STATERA
BALANCING THE GRID

East Claydon Battery Energy Storage System (BESS)

Environmental Statement

Design Evolution and Site Selection

November 23

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Prepared by:	Kirsty Cassie - Project Developer
Checked by:	Chris Palmer - Planning Lead
Approved by:	Chris Palmer - Planning Lead

Contents

1 Introduction

1.1.1 This chapter of the ES summarises the surrounding context of the site including environmental opportunities and constraints that have influenced the design; discusses the alternatives analysis undertaken with regards to due consideration of a Do Nothing / No Development alternative, alternative sites and alternative design; provides a summary of the consultation undertaken to date with regards to the Proposed Development; describes the design evolution of the Proposed Development, focusing on key design modifications that were made during the design process; and discusses some of the environmental considerations which have influenced the design evolution process where relevant.

1.1.2 It provides sufficient information on the Proposed Development to aid the identification and assessment of potential environmental impacts and likely environmental effects across the environmental topic areas addressed by the EIA.

1.1.3 Further details on the Proposed Development can be found within the Planning Design & Access Statement (PDAS),

2 Site and Local Environment Context

2.1 Site Description and Context

2.1.1 The site is irregular in shape and is centred around National Grid Reference (NGR) SP 75557 25324. The site is located on land to the South of East Claydon National Grid substation and between the settlements of Granborough and East Claydon in the county of Buckinghamshire.

2.1.2 Nearby residential properties are located at Granborough adjacent to Hogshaw Road some 500m to the west of the site, and at Hogshaw Road immediately opposite the proposed site access. East Claydon substation is some 75m distance at closest point, Sion Hill farm is circa 415m to the east.

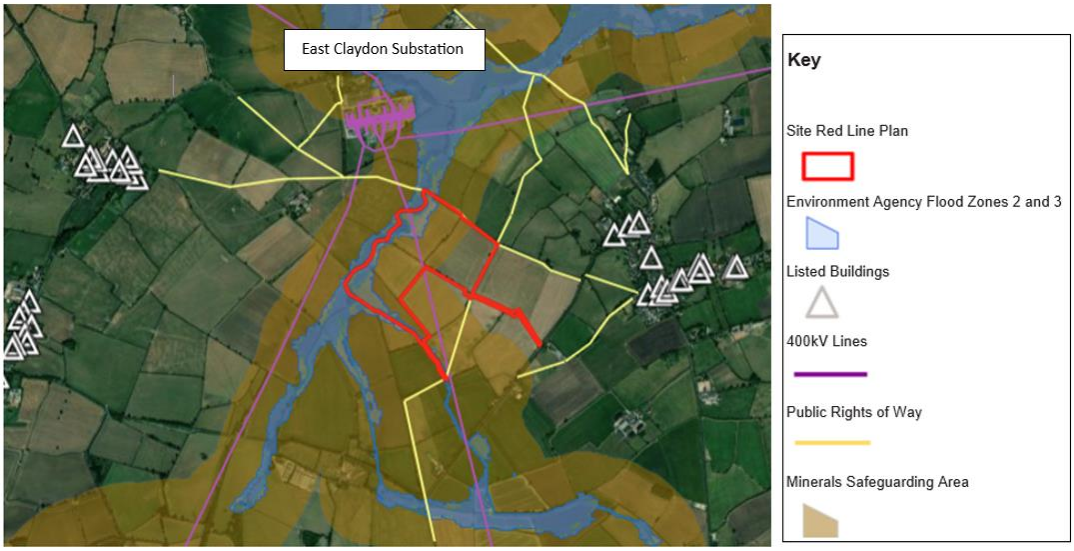
2.1.3 There are a number of listed buildings within the wider area of the Site, in the villages Granborough, Botolph Claydon and East Claydon

2.1.4 The site is accessed from the south by an access onto Hogshaw Road. Two public rights of way (PRoW) sit adjacent to the site (GRA/2/1 and GRA 2/2), one bounding the site to the north and the other running to the east of the proposal site boundary, these two PRoW routes intersect near to the northeastern corner of the proposal site.

