **Work Nos. 8A** and **8B** within Schedule 1 of the **Draft DCO [EN010158/APP/3.1]**, the potential activities occurring within the Primary and Secondary Construction and Decommissioning Compounds include the following:

- areas of hardstanding with haul road areas comprising stone laid on a geotextile membrane;
- car parking;
- site and welfare offices and facilities, canteens, and workshops;
- area to store materials, plant, and equipment;
- storage and waste skips;
- area for download and turning;
- security infrastructure, including cameras, perimeter fencing, security gatehouse(s) and lighting;
- site drainage and waste management infrastructure (including sewerage); and
- electricity, water, wastewater, and telecommunications connections.

3.11.7. Whilst temporary, the structures within the Primary and Secondary Construction and Decommissioning Compounds may also include roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems. These elements have not been factored into the assessments as the Proposed Development is not committing to or relying upon roof-mounted solar panels and/or rain and/or grey water harvesting and recycling systems.

3.11.8. Towards the end of the Proposed Development's construction phase, the temporary Primary and Secondary Construction Compounds would be removed, and these locations could be utilised for those other Work Nos. as identified on the **Works Plans [EN010158/APP/2.3]**.

3.11.9. At the start of the Proposed Development's decommissioning phase, the infrastructure within the Compound areas would be removed first to allow for the temporary Primary and Secondary Decommissioning Compounds to be set up for the wider decommissioning phase. The locations of the

Primary and Secondary Decommissioning Compounds are shown respectively as **Work No. 8A** or **Work No. 8B** on the **Works Plans [EN010158/APP/2.3]**.

3.11.10. **Table 3.15** provides the basis of assessment for the Primary and Secondary Construction Compounds.

Table 3.15: Primary and Secondary Construction Compound parameters

Component	Parameters	Securing mechanism
Primary Construction Compounds (Work No. 8A)		
Maximum number of Primary Compounds	3.	**Outline CEMP [EN010158/APP/7.2]**
Maximum total/ combined footprint	25,000m^2 in plan, per Primary Construction Compound.	
Material	Compacted hardcore surface and membrane, with temporary mats or plates used in areas with high traffic.	
Secondary Construction Compounds (Work No. 8B)		
Maximum number of Secondary compounds	3.	**Outline CEMP [EN010158/APP/7.2]**
Maximum footprint	1,250m^2 in plan, per Secondary Construction Compound.	
Material	Compacted hardcore surface and membrane, with temporary mats or plates used in areas with high traffic.	
Drainage	Infiltration or attenuated - provided with a slight camber on the Secondary compound and French drains at the edges.	

3.12. Work No. 9 – Highways Works

3.12.1. The following accesses would serve as permanent accesses to the Site across all phases of the Proposed Development and are secured by **Work No. 9** which is delineated on the **Works Plans [EN010158/APP/2.3]**:

- The main access is located on Claydon Road serving Parcels 1, 1a and 2 and would provide immediate access into Field D7.

- A second access is located on Quainton Road to the north of Parcel 2 between/along Fields D44 and D45. This would provide connection between Parcels 1, 1a and 2 and Parcel 3 via Claydon Road, and Granborough Road.
- The third access is on Granborough Road, providing access to Parcel 3. Granborough Road would be subject to widening or layby works to assist with traffic management, particularly for the construction phase.
- Fourth and fifth accesses are provided for in proximity to one another on Three Points Lane to allow for east/west movements between Fields B23 (South), B20 and SA12 to serve Parcels 1 and 1a.

3.12.2. An additional single and permanent access off East Claydon Road would be exclusively available for a small number of AIL deliveries (being loads which are in excess of The Road Vehicles (Construction & Use) Regulations 1986) **[Ref. 3-2]**. This access would facilitate construction-phase AIL movements and would become permanent into the operation (including maintenance) phase.

3.12.3. **ES Volume 3, Figure 3.9: Indicative Construction and Operational Access [EN010158/APP/6.3]** identifies the location of this AIL access off East Claydon Road. This access, identified under **Work No. 9** on the **Works Plans [EN010158/APP/2.3]**, would be related to **Work No. 2B** which provides the AIL corridor and connection between this access to Fields E10 and E11.

3.12.4. Vegetation removal would be required to either widen existing field accesses or create new points of access, or in some instances managed to create visibility splays. Where vegetation removal or management is required, the works would be limited to the required amount of vegetation removal to achieve the necessary access/visibility. Pruning of vegetation would be preferred over removal wherever possible. Further details can be found in the **Outline LEMP [EN010158/APP/7.6]**. Meanwhile a plan showing the proposed areas of vegetation removal (including the locations of the sections of hedgerows affected) is provided in **Appendix 3 - Vegetation Removal Parameters** of the **Outline LEMP [EN010158/APP/7.6]**.

3.12.5. Layby and road widening works on Granborough Road are required and are set out within the **Outline Construction Traffic Management Plan (Outline CTMP) [EN010158/APP/7.5]** and as detailed in **ES Volume 2, Chapter 15: Transport and Access [EN010158/APP/6.2]**.

3.12.6. The Grid Connection Cabling Corridor would not cross any public roads. However, the Interconnecting Cabling Corridor(s) which would connect Parcels 1, 2 and 3 would cross public roads. In these instances, crossings are proposed to be undertaken by HDD or by partial trenching. No full road closures are proposed in order to construct the Interconnecting Cabling Corridor(s).

3.12.7. The above construction Site access points and road crossing options to and between Parcels 1, 1a, 2 and 3 are shown indicatively in **ES Volume 3, Figure 3.9: Indicative Construction and Operational Access [EN010158/APP/6.3]**.

3.12.8. Widening at the junction of Claydon Road and along Snake Lane/Fiddlers Field is required. These works would increase the width of the Claydon Road junction at Shipton Lee to accommodate two lanes. The works required for this are set out within the **Streets, Rights of Way and Access Plans [EN010158/APP/2.4]** and are detailed in **ES Volume 2, Chapter 15: Transport and Access [EN010158/APP/6.2]**.

