Chapter 3: Development Description

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3 DEVELOPMENT DESCRIPTION

3.1 Introduction

3.1.1.1 This Chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the proposed Springfield Solar Farm and Battery Energy Storage System (BESS) (the Proposed Development) which forms the basis of the assessments and mitigation presented within **Chapters 6 - 15**. It provides details of the construction phase, the 40-year operational phase and decommissioning phase of the Proposed Development.

3.1.1.2 This Chapter includes an overview of the Proposed Development, followed by a description of the main components and their method of construction. Measures that have been built into the design of the Proposed Development to reduce effects (primary mitigation) and tertiary mitigation (measures to meet existing legislative requirements and standard practice), also known as 'embedded' mitigation measures, are described in **Chapter 2: Site Selection and Design Evolution.**

3.1.1.3 This Chapter of the EIAR is also supported by the following figures, provided in **Volume 2**:

- Figure 3.1: Site Layout Plan;
- Figure 3.2: PV Structure Details;
- Figure 3.3. Central Inverter Details;
- Figure 3.4: Battery Container Details;
- Figure 3.5: Power Control System Details;
- Figure 3.6.MV Transformer Details;
- Figure 3.7: Customer Substation Details;
- Figure 3.8: 33 kV Customer Substation Details;
- Figure 3.9: 132 kV Customer Substation Details;
- Figure 3.10: O&M Building Details;
- Figure 3.11: Track Details;
- Figure 3.12: Fence Details;
- Figure 3.13: Security Fence Details;
- Figure 3.14: Acoustic Fencing Details;
- Figure 3.15: Gate Details; and
- Figure 3.16: CCTV Details.

3.1.1.4 This Chapter of the EIAR is supported by the following Technical Appendix, provided in **Volume 3**:

- Technical Appendix 3.1: outline Construction Environmental Management Plan (oCEMP); and
- Technical Appendix 3.2: outline Landscape and Biodiversity Management Plan (oLBMP).

3.2 Description of the Site and Surrounding Area

3.2.1 Key Development Parameters

3.2.1.1 The Proposed Development consists of a solar photovoltaic (solar PV) energy generating station and a co-located BESS, together known as Springfield Solar Farm and BESS. The Proposed Development will have a generating capacity of up to 165 MW (AC) from the solar PV modules (solar panels), while the BESS will have a generating capacity of up to 80 MW. It will involve the construction and operation of solar panels, BESS units, and associated infrastructure as summarised in **Table 3.1**, with further details of these components provided in the subsequent subsections.

TABLE 3.1 DESCRIPTION OF THE PROPOSED DEVELOPMENT COMPONENTS

ELEMENT	DETAILS
Solar PV Array	Solar panels will be the most numerous item of infrastructure included within the Proposed Development. While the exact number of panels will be subject to the technology available during procurement, enough panels will be installed to provide up to165 MW of generating capacity. Each Solar Panel will contain individual PV cells, mounted on aluminium frames, at angles of up to 25 degrees from horizontal, resulting in a height of up to 0.8 m above ground level at its lowest edge, and up to 3.2 m at its highest edge. These panels will then be mounted on steel supports, pile driven into the ground. However, depending on the underlying ground conditions, or subsurface archaeology, the Panels may be mounted on surface level concrete footings to minimise subsurface effects.
Central Inverters	To facilitate the transfer of electricity between the solar PV Array and the Substation, up to 16 central inverters will be sited throughout the Proposed Development. These inverters will have dimensions up to 2.93 (H) m x 12.55 (L) m x 3 (W) m (W x L x H).
Battery Energy Storage System	Up to 40 BESS units, providing a generating capacity of up to 80 MW. The containers will have dimensions up to 2.4 m x 6 m x 3 m (W x L x H), located at approximately NGR 748 720. Each unit will sit on 6 concrete foundations up to 0.2 m above ground level, and up to 3 m below ground level.
Customer Substation Electrical Infrastructure	A 132kV and 33kV Electrical Substation will be located at approximately NGR 748 720.

ELEMENT	DETAILS
Access Tracks	Access tracks to serve the construction and operation of the Proposed Development, with a width of 5 m, with a likely verge of 1 – 1.5 m either side of the track itself.

3.2.2 Solar PV Arrays and Associated Infrastructure

3.2.2.1 Solar panels that comprise the PV arrays are composed of photovoltaic (PV) cells, typically with 120 cells per panel. The purpose of these panels is to absorb solar radiation (light) and generate electricity. The installed solar panels will be designed to maximise this absorption, and thus will be coated with an anti-reflective coating which will limit the amount of glint and glare they produce (see **Technical Appendix 15.1: Glint and Glare Assessment**). The PV cells will be mounted on a matte galvanised framework to minimise reflection.

