Stonestreet Green Solar

Design Principles

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

1 Design Principles

1.1 Introduction and Purpose

1.1.1 Table 1 below sets out the Design Principles for Stonestreet Green Solar (the 'Project'). A full description of the Project can be found in **Environmental Statement ('ES') Volume 2, Chapter 3: Project Description (Doc Ref. 5.2).** The terminology used in this document is defined in the **Glossary (Doc Ref. 1.6).**

1.1.2 The use of design principles helps define the Project, where details are being reserved for subsequent determination. The Design Principles are intended to provide the guiding principles for the detailed design of the Project following the grant of development consent.

1.1.3 These Design Principles establish a series of parameters for the Project, and the layout of the Project is then defined by the **Works Plans (Doc Ref. 2.3)**. The Design Principles form part of the Rochdale Envelope for the purposes of the Environmental Impact Assessment ('EIA'), the conclusions of which are set out in the **ES (Doc Ref. 5.1-5.4).** Where necessary the Design Principles cross-refer to controls within other application documents.

1.1.4 The Design Principles will be secured by Requirement 4 of the **Draft Development Consent Order ('DCO') (Doc Ref. 3.1)**, which requires the detailed design proposals to be developed in accordance with the Design Principles.

1.2 Structure

1.2.1 These Design Principles are set out for each defined work (where applicable) that is described within the description of the Authorised Development, as set out in Schedule 1 of the **Draft DCO (Doc Ref. 3.1)**. There are no Design Principles proposed for Work No. 6.

Table 1: Design Principles

Project Component	Design Principle
Work No. 1 – a ground mounted solar photovoltaic generating station with a gross electrical output capacity of over 50 megawatts	
Solar PV modules and mounting structures	The PV panels will have a maximum height of 3.5m Above Ground Level ('AGL') and will be mounted with a minimum clearance of 0.8m AGL. The PV panels will be installed using a fixed tilt arrangement. The colour of PV panels will be dark blue, black, grey or similar neutral colour. The angle of elevation will be between 20-25 degrees and will be south facing. The maximum depth of piled foundations will be 3m Below Ground Level ('BGL'). A non-invasive mounting solution that uses pre-cast reinforced concrete blocks or similar to provide ballast to support the PV panels would be used should the undertaker consider that piled foundations are not appropriate. The distance between each row of PV panels will be between 2m and 5m. A distance of at least 3.2m will be provided between the edge of PV panels and the security fencing to allow for maintenance.
Work No. 2 – Balance of System and BESS	
Foundations	Any foundations installed as part of Work No.2 will have a depth of no greater than 2m BGL.
Inverter Stations	There will be up to 32 Inverter Station locations. Inverter Stations will not exceed 4m in height AGL and will be a dark green or similar neutral colour.
BESS Units and DC-DC Converters	BESS Units and DC-DC converters will be co-located with the Inverter Stations within bunded enclosures lined with a protective membrane. Each BESS Unit will be single-stacked. BESS Units and DC-DC Converters will not exceed 4m in height and will be a dark green or similar neutral colour. BESS Units will be spaced at least 6m apart from one another (measured wall to wall).

Project Component	Design Principle
	BESS Units will be distributed across the Site with up to four Units at an Inverter Station. Where two Inverter Stations are paired, up to eight BESS Units can be located in a single area. The nearest residential receptor to any BESS Unit will be a minimum of 150m. No BESS Units or DC-DC Converters will be included within Field 9 and Fields 20 to 22.
Intermediate substations	Each intermediate substation will have a maximum height of 4m and will be a dark green or similar neutral colour.
Acoustic Barriers	Acoustic barriers (including an insulated gate) will be provided at all Inverter Stations. The maximum height of acoustic barriers will be 4m AGL.
Work No. 3 – Project Substation and associated works	
Project Substation	The development platform level of the Project Substation will be no greater than 56m above ordnance datum (AOD) and no lower than 55m AOD. The development platform will contain retaining structures. The maximum height of any building or infrastructure within the Project Substation will not exceed 7.5m AGL. As such, no building or infrastructure will be greater than 63.5m AOD in height. The total impermeable area within the Project Substation will not exceed 0.8ha. The maximum voltage of the Project Substation will be 132 Kilovolts ('kV').
Palisade Fencing	The Project Substation will be enclosed by palisade fencing with a maximum height of 3m AGL.
Acoustic Barriers	Acoustic barriers will be provided along the northern and eastern boundaries of the Project Substation. The maximum height of acoustic barriers will be 4m AGL.
Work No. 4 – Works to lay high voltage electrical cables and extend Sellindge Substation to facilitate grid connection	
Grid Connection Cable	The Grid Connection Cable will be installed below ground via excavated trenching or horizontal directional drilling ('HDD') construction methods.