2.1.5 A significant portion of the site is located within a Mineral's Safeguarding Area (MSA) for clay, silt, sand and gravel.

2.1.6 The site comprises a collection of agricultural fields, predominantly in use for arable farming. The site is not an allocated site. It is a greenfield, countryside site. The key environmental impacts can be seen in Figure 2.1 below.

Figure 2.1 Environmental Context Plan

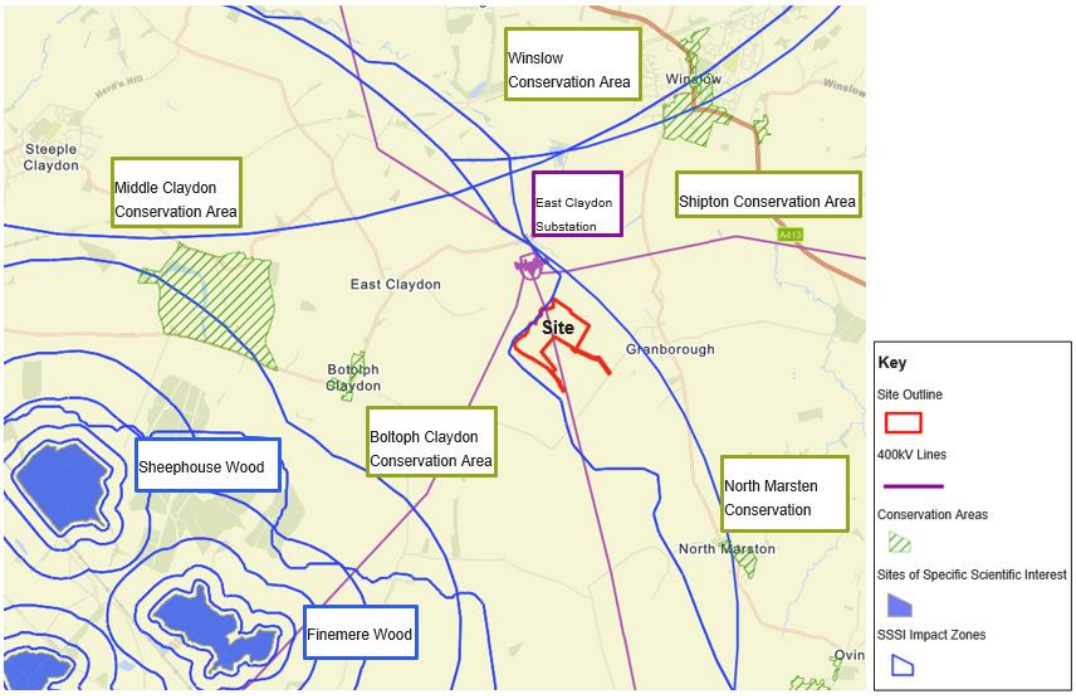


2.1.7 The Vale of Aylesbury Local Plan (September 2021) indicates that the whole of the site lies within the Granborough Neighbourhood Plan area (made 2022).

2.1.8 According to The Vale of Aylesbury Local Plan the site is within the zone of influence of two SSSI and 5 local nature reserves, shown in Figure 2.2 and include.

- Winslow Conservation Area
- Shipton Conservation Area
- Middle Claydon Conservation Area
- North Marston Conservation Area
- Botolph Claydon Conservation Area

Figure 2.2 Wider Environmental Context Plan



2.2 Local Environmental Context

2.1.9 The following environmental considerations were reviewed as part of the design evolution of the Proposed Development with regards to establishing site environmental constraints and opportunities. Figures 2.1 and 2.2 summarise the site's content.

Land Use and Soil

2.1.10 The site currently comprises agricultural land predominantly used for arable farming. An Agricultural land Classification (ALC) survey of the site has been undertaken (ES Volume 11, Appendix 1) which identified the presence of Grade 3b agricultural land across the entire area of the site.