3.2.2.2 Each solar panel would be mounted on an aluminium frame, with steel supports pile driven into the ground at a depth of approximately 1.5 – 2.5 m. In some cases, the solar panels may sit on concrete footings, with no subsurface elements, should pre-construction surveys reveal certain areas to have archaeological potential.

3.2.2.3 The solar panels would be lain in rows (arrays), with gaps of approximately 2 – 6 m between row, depending on the individual field topography. The arrays would be oriented in an approximate east-west alignment across the Site. This would result in the façade of the panels facing south, maximising the absorption of incident solar radiation throughout the daytime. The solar panels comprising the arrays would be inclined at an angle of up to 25 degrees from horizontal. This would result in them being 0.8 m from ground level at their southern edge, rising to a maximum of 3.2 m at their northern edge.

3.2.2.4 Typical elevations of the solar panels are shown on **Figure 3.2**. Due to the rapid advancement of solar PV technologies, it is possible that the design of the solar panels may differ slightly from those shown on the plan. However, any design changes would be within the design parameters of the Proposed Development.

3.2.2.5 Each Solar PV Array produces a Direct Current (DC). In order to be exported, this must be converted into Alternating Current (AC) using inverters. It is anticipated that up to 16 inverters will be required. The locations of these are shown in **Figure 1.2**. The inverters will have maximum dimensions of 2.93 (H) m x 12.55 (L) m x 3 (W) m, detailed in **Figure 3.3**. Each inverter would be mounted on 12 concrete foundations with depth up to 1 m, and extending up to 0.2m above ground level. The inverters would also be underlain by permeable gravel.

3.2.2.6 The generated power will be transferred from the inverters to the on-site substation via sub-surface cables. The chosen cable routes will be designed to minimise the environmental impact and length of cable required in order to connect to the on-site substation.

3.2.3 Battery Energy Storage System (BESS) and Associated Infrastructure

3.2.3.1 The Proposed Development will contain a BESS compound, situated in Field 5 (approximate NGR 748 720). The footprint to this compound would measure approximately 80 m x 85 m. This BESS compound would be co-located with the substation and surrounded by security fencing.

3.2.3.2 There will be a total of up to 40 energy storage units. These would be oriented into two groups, each with two rows of 10 containers. This indicative arrangement can be seen in **Figure 3.1**.

3.2.3.3 Each energy storage unit would consist of a steel container, designed to be secure and provide weather protection. The containers will have an appropriate RAL light grey and/or green finish, to be agreed with the Planning Authority.

3.2.3.4 Each unit will have approximate dimensions up to: 3 m height; 2.4 m width; and 6 m length. The units will sit on 6 concrete pillars with an anticipated height above ground level of 0.2 m. This will mean that the total anticipated height of an individual energy storage unit is 3.2 m. **Figure 3.4** shows these indicative elevations.

3.2.3.5 The six concrete pillars will also be driven into the ground, providing foundations up to 1.3 m deep.

3.2.3.6 Each container will house rows of battery modules, arranged in racks. The battery cells are likely to be Lithium iron Phosphate (LFP) type, although this assumption is subject to pre-construction procurement.

3.2.3.7 The battery units will incorporate a liquid cooling system, rather than an air conditioning cooling system. There is therefore no need for Heating Ventilation and Air Conditioning (HVAC) units on top or at the side of the container units.

3.2.3.8 Alongside the BESS containers, up to 20 Power Control System (PCS) boxes (**Figure 3.5**), and 10 MV transformers (**Figure 3.6**) will be installed. The PCS boxes will have dimensions up to 2 m (W) x 2.4 m (H) x 3.7 m (L), while the MV transformers will have dimensions 2.45 m (W) x 2.55 m (L) x 3 m (H). The indicative locations of these are shown in **Figure 3.1**.

3.2.4 Customer Substation

3.2.4.1 Located at approximately NGR 748 720 is the on-site Customer Substation that contains the specialist equipment to allow the voltage of electricity to be transformed from the Solar PV arrays and BESS facility. The substation compound will comprise the following infrastructure:

- Customer Substation – The compound will house the respective switch gears, dimensions up to 2.4 m (w) x 6.5 m (L) x 3 m (H). This will be built on top of a concrete plinth of up to 0.5 m in height, underlain by permeable gravel. (**Figure 3.7**);
- 33 kV Customer Substation – This would be a small building, with dimensions up to 2.4 (W m x 6 (L) m x 3 (H) m. This building will be built on top of a concrete plinth of up to 0.5 m in height and would be underlain by a permeable gravel sub-base (See **Figure 3.8**).