3.12.9. Operational (including maintenance) access to the Proposed Development would be taken from two principal access junctions as shown indicatively on **ES Volume 3, Figure 3.9: Indicative Construction and Operational Access [EN010158/APP/6.3]**. The first access would be taken from the priority junction on Claydon Road to provide access to the whole Site to the west of Claydon Road and access to the solar arrays within Parcels 1, 1a and 2. The second access would be taken via the priority junction off Granborough Road to serve Parcel 3.

3.12.10. The construction phase network of internal access tracks, as shown indicatively in **ES Volume 3, Figure 3.11: Indicative Location of Internal Access Tracks [EN010158/APP/6.3]**, would remain in situ into the operation (including maintenance) phase of the Proposed Development to provide intra and inter-parcel access across Parcels 1, 1a, 2 and 3.

3.12.11. Each access would be designed to provide safe access and egress to and from the public highway and would lead onto an access track which would be up to 6m in width, with a gate located a minimum of 18m from the edge of the public highway. This would enable vehicles to pull off the public highway and wait off the highway safely before entering the Site.

3.13. Work No. 10 – Green and Blue Infrastructure

3.13.1. **Work No. 10** is split into **Work No. 10A** and **Work No. 10B.**

3.13.2. **Work No. 10A** encapsulates all green and blue infrastructure works under **Work No. 10** except for a single aspect of works which is covered by **Work No. 10B**. **Work No. 10B** relates only to the provision of internal access to the mitigation area in Parcel 1a. No other works are proposed under Work No. 10B and the maximum extent of this work is shown on the **Works Plans [EN010158/APP/2.3]**.

Landscape and ecological assets, offsets and enhancements

3.13.3. The existing hedgerows, woodlands, ditches, and field margins would be retained within the Order Limits, with possible exceptions of:

- the hedgerow between Fields E20 and E11 (to facilitate the Rosefield Substation);
- small breaks and/or crossings required for new access tracks;
- security fencing; and
- cable routes and new access junctions.

3.13.4. A plan showing the proposed areas of vegetation removal (including the locations of the sections of hedgerows affected) is provided in **Appendix 3 - Vegetation Removal Parameters** of the **Outline LEMP [EN010158/APP/7.6]**.

3.13.5. Hedgerow or ditch crossings would use existing agricultural gateways/tracks or gaps in field boundaries (where practicable) and the width of any new crossing would be kept to a minimum. Where a cable crosses a hedgerow and the hedgerow is removed, these would be reinstated post-construction.

3.13.6. The minimum offsets from the perimeter fencing surrounding the Solar PV development are set out in **Table 3.16** and secured within the **Design Commitments [EN010158/APP/5.9]**. The offsets apply to existing features within the Order Limits, with the exception of where access tracks, security fencing and/or cable routes are required to cross an existing feature. Based on best practices, these offsets have been established as minimum distances. The offset areas would be used to deliver additional planting of diverse habitats to either increase habitat connectivity and structural diversity through combinations of hedgerow, scrub, grassland planting and the creation of ponds.

Table 3.16: Landscape and ecological features and designations parameters

Landscape/ ecological feature & designations	Parameters	Securing mechanism
Minimum offset to perimeter fencing surrounding the Solar PV development*		
Ditches and ordinary watercourses	10m.	**Design Commitments [EN010158/APP/5.9]**
Statutory and locally designated wildlife sites	30m.	
Ancient woodland	30m.	
Existing hedgerows	10m.	

Landscape/ ecological feature & designations	Parameters	Securing mechanism
Ponds	10m.	
All other existing woodlands	20m.	
HS2 planting	20m.	
Existing PRoW	10m.	
Minimum offset to the principal components of the Proposed Development*		
Existing trees	Tree Root Protection Area (RPA) buffers would be applied, as far as reasonably practicable.	**Design Commitments [EN010158/APP/5.9]**
* With the exception of where access tracks and/or cable routes are required to cross an existing feature; however, these crossings would be kept to a minimum and restored where practical.		

3.13.7. The landscape and ecological mitigation within the Order Limits is shown in **Appendix 1 - Green and Blue Infrastructure Parameters** of the **Outline LEMP [EN010158/APP/7.6]** and **Appendix 2 - Landscape and Ecological Mitigation and Enhancements** of the **Outline LEMP [EN010158/APP/7.6]**.

3.13.8. The habitat creation proposed includes:

- the sowing of grassland open fields;
- scrub and margins with wildflower;
- the planting of hedgerows and tree belts; and
- the establishment of ecological ponds (either former ponds for recreation or new ponds).

3.13.9. Proposed grassland habitats include calcareous grassland, neutral grassland meadow, arable field margins, tussocky grass margins, flower rich neutral grassland margins and lowland meadow grassland as set out within the **Outline LEMP [EN010158/APP/7.6]**.

3.13.10. Under the Solar PV modules, there would be habitat enhancement including the creation of legume rich modified grassland, as identified in the **Outline LEMP [EN010158/APP/7.6]**.

3.13.11. The Green and Blue Infrastructure strategy would deliver a minimum 10% biodiversity net gain as demonstrated within the **ES Volume 4, Appendix 7.17: Biodiversity Net Gain Assessment [EN010158/APP/6.4]**.

3.13.12. Further habitat enhancement would be achieved through the planting of approximately 8.78ha of structural tree planting and approximately 4,336 linear meters of structural hedgerow planting as identified in **Appendix 1 - Green Infrastructure Parameters** of the **Outline LEMP [EN010158/APP/7.6]**.