Project Component	Design Principle
	The Grid Connection Cable trench will have a width of up to 2m once installed. The Grid Connection Cable will be laid at a maximum depth of 2m BGL except where crossing the East Stour River or third-party infrastructure (as set out below). The maximum voltage of the Grid Connection Cable will be 132kV.
East Stour River Crossings	HDD will be used to install the Grid Connection Cable beneath the East Stour River pursuant to Work No. 4, within the areas shown within **ES Volume 4, Appendix 10.5: Schedule of Watercourse Crossings (Doc Ref. 5.4)**. Where the HDD is beneath the East Stour River, a minimum depth of 2m from the bed of the East Stour River will be maintained. In order to achieve this depth, the entry and exit pit locations for HDD will need to be set back at least 10m from top of the bank / channel edge.
Third-party infrastructure crossings	Where the Grid Connection Cable crosses under Network Rail / High Speed 1 infrastructure, if new ducts are required, these will be installed using HDD construction methods. Where the Grid Connection Cable crosses any third-party infrastructure, cables will be laid at an appropriate separation distance from the infrastructure.
Vehicle Bridge Crossings	Any vehicle bridge crossings of watercourses will be within the areas shown within **ES Volume 4, Appendix 10.5: Schedule of Watercourse Crossings (Doc Ref. 5.4).** The vehicle bridge crossings will be installed to avoid impact to the channel and minimise on-site engineering. The bridge soffits will be set at least 600mm above the adjacent bank level and the bridge supports will be set back at least 1m from the edge of the top of the bank. The track approach to the watercourse crossings will be kept at grade. The vehicle bridge crossings will be pre-engineered modular steel bridges.
Sellindge Substation Extension	The Sellindge Substation Extension will use a maximum land area of no more than 0.05ha, with a maximum height of any building or infrastructure being no greater than the existing Sellindge Substation infrastructure. The Sellindge Substation Extension will be constructed at the same level as the existing Sellindge Substation.

Work No. 5 – associated works

Project Component	Design Principle
Security Fencing / Boundary Treatments	The PV panels will be set within security fencing comprising deer-proof fencing (wooden posts, metal fencing) with a maximum height of 2.5m AGL. Security fence posts will be installed to a maximum depth of 1m BGL. Distance between the security fencing and hedgerows outside of the security fence would be at least 3.2m. Security fence gates will be provided for maintenance, habitat management, passage of mammals, security purposes and fire response access. Security fencing within Fields 19, 23 and 24 will have a minimum clearance space of 0.2m between the bottom of the security fence and the ground, and with minimum mesh spacing of 0.1m.
CCTV	CCTV cameras will be located throughout the Work No. 5 area up to a maximum height of 3m AGL. CCTV will be infrared and will be directed towards the Order limits and its immediate environs, or away from residential properties. CCTV mounting structures will be installed to a maximum depth of 1m BGL.
Lighting	Operational lighting will be limited for emergency and overnight maintenance purposes only at Inverter Stations, Intermediate Substations and the Project Substation and will be directed within the Order limits. Lighting mounting structures will be installed to a maximum depth of 1m BGL. Lighting will include features designed to reduce light spill beyond the areas required to be lit.
Electrical Cables	No new Overhead Lines will be constructed as part of Work No. 5. Electrical Cables will be installed below ground via excavated trenching or HDD construction methods (as outlined below). Where the Electrical Cables are installed below ground via trenching methods this will have a maximum width of 2m and a maximum depth of 1.5m BGL, except where crossing the East Stour River, IDB-managed watercourses or third-party infrastructure (as set out below). Joining cable pits will have a

Project Component	Design Principle
	maximum depth of up to 2m BGL. Where Electrical Cables cross drains, these drains will be reinstated once the Electrical Cables have been installed.
East Stour River and IDB-managed watercourses	HDD will be used to install the Electrical Cables beneath the East Stour River and IDB-managed watercourses pursuant to Work No. 5, within the areas shown within **ES Volume 4, Appendix 10.5: Schedule of Watercourse Crossings (Doc Ref. 5.4)**. Where HDD is used, a minimum depth of 2m from the bed of the river or watercourse will be maintained. In order to achieve this depth, the entry and exit pit locations for HDD will need to be set back at least 10m from top of the bank / channel edge. Electrical Cable bridge ducts may be used should the undertaker consider HDD to be inappropriate or technically unfeasible.
Third-party infrastructure	Where Electrical Cables cross any third-party infrastructure, cables will be laid at an appropriate separation distance from the infrastructure.
Vehicle Bridge Crossings	Any vehicle bridge crossings of watercourses will be within the areas shown within **ES Volume 4, Appendix 10.5: Schedule of Watercourse Crossings (Doc Ref. 5.4).** The vehicle bridge crossings will be installed to avoid impact to the channel and minimise on-site engineering. The bridge soffits will be set at least 600mm above the adjacent bank level and the bridge supports will be set back at least 1m from the edge of the top of the bank. The track approach to the watercourse crossings will be kept at grade. The vehicle bridge crossings will be pre-engineered modular steel bridges.
Internal Access Tracks	The internal access tracks will be at grade and have a minimum width of 3.7m and a carrying load in compliance with Building Regulations and NFCC Guidance. The internal access tracks will be constructed using a 90% permeable grass-paving hardstanding surface with foundations with an approximate depth of 300mm.
Water Tanks / Pipework	Water tanks for fire suppression water will have a maximum diameter of 12m and a maximum height of 3.5m. Water tanks will be a dark green or similar neutral colour.