- 132 kV Customer Substation – This will be a small building, dimensions up to 4 m (W) x 7 m (L) x 3.7 m (H). This building will be built on top of a concrete plinth of up to 0.6 m in height. See **Figure 3.9**.

3.2.4.2 The compound will also contain an operations and maintenance building. This building will have dimensions up to 6.4 m (W) x 24 m (L) x 3 m (H) (See **Figure 3.10**). This building will contain the site welfare facilities and storage.

3.2.5 Fire Safety

3.2.5.1 The risk of fire at BESS sites is low, however, the risks must be considered and mitigated through design and operation practices. The main fire risk concern is known as 'thermal runaway'. This is a cycle where excessive heat then goes on to create more heat until the energy stored within the batteries runs out.

3.2.5.2 As shown in **Figure 3.1**, the battery energy storage containers will be separated by a minimum of 3 m, to reduce the risk of thermal runaway, in line with the following guidance documents for BESS, UL95401[1], UL9540a[2] and NFPA 855[3].

3.2.5.3 The battery units incorporate a liquid cooling system rather than an air conditioning based cooling system.

3.2.5.4 Aspirating smoke gas detectors will be fitted within each enclosure within each unit. This will provide an early warning in the unlikely event of a battery cell fire. This is far more sensitive than older systems which only monitor heat building up. There will also be carbon monoxide detectors within the containers and other buildings within the facility. The detectors would send an alarm to a monitoring station and will trigger an automatic power disconnection.

3.2.5.5 The gas detectors will be part of a wider supervisory control and data acquisition (SCADA) system. This would include an advanced battery management system which would continually monitor the performance of each battery cell and immediately draw the attention of site operator attention to any potential faults.

3.2.5.6 Each battery unit will have a three-stage Battery Management System (BMS), managing the system at cell, module, and rack level. This system is designed to identify any issues in these levels, and lead to a shutdown of that specific part of the system, thereby reducing the chance of further damage and potential for thermal runaway.

3.2.5.7 The SCADA system will incorporate numerous alarms such as intruder, heat and smoke alarms, which are highly sensitive to deviations from pre-defined levels. Once an alarm is raised on the system, a remote operator will assess the implications of the alarm and activate a protocol of commands, which will dictate the resultant activities. The system can

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[1] UL9540 Energy Storage Systems and Equipment

[2] UL 9540A, the Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems

[3] National Fire Protection Association 855 Standard for the Installation of Stationary Energy Storage Systems

remotely close down the installation, disconnecting the power connection to minimise the risk of any fire hazard developing.

3.2.5.8 A sophisticated fire prevention and suppression system would also be installed where inert gas (non-toxic and environmentally benign) will be automatically discharged in the unit if abnormal levels of heat, gas and, or smoke are detected. This will not require remote activation and will trigger an automatic disconnect. An alarm would also then be sent to the monitoring station. The inert gas would displace oxygen in the battery unit and will stop any fire developing and spreading.

3.2.5.9 Allowance has been made in the drainage design for a concrete slab with water tank and valve house for fire-fighting purposes. This has been sized so that it would contain approximately 160 m^3 of water.

3.2.5.10 Training exercises will be planned with the local fire service when the system is being commissioned. Standard Operating Procedures (SOP) will be drawn up in consultation with the fire service and these will be updated and tested on a regular basis

3.2.6 Grid Connection

3.2.6.1 The Proposed Development will be connected to the consented Branxton Substation, which is to be constructed approximately 1.2 km to the north of the Site, as measured from the customer substation.

3.2.6.2 The Transmission Network Operator (TSO) will be responsible for assessing, designing, and obtaining consent for the connection. It is anticipated that it will take the form of a combination of overground line and underground cable following public roads where possible.

3.2.6.3 The grid connection does not form part of the application for the Proposed Development, and its environmental effects will be considered as part of any future application for consent to be made by the Transmission Network Operator (TSO).

3.2.7 On-Site Access Tracks

3.2.7.1 The Site will be accessed via an entrance on the northern boundary of the Site off the C120 road. This entrance will serve all vehicles entering the Site during all phases of the Proposed Development. The Site entrance and track layout for the Proposed Development is shown in **Figure 3.1**.

3.2.7.2 The length of on-site track will be approximately 3472.5 m.

3.2.7.3 All access tracks have been designed to minimise environmental disturbance and land take where practicable. This has been done through avoidance of environmental constraints identified during the EIA and limiting the number of watercourse crossings.

3.2.7.4 Access tracks will be up to 5 m in width, with an additional verge on either side of up to 1 m to 1.5 m, subject to local ground conditions. A typical cross-section for site access tracks is shown in **Figure 3.11**.

