Chapter 3: Site Selection and Design Iteration

Kirknewton Solar & BESS EIA Report

Trio Power Limited

UK House
5th Floor
164-182 Oxford Street
London
W1D1NN

Prepared by:

SLR Consulting Limited

The Tun, 4 Jackson's Entry, Edinburgh, EH8 8PJ

SLR Project No.: 405.065786.00001

10 December 2025

Revision: 1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	11 November 2025	LG / JK	SC	GS
2.0	8 December 2025	LG / JK	SC	GS
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			

Basis of Report

This document has been prepared by SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with Trio Power Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

Table of Contents

Basis of Report ..... **i**

Acronyms and Abbreviations ..... **iii**

3.0 Site Selection and Design Iteration **1**

3.1 Introduction 1

3.2 Background 1

3.3 Site Location, Site Selection and Alternatives 1

3.4 Design Process 2

Supporting Figures (EIA Report Volume II)

Figure 3.1.1: Environmental Designations within 5 km

Figure 3.1.2: Environmental Designations within 1 km

Figure 3.2: Layout 1

Figure 3.3: Layout 2

Figure 3.4: Layout 3

Acronyms and Abbreviations

BESS	Battery Energy Storage System
EIA	Environmental Impact Assessment
HGV	Heavy Goods Vehicle
km	Kilometres
PV	Photovoltaic
SuDS	Sustainable Drainage System

3.0 Site Selection and Design Iteration

3.1 Introduction

3.1.1 This chapter describes the Site identification and design iteration process which has been undertaken by the Applicant prior to arriving at the final design, described in **Chapter 4: Proposed Development**.

3.1.2 This chapter is supported by the following figures, which are presented in EIA Report, Volume II:

- **Figure 3.1.1** – Environmental Designations within 5 km
- **Figure 3.1.2** – Environmental Designations within 1 km
- **Figure 3.2** - Layout 1
- **Figure 3.3** – Layout 2
- **Figure 3.4** - Layout 3
- **Figure 1.2** – Proposed Development Layout

3.2 Background

3.2.1 The Applicant proposes to construct the Proposed Development on land at a site near Kirknewton in West Lothian (the Site). The principles of the Environmental Impact Assessment (EIA) process, that site selection and project design should be an iterative process, have been followed as part of the Proposed Development. This has ensured that potential adverse environmental effects, as a result of the Proposed Development, have been avoided or minimised as far as reasonably possible.

3.3 Site Location, Site Selection and Alternatives

3.3.1 Following engagement with the landowners, a desktop assessment was conducted to identify areas of opportunity for a viable solar photovoltaic (PV) and battery energy storage (BESS) development. The assessment reviewed:

- Planning and environmental consideration such as designated areas, agricultural land quality, and local and national planning policy;
- Technical factors such as the topography of the land, traffic access and shading;
- Land available to the Applicant; and
- Available grid capacity at nearby substation

3.3.2 Based on the outcome of this work, the Site was selected as a suitable location for the proposed solar and BESS development (**Figure 1.1**).

3.3.3 The main alternatives including design, location, size, and scale have been considered for the Proposed Development. This chapter explores these options and explains how the final design of the Proposed Development has evolved.

Site Location

3.3.4 The Proposed Development Site is located approximately 1.5 kilometres (km) south of Kirknewton at Leyden Road, East Calder, West Lothian, EH27 9DQ (as shown in **Figure 1.1**).

Site Selection

3.3.5 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) state that the EIA Report must include *"A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*" (Schedule 4, Part 2) (Scottish Government, 2017)[1].

3.3.6 The Site was identified as an area which would be appropriate for solar development through initial feasibility work which considered the following key issues:

- Residential amenity;
- Topography;
- Cumulative impact from other solar developments;
- Grid connection;
- Environmental designations;
- Visual impact;
- Flood risk;
- Traffic access;
- Agricultural land use; and
- Land available to the Applicant.

3.3.7 A description of the characteristics of the Site and surroundings is provided in **Chapter 4: Proposed Development**.

3.4 Design Process

Design Principles

3.4.1 In an EIA, the identification of constraints should continue throughout the design process as more detailed surveys reveal additional constraints to development. In this way, the findings of the technical and environmental studies can be used to inform the design of a development and hence achieve a 'best fit' within the Site.

[1] Scottish Government (2017) *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.* Available at: The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017

3.4.2 The Applicant adopted the following principles during the design iteration process where possible to ensure the final design of the Proposed Development was the most suitable for the Site:

- Locating the BESS at least 500 m from neighbouring residential receptors;
- Locating the solar infrastructure at least 100 m away from neighbouring residential receptors;
- Maintaining hedgerows and trees within and surrounding the Proposed Development boundary;
- Utilising existing vegetation and terrain to maximise screening;
- Optimising the opportunity for biodiversity enhancement measures;
- Respecting a buffer zone from the overhead line which transects the western land parcel of the Proposed Development;
- Respecting a buffer zone from the Scottish Water pipeline which transects the Site;
- Respecting buffer zones from watercourses;
- Respecting buffer zones around woodland and key ecological habitats;
- Respecting a buffer zone around the heritage asset in the middle of the eastern land parcel; and
- Ensuring a walking track remains between the two fields in the eastern land parcel, and maintaining access to existing recreational paths.