2.1.11 The soils on site are described as comprising a mixture of heavy silty clay loam topsoil over slow permeable clay; calcareous silty clay topsoil over slowly permeable clay; and non-calcareous clay topsoil over slowly permeable clay.

Archaeology and Heritage

2.1.12 The Site does not contain any nationally designated (protected) heritage assets, such as scheduled ancient monuments, listed buildings, or registered parks and gardens. There are two Grade II Listed Buildings within 1km of the Site: Rookery Farmhouse and 17 Winslow Road. The Site does not lie within a Conservation Area, nor are there any within the vicinity of the site.

2.1.13 There are a number of other listed buildings within the wider area of the Site, however, a site visit confirmed that there was no intervisibility between them and the Site.

Ecology and Biodiversity

2.1.14 No statutory or non-statutory designated sites are located within 2km of the Site.

2.1.15 The Site lies within the Natural England Impact Risk Zone of two statutorily designated sites (Sheephouse Wood Site of Special Scientific Interest (SSSI), and Finmere Wood SSSI). These sites are located 4.6km and 4.3km south-east respectively.

2.1.16 Sheephouse Wood SSSI comprises ancient lowland mixed deciduous woodland. The site supports black hairstreak, a nationally restricted species, as well as other woodland butterflies including white admiral and purple hairstreak.

2.1.17 Finmere SSSI is similar in character, also supporting ancient lowland mixed deciduous woodland. The rides and open areas support diverse flora and invertebrates including black hairstreak white admiral, purple hairstreak, wood white dingy skipper and grizzled skipper.

2.1.18 Both Sheephouse SSSI and Finmere SSSI are considered to be of national value.

2.1.19 Habitats on-site, informed by a detailed Phase 1 Habitat Survey in October 2022, include:

- Arable farmland;
- Neutral grassland;
- Native hedgerows;
- Ponds;
- Scrub;
- Stream;
- Mature trees;
- Modified grassland; and
- Aquatic vegetation.

2.1.20 Ecological surveys of the site, as detailed within ES Volume 6, have identified the following species within the site:

- Bats;
- Reptiles;
- Water voles;
- Breeding birds;
- Otter; and
- Badger.

2.1.21 The site is considered to have a biodiversity baseline value of 95.38 habitat units and 30.32 hedgerow units in line with Natural England Defra Biodiversity Metric 4.0, as detailed within ES Volume 3.

2.1.22 An Arboricultural Impact Assessment, submitted in support of the planning application, undertaken of the site and its immediate surrounds identified a number of trees, groups of trees, hedgerow and woodland, with many of the trees located to the north-east of the site along the Claydon Brook. No Tree Preservation Orders on site protects the trees on site and the site is not located within a Conservation Area.

2.1.23 For further information, see ES Volume 3.

Noise and Vibration

2.1.24 An environmental sound survey was undertaken between the 9th and 16th November 2022 to establish the baseline sound levels at the nearby noise sensitive receptors (NVSRs).

2.1.25 A 3D noise model was built based on the proposed site layout to predict the specific sound levels from the construction and operation phase of the proposed development at the NVSRs. The 3D noise model included noise source data provided by the client and

2.1.26 A BS4142:2014+A1:2019 assessment was undertaken the derive an initial estimate of impact from the assessment of the operational noise from the Proposed Development.

2.1.27 The outcome of this initial BS4142:2014+A1:2019 assessment showed that there is a negligible to low risk of impacts at the existing sensitive receptor locations during both the daytime and night-time periods, depending on the context.

2.1.28 With regards to national and local planning policy it is considered that the results of the operational assessment demonstrate that Proposed Development will not result in an adverse impact to amenity of the nearby receptors manufacturer's data.