3.2.7.5 It is anticipated that access tracks would be constructed using a 'cut track' design where topsoil is stripped to expose a suitable rock or sub-soil horizon on which to build the track. The track is built up on a geotextile layer by laying and compacting crushed rock to a depth dependent on ground conditions and topography. Generally, the surface of the track will be flush with or raised slightly above the surrounding ground level.

3.2.7.6 Excavated soils would be stored at no greater than 3 m in height, directly adjacent to, or near the tracks on ground appropriate for storage of materials i.e., relatively dry and flat ground, a minimum of 50 m away from any other watercourses. Wherever possible, reinstatement will be carried out as track construction progresses.

3.2.7.7 Prior to the commencement of construction, a detailed engineering specification for the access track design will be submitted to the planning authority as part of a Planning Conditions Compliance Statement which will include Construction Method Statements (CMS) for all aspects of construction.

3.2.7.8 All access tracks will incorporate robust drainage, including drainage channels running adjacent to the tracks, either on one or both sides. The track would be designed with a crossfall towards the drainage channels to prevent a build-up of surface water and allowing the track to act as a watercourse. The make-up of the tracks will also be as permeable as possible to prevent any instances of surface water build up.

3.2.7.9 Cross drainage pipes will be installed at regular intervals to prevent flooding or surcharging of the drainage channels and to maintain natural drainage catchments.

3.2.7.10 The implementation of the drainage design will be developed in response to a risk appraisal undertaken by the contractor and will be proactive, rather than being reactive to any events arising once work commences. The design will minimise the risk of sedimentation (from loose material) and pollution (from accidental spillage) of all downstream watercourses.

3.2.8 Hardstanding

3.2.8.1 The BESS compound and substation will be formed of crushed aggregate laid on permeable membranes. The aggregate will be sourced from local quarries (where possible) and transported to the site via the A1, U246, U220 and C120. The aggregate cannot be obtained from within the Site due to unsuitable on-site geology.

3.2.8.2 Any cut and fill earthworks across the compound area would be carried out at an early stage of the construction process to create a suitable level development platform. The earthworks will be designed to minimise the need for fill material to be brought to the site or for excess material to be removed from site, as far as practicable.

3.2.8.3 The aggregate within the compound will be compacted and therefore semi-permeable. An indicative typical cross section of the compound hardstanding is shown in **Figure 3.11**.

3.2.9 Water Course Crossings

3.2.9.1 As noted above, the track layout design has sought to limit the number of watercourse crossings however, the Proposed Development will require 3 watercourse crossings to be created or upgraded.

3.2.9.2 The locations of these watercourse crossings are detailed in full in **Chapter 9: Water Resources**.

3.2.9.3 The type and design of each watercourse crossing will be dependent on the stream morphology, peak flows, local topography and ecological requirements, and will be chosen to avoid or minimise potential environmental effects.

3.2.9.4 Any crossing would be designed in accordance with Construction Industry Research and Information Association (CIRIA) Culvert design and operation guide (C689)[4] and incorporating the most recent climate change allowances, to ensure sufficient carrying capacities.

3.2.10 Fencing

3.2.10.1 Both the substation and BESS compound will be surrounded by wire mesh fences, up to 2 m in height. A secondary, galvanised security fence, up to 2.5 m high, will be placed within the wire mesh fencing surrounding the Customer Substation substation, to provide additional security.

3.2.10.2 Wire mesh fences, up to 2 m in height, will be installed around each field containing the Solar PV Arrays to provide security for the infrastructure in these fields.

3.2.10.3 The positions of fencing in the Proposed Development are shown in **Figure 3.1**, with indicative details of the wire fencing shown in **Figure 3.12** and Security Fencing shown in **Figure 3.13**.

3.2.10.4 As part of the embedded mitigation for noise and vibration (see **Chapter 12: Noise and Vibration**) acoustic fencing will be incorporated into the site design. This acoustic fencing will surround each central invertor at a distance of 2 m, with height up to 4.5 m. This height is composed of an up to 4 m vertical portion, with a subsequent inward cantilevered section extending another 0.5 m vertically. Similar acoustic fencing, will be installed around each of the groupings of BESS containers as shown in **Figure 3.1**, However, the Acoustic fencing surrounding the BESS containers will have a vertical height of 3.5 m and will not include a cantilever. An indicative detailed drawing of the proposed acoustic fencing can be seen in **Figure 3.14**.

3.2.10.5 **Figure 3.15** provides indicative details of gates that would be required for access into fenced areas.