3.4.3 The design of any solar development is driven by the key objective of positioning panels so that they capture the maximum energy possible within a suitable area, further informed by environmental and technical constraints.

3.4.4 Many solar developments now include BESS to store excess energy for use when solar generation is low, improving reliability and grid stability. This placement and capacity of BESS are determined by site-specific factors such as available space, grid infrastructure, and environmental considerations, ensuring efficient operation within planning regulations.

3.4.5 All site constraints are discussed in more detail in **Chapter 4** and are shown in **Figure 3.1.1 and 3.1.2.**

3.4.6 It is important to note that the identification of a constraint does not necessarily result in the exclusion of that area from the potential development envelope; rather it means that careful thought and attention was paid to the constraint and the design altered appropriately. The key constraints considered during the design process included:

- Landscape and visual constraints, also taking account of potential mitigation and enhancement opportunities for example through landscape planting;
- Location of residential receptors;
- Location of existing infrastructure;
- Location of Scottish Water underground pipeline;

- Location of overhead electricity lines;
- Presence of cultural heritage features; and
- Presence of protected habitats.

3.4.7 The identification of constraints continued throughout the design evolution process as more detailed surveys refined the development envelope.

3.4.8 Details of how the design has evolved to minimise the potential environmental effects associated with the identified constraints are set out below.

Layout Evolution and Design Iterations

3.4.9 This section details the design iterations that have been undertaken as the Applicant has sought to achieve a viable design that maximises the renewable electricity generation from the Site, whilst minimising the environmental effects.

3.4.10 These design iterations have been made in line with the design principles set out in **Paragraph 3.4.2**.

3.4.11 There have been four principal iterations in the design of the Proposed Development. These iterations, referred to as Layouts 1 to 4, are summarised below.

Layout 1 (Preliminary Layout – May 2025)

3.4.12 Layout 1 (**Figure 3.2**) was informed by preliminary desktop environmental studies and was the layout presented at the initial community consultation events. This layout represents maximum coverage of the Site with solar PV panels based on maximising generating capacity of the Site and available grid capacity whilst taking consideration of known site constraints, primarily ecological factors. The BESS was located in the south-western corner of the eastern land parcel.

3.4.13 This design incorporated topography into the layout and included buffers around the trees between fields in the eastern land parcel, and a buffer around the drainage ditch feeding into the Green Burn in the centre of the eastern land parcel. Further buffers were applied to an overhead line traversing the western land parcel to ensure safety and compliance with infrastructure requirements. Buffers were also applied to the eastern edge of the Site adjacent to the houses at Newlands, and to an undesignated heritage asset (derelict farmstead) in the eastern land parcel.

Layout 2 (Design Chill – July 2025)

3.4.14 Layout 2 (**Figure 3.3**) was shaped by input from the design workshop, ongoing surveys, and feedback gathered during community engagement events such as public exhibitions. This iteration features a reduced number of PV modules to address constraints identified by technical specialists, while also accommodating necessary site infrastructure. The BESS was moved slightly to the north to flatter ground, to reduce the amount of cut and fill required during construction. Hydrological survey work had identified a Scottish Water mains pipe transecting the site, so an initial 3 m buffer was created over the pipe as per Scottish Water easement guidelines.

3.4.15 Further ecology buffers were introduced at Layout 2 to further buffer from ancient woodland inventory and other potential protected species habitat. The exterior

fence along the north of the Site was relocated closer to the edge of the Site to allow for a 30 m buffer from the trees along the Site boundary.

Layout 3 (Design Freeze – September 2025)

3.4.16 Layout 3 (**Figure 3.4**) was informed by ongoing survey work and design input. A sustainable drainage system (SuDS) pond was added to the north of the BESS which resulted in removal of a number of panels and the relocation of the construction compound to the north-west of the eastern land parcel. The easement on the Scottish Water mains pipeline was increased to 10 m following consultation with Scottish Water. The buffer between the northern Site boundary and the access track in the north was increased, pulling the perimeter fence closer to the solar panels to allow for additional planting.

Layout 4 (Design Freeze Update – October 2025)

3.4.17 Layout 4 (Design Freeze) (**Figure 1.2**) had minor changes as a result of hydrology input to the design. The SuDS pipeline route was changed to travel parallel to the access track from the BESS to the Site access, then turning at right angles to follow the line of the existing drainage ditch in the eastern land parcel. This was to avoid the SuDS pipeline going through the solar panels, which would have required removing further solar panels. Layout 4 also included reducing the number of battery containers in the BESS part of the development, increasing the buffer to 100m between the panels and housing at Newlands to allow for additional woodland & hedgerow planting, and minor changes to internal fencing around ecology buffers.

