Tillbridge Solar Project

EN010142

Volume 7

Outline Design Principles Statement

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1. Introduction

1.1 Overview

1.1.1 This Outline Design Principles Statement (ODP Statement) has been prepared to accompany the Development Consent Order (DCO) Application for the Tillbridge Solar Project ('the Scheme'). Document references have not been updated in this document, but are set out in the ~~This ODP Statement should be read in conjunction with the~~ most recent **Guide to the Application [EN010142/APP/1.2 (Rev 02)]** and Schedule 13 (Documents and Plans to be certified) of the **dDCO [EN010142/APP/3.1 (Rev 02).**

1.1.2 This report has been amended to reflect the refinement of the Scheme layout and design to create two additional accesses off School Lane (one temporary and one permanent) with these having been added to the Work to Streets table on page 17 of this ODP Statement.

1.1.3 In addition, following collaboration with the Canal and River Trust (CRT), Plots 20-07 and 20-12 as shown in the submitted **Land and Crown Plans [EN010142/APP/2.2]** are removed from the Scheme. Associated with this request was a request by CRT to clarify the depth of the cable under the River Trent. This refinement is included within this amended ODP.

~~1.1.1~~1.1.4 It provides the guiding principles for the detailed design of the Scheme and is secured in Schedule 2, requirement 5 (detailed design approval) of the **draft DCO [EN010142/APP/3.1]**. When the detailed design for the Scheme is submitted for approval to the relevant planning authorities, those details must be in accordance with the design principles set out in this ODP Statement.

~~1.1.2~~1.1.5 Securing the detailed design post-consent is necessary to achieve technological and design flexibility for the Scheme because solar photovoltaic (PV) technology is rapidly evolving. The Scheme seeks to allow provision in the DCO for the technological innovation and improvements that may be realised at the time of procurement and construction, in order to ensure that the Scheme can be constructed taking advantage of innovation and cost efficiencies.

~~1.1.3~~1.1.6 That necessary flexibility has been facilitated by the adoption of the 'Rochdale Envelope' approach in the Environmental Statement (ES) which is explained in **Chapter 3: Scheme Description** of the ES **[EN010142/APP/6.1]**. The Rochdale Envelope approach ensures the maximum parameters and realistic worst case has been assessed, and that envelope is defined by the design principles set out in this document. Therefore, by requiring that the detailed design of the Scheme must be in accordance with the design principles, there can be confidence that the environmental effects will be the same as or no worse than those assessed and reported in the ES.

1.2 Design Principles

1.2.1 The Scheme is described in Schedule 1 of the **draft DCO [EN010142/APP/3.1]** where the different components of the Scheme are divided into works which correspond with the work number areas shown on the **Works Plans [EN010142/APP/2.3]**. For the purposes of the Environmental Impact Assessment (EIA), the Scheme is described in **Chapter 3: Scheme Description** of the ES **[EN010142/APP/6.1]**.

1.2.2 The works include Work No.1 for a generating station with a capacity of over 50 Megawatts (MW), which constitutes the Nationally Significant Infrastructure Project (NSIP) in accordance with section 14 and section 15 of the Planning Act 2008.

1.2.3 Work No. 2 (g) of the **draft DCO [EN010142/APP/3.1]** includes fire safety infrastructure, mitigation and control measures. The design principles of this are set out in the **Framework Battery Safety Management Plan (BSMP) [EN010142/APP/7.13]** and the **Outline Drainage Strategy** (refer to **Appendix 10-4** of the ES **[EN010142/APP/6.2]**). Requirements 6 and 10 of the **draft DCO [EN010142/APP/3.1]** requires the submission and approval of both a battery safety management plan and details of the surface water drainage scheme. These details have to be substantially in accordance with the **Framework BSMP [EN010142/APP/7.13]** and **Outline Drainage Strategy** (refer to **Appendix 10-4** of the ES **[EN010142/APP/6.2]**). These control measures secure the design parameters of this part of the Scheme, and this is therefore not included in **Table 1~~Table 1~~** of this ODP Statement.

1.2.4 Work No. 7 and parts of Work No. 4 include temporary construction and decommissioning compounds. The parameters for these temporary construction and decommissioning compounds are provided for on the **Works Plan [EN010142/APP/2.3]**, in the **Framework Construction Environmental Management Plan (CEMP) [EN010142/APP/7.8]**, **Framework Decommissioning Environmental Management Plan (DEMP) [EN010142/APP/7.10]** and the **Framework Construction Traffic Management Plan (CTMP) [EN010142/APP/7.11]**. The temporary construction and decommissioning elements of Work Nos. 7 and 4 are not therefore included in **Table 1~~Table 1~~** of this ODP Statement.

1.2.5 The design principles which apply to the Scheme for the Works are set out in **Table 1~~Table 1~~**. Further associated development in connection with the above works (as listed in the final paragraph of Schedule 1 to the **draft DCO [EN010142/APP/3.1]**) may be necessary across the Order limits and will be subject to the design principles where they are applicable.