Public rights of way, recreation and amenity improvements

3.13.13. Existing PRoWs that cross the Site have been retained as far as practicable and have been incorporated within multifunctional green and blue infrastructure corridors. Temporary closure of PRoWs is to be avoided as far as practicable, and temporary diversions would be preferred and provided for instead of temporary closures, where required. If a temporary diversion or closure is required, then it has been assumed that this would be in place for a period of up to 6 months during the construction phase, as set out within the **Outline Rights of Way and Access Strategy (Outline RoWAS) [EN010158/APP/7.8],** the **Streets, Rights of Way and Access Plans [EN010158/APP/2.4]** and the **Outline CEMP [EN010158/APP/7.2]**.

3.13.14. In some cases, diversions and closures made to existing PRoWs during the construction phase would become permanent into and beyond the operation (including maintenance) and decommissioning phases of the Proposed Development. Where this is the case, these permanently diverted PRoWs would reflect an equivalent design to the existing PRoWs that they are replacing, based on user requirements. The **Outline RoWAS [EN010158/APP/7.8]** and **Streets, Rights of Way and Access Plans [EN010158/APP/2.4]** provide the detail of each permanent PRoW diversion and associated closure, whilst a high-level summary of the PRoWs to be permanently diverted is explained below.

3.13.15. As part of the **Outline RoWAS [EN010158/APP/7.8]**, a programme of PRoW temporary closures and diversions would be produced by the Applicant and its principal contractor prior to the commencement of the construction phase.

3.13.16. Appropriate advanced notification of temporary and permanent PRoW diversions and/or closures would be provided to all relevant stakeholders prior to the commencement of the construction phase. Measures would be implemented to maintain public safety, the details of which are set out within the **Outline CEMP [EN010158/APP/7.2]**.

3.13.17. The Proposed Development would include recreation and amenity improvements designed to retain and enhance recreational connectivity across the Site, as set out within the **Outline RoWAS [EN010158/APP/7.8]. ES Volume 3, Figure 3.10: Existing and Proposed PROW and Permissive Footpaths [EN010158/APP/6.3]** provides a plan showing the existing PRoW network as well as the recreation and amenity improvements as detailed below.

3.13.18. The Proposed Development is proposing to enhance the connectivity in the local area through the inclusion of three new operation (including maintenance) phase permissive footpaths within the Site as well as five permanent diversions to existing PRoWs to rationalise and improve the network. The five permanent diversions to existing PRoWs would serve to better connect the local network of piecemeal PRoWs whilst also minimising the extent to which PRoWs interact with **Work Nos. 1 - 9**.

3.13.19. The Proposed Development's three new permissive footpaths are to have a combined and total length of approximately 3.1 kilometres (km). New signage and/or waymarking would be provided for along the diverted PRoWs and the permissive footpaths.

3.13.20. Five PRoWs would be permanently diverted as follows:

- A diversion to the existing PRoW Footpath (reference 'ECL/4/2') (463m to-be-stopped up) to the north of Parcel 3 to align the PRoW Footpath with the field boundaries of Fields E10 and E11, rather than crossing Field E11 (new length 559m).
- A diversion to the existing PRoW Footpath (reference 'ECL/7/2') (243m to-be-stopped up) to the east of Parcel 2 to align the PRoW Footpath with the field boundary of Field D19 (new length 274m).
- A diversion to the existing PRoW Footpath (reference 'SCL/13/2') (323m to-be-stopped up) to the south of Parcel 1 (between Shrubs Wood and Decoypond Wood) to align the PRoW Footpath with the field boundary of Field B7 (new length 410m).
- Diversions to three existing PRoW Footpaths (references 'SCL/13/1', 'SCL/12/2' and a further diversion to 'SCL/13/2') (1,285m to-be-stopped up) to rationalise them into a single PRoW Footpath providing access between Pond Farm and Calvert Road (new length 1,027m).

3.13.21. The above diversions to PRoWs would be undertaken and completed during the construction phase of the Proposed Development. These diversions would then become permanent and would therefore be in place in perpetuity. The diversions to PRoWs are shown and secured via the **Streets, Rights of Way and Access Plans [EN010158/APP/2.4]** and the **Draft DCO [EN010158/APP/3.1]**.

3.13.22. The three permissive footpaths would be aligned as follows:

- A new public route across Parcel 1 by connecting the to-be-rationalised PRoW Footpath (reference 'SCL/13/2') before tracking east to the south of Shrubs Wood, east across Knowl Hill (Field B17) and then tracking north towards Three Points Lane (approximate length 1.9km);

- A new public route across Parcel 1 connecting the above permissive path beginning from the intersection between Fields B17, B20 and B21 which then runs north to the west of B21 and B22 to Calvert Road and onwards to PRoW Footpath (reference 'MCL/13/1') (approximate length 0.7km); and
- A new public route across Parcel 2 which connects the existing PRoW Footpath (reference 'ECL/8/1') before tracking west along the north of D3 (South) to PRoW Footpath (reference 'ECL/9/2'') and PRoW Bridleway (reference 'ECL/10/2') (approximate length 0.5km).

3.13.23. The proposed permissive footpaths would be implemented during the construction phase, remain open and accessible to the public during the operation (including maintenance) phase and would then be retained or removed at the discretion of the landowner post-decommissioning.

3.13.24. **ES Volume 3, Figure 3.10: Existing and Proposed PRoW and Permissive Footpaths [EN010158/APP/6.3]** illustrates the permanent PRoW diversions and the new permissive footpaths. The **Outline RoWAS [EN010158/APP/7.8]** forms the framework for detailed Rights of Way and Access Strategy Plan(s) which is to be developed by the principal contractor to cover all phases of the Proposed Development. The outline framework submitted with this DCO Application details the principles, management and inspection requirements as well as the extent and nature of any closure, diversion and/or improvement to the PRoW network and permissive footpaths.

3.14. Works in connection with and in addition to Work Nos. 1 to 10: Fencing, Security & Ancillary infrastructure

3.14.1. Fencing would enclose the Solar PV modules located within **Work No. 1**. The fields containing the Solar PV modules and supporting infrastructure would likely be fenced using 'deer-proof fencing' (as shown indicatively in **Plate 3.12** below), which is formed of wooden and/or metal posts and wire mesh, up to 2.5m in height (AGL). Pole-mounted internal-facing closed-circuit television (CCTV) systems would be installed at a height up to 5m. Access gates would be metal and be of a similar height to the perimeter fencing. Clearances above ground, or mammal gates, would be included to permit the passage of wildlife.