2.1.29 For further information, see ES Volume 2.

Water Resources and Flood Risk

2.1.30 The EA Flood Map for Planning, which is available online, indicates that the majority of the site is located within Flood Zone 1, which is land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding. The western and southern portions of the site are located in Flood Zone 2 and 3. Flood Zone 3 is an area whereby the annual probability of flooding from fluvial sources is classified as 1 in 100 or greater. Flood Zone 2 is an area whereby the annual probability of flooding from fluvial sources is classified as between 1 in 100 and 1 in 1,000.

2.1.31 The site is not located in a Flood Warning Area. The EA defines a flood warning area as "geographical areas where we expect flooding to occur and where we provide a Flood Warning Service. They generally contain properties that are expected to flood from rivers or the sea and in some areas, from groundwater.

Landscape and Visual Amenity

2.1.32 There are no international or national landscape designations relating to the application Site or its immediate surroundings. The Site is not in a National Park or an AONB and does not lie within the settings of such areas. Quainton Hill, 4km to the south has a local designation; Area of Attractive Landscape. The Site and immediate area is classified as Countryside within the Local Plan.

Transport and Access

2.1.33 The site can be accessed from the east by Hogshaw Road, the access point is to the south of the village of Granborough. A temporary construction haul route using matting is also proposed for the use of HGV vehicles, this route will access the site from the north via the East Claydon Road.

2.1.34 The proposed construction traffic route between the A421 Buckingham Bypass and the site via the A413 London Road, local roads through Winslow, Granborough Road to East Claydon Road and beyond to the main construction access to the site. A second route for the AIL movements and to act as a reserve construction route should the main construction access be blocked for whatever reason will continue via Granborough Road and Winslow Road to Granborough village, and Hogshaw Road to the proposed operational site access.

2.1.35 Buckinghamshire Council has produced a series of maps showing recommended routes for Heavy Goods Vehicles (HGVs) throughout the Authority area. These show the A421 and A413 as being part of these recommended routes hence the proposed construction delivery routes.

3 Alternatives and Design Evolution

3.1.1 The following sections review the alternatives to the Proposed Development that have been considered by the Applicant (as relevant), including

- The Do-Nothing/No Development Alternative;
- Alternative Sites; and
- Alternative Designs and Design Evolution.

3.2 Do Nothing/ No Development Alternative

3.1.2 The Do-Nothing / No Development Alternative refers to the option of leaving the site in its current state.

3.1.3 The site is undeveloped, comprising areas of open fields, predominantly used for arable farming.

3.1.4 BESS facilities provide a means of allowing electricity from the grid to be imported and stored at times of low demand/high generation, which can then be exported back into the grid at times of higher demand / system stress.

3.1.5 System frequency is also a continuously changing variable that is determined and controlled by the second-by-second (real time) balance between system demand and total generation. If demand is greater than generation, the frequency falls while if generation is greater than demand, the frequency rises. If the transmission system is not maintained within the required frequency tolerance system stress can result in widespread power supply issues and damage to network infrastructure.

3.1.6 Battery storage is a key part of the National Grid energy strategy and provides balancing services to help accommodate the increasing level of renewable energy generation.

3.1.7 By importing excess renewable energy from the grid and storing it, batteries can capture energy that would otherwise be lost / unutilised. In respect of their storage ability, batteries offer opportunities to support the intermittent nature of renewables by storing the excess energy they produce and importing it back into the grid when demand requires.

3.1.8 During situations when primary power sources (e.g., traditional power stations) are interrupted, BESSs can bridge the gap in production, thus avoiding potential blackouts. It should be noted that the UK electricity network is wholly interconnected and issues in one geographic location can have far reaching implications on the network. Accordingly, BESSs offer additional capacity to deal with system stress and any variations in grid frequency at both a local and national level.

3.1.9 As has been recognised by National Grid's 2016 System Operability Framework (SOF): "Faster response is more effective and so less response is needed if speed can be increased." BESSs can respond more rapidly than other types of balancing services, as they have no start-up delays. As such, BESSs can balance the real-time requirements of the national grid more efficiently. The Department for Business, Energy and Industrial Strategy (BEIS) review of electricity market arrangements (REMA) in 2022 found that "frequency response markets have helped to deploy new batteries".