1.2.6 Construction activities will be subject to the controls included in detailed management plans. The detailed management plans will need to be submitted to and approved by the relevant planning authority prior to the commencement of development in accordance with requirements attached to the **draft DCO [EN010142/APP/3.1]** and for the Scheme to be implemented in accordance with the approved details. The detailed management plans will comprise:

a. Construction Environmental Management Plan (CEMP) which will need to be substantially in accordance with the **Framework CEMP [EN/010142/APP/7.8]**.

b. Construction Traffic Management Plan (CTMP) which will need to be substantially in accordance with the **Framework CTMP [EN010142/APP/7.11]**.

c. Public Rights of Way (PRoW) Management Plan which will need to be substantially in accordance with the **Framework PRoW Management Plan [EN010142/APP/7.16]**.

d. Soil Management Plan (SMP) which will need to be substantially in accordance with the **Framework SMP [EN010142/APP/7.12]**.

e. Battery Safety Management Plan (BSMP) which will need to be substantially in accordance with the **Framework BSMP [EN010142/APP/7.13]**.

1.2.7 Decommissioning activities will be subject to the controls included in the Decommissioning Environmental Management Plan (DEMP). This will be secured by requirement 20 of the **draft DCO [EN010142/APP/3.1]**, which sets out when the DEMP must be submitted to and approved by the relevant planning authority and confirms that it must be substantially in accordance with the **Framework DEMP [EN010142/APP/7.10]**.

1.2.8 The operation of the Scheme will be subject to the controls included in:

a. Operational Environmental Management Plan (OEMP), which will need to be substantially in accordance with the **Framework OEMP [EN010142/APP/7.9]**;

b. Landscape and Ecological Management Plan (LEMP) which will need to be substantially in accordance with the **Framework LEMP [EN010142/APP/7.17]**;

c. Surface Water Drainage Scheme which will need to be substantially in accordance with the **Outline Drainage Strategy** (refer to **Appendix 10-4** of the ES **[EN010142/APP/6.2**]);

d. **Works Plan [EN010142/APP/2.3]**;

e. **Streets, Rights of Way and Access Plans [EN010142/APP/2.4]**; and

f. Battery Safety Management Plan which will need to be substantially in accordance with the **Framework BSMP [EN010142/APP/7.13]**.

1.2.9 These documents and plans are secured by requirements in the **draft DCO [EN010142/APP/3.1]**. The controls in these framework documents and plans are therefore not duplicated in this ODP Statement.

Table 1. Design Principles

Element of Scheme	Parameters Type	Design Principle

Work No. 1
— a ground mounted solar photovoltaic generating station with a gross electrical output capacity of over 50 megawatts including—
(a) solar panels fitted to mounting structures;

Element of Scheme	Parameter Type	Design Principle
Solar PV panels Work No. 1(a)	Location	The Solar PV panels will be located as shown as Work No. 1 on the **Works Plan [EN010142/APP/2.3]**.
	Scale	The maximum total land area occupied by the Solar PV panels, as shown as part of Work No. 1 on the **Works Plan [EN010142/APP/2.3]** will be up to 739.56 hectares (ha).
	Scale	Solar PV panels will be laid out in 'strings'[1]. The 'strings' of PV will be secured on single axis trackers that are configured north-south and will track 60 degrees east-west, where the panels will turn from east to west during the course of the day. Strings will be in varying lengths depending on available space and field size, which will have 15, 30, 60 or 90 panels in portrait.
	Design	An anti-reflective coating (ARC) will be applied to the Solar PV panels to reduce the reflective properties of the panels.
	Design	Solar PV panels will be framed in anodised aluminium and be black or dark blue in colour.
Solar PV panel mounting structures Work No. 1(a)	Location	The Solar PV panel mounting structures will be located within the areas shown as Work No. 1 on the **Works Plan [EN010142/APP/2.3]**.
	Scale	The foundations of the Solar PV panel mounting structures will be galvanised steel poles driven into the ground to a maximum depth of 4m.

[1] A string consists of solar PV panels that are wired in a series to one inverter.

Element of Scheme	Parameters Type	Design Principle
	Scale	The height of the bottom of the panel above ground level will be at a minimum of 0.6m, this is when the panel is at maximum tilt.
	Scale	The height of the bottom of the panel above ground level will be between 0.6m and 2.5m, depending on tilt. The height of the top of a Solar PV panel above ground level will be at a maximum of 3.5m when the panel is at maximum tilt.
	Scale	The Solar PV panels will not be installed lower than 20.06m AOD to mitigate the risk of flooding from the Yewthorpe Beck surface water ditch within fields 51, 56 and 57 as shown **Figure 1**~~**Figure 1**~~ of **Appendix A** of this ODP Statement.
	Design	The Solar PV panel mounting structures will be made with galvanised steel appearance.