Plate 3.12: Example Deer-Proof Fencing

3.14.2. Fencing and CCTV would also be installed around the perimeters of **Work Nos. 2 - 5** and the Jointing Bay elements of **Work No. 6**. The fencing of these works would either be palisade security fencing or monitored pulse and wire mesh fencing.

3.14.3. Palisade security fencing would be up to 2.75m in height (AGL) and comprise steel rails attached to horizontal-running rails, connected to vertical steel joints.

3.14.4. Monitored pulse and wire mesh fencing would comprise a mesh fence up to 2.75m in height (AGL) with a pulse monitoring security fence up to 3.4m height (AGL) inside the mesh fence.

3.14.5. The pole-mounted CCTV systems would have a maximum height of 5m around the perimeters of **Work Nos. 1 - 5** and the Jointing Bay elements of **Work No. 6**. All CCTV cameras would have fixed views of the Proposed Development; not be positioned to face any residential properties and would have fixed views into the Order Limits as a security measure.

3.14.6. The Rosefield Substation, BESS, Main and Satellite Collector Compounds (being **Work No. 2, Work No. 4, Work No. 5** and **Work No. 3** respectively) are to not be permanently lit. However, at the detailed design stage, the lighting for **Work Nos. 2 – 5** would be designed to take account of health and safety requirements and so, only where necessary, some permanent lighting may be required to accommodate for emergency exits relating to **Work Nos. 2 – 5**.

3.14.7. Otherwise, manually operated or sensor operated lighting would be utilised and would remain switched off unless operatives are on-site and working during dusk/winter periods, unless health and safety requirements deem otherwise.

3.14.8. **Table 3.17** and **Table 3.18** provide the basis for the assessment of fencing, security, and ancillary infrastructure.

Table 3.17: Fencing parameters

Component	Parameters	Securing mechanism
Fence type (**Work No. 1**)	Deer-proof constructed of wooden and/or metal posts and wire mesh.	**Design Commitments [EN010158/APP/5.9]**
Deer-proof fence maximum height (AGL, post-earthworks)	2.5m.	
Fence type (**Work Nos. 2 - 5** and the Jointing Bay elements of **Work No. 6**) (AGL, post-earthworks)	Palisade fencing (steel) or Mesh fencing (metal) together with monitored pulse fencing (metal).	
Palisade fence maximum height (AGL, post-earthworks)	2.75m.	
Monitored pulse and wire mesh fencing maximum height (AGL, post-earthworks)	Mesh fence: 2.75m. Pulse monitoring security fence: 3.4m.	

Table 3.18: CCTV parameters

Component	Parameters	Securing mechanism
CCTV technology type	Passive Infra-red Detector.	**Design Commitments [EN010158/APP/5.9]**
Support column	Wooden pole.	
CCTV maximum height (AGL, post-earthworks)	5m for **Work Nos. 1 - 5** and the Jointing Bay elements of **Work No. 6**.	
Camera positioning	Internal-facing and deployed at regular intervals to provide a sufficient field of view along	

Component	Parameters	Securing mechanism
	boundaries, typically one spaced every 50 - 60m.	
Lighting design	Use of directional fittings facing away from boundaries and into the Order Limits, in accordance with health and safety and environmental requirements.	

3.14.9. **ES Volume 3, Figure 3.12: Typical Security Details [EN010158/APP/6.3]** presents an illustration of the proposed elevation of the fencing and access gates within the maximum parameters, as captured in the **Design Commitments [EN010158/APP/5.9]**.

Internal access tracks

3.14.10. Construction phase internal access tracks within the Site would follow the alignment of existing agricultural tracks where practicable, limiting the requirement for new drainage ditch crossings, disturbance to soils and habitat removal. The internal access tracks would typically be constructed of permeable materials such as gravel and have a running width of up to 6m.

3.14.11. During the construction phase only, there would also be a network of two-lane haul roads which would be exclusive to the Interconnecting Cabling Corridor(s) between the Proposed Development's Parcels. The location of these haul roads would be within the Construction Cabling Access Corridors which are shown on **ES Volume 3, Figure 3.9: Indicative Construction and Operational Access [EN010158/APP/6.3]**.

3.14.12. No new internal access tracks would be constructed for the operation (including maintenance) phase of the Proposed Development. The construction phase internal access tracks would remain into the operation (including maintenance) phase of the Proposed Development.

3.14.13. Where drainage is required, a ditch or a swale with check dams would be located downhill of the internal access track to control any potential surface water runoff.

3.14.14. **Table 3.19** provides the basis for the assessment of internal access tracks.

Table 3.19: Internal Access Track parameters

Component	Parameters	Securing mechanism
Maximum running width	6m.	**Design Commitments [EN010158/APP/5.9]**
Material	Permeable material (assumed to be compacted gravel).	
Drainage arrangement	Swale or ditch on the downhill side of the track (inclusive of check dams).	
Check dam maximum depth (BGL, post-earthworks)	0.2m.	

3.14.15. Plans showing the illustrative design of internal access tracks are provided for in **ES Volume 3, Figure 3.13: Indicative Drainage Cross Sections**, **Figure 3.11: Indicative Location of Internal Access Tracks** and **Figure 3.14: Indicative Watercourse and Ditch Crossing Locations [EN010158/APP/6.3]**.

Drainage

3.14.16. The Solar PV modules would not materially increase the impermeable area within the Site and are not anticipated to increase the volume of surface water runoff. A rainwater gap would separate the individual Solar PV modules, allowing rainwater to drain freely to the ground between the panels which helps to replicate the greenfield runoff conditions.