3.1.10 The Proposed Development has come forward following the Government's reform of the Nationally Significant Infrastructure Project ("NSIP") process through the Infrastructure Planning (Electricity Storage Facilities) Order 2020 (the "Storage Order")

aimed at reducing barriers to investment and delivery of large BESS over a 50MW capacity.

3.1.11 The Government considers that larger capacity BESS developments are crucial to meeting the country's overall net zero 2050 target, as well as its target to decarbonise the power system by 2035, which will require a substantial growth in renewable energy generation, along with electricity storage to balance the intermittent generation from renewables, and stability services to keep the national grid stable.

3.1.12 National Grid's Future Energy Scenarios document (July 2022) states "we expect battery storage to make up the largest share of storage power capacity in all scenarios by 2050 to help with shifting demand within the day and managing network constraints as battery costs fall". As such, the Future Energy Scenarios document foresees battery use rising "from 1.6GW in 2021 to as much as 20GW by 2030 and 35GW by 2050".

3.1.13 To be most effective in contributing to the country's targets, the proposals need to be of a large capacity (i.e., over 50MW) and located in an area where there is a significant need for new capacity to support renewable energy generation.

3.1.14 Furthermore, the proposal supports renewable planning policy in the National Planning Policy Framework and would help meet National Grid's requirement for ancillary services.

3.1.15 These objectives have also driven the site selection process and the scale and types of technology proposed, as set out below in the 'Alternative Sites' section.

3.1.16 The 'No Development' option would therefore not result in the benefits that could be realised by the Proposed Development with regards to the import, storage and export at electricity, and the benefits this offers the grid and the viability of lower carbon energy. The Do-Nothing option on the site has therefore not been considered in further detail within this ES.

3.3 Alternative Sites

3.1.17 To meet the primary objectives of the scheme, the following key site selection criteria were applied by the Applicant:

- Located in a region where there is a need for voltage and power flow support – this is important to replace generation from traditional coal and gas plants and manage voltage issues arising from the increasing generation from renewable energy sources;
- Connection to the National Grid transmission networks 275/400kV – in order to deliver the greatest benefit, connection to the transmission system is required. The 275/400kV network is generally used to transmit energy from its source to areas of demand. To maximise the benefits of the Proposed Development, it is important to connect large scale BESS to a 275/400kV grid substation. The 275/400kV transmission network often suffers from voltage and stability issues whereby BESS help to address these issues;
- Three or more 275kV and 400kV circuits – National Grid designs the network for an n-1 condition, i.e., assuming a single outage of any one circuit, thus a substation with two circuits will only be considered to have one-circuit (for load flow purposes) as the second circuit will be considered switched-out. However, a substation with three circuits, using the n-1 condition, will have two circuits for load flow considerations, thus having more delivery capability