Work No. 1

— a ground mounted solar photovoltaic generating station with a gross electrical output capacity of over 50 megawatts including—

(a) solar stations; and

Work No. 2

— battery energy storage systems including —

(a) BESS

(b) a structure protecting the BESS comprised in Work No. 2 (a) and ancillary equipment, being either one container or multiple containers within a larger building or buildings laid on a concrete slab or raft foundation located alongside Work No. 1(b).

(c) heating, ventilation and air conditioning (HVAC) or liquid cooling systems either housed within the containers comprised in Work No. 2(b), attached to the side or top of each of the containers, or located separate from but near to each of the containers;

(d) monitoring and control systems housed within the containers with the HVAC or liquid cooling systems in Work No. 2(c) or located separately in its own container or control room;

(e) battery management system to monitor and control the stage of charge, temperature, and the overall health of the batteries;

(f) DC/DC converter;

Element of Scheme	Parameters Type	Design Principle
(g) fire safety infrastructure, mitigation and control measures including:		
(i) fire service access,		
(ii) fire compartmentation measures,		
(iii) water storage tanks and hydrants,		
(iv) impermeable membrane surrounding the BESS which directs fire water to a swale for containment and a sump and drain valve to allow the extraction of contaminated fire water,		
(v) hard standing to accommodate emergency vehicles,		
(vi) parking spaces; and		
(h) electrical cables connecting to Work No. 1(b), and Work No. 3.		

Element of Scheme	Parameter Type	Design Principle
Solar Station (a station comprising an inverters, transformers and switchgear) Work No. 1(b) and BESS (equipment used for the storage of electrical energy) Work No. 2	Location	All Solar Stations and BESS will be located within the areas marked as Work No. 1 and 2 on the **Works Plan [EN010142/APP/2.3]**.
	Location	To avoid adverse noise effects on residential properties in close proximity to the Scheme, Solar Stations and BESS will not be located within 250m of a residential property.
	Scale	There will be up to 140 BESS Stations co-located alongside Solar Stations spread across the Principal Site.
	Scale	The maximum footprint of the Solar Station and BESS compound will be up to 48m in length by 30m in width. This will contain the Solar Station comprising transformer, switchgear and inverter, BESS container, DC/DC converter, interconnecting cables between the components and a parking area.
	Scale	The maximum height of the Solar Station and BESS components will be up to 4m.
	Scale	A concrete foundation slab for each of the inverters, transformers and switchgear and a levelling layer of thick sand underneath the slab with a maximum depth of 1m.

Element of Scheme	Parameters Type	Design Principle
		The maximum width and length of each foundation slab for each component (inverters, transformers and switchgear) is the length +0.5m and the width +0.5m of the component.
	Scale	Inverters forming part of the Solar Stations will be decentralised, placed inside housing.
	Scale	Inverters as an individual component as part of the overall Solar Station will be up to 3m in length by 2m in width, and 3m in height.
	Scale	Transformers forming part of the Solar Stations will be outdoor or within container type housing.
	Scale	Switchgear forming part of the Solar Stations and when placed together with the transformer, will have a maximum dimension of up to 5.5m in length by 2.5m in width, and up to 3m in height.
	Scale	The footprint for each BESS container will be up to 12.5m in length, 3m in width and up to 4m in height
	Scale	The DC/DC converter will be installed alongside every BESS container. The footprint for each DC/DC converter will be up to 2.5m in length by 1.2m in width by 2.8m in height
	Scale	The BESS foundations will comprise either a reinforced concrete base to a maximum depth of 1m, with the maximum width and length being the length +0.5m and the width +0.5m of the BESS, container and DC/ DC converter; or a piling solution may be required, depending on the results of geotechnical surveys. If a piling solution is required, piles will be up to a maximum depth of 12m.
	Design	A Solar Station will comprise a Direct Current (DC)/Alternating Current (AC) inverter and a Low Voltage (LV)/Medium Voltage (LV/MV) transformer, including switchgear.
	Design	A BESS Station will comprise Battery Containers and DC/DC Converter.
	Design	Solar Stations and BESS will be externally finished in either shades of white, grey or green painted finish.

Element of Scheme	Parameters Type	Design Principle

Work No. 3

— development of onsite substations and associated works including —

(a) Works 3A – Substation A

(i) substation comprising main components of 400kV Gas Insulated Switchgear, 400kV Cable Sealing End, 400kV Surge Arrester, 400kV Post-Insulator, 2 x 400/33kV, 150/75/75 MVA Transformers, 400kV shunt reactor, 400kV gas insulated bus duct, 33kV Switchgear, 33kV Cabling and auxiliary equipment;

(ii) substation buildings including building to accommodate 400kV switchgear, buildings to accommodate 33kV switchgear and associated control and protection equipment, control room building to accommodate protection and control cabinets and auxiliary boards and panels and a diesel generator;

(iii) hardstanding, internal access road and parking areas; and

(iv) a water storage structure (swales) to collect and treat surface water before discharge.