3.14.17. The **Outline Drainage Strategy [EN010158/APP/7.11]** outlines the principles of the drainage strategy for the Proposed Development. The principles for the drainage design have been established in conjunction with **ES Volume 4, Appendix 16.1: Flood Risk Assessment [EN010158/APP/6.4]** to ensure no increase in flood risk is experienced by off-site receptors and to manage on-Site drainage.

3.14.18. The **Outline Drainage Strategy [EN010158/APP/7.11]** details the maximum footprints of the Rosefield Substation and BESS, in accordance with this chapter. However, for the purposes of assessment, the **Outline Drainage Strategy [EN010158/APP/7.11]** has assumed a smaller impermeable area to reflect the constructed characteristics expected at the Rosefield Substation and BESS and the mix between impermeable and permeable materials to be used across the Site. These assumptions are considered to reflect a likely worst case.

3.14.19. Due to an increase in impermeable area resulting from the construction of the Rosefield Substation, BESS and Main and Satellite Collector Compounds, a surface water drainage system is required to ensure that there is no increase in surface water runoff from the Proposed Development.

3.14.20. Whist the permeable materials and foundations (assumed to be compacted gravel) have some permeability, the extent of permeability will depend on how the tracks are constructed which means, in any case, that they are not fully permeable for drainage. For the purposes of assessment, the **Outline Drainage Strategy [EN010158/APP/7.11]** assumes that track surfaces and permeable hardstanding is impermeable as this approach ensures that the likely worst-case effects are reported.

3.14.21. A Sustainable Drainage System (SuDS) design forms part of the **Outline Drainage Strategy [EN010158/APP/7.11]** to control surface water runoff from these areas. With the control and limit on surface water runoff from the Proposed Development considered, the SuDS would ensure that there is no increase in flood risk off-site whilst also providing flood risk betterment for higher severity rainfall events.

Waste and foul water

3.14.22. With regard to the BESS, provided the current best practice approaches to BESS incidents as assessed within this ES are adopted, a collection system and storage tank would be installed to isolate and contain firefighting water runoff. This approach would ensure that the potentially contaminated water from a firefighting event does not enter the wider hydrological network. The potentially contaminated runoff would be contained within an on-Site storage tank before it is collected, tested and tankered off-site to be suitably disposed of. If water is found not to be contaminated, it will be retained and reused as firefighting water on-site.

3.14.23. The best practice approaches and measures factored into this ES would be reviewed at the detailed design stage as it may be the case that approaches to BESS incidents have evolved to not require firefighting water. In any case, the **Outline BSMP [EN010158/APP/7.9]** forms the framework and secures that any best practice approach taken forward at the detailed design stage is no worse than the likely worst-case effects that are reported in this ES.

3.14.24. Waste/foul water discharge during the Construction and Decommissioning phases of the Proposed Development could be achieved through two possible disposal options: a potential connection to the local foul sewer network or, alternatively, the waste/foul water would be collected across the welfare areas of the site and stored in cesspits. These would then be managed, inspected and drained by a licensed carrier who would then dispose of the waste/foul water discharge offsite.

3.14.25. Waste/Foul water discharge during the pre-commencement and operation (including maintenance) phases of the Proposed Development would have significantly lower volumes than those collected during the Construction and Decommissioning phases due to the amount of workers on-site. During these phases of the Proposed Development, the waste/foul water discharge could be achieved through the same options as discussed in the above paragraph but also through a potential third option. This third option would be a package treatment works that would located within the vicinity of the Rosefield Substation, BESS and Main Collector Compound. Due to the nature of the Site, the foul flows in these phases of the Proposed Development are likely to be small and, as such, a package treatment works may be a viable approach with ultimate discharge towards a drainage field or the local ditch/watercourse network (if required via a field drain).

Earthworks

3.14.26. Earthworks are required to facilitate the Proposed Development, the management of which is set out in the **Outline CEMP [EN010158/APP/7.2]** and the **Outline Soil Management Plan (Outline SMP) [EN010158/APP/7.7]**. Excavation is required for cable trenching and for the laying of equipment foundations. Excavated material would be replaced where possible (e.g. backfilling of cable trenches) or used elsewhere on-site with the aim of ensuring soil is moved as minimally as possible.

3.14.27. More extensive earthworks are required to create level platforms for the foundations of **Work No. 2, Work No. 4** and to lesser extents **Work Nos. 3, 5** and **6**. It is not anticipated that excess material would be generated from these earthworks but should excess material be generated within one area of the Site, this material could be used for landscape bunding and earth profiling across the Site.

3.15. Construction phase

Indicative construction programme

3.15.1. The construction phase is anticipated to occur over a 30-month period. Subject to being granted consent, the earliest the Proposed Development's construction phase is anticipated to commence is mid to late 2029. The final construction programme would depend on the detailed layout design and the potential environmental constraints on the timing of construction activities.

3.15.2. The Proposed Development currently has a grid connection date of Q4 2031. It is currently anticipated that construction works would commence in mid to late 2029 and run to 2031. As such, there is a potential likelihood of overlapping construction works on different parts of the Site.

3.15.3. **Table 3.20** indicates the potential construction durations across the different parts of the Proposed Development, showing a series of overlapping stages. The assessments have considered a realistic worst-case commencement of construction works being from the year 2029.

Table 3.20: Indicative construction programme*

Works/Year	2029	Q1/Q2 2030	Q3/Q4 2030	2031
Parcel 1				
Parcel 2				
Parcel 3				
Rosefield Substation				
BESS				
* Greyed cells reflect construction works taking place. White cells reflect no construction works taking place.				

3.15.4. For the purposes of assessment, it has been assumed that the Proposed Development's construction works, as detailed in **Table 3.20** above, would be undertaken simultaneously across the 30-month period, assuming a peak construction year (i.e., the year during which the greatest level of construction activity would occur) of 2030, and that this peak level of construction activity occurs for the full 30 months. This construction assumption is considered to reflect a likely worst case for the environmental factor assessments (i.e., peak noise, dust, traffic volumes etc. occurring across the entire construction phase).