Project Component	Design Principle
	Water tanks will use foundations which will have a depth of no greater than 2m BGL. The water tanks will be located at least 50m from a BESS location. Water pipes laid from the water tanks to a fire hydrant located adjacent to each of the BESS Units will either be installed within a trench below ground, or laid along the ground between the PV panels. Where water pipes are installed below ground via trenching methods, these will be dug to a depth of up to 1.5m BGL and a width of up to 2m.
Work No. 7 – construction and decommissioning works	
Internal haulage road	The internal haulage road required for construction and decommissioning will be provided at grade using a permeable surface.
Work No. 8 – works to create, enhance and maintain green infrastructure, boundary treatments and crossing structures	
Protection of ancient woodland and veteran trees	A minimum buffer of 15 times the stem diameter or 5m beyond the trees crown spreads (whichever is greater) for veteran trees and of 15m from the canopy spread for ancient woodland will be maintained. Within this buffer no infrastructure will be constructed.
Vehicle Bridge Crossings	Any vehicle bridge crossings of watercourses will be within the areas shown within **ES Volume 4, Appendix 10.5: Schedule of Watercourse Crossings (Doc Ref. 5.4).** The vehicle bridge crossings will be installed to avoid impact to the channel and minimise on-site engineering. The bridge soffits will be set at least 600mm above the adjacent bank level and the bridge supports will be set back at least 1m from the edge of the top of the bank. The track approach to the watercourse crossings will be kept at grade. The vehicle bridge crossings will be pre-engineered modular steel bridges.
PRoW footbridges	New PRoW footbridges will be free standing structures within the areas shown within **ES Volume 4, Appendix 10.5: Schedule of Watercourse Crossings (Doc Ref. 5.4).** The footbridge soffits will be set at least 600mm above the adjacent bank level and the bridge supports will be set back at least 1m from the edge of the top of the bank.

Project Component	Design Principle
PRoW	All PRoWs will be a minimum of 2m wide and will sit within a corridor of 10m minimum width, with the exception of the section of 'NEW 3' adjacent to Work No. 3 (Project Substation) which will sit within a 5m corridor.
Site Wide works	
Offsets from East Stour River, drains, channels and IDB-managed Ordinary Watercourses	A minimum 10m buffer (as measured from the top of the bank or channel edge under normal flows) will be provided from the East Stour River and IDB-managed Ordinary Watercourses. A minimum 3.2m buffer will be provided from all drains and channels. No new physical infrastructure other than essential works (such as cable crossings, watercourse crossings, drainage and Public Rights of Way ('PRoW') footbridges) will be developed within this buffer.
Offsets from the Aldington Flood Storage Area (AFSA)	A buffer will be provided from the toe of the AFSA embankment as shown on **ES Volume 4, Appendix 10.4: Aldington Flood Storage Area Risk Assessment (Annex A).** This buffer extends at least 8m from the toe of the raised embankment and extend beyond this to align with the wider standoff requested by the Environment Agency. No new physical infrastructure other than: ▪ Approximately 40m section of the internal haulage road associated with Work No. 7 during the construction and decommissioning phases; ▪ The access track where it enters the Project Substation – the works associated with this are above ground only comprise improvements to the surface treatment only; and ▪ Approximately 10m section of the cable route to the Project Substation which crosses the northern most section of the Primary Access Track.
Protection of existing ponds	All existing ponds within the Order limits are to be retained with a minimum set back of 3.2m. Within this buffer no infrastructure will be constructed.
Protection of badger setts	A buffer of 30m is to be provided from the badger setts identified in **ES Volume 4, Appendix 9.5m: Badger Survey Report (Doc Ref. 5.4)**. Within this buffer no infrastructure will be constructed.

Project Component	Design Principle
Vegetation loss	Unless otherwise agreed with the local planning authority, vegetation loss will be restricted to the maximum extents shown on the **Vegetation Removal Plan (Doc Ref. 2.8).** No more than 150m of hedgerow is to be removed.