(b) Works 3B – Substation B

(i) substation, comprising main components of 400kV Gas Insulated Switchgear, 400kV Cable Sealing End, 400kV Surge Arrester, 400kV Post-Insulator, 2 x 400/33kV, 150/75/75MVA Transformers, 400kV gas insulated bus duct, 33kV Switchgear, 33kV Cabling and auxiliary equipment;

(ii) substation buildings including building to accommodate 400kV switchgear, buildings to accommodate 33kV switchgear and associated control and protection equipment, control room building to accommodate Protection and Control cabinets and auxiliary boards and panels and a diesel generator;

(iii) hardstanding, internal access road and parking areas; and

(iv) a water storage structure (swales) to collect and treat surface water before discharge.

Element of Scheme	Parameter Type	Design Principle

Element of Scheme	Parameters Type	Design Principle
Substations A and B Work No. 3	Location	All Substations are located on areas marked as Work No. 3 on the **Works Plan [EN010142/APP/2.3]**.
	Location	There will be a total of two Substations located within the Principal Site.
	Scale	The footprint of each Substation compound will be up to 108m in width by 115m in length.
	Scale	Within each Substation compound there will be a 400kV switchgear building, two 33kV switch room buildings, two 400 kV transformers, one 400 kV shunt reactor (Substation A only), a control building, a backup diesel generator and up to four parking spaces per Substation. The 400kV switchgear building will be up to 43m in length by 15m in width by 10m in height. The 33kV switch rooms will be up to 20m in length by 5m in width by 6m in height. The control building will be up to 25m in length by 18m in width by 7m in height.
	Scale	There will be a foundation slab for each of the 400kV switchgear building, two 33kV switch room buildings, two 400kV transformers, one 400 KV shunt reactor (Substation A only), a control building and a backup generator. Foundation slabs will be a maximum depth of 1m, with a length +0.5m and a width +0.5m of the onsite substation building, or a piling solution may be required depending on the results of geotechnical surveys. If this is case, piles to a maximum depth of 12m would be used.

Work No. 4
— works in connection with high voltage electrical cabling including —
(a) Work No. 4A – works to lay high voltage electrical cables including-

(i) connecting Work No. 3A to Work No. 3B;

Element of Scheme	Parameters Type	Design Principle

(b) Work No. 4B – works to lay high voltage electrical cables, access and construction compounds for the electrical cables including-

(i) works to lay 400kV electrical cables connecting to Work No. 4A;

(ii) works to lay 400kV electrical cables connecting to Work No. 4C;

(iii) laying down of access tracks, ramps, footpaths, roads, including the laying and construction of drainage infrastructure, signage and information boards;

(iv) joint bays, link boxes, cable ducts, cable protection, joint protection, manholes;

(v) marker posts, underground cable marker, tiles and tape, communications chambers, fibre optic cables and lighting and other works associated with cable laying;

(vi) tunnelling, boring and drilling works.

(c) Work No. 4C – works to lay high voltage electrical cables, access and construction compounds for the electrical cables including –

(i) works to lay 400kV electrical cables connecting to Work No. 4B;

(ii) works to lay 400kV electrical cables connecting to Work No. 4D;

(iii) laying down of access tracks, ramps, footpaths, roads, including the laying and construction of drainage infrastructure, signage and information boards;

(iv) joint bays, link boxes, cable ducts, cable protection, joint protection, manholes;

(v) marker posts, underground cable marker, tiles and tape, communications chambers, fibre optic cables and lighting and other works associated with cable laying; and

(vi) tunnelling, boring and drilling works.

(d) Work No. 4D – works to lay high voltage electrical cables, access and construction compounds for the electrical cables including –

(i) works to lay 400kV electrical cables connecting to Work No. 4C;

Element of Scheme	Parameters Type	Design Principle

(ii) works to lay 400kV electrical cables connecting to Work No. 4E;

(iii) laying down of access tracks, ramps, footpaths, roads, including the laying and construction of drainage infrastructure, signage and information boards;

(iv) joint bays, link boxes, cable ducts, cable protection, joint protection, manholes;

(v) marker posts, underground cable marker, tiles and tape, communications chambers, fibre optic cables and lighting and other works associated with cable laying; and

(vi) tunnelling, boring and drilling works.

(e) Work No. 4E – works to lay high voltage electrical cables, access and construction compounds for the electrical cables including –

(i) works to lay 400kV electrical cables connecting to Work No. 4D;

(ii) works to lay 400kV electrical cables connecting to Work No. 5;

(iii) laying down of access tracks, ramps, footpaths, roads, including the laying and construction of drainage infrastructure, signage and information boards;

(iv) joint bays, link boxes, cable ducts, cable protection, joint protection, manholes;

(v) marker posts, underground cable marker, tiles and tape, communications chambers, fibre optic cables and lighting and other works associated with cable laying; and

(vi) tunnelling, boring and drilling works.