3.2.11 Closed Circuit Television Masts

3.2.11.1 During the operation of the Proposed Development closed circuit television (CCTV) masts with security cameras on the perimeter of the compound would be installed. The masts would be slender and measure up to 3 m in height, and are shown in **Figure 3.16**.

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[4] CIRIA, 2010, “Culvert Design and Operation Guide”, Available Online [https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C689F&Category=FREEPUBS] (Accessed: 19/03/2025)

3.2.11.2 The masts will accommodate infrared night-time cameras, as well as standard cameras, to maintain security surveillance during hours of darkness.

3.2.12 Lighting

3.2.12.1 During the construction of the Proposed Development 50/30 W Halogen floodlights would be mounted to the welfare buildings. Additionally, solar powered LED lights fitted to CCTV cameras would be placed throughout the site in high priority areas to ensure the security of materials on site.

3.2.12.2 During operation there will be no lighting present within the fields containing the solar PV arrays. Within the BESS and substation compounds the following lighting will be present, but will be off during normal operation:

- External 50/30 W floodlight on the welfare building; and
- 30 W LED floodlights fitted to CCTV lighting columns (**Section 3.2.11**).

3.2.12.3 Certain maintenance actions may require the use of temporary lighting as required by the task and time of year etc. These would most likely be 30 W LED floodlights on stands, powered by a portable generator, solar panel, or battery.

3.2.13 Temporary Construction Compound

3.2.13.1 A temporary construction compound for the Proposed Development will be created for the duration of construction, located at approximately NGR 744 713, This area will ultimately be back-filled with solar panels, as shown in Figure 3.1. The area of the compound will measure approximately 100 x 155 m, and will include space for:

- Portacabins for site office and staff welfare facilities with provision for sealed waste storage and removal;
- Areas for storing construction materials;
- Parking for project related vehicles; and
- Containerised storage for tools and spares.

3.2.13.2 A second, smaller temporary construction compound located at NGR 746 720, measuring approximately 30 x 75 m. This will serve the construction of the on-site substation and BESS compound.

3.2.13.3 Welfare facilities for site personnel will be required during construction which would be located within the construction compound. Foul water and effluent would be treated either via a septic tank with soakaway designed to SEPA Guidelines (including GPP4[5]), or by the

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[5] SEPA, 2021, Treatment and disposal of wastewater where there is no connection to the public foul sewar, Available Online: [https://www.netregs.org.uk/media/1887/guidance-for-pollution-prevention-4-2022-update.pdf], (Accessed: 11/03/2025)

use of chemical facilities with periodic material for offsite disposal. Any facilities would be subject to agreement with SEPA.

3.2.13.4 The area to be used for the construction compound would be stripped of topsoil, which would be stored for future re-instatement, to expose a suitable foundation. A geosynthetic material base or similar will then be laid, followed by a layer of suitable material, then a further geosynthetic material laid prior to the top surface of blended fines.

3.2.13.5 Appropriate bunding arrangements will be employed in all areas where fuel and oil storage tanks will be situated to prevent contamination of the surrounding soils, vegetation, surface water, and ground water.

3.2.13.6 The fuel storage area will be above ground with secondary containment in accordance with SEPA's GPP2[6] (Above Ground Oil Storage Tanks), PPG7[7] (Refuelling Facilities) and GPP8[8] (Safe storage and disposal of fuel oils), and will be situated a minimum of 50 m from watercourses to reduce the risk of pollution of watercourses. Any contaminated run-off within the sealed bund will be removed to a licensed waste management facility.

3.2.13.7 Following completion of the construction phase, the components of the compounds will be removed and the area fully restored.

3.2.14 Restoration

3.2.14.1 Site restoration will involve the restoration of track and hardstanding verges, and the temporary construction compound to provide a natural ground profile. Restoration will be undertaken at the earliest opportunity to minimise storage of turf and other materials, and to allow restoration of disturbed areas as early as possible.

3.2.14.2 A restoration plan for the site will be secured by condition and agreed with the Planning Authority and relevant statutory consultees.

3.3 Construction and Development Phasing

3.3.1.1 The on-site construction period is estimated at approximately 18 months in duration and would comprise the following principal operations:

- Upgrading/creation of access junctions for construction vehicles;
- Construction of the temporary construction compound;

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[6] SEPA, 2021, Above ground oil storage tanks: GPP 2, Available Online: [https://www.netregs.org.uk/media/1890/guidance-for-pollution-prevention-2-2022-update.pdf] (Accessed: 11/03/2025)
[7] SEPA, 2021, The Safe operation of refuelling facilities: PPG 7, Available Online: [https://www.sepa.org.uk/media/145003/ppg-7_the_safe_operation_of_refuelling_facilities.pdf] (Accessed: 11/03/2025)
[8] SEPA, Safe storage and disposal of used oils: GPP 8, Available Online [https://www.netregs.org.uk/media/1900/guidance-for-pollution-prevention-8-2022-update.pdf] (Accessed: 11/03/2025)