Other Site Infrastructure

Site Access and Site Tracks

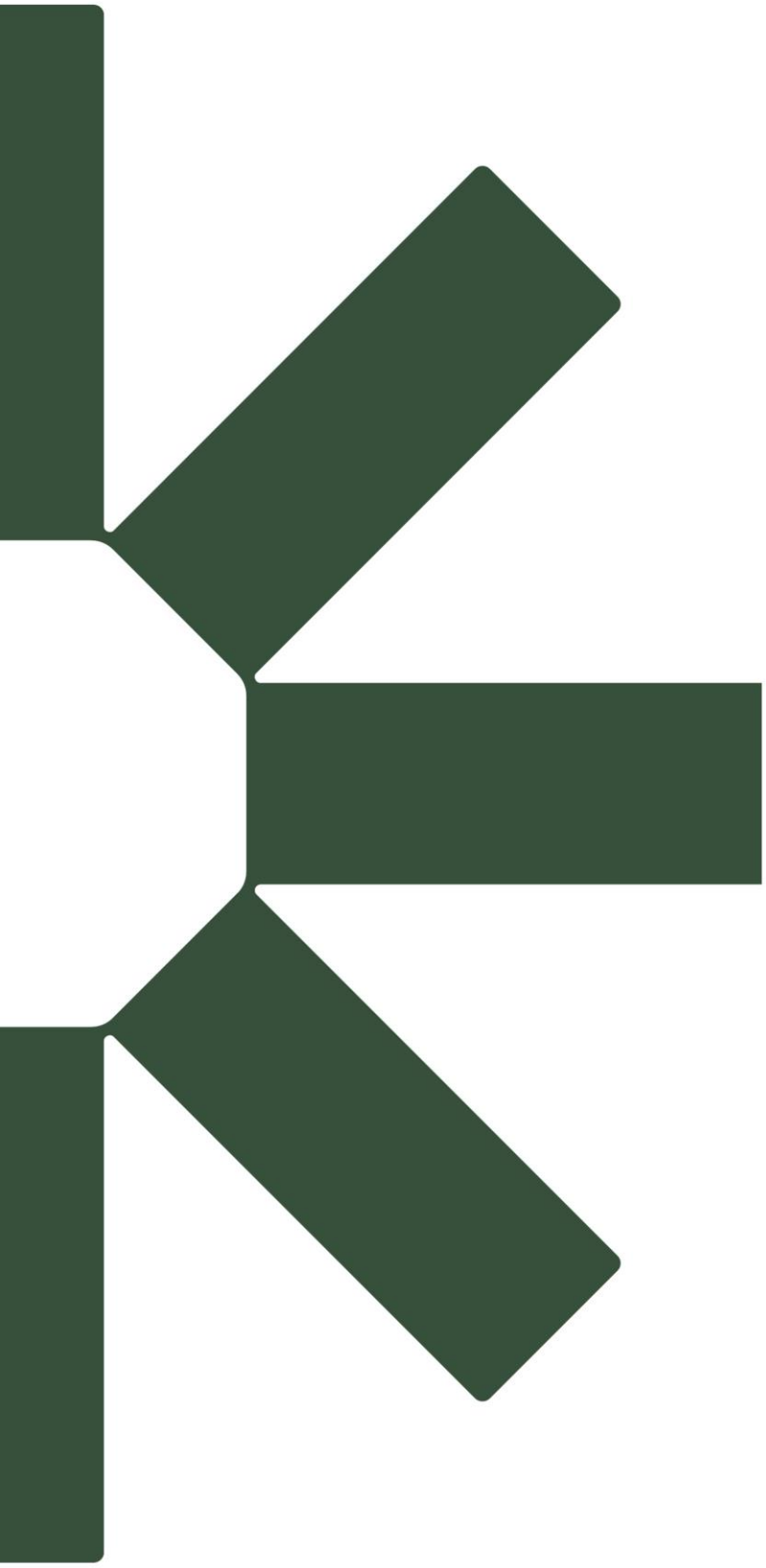
3.4.18 The proposed access to the Site has been carefully assessed throughout the design process, with various construction and operational access options considered. The Site is bisected by Leyden Road (also referred to as the U32 by WLC), which meets the A70 around 1.1 km to the south of the Proposed Development and links with Station Road and the A71 near Kirknewton to the north.

3.4.19 Potential Site access via Station Road to the north was discounted at an early stage of the development design due to 4.1 m height restriction on Leyden Road as it passes under the Edinburgh – Mid Calder Junction railway line, making it unsuitable for Heavy Goods Vehicle (HGV) access.

3.4.20 Access to the Site via the A70 and Leyden Road has been selected as the most viable and least disruptive option, ensuring controlled and efficient vehicle movement while reducing transport impacts on the local road network.

3.4.21 Access to the Site from Leyden Road will be from two existing field accesses. Both accesses will be improved to make them suitable for vehicles accessing the Proposed Development.

3.4.22 Refer to the Transport Statement in **Technical Appendix 2.4** for more information.



Making Sustainability Happen