Element of Scheme	Parameter Type	Design Principle
Cable Route Corridor Work No 4A to 4E	Location	All Cable Route Corridor cables are located within areas marked as Work No. 4A, 4B, 4C, 4D and 4E on the **Works Plan [EN010142/APP/2.3]**.
	Location	All Cable Route Corridor cables would be installed at a minimum distance of 10m from the façade of any residential building.

Element of Scheme	Parameters Type	Design Principle
	Scale	To connect the Principal Site to National Grid Cottam Substation, 400kV cables will be installed. The total length of the cable run within the Cable Route Corridor is approximately 18.5km from National Grid Cottam Substation to the edge of the Principal Site.
	Scale	The total length of the cable run within the Principal Site is approximately 8.5km.
	Scale	The 400kV cables will be approximately 115mm (nominal) in diameter.
	Scale	There will be one single circuit comprising 3 cables laid in trefoil formation.
	Scale	The construction width for the Cable Route Corridor will be up to 40m wide.
	Scale	The cables will be buried underground either laid in trenches or installed using trenchless techniques.
	Scale	The trench will be up to a maximum of 2m in depth and up to a maximum 3.5m in width for general installation. For trenchless crossings this will be deeper for construction purposes with a maximum of 5m below utilities, and a minimum of 10m below Network Rail infrastructure. For watercourses, the minimum depth is 3m and maximum depth is 5m. This is with the exception of the River Till and the River Trent where cables will be installed at a minimum of 5m below the lowest surveyed point of the riverbed to prevent disturbance to fish species~~the bed of the watercourse~~, and a maximum depth of 25m, depending on the ground investigation results.
	Scale	A trench will be dug to provide drainage across the Cable Route Corridor during construction. This ditch will be a maximum of 2.0m in width and a maximum depth of 1.5m.
	Scale	Jointing bays will be required every 1,000m apart to join sections of cable together. The dimensions of the jointing pit will be up to 21m in length, by 43m in width, by 2.5m in depth.
	Scale	A link and communications box pit of up to a maximum of 5m in length by a maximum of 5.5m in width and a depth of 1.3m will be required next to every jointing bay.
	Design	HDD Crossing Platform (trenchless crossing) - These will require a granular platform up to 60m in length, 40m in width and 1m in depth for both drilling and receiving.

Element of Scheme	Parameters Type	Design Principle
	Design	Thrust Bore Crossings (trenchless Crossing) - These will use precast concrete manholes which have up to a 3.0m internal diameter and are proposed to act as the drilling and receiving pits for Thrust Bore Crossings.

Work No. 5
– works to the National Grid Cottam substation to facilitate connection of the authorised development to the National Grid Cottam substation including –

(a) busbars and connectors to connect to the existing busbar disconnectors at the National Grid substation;

(b) a 400kV 3phase circuit breaker for control and protection of the outgoing circuit serving the authorised development;

(c) a 3phase set of current transformers for protection of the new outgoing 400kV feeder circuit and the overlap with the National Grid system;

(d) a 3phase high accuracy metering current and voltage transformer assembly for commercial metering of the connection;

(e) a 3phase 400kV line disconnector/earth switch for isolation and earthing of the outgoing 400kV feeder circuit;

(f) a 3phase set of 400kV high voltage cable sealing ends and cables connecting the National Grid substation with Work No. 4; and

(g) protection and control works in the existing relay room or erection of new building to house protection and control works apparatus if required.

Element of Scheme	Parameter Type	Design Principle
Works to National Grid Cottam Substation	Location	These works relate to Work No. 5 on the **Works Plan [EN010142/APP/2.3]**.

Work No. 6
– works including –

Element of Scheme	Parameters Type	Design Principle
(a) electrical cables, including but not limited to electrical cables connecting Works No. 1, 2 and 3 to one another, connecting solar panels to one another, connecting the solar panels to the BESS, the solar stations and on-site substations, including tunnelling, boring and drilling works for trenchless crossings; and open trench crossings;		
(b) site establishments and preparation works, including site clearance (including vegetation removal, demolition of existing buildings and structures); 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;		
(c) laying down of permissive paths;		
(d) hardstanding and parking areas;		
(e) sustainable drainage systems including swales, runoff outfalls, general drainage and irrigation infrastructure, systems and improvements or extensions to existing drainage and irrigation systems;		
(f) fencing, gates, boundary treatment and other means of enclosure;		
(g) works for the provision of security and monitoring measures such as CCTV columns, cameras, lighting columns and lighting, weather stations, perimeter fencing and communication infrastructure;		
(h) improvement, maintenance and use of existing private tracks;		
(i) works to maintain and repair streets and access roads;		
(j) laying down of internal access tracks, ramps, means of access, footpaths, crossing of watercourses and roads, including the laying and construction of drainage infrastructure, signage and information boards;		
(k) electricity, water, waste water and telecommunications connections including pressurised water pipes; and		
(l) other works to mitigate any adverse effects of the construction, maintenance, operation or decommissioning of the authorised development.		
	Location	Low voltage cables within the Principal Site to connect the solar PV panels to the Solar Stations and the Solar Stations and BESS to the inverters.