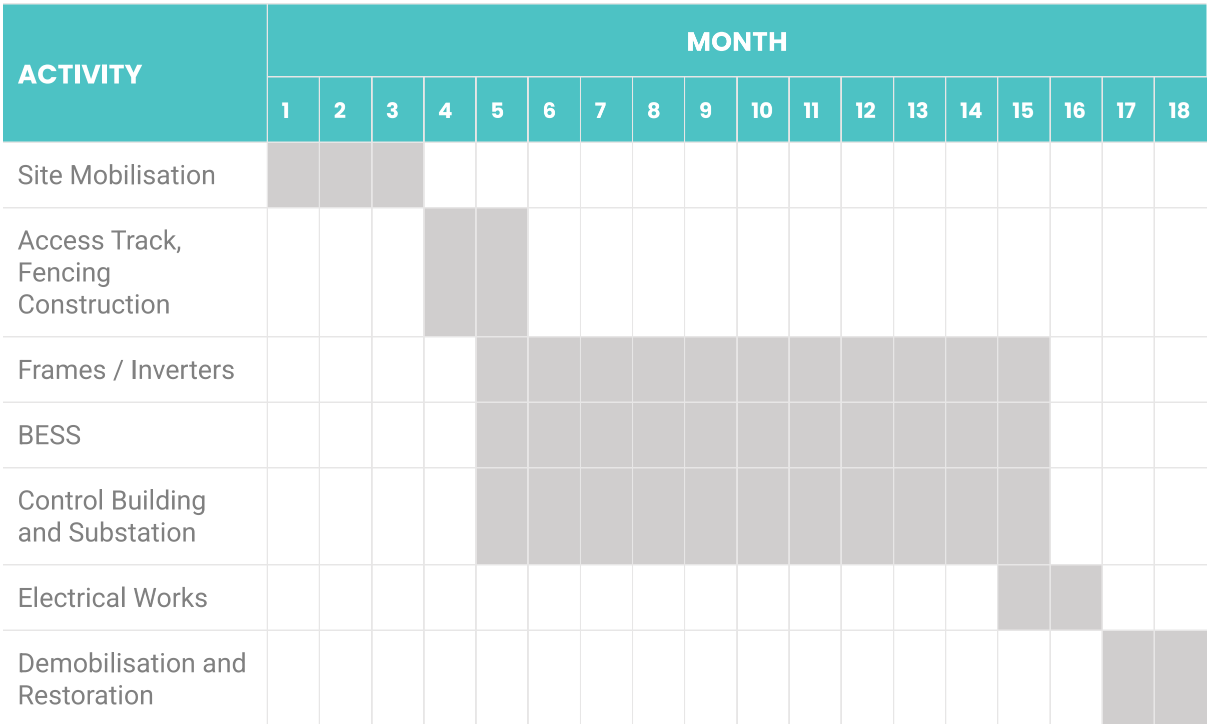
- Upgrading of existing tracks and creation of new access tracks, including water course crossing points;
- Construction of substation building, including O&M building and BESS facility;
- Excavation of trenches and cable laying;
- Delivery, erection, and commissioning of solar panels;
- Backfilling of temporary construction compound with remaining solar panels, followed by commissioning; and
- Commissioning of on-site equipment.

3.3.1.2 Site restoration and habitat management (outline Landscape and Biodiversity Management Plan (oLBMP) provided as **Technical Appendix 3.2)** provisions will be implemented post-construction and through operation of the Proposed Development.

3.3.2 Construction Period

3.3.2.1 It is expected that many of the above operations will be carried out concurrently (minimising the overall length of the construction programme), although they would occur predominately in the listed order presented in **Chart 3.1**. A high-level indicative Construction Programme is presented in **Chart 3.1**.

CHART 3.1 INDICATIVE CONSTRUCTION PROGRAMME



3.3.2.2 The starting date for construction activities will be dependent on the date that consent may be granted, and on grid connection availability. Subsequently, the programme would be influenced by constraints on the timing and duration of any mitigation measures detailed in the individual technical chapters, or by the consent decision. Additionally, factors such as weather conditions and on-site ground conditions will influence the final programme.

3.3.2.3 The final length of the programme would depend on seasonal working and weather conditions. Summer months are favoured for construction due to longer periods of sunlight, allowing longer working hours. Summer months are also generally drier which aids the construction process, and reduces the impact of site debris reaching public roads (e.g. mud, etc.). However, if required wheel wash facilities will be installed at site entrances as appropriate.