Pre-commencement activities

3.15.5. The initial works for each Work No. would include the enabling works required (including installation of any internal access tracks, installation of temporary construction compounds and installation of fencing) to construct the Proposed Development.

3.15.6. The Site preparation and permitted preliminary works would involve the following activities (not necessarily in order):

- Environmental surveys, geotechnical surveys, intrusive archaeological surveys and other investigations for the purpose of assessing ground conditions and the identification, if present, of unexploded ordnance across the Site;

- Remedial work in respect of any contamination or other adverse ground conditions;
- Above ground site preparation for temporary facilities for the use of contractors;
- Temporary display of site notices or advertisements;
- Diversion of existing services and the laying of temporary services;
- The provision of temporary means of enclosure and site security for construction;
- Site access works to allow for the establishment of temporary and permanent points of access from the public highway;
- Site clearance (including vegetation removal and pruning);
- Early planting;
- Delivery of construction materials, equipment, and plant to the Site; and
- Removal of plant and machinery.

Construction activities

3.15.7. The general construction activities would be undertaken in accordance with the principles set out within the **Outline CEMP [EN010158/APP/7.2]**. The indicative construction activities that would be required comprise (not necessarily in order):

- Site preparation, including minor localised site levelling, vegetation clearance, landscape planting and establishment of perimeter fencing and security measures;
- Import of construction materials, plant, and equipment to Site;
- Establishment of Site construction compounds and welfare facilities;
- Appropriate storage and capping of soil;
- Management of waste;
- Establishment of drainage systems;
- Site access works and construction of new Site tracks and points of access from the public highway;
- Installation of bridges and culverts across watercourses and ditches;
- Off-site highway works;
- Installation of PV module frames, PV modules, ITS, cabling, and fencing within each PV field;

- Installation of Rosefield Substation, Main and Satellite Collector Compounds, BESS and associated foundations and cabling within Interconnecting Cabling Corridor(s);
- Trenching in sections;
- Installation of HDD launch and reception compounds and drilling of HDD crossings;
- Testing and commissioning; and
- Site reinstatement (i.e., returning any land used during construction for temporary purposes to its previous condition).

3.15.8. The erection of the mounting structures and the mounting of the Solar PV modules to the mounting structures within **Work No. 1** would include the following activities (not necessarily in order):

- Import and delivery of materials to the Site;
- Piling (where appropriate) and installation of the mounting structures (see **Plate 3.13** and **Plate 3.14**);
- Mounting of the Solar PV modules; and
- The installation of cabling between Solar PV modules.

Plate 3.13: Example Solar PV mounting structure

Plate 3.14: Example construction piling for the installation of the Solar PV mounting structures

3.15.9. The installation of **Work Nos. 2 - 7** would include the following activities (not necessarily in order):

- Import and delivery of materials to the Site;
- Trenching and installation of Interconnecting Cabling Corridor(s);
- Transformer, Inverter and Switchgear installation and construction. Lorry mounted cranes would be used to lift the equipment into position;
- Foundation excavation and construction for the BESS, Rosefield Substation and Transformer, Inverter and Switchgear (if required);
- Pouring of the concrete foundation base, where required;
- Installation of equipment that form part of the BESS;
- Construction of control and other buildings that form part of the Main Collector Compound, Satellite Collector Compounds, BESS compound and Rosefield Substation compound;
- Installation and construction of equipment in the Main Collector Compound, Satellite Collector Compounds, BESS compound and Rosefield Substation compound. Cranes would be used where necessary to lift equipment into position; and
- Installation of control, monitoring, and communication systems.

Construction access

3.15.10. The primary construction route has been considered for construction traffic, including HGVs, to access the Site from the Strategic Road Network. The construction route to the Site would make use of the A41 to Claydon Road via Snake Lane/Fiddlers Field. This routing avoids construction traffic passing through villages and towns in the surrounding area and is reflected in **ES Volume 4, Appendix 15.1: Transport Assessment [EN010158/APP/6.4]**.

3.15.11. All AIL traffic would access the Site via an exclusive access into Parcel 3 off East Claydon Road during the construction phase. This access would be taken via Winslow, making use of National Highways' preferred routes for high and heavy abnormal load movements. The preferred entry and exit route for AIL traffic has been included within the Order Limits. Swept path analysis along this route has identified the potential need for temporary localised road widening, temporary adjustments to the highway arrangement and/or street furniture, or other highway improvements leading to Parcel 3.

3.15.12. Several access points and road crossing options between Parcels 1, 1a, 2 and 3 have been identified to access the Site and have been described in full above under **Work No. 9: Highways Works**. All access points for construction would become permanent into the operation (including maintenance) phase and are displayed in **ES Volume 3, Figure 3.9: Indicative Construction and Operational Access [EN010158/APP/6.3]**.

3.15.13. Approximately 30 staff per Primary Construction Compound would be on-site for the initial site set-up, including forming the access points and preparing the ground, which would increase once the construction compounds are set up and construction of the access tracks within each parcel begins.

3.15.14. The construction phase is anticipated to require a maximum of 600 construction staff on-site during the construction period.

3.15.15. An Outline Travel Plan has been prepared and is appended to the **Outline CTMP [EN010158/APP/7.5]**. This sets out strategies to encourage the use of sustainable transport for the construction workforce.

3.15.16. **Table 3.21** provides the assessed details for construction staff. Details of the AIL and construction equipment details are provided for in **Table 3.22**.

Table 3.21: Construction staff details

Construction staff & parking	Details
Peak number of construction staff	600.
Dedicated construction car park(s)	To be located within and/or adjacent to each of the Primary Construction Compounds with some parking provision at Secondary Construction Compounds.
Construction working hours	Monday to Friday (hours on-site): 07:00 to 19:00 Saturday (hours on-site): 07:00 to 12:00 Sunday and Bank Holidays: No working.