Element of Scheme	Parameters Type	Design Principle
On-site cabling (between PV panels, inverters within the Solar Stations and BESS Work No. 6(a)	Scale	The dimension of the trenches will vary depending on the number of ducts they contain but will be up to a maximum of 4m in width and 1.2m in depth.
	Scale	Where the DC cables from the panel strings converge to connect to the inverter within the Solar Station the maximum width of the trench will be 6m wide as up to 20 pairs of cables will connect to the inverter within the Solar Station. The maximum depth of a trench will be 0.85m.
	Design	Typically, 1.5kV cabling between PV panels and the inverters will be along the racks, fixed to the mounting structure, and then buried underground in trenches from the racks to the Solar Stations
On-site (underground) cabling (between transformers and on-site substations) Work No 6(a)	Location	Medium voltage cables within the Principal Site to connect the transformers, which are part of the Solar Stations and on-site substations.
	Scale	The 33kV cable trenches will be up to 1m wide and 1.7m deep for general installation.
	Design	Typically 33kV power cables single-core.
Permissive paths Work No. 6(c)	Location	The inclusion within the Principal Site of two permissive paths connecting from Common Lane to Northlands Road and Common Lane to Kexby Road.
	Scale	The permissive paths will be located within a corridor that measures 25m in width.
Fencing and security Work No. 6(f)	Location	A security fence will enclose the PV panel areas of the Principal Site and the BESS and Solar Stations.
	Scale	Fencing will be a maximum of 2.5m in height from the ground
	Scale	Pole mounted internal facing closed CCTV systems up to a maximum of 3m high will be deployed around the perimeter of the operational areas of the Principal Site.
	Design	The security fence around the PV panel areas will be a ‘deer fence’ type and fencing around the BESS and Solar Stations will be metal security fencing.

Element of Scheme	Parameters Type	Design Principle
	Design	During operation, permanent security lights with motion detectors will be used for security purposes around the electrical infrastructure, emergency access points to facilities within the Scheme and potentially at other pieces of critical infrastructure.
Access Work No. 6(h)	Scale	The proposed internal access tracks will be compacted stone tracks up to 4m wide with 1:2 gradient slopes on either side.
	Scale	The primary access points (Principal Site Accesses 1, 2, 3 and 4) will be wider, up to a maximum of 6m.
	Design	Internal access tracks within the Principal Site will use existing farm tracks as much as possible, upgrading surfaces as required. The creation of new access tracks will be minimised.

Work No. 8
– works to develop a solar farm control centre and equipment storage including –

(a) erection of a new building to accommodate the solar farm control centre including;

(i) Central Control Room;

(ii) Central CCTV and security control, including access gates to fenced areas;

(iii) welfare facility for staff and subcontractors;

(iv) parking area for staff and visitors;

(v) independent power supply including emergency power supply; and

(vi) equipment storage.

Solar Farm Control Centre Work No. 8	Location	There will be one Solar Farm Control Centre located in the area shown as Work No. 8 on the **Works Plan [EN010142/APP2.3]**.

Element of Scheme	Parameters Type	Design Principle
	Scale	The Solar Farm Control Centre will measure up to 20m in length by 15m in width by 6m in height.
	Scale	Foundation slabs typically will be, a concrete foundation slab with a levelling layer of thick sand, the depth will be a maximum of 1m, with the length +0.5m and the width +0.5m of the Solar Farm Control Centre; or a piling solution may be required, depending on the results of geotechnical surveys. If a piling solution is required, piles will be a maximum depth of 12m.
	Design	The Solar Farm Control Centre will comprise of block construction.
	Fencing height	Fencing around the Solar Farm Control Centre would be up to a maximum of 2.5 metres in height. Pole mounted internal facing closed CCTV systems up to a maximum of 3m high will be deployed around the perimeter.
Equipment Storage Work No. 8	Location	There will be one area for equipment storage as shown by Work No. 8 on the **Works Plan [EN010142/APP2.3]**.
	Scale	A storage area measuring up to 1,200m^2 to either contain a maximum of 40 individual storage containers or to be used as open storage with a canopy. Individual storage containers will measure a maximum of 12m in length by a maximum of 2.5m in width by a maximum of 3m in height. The canopy will measure up to 3.2m in height.
	Scale	Foundation slabs typically will be, a concrete foundation slab with a levelling layer of thick sand, the depth will be a maximum of 1m with the length +0.5m and the width +0.5m of the area.