3.3.2.4 It is proposed that construction activities be limited to the working hours of 07:00 to 19:00, Monday to Friday, and 07:00 to 13:00 on Saturdays, with the exception of any emergency working. During the construction phase, should any critical elements of the installation require extended working hours due to an inability to stop the process once started, agreement with the Planning Authority will be sought in advance of these works.

3.3.3 Construction Methods and Environmental Management Plan

3.3.3.1 The construction phase will be controlled via a series of detailed method statements, which will be prepared by an Infrastructure Contractor appointed by the Applicant who will have overall responsibility for environmental management on the construction site. While these method statements can only be formulated following detailed site investigation and detailed engineering design, it is possible to indicate the outline of the methods that will be used.

3.3.3.2 The services of specialist advisors will be retained as appropriate, such as an archaeologist, and ecologist, to be called upon as required to advise on specific environmental issues. The appointed Infrastructure Contractor will ensure construction activities are carried out in accordance with mitigation measures outlined in this EIAR.

3.3.3.3 An outline Construction Environmental Management Plan (oCEMP) has been provided alongside this EIAR as **Technical Appendix 3.1**. Prior to commencement of construction, a final, detailed CEMP would be prepared that expands upon the oCEMP and details all measures required during construction to avoid and minimise environmental harm, including guidance and best practice. The CEMP would cover:

- Site introduction and training;
- Working hours;
- Enabling works;
- Surface water and drainage management;
- Waste management;
- Wastewater and water supply monitoring and control;
- Water quality monitoring;
- Oil and chemical delivery and storage;
- Ecological protection measures;

- Construction noise management;
- Cultural heritage protection measures;
- Handling of excavated materials;
- Reinstatement and restoration;
- Traffic management;
- Environmental incident response and reporting;
- Method statements and risk assessments;
- Final drawings and details of access tracks; and
- Final drawings and details of infrastructure foundations.

3.3.3.4 In addition to the measures presented in the CEMP, contractors will also be required to adhere to the following to minimise environmental effects of the construction processes:

- Conditions required under the Consent and deemed planning permission;
- Requirements of statutory consultees, including SEPA and NatureScot;
- Any relevant mitigation measures identified in this EIAR; and
- All relevant statutory requirements and published guidelines that reflect 'good practice'.

3.3.3.5 The Applicant will require that all contractors follow the requirements of ISO14001 – 'Environmental Management Systems – Specification and Guidance for Use', and will provide the following:

- Details of the main contractor's corporate environmental policy;
- Assessment of environmental impacts during construction;
- Procedures and controls for environmental management;
- Environmental monitoring details and reporting systems;
- Schedule of contractual and legislative requirements; and
- Schedule of relevant consents, licenses and authorisations.

3.3.3.6 The CEMP will be subject to approval with relevant statutory bodies, including SEPA, NatureScot, and the Planning Authority prior to commencement of construction. Performance against the CEMP will be monitored by the Applicant's construction Project Manager throughout the construction period.

3.3.3.7 Particular environmental impacts and associated mitigation measures required to be addressed within the CEMP are discussed in the relevant sections of this EIAR.

3.3.3.8 Additionally, the CEMP will typically be supported by the following documents which apply to the construction process:

- Drainage Management Plan:
- Landscape and Biodiversity Management Plan (LBMP);
- Bird Protection Plan;
- Pollution Prevention Plan;
- Water Protection Plan;
- Traffic Management Plan;
- Site Water Management Plan (SWMP);
- Emergency Response Plan; and Restoration Plan.

3.3.3.9 As earlier noted, an oLBMP (**Technical Appendix 3.2)** is included with this EIAR.

3.3.3.10 The Drainage Management Plan (DMP), which will detail proposed surface drainage measures to treat and deal with all the surface runoff from the Site, will be designed in accordance with Sustainable Drainage Systems (SuDS) principles. An outline DMP is not included as part of the EIAR.

3.3.3.11 The remaining documents listed above will be agreed and approved with the relevant bodies prior to construction.

3.3.4 Construction Materials

3.3.4.1 The key materials which would be required for the construction of the tracks, foundations, cable trenches, and BESS/Substation compounds are:

- Excavated materials from the site (earth, stone and rock);
- Crushed stone and gravel aggregate;
- Crushed concrete aggregate;
- Concrete quality aggregate: high strength structural grade, which is not prone to substantial leaching of alkalis;
- Steel reinforcement; and
- Electrical cable.

3.3.4.2 All materials will be sourced and transported to the site from local suppliers, where possible. Concrete batching may be undertaken onsite if required.