3.15.17. Working days would consist of one 12-hour shift, with employees travelling to and from Site an hour on either side of these times (i.e. between 6am - 7am and 7pm - 8pm).

3.15.18. Between 07:00 - 08:00 and 18:00 - 19:00 Monday to Friday and 07:00 – 08:00 on Saturdays, noisier activities (such as piling) would be restricted depending on the construction activity proposed to take place and its proximity to sensitive receptors. Further, where on-Site works are to be conducted outside the construction working hours, they would comply with the restrictions detailed in the **Outline CEMP [EN010158/APP/7.2]**.

3.15.19. No work would be undertaken on Sundays or Bank Holidays without prior agreement with Buckinghamshire Council as the host Local Planning Authority.

Table 3.22: Abnormal Indivisible Loads and construction equipment

Construction staff & parking	Details
Maximum number of AIL movements	14.
Maximum dimensions of AILs	Width: 5.5m. Total vehicle length: 64m.
Details of crane for unloading at Secondary Construction Compounds	Unloading at secondary compounds would be by telehandler/forklift or lorry-mounted crane. Mobile cranes would be used at the Rosefield Substation to unload the main Transformers and other equipment (e.g. pre-packaged switch rooms). Smaller cranes are expected to be used to unload the BESS units and other equipment.

Construction staff & parking	Details
Construction vehicles	Construction vehicles would include excavators, dump trucks, tractors, trailers, bobcats, piling rigs, telehandlers, and personnel transport vehicles.
Internal construction movements	Construction and personnel vehicles would move across the Site sequentially as work in each area progresses. Different site areas would experience different types and numbers of vehicles at different times.

Construction traffic management

3.15.20. The **Outline CTMP [EN010158/APP/7.5]** has been produced to support the DCO Application. It includes details on construction logistics and construction worker travel; alongside controls to guide the delivery of material, plant, equipment and staff during the construction phase.

3.15.21. The **Outline CTMP [EN010158/APP/7.5]** forms the framework for a detailed Construction Traffic Management Plan(s) to be approved by the host Local Planning Authority prior to construction.

Public rights of way management

3.15.22. PRoWs would be kept open during the construction phase as far as it is practicable and safe to do so. However, where it is not practicable and safe, some PRoWs may need to be temporarily or permanently diverted or closed.

3.15.23. Where PRoWs are to be temporarily diverted or closed, the duration of such a diversion/closure in that area would be for a maximum period of 6 months. The **Outline RoWAS [EN010158/APP/7.8]** details this and forms the framework for detailed Rights of Way and Access Strategy Plan(s) which are to be developed by the principal contractor to cover all phases of the Proposed Development.

3.15.24. In the case of PRoW Footpaths 'SCL/13/1', 'SCL/13/2', 'SCL/12/2', 'ECL/4/2' and 'ECL/7/2', these PRoWs would be diverted during the construction phase of the Proposed Development. These diversions would then become permanent and would therefore be in place throughout the operation (including maintenance) and decommissioning phases of the Proposed Development and remain post-decommissioning.

Construction environmental management

3.15.25. The **Outline CEMP [EN010158/APP/7.2]** has been produced to support the DCO Application. It establishes the legislation, guidance, best practice guidance, and mitigation measures identified through the EIA process to be employed during the construction phase, such as construction lighting to avoid ecologically sensitive habitats.

3.15.26. The **Outline CEMP [EN010158/APP/7.2]** forms the framework for a detailed Construction Environmental Management Plan(s) to be approved by the Local Planning Authority prior to construction.

Construction reinstatement and habitat creation within the Proposed Development

3.15.27. A reinstatement and habitat creation programme would commence following the completion of the construction phase. This would include landscaping; habitat management and biodiversity enhancement works. Areas under the Solar PV modules and the landscape buffers would be planted with grassland open fields and margins with wildflower.

3.15.28. Woodland blocks and belts would be planted strategically to provide visual screening and ecological habitats to achieve a biodiversity net gain. The reinstatement and creation of the landscape and habitat would be undertaken in accordance with the commitments set out in and secured by the **Outline LEMP [EN010158/APP/7.6]**.

3.15.29. The **Outline LEMP [EN010158/APP/7.6]** forms the framework for a detailed Landscape and Ecology Management Plan(s) to be approved by the Local Planning Authority prior to construction.

3.16. Commissioning

3.16.1. During the 30-month construction period, a 6-month commissioning period would occur and involve various stages of testing before electricity could be generated and supplied to the National Grid. This work has been incorporated into the 30-month construction phase and the commissioning would likely involve inspections and electrical and equipment testing before the Proposed Development can become operational.

3.17. Operation (including maintenance) phase

3.17.1. The operational life of the Proposed Development is 40 years, which is controlled by a Requirement of the **Draft DCO [EN010158/APP/3.1]**.

3.17.2. During the operation (including maintenance) phase of the Proposed Development, on-site activities would include routine servicing, maintenance, and replacement of solar or BESS equipment as and when required, as well as solar panel cleaning and vegetation management.

3.17.3. Any equipment that needs to be replaced during the operation (including maintenance) phase would be disposed of following the waste hierarchy, with materials being reused or recycled wherever possible. Electrical waste would be disposed of as per the Waste Electrical and Electronic Equipment (Amendment) (No. 2) Regulations 2018 **[Ref. 3-4]**, minimising the environmental impact of replacing any elements of the Proposed Development.

3.17.4. **Table 3.23** provides the equipment service life assumptions that have been applied. Assets with a service life of 40 years would not require any replacement unless damaged or faulty. The assumed annual rate of replacement of Solar PV modules is reflected in **ES Volume 2, Chapter 8: Climate [EN010158/APP/6.2]**.