Work No. 9

– areas of habitat management and protection including —

(a) measures to enhance the existing woodland and hedgerows;

(b) landscape and biodiversity enhancement measures;

(c) habitat creation and management including earthworks and landscaping;

Element of Scheme	Parameters Type	Design Principle
(d) construction of drainage infrastructure and means of access;		
(e) laying down of internal access tracks, means of access and crossing of watercourses; and		
(f) fencing gates boundary treatment and other means of enclosure.		
Area of habitat management and protection Work No. 9	Location	The areas of habitat management and protection will be located on areas marked at Work No. 9 on the **Works Plan [EN010142/APP/2.3]**.
Work No. 10 **– works to facilitate access to Work No. 1 to 9 including —** **(a) Work No. 10A— works to facilitate permanent access to Work Nos. 1 to 9 including;** **(i) alternation and improvement of existing road layout;** **(ii) creation of visibility splays; and** **(iii) street works to facilitate the construction of proposed accesses.** **(b) Work No. 10B— works to facilitate temporary construction and decommissioning access to Work Nos. 1 to 9 including:** **(i) creation of new access or improvement of existing access from the public highway;** **(ii) street works to facilitate the construction of proposed accesses and cable installation works;** **(iii) alteration of road layouts, including modifications to road markings and temporary removal of signage to facilitate abnormal load manoeuvres;** **(iv) alteration of road layout to facilitate localised carriageway widening for construction vehicles; and** **(v) alteration of road layout to facilitate the construction of passing bays.** **(c) Work No. 10C— works to facilitate permanent emergency access for fire service vehicles associated with Work No. 2 including:**		

Element of Scheme	Parameters Type	Design Principle
(i) alteration of existing road layout to facilitate the creation of new emergency accesses from the public highway including the creation of visibility splays; and		
(ii) street works to facilitate the construction of the proposed accesses.		

Works to Streets	Location	The Works to Streets will be located within the limits of deviation of Work No. 10 as shown on the **Works Plans [EN010142/APP/2.3]** as more particularly described in the relevant **Schedule** of the **draft DCO [EN010142/APP/3.1]** and shown on the **SRoWA Plans [EN010142/APP/2.4]**.			
	SRoWA Access Reference	Scheme Phase			
		Construction	Operation	Decommissioning	Comment
	Principal Site				
	1/13	✓	✓	✓	Primary point of access will be used during all phases.
	1/14	✓	✓	✓	Secondary, internal access will be used during all phases.
	1/15	✓	✓	✓	Secondary, internal access will be used during all phases.

Element of Scheme	Parameters Type	Design Principle			
	1/35	✓	×	✓	Secondary, internal access will be used during construction and decommissioning
	1/346	✓	✓	✓	Secondary, internal access will be used during all phases.
	2/03	✓	✓	✓	Primary point of access will be used during all phases.
	2/09[2]	~~✓~~×	✓	~~✓~~×	Primary point of access will be used during oOperation ~~all phases.~~
	4/01	✓	✓	✓	Primary point of access will be used during all phases.
	5/23	✓	✓	✓	Secondary, internal access will be used during all phases.
	6/01	✓	✓	✓	Secondary, internal access will be used during all phases.
	6/04	×	✓	×	Emergency access only during operation.
	6/15	×	✓	×	Emergency access only during operation.
	Cable Route Corridor				
	8/13	✓	×	×	The access locations across the Cable Route Corridor will be re-
	13/26	✓	×	×	

[2] ~~Principal Site Access 3 is available for emergency use during the construction and decommissioning phases.~~

Element of Scheme	Parameters Type	Design Principle			
	13/28	✓	×	×	instated to their condition prior to the operational phase.
	13/31	✓	×	×	
	13/32	✓	×	×	
	16/06	✓	×	×	
	16/07	✓	×	×	
	16/08	✓	×	×	
	16/09	✓	×	×	
	17/25	✓	×	×	
	17/04	✓	×	×	
	18/01	✓	×	×	
	19/03	✓	×	×	
	19/04	✓	×	×	
	19/12	✓	×	×	
	19/15	✓	×	×	
	20/01	✓	×	×	
	21/62	✓	×	×	
	21/63	✓	×	×	
	21/64	✓	×	×	
	22/01	✓	×	×	
	22/02	✓	×	×	

Element of Scheme	Parameters Type	Design Principle			
	23/03	✓	×	×	
	23/07	✓	×	×	Access to replace existing field access. Permanent access to be retained since this goes across the Seymour Drain. Access to be retained to minimise disturbance to the watercourse.
	23/08	✓	×	×	The access locations across the Cable Route Corridor will be re-instated to their condition prior to the operational phase.
	23/09	✓	×	×	
	24/03	✓	✓	×	
	Scale	Primary, internal and emergency access points will be a minimum of 6m in width			
		Internal temporary access for construction of on-site substation will be a minimum of 5m in width.			
		Cable Route Corridor access points will be a minimum of 6m in width. This is except for access 24/03, which will be a minimum of 10.3m in width			

Work No. 11
– sensitive archaeological site protection and management including —

(a) habitat creation and management; and

(b) fencing gates boundary treatment and other means of enclosure.