3.4 Waste

3.4.1 Waste Composition

3.4.1.1 Exact quantities and types of waste are unknown at this stage of the Proposed Development. It is expected that they could include:

- Excavated material;
- Welfare facility waste;
- Packaging;
- Waste chemicals, fuels, and oils;
- Waste metals;
- Waste water from cleaning activities; and
- General construction waste.

3.4.1.2 The main items of construction waste and their sources are:

- Hardcore, stone, gravel from temporary surfaces to facilitate construction, and concrete waste;
- Subsoil from excavations for foundations and roads;
- Timber from temporary supports, shuttering and product deliveries;
- Miscellaneous building materials left over from construction of the O&M building;
- Sanitary waste from chemical toilets (if used);
- Plastics packaging of material; and
- Lubricating oils, diesel - unused quantities at end of construction period.

3.4.1.3 A Site Waste Management Plan (SWMP) will detail how waste streams are to be managed, following the Waste Hierarchy[9] of prevention, reuse, recycle, recover, and as a last resort, disposal to landfill. The SWMP will be agreed and implemented prior to construction commencing on Site via a planning condition.

3.4.2 Waste Management

3.4.2.1 All waste will be removed off-site for safe disposal at a suitably licensed waste management facility in accordance with current waste management regulations. Wherever possible,

[9] The Waste Management Licencing (Scotland) Regulations 2011 places a duty on all persons who produce, keep, or manage waste to apply the 'Waste Hierarchy' in order to minimise waste production at all stages of the development.

excavated stone or soils will be re-used on-site, primarily for the restoration of disturbed ground. All details of this will be included within the CEMP, as agreed with the Council and SEPA.

3.4.2.2 Subsoil not required for reinstatement purposes will be collected at the end of the construction phase and disposed of according to best practice and existing waste legislation. Waste oils and diesel will be removed from the Site and disposed of by an approved waste contractor in accordance with provisions of the Special Waste Regulations 1996.

3.4.2.3 The infrastructure contractor will be required to prepare a SWMP so that best practice principles are applied with regard to reducing, re-using and recycling of all materials.

3.4.3 Health and Safety Related Issues

3.4.3.1 Health and safety issues during construction and decommissioning fall under the Construction (Design and Management) (CDM) Regulations 2015[10]. Health and safety will be initially addressed as part of the Pre-Construction Information Pack prepared by the Applicant. The Contractor will be required to prepare a Construction Phase Plan (Health and Safety Plan) and to forward information to the Applicant during the works to enable the Health and Safety File to be completed.

3.4.3.2 Day-to-day operational and maintenance activities will be co-ordinated with the private landowner's operational requirements.

3.4.3.3 Public access to the Site will be restricted throughout the construction working area during construction for health and safety reasons and will be reinstated where practicable following cessation of construction activities.

3.4.3.4 An Operations and Maintenance Manual for the design life of the Proposed Development will be prepared by the Contractor and will cover all operational and decommissioning procedures.

3.5 Operational Phase

3.5.1.1 The Proposed Development will have an operational lifespan of up to 40 years from full energisation of the generating infrastructure.

3.5.1.2 Maintenance would be overseen by suitable qualified contractors who would visit the Site as required. Activities would be restricted principally to vegetation management, equipment/infrastructure maintenance and servicing, including replacement of any components that fail, and monitoring to ensure the continued effective operation of the Proposed Development.

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[10] Health and Saftey Execiutive (2025). "Construction (Design and Management)(CDM) Regulations 2015". [Online] Available at: https://www.hse.gov.uk/construction/cdm/2015/index.htm. Accessed: 21/04/2025.

3.5.2 Decommissioning

3.5.2.1 When the operational phase ends, the Proposed Development will require decommissioning. All solar PV infrastructure, including modules, mounting structures, cabling, inverters, and transformers would be removed from the Site and recycled or disposed of in accordance with good practice guidance and market conditions at the time.

3.5.2.2 The effects of decommissioning are similar to, or often of lesser magnitude than construction effects. This is due to many of the decommissioning activities essentially being the reverse of their construction phase equivalents. Where possible these effects have been considered in the relevant technical assessments. This will allow for the recovery of major components including glass, aluminium and copper, with likely cumulative yields of greater than 85% of total panel mass. In the long term, dedicated panel recycling plants can be expected to increase treatment capabilities and the ability to recover a greater fraction of embodied materials.

3.5.2.3 As engineering approaches and technologies are likely to change over the operational lifetime of the Proposed Development, detailed planning for decommissioning will be undertaken towards the end of the operational life of the Proposed Development, taking into account the latest regulations and technology. The Proposed Development will be decommissioned in accordance with a decommissioning, restoration and aftercare plan to be agreed with the local authority.