Table 3.23: Service life of the Proposed Development's components

Item	Service life (years)
Solar PV	40
Solar PV frames	40
Solar PV foundations	40
BESS	17.5
BESS units/control containers	40
Switchgear	30
String Inverters	10
Inverter Transformer Stations	40
Transformers	40
BESS building(s)	40
Main Collector Compound building(s)	40
Satellite Collector Compound building(s)	40
Cabling	40
Other Infrastructure	40

3.17.5. It is anticipated that up to 24 permanent staff per day would be on-site during the operation (including maintenance) phase, with additional staff attending when required for maintenance, replacement of faulty or end of service life solar equipment, vegetation management activities and cleaning.

3.17.6. In the event of the need to replace any of the Proposed Development's operational equipment, there may be a level of HGV activity required to complete these works within the Order Limits. The extent of traffic generation, however, would be significantly less than that assessed for the peak of construction activities.

3.17.7. The land underneath and around the Solar PV modules along with the Green and Blue Infrastructure and Mitigation and Enhancement areas would be managed in accordance with the **Outline LEMP [EN010158/APP/7.6]**.

3.17.8. The operational (including maintenance) activities would be undertaken in accordance with the **Outline Operational Environmental Management Plan (Outline OEMP) [EN010158/APP/7.3]**. This includes measures that control the following types of activities:

- Working hours;
- Lighting;
- Parking;
- Security;
- Monitoring and maintenance of electrical equipment (including cleaning of Solar PV modules) and drainage;
- Storage of materials;
- Vegetation management;
- Noise limits; and
- Management of waste.

3.17.9. The **Outline BSMP [EN010158/APP/7.9]** sets out the approach to be taken to manage the safety of the BESS in accordance with regulatory requirements, guidance, and good industry practice. The **Outline BSMP [EN010158/APP/7.9]** addresses aspects such as safe design, construction, operation, and disposal and the strategy for firefighting and emergency planning.

3.17.10. The **Outline BSMP [EN010158/APP/7.9]** forms the framework for a detailed Battery Safety Management Plan to be approved by the Local Planning Authority prior to construction of the BESS.

3.18. Decommissioning phase

3.18.1. The Proposed Development is to be operational for a period of up to 40 years. Following the operation (including maintenance) phase, the Proposed Development will require decommissioning. This would involve the removal of all the above ground infrastructure and any infrastructure up to a depth of 1m (BGL).

3.18.2. Temporary Primary and Secondary Decommissioning Compounds would be created to house necessary plant and equipment and provide areas for parking for staff. These Compounds would be removed and the ground restored upon completion of the decommissioning phase.

3.18.3. At the end of the operation (including maintenance) phase, any above-ground infrastructure will be dismantled and removed per industry best practices. The decommissioned materials will follow the waste hierarchy such that they will be reused where possible before recycling and disposal are considered.

3.18.4. Solar PV modules are made up of several materials, including a metal frame, of which approximately 99% can currently be recycled. When decommissioning the Proposed Development, options to reuse or recycle materials available at the time would be explored to ensure that as much of the material as possible is recycled and diverted from landfills.

3.18.5. During the decommissioning phase, all concrete, hardstanding areas, foundations for the infrastructure and any internal tracks will be removed to a depth of up to 1m. All the below-ground cables below 1m will be left in situ, however, this will be dependent upon the legislation and industry standards at the time of decommissioning.

3.18.6. The Site would be reinstated in accordance with the **Outline Decommissioning Environmental Management Plan (Outline DEMP) [EN010158/APP/7.4]**. The **Outline DEMP [EN010158/APP/7.4]** forms the framework for a detailed Decommissioning Environmental Management Plan(s) which would be subject to the approval of the Local Planning Authority at the time of decommissioning.

3.18.7. The decommissioning phase would see the land returned to the landowner. The permanently diverted PRoWs would not be altered any further and would remain, post-decommissioning of the Proposed Development. The permissive footpaths would be retained or removed at the discretion of the landowner post-decommissioning.

3.18.8. Landscape structural planting, including tree planting, hedgerows, scrub, etc., created to deliver biodiversity mitigation and enhancement associated with the Proposed Development would be left in situ when the Site is returned to the landowner. Earth bund(s) would also be removed/reinstated to allow the fields to be returned to agricultural use. Otherwise, it is assumed that the landowner would return the land to agricultural use following decommissioning.

3.18.9. Decommissioning is expected to take approximately 24 months and may be undertaken in phases.

3.18.10. The effects of the decommissioning phase are assumed to be similar to, or of a lesser magnitude than, the effects generated during the construction phase. The decommissioning effects have been assessed within **ES Volumes 2 to 4 [EN010158/APP/6.2 – 6.4]**. However, as there can be a high degree of uncertainty regarding the decommissioning phase (since engineering approaches and technologies evolve across the operational (including maintenance) life of the Proposed Development), appropriate assumptions have been made at this point in time.

3.19. References

- **Ref. 3-1:** Nationally Significant Infrastructure Projects - Advice Note Nine: Rochdale Envelope (July 2018). The Planning Inspectorate. Available online at: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-nine-rochdale-envelope/nationally-significant-infrastructure-projects-advice-note-nine-rochdale-envelope (Accessed 18/02/25).
- **Ref. 3-2:** The Road Vehicles (Construction and Use) Regulations 1986. Legislation.gov.uk. Available at: https://www.legislation.gov.uk/uksi/1986/1078/contents (Accessed 04/03/25).
- **Ref. 3-3:** Grid Scale Battery Energy Storage System planning – Guidance for FRS (November 2022). National Fire Chiefs Council. Available online at: https://nfcc.org.uk/wp-content/uploads/2023/10/Grid-Scale-Battery-Energy-Storage-System-planning-Guidance-for-FRS.pdf (Accessed 18/02/25).
- **Ref. 3-4:** The Waste Electrical and Electronic Equipment (Amendment) (No. 2) Regulations 2018 (In force as of January 2019). Legislation.gov.uk. Available at: https://www.legislation.gov.uk/uksi/2018/1214/contents/made (Accessed 19/02/25).

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