Element of Scheme	Parameter Type	Design Principle

Element of Scheme	Parameters Type	Design Principle
Sensitive Archaeological Site Work No. 11	Location	The areas of sensitive archaeological site protection and management will be located on areas marked as Work No. 11 on the **Works Plan [EN010142/APP/2.3]**.

Appendix A: Minimum heights of solar PV panels in fields 51, 56 and 57 above ground level in Flood Zone 3

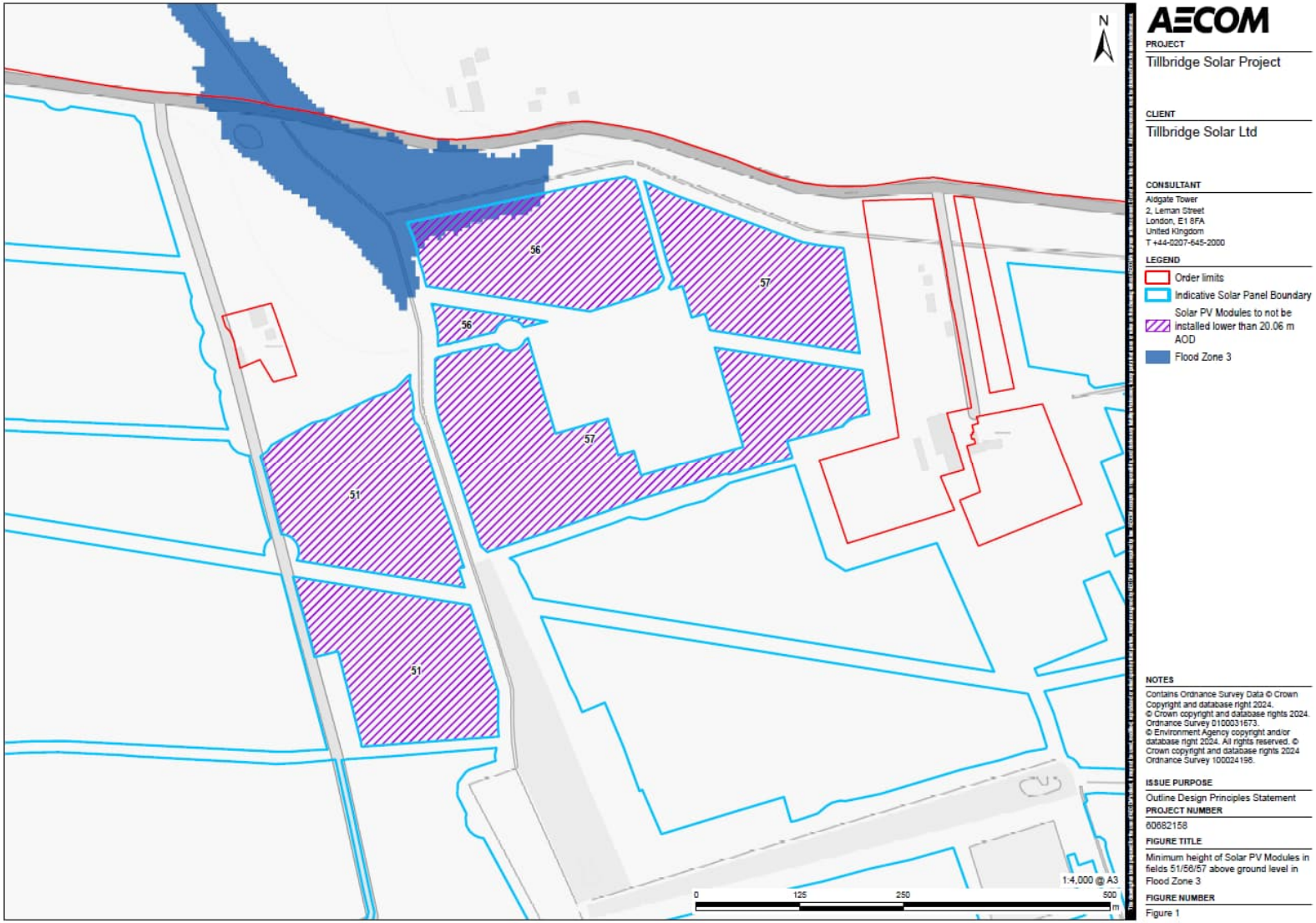

Figure 1 – Minimum height of Solar PV Panels in fields 51/56 and 57 above ground in Flood Zone 3