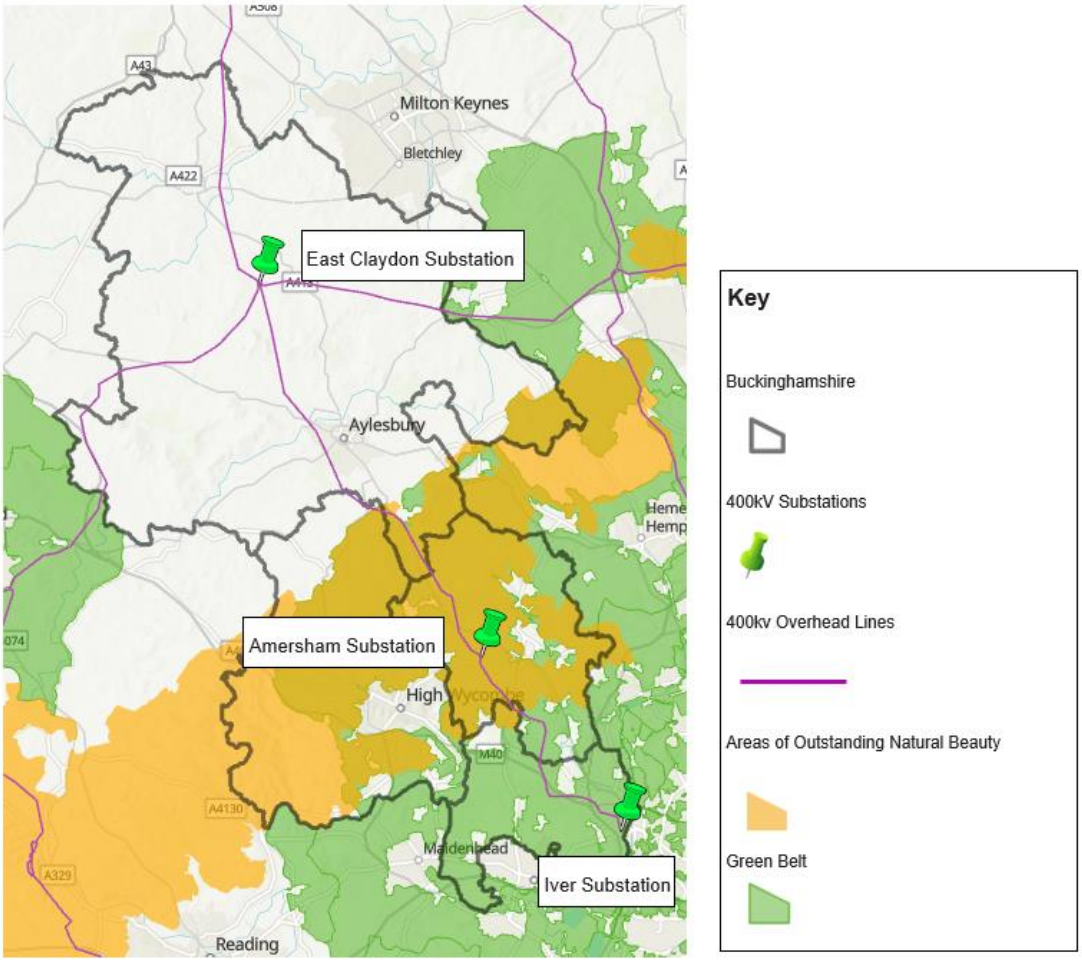
to the grid system. As the Proposed Development delivers large volumes of services to the grid, after load flow evaluation, three or more circuits are required to accommodate these large service volumes and maximise the benefit to the transmission network;

- Available grid connection by 2030 – to enable the Government to reach its 2035 net zero carbon electricity target; and
- Located within a heavily constrained transmission area – to provide the greatest level of support to the national grid, the project should be located within an area of the national grid transmission network which is heavily constrained due to high loaded circuits.

3.1.18 There are three National Grid Electricity Transmission (NGET) substations within Buckinghamshire;

- East Claydon substation,
- Amersham substation, and
- Iver substation

3.1.19 The NGET substations located within Buckinghamshire are plotted in Figure 3.1 below. East Claydon substation is the only one not constrained by the Chilterns Area of Outstanding natural Beauty (AONB) or the Greater London Green Belt.



3.1.20 Statera has identified that the site fulfils this key site selection criteria, whereby it is located within an area that requires additional backup capabilities to meet peak demand and can provide critical ancillary services at a strategic substation and important area of the grid network.

3.1.21 The size of the site offers the potential for a large capacity BESS, the need for which is set out within the 'Do Nothing / No Development Alternative' section, whilst also offering the potential to deliver significant Biodiversity Net Gain (BNG).

3.1.22 The Applicant holds an agreement with National Grid Electricity Transmission (NGET) to connect its BESS to East Claydon substation, located to the south of the site, which critically enables export and import for a battery system. The site location next to East Claydon substation presents the opportunity to precisely secure the right sort of grid connection offer allowing import and export for the battery system. The need for this type of facility is a direct consequence of the amount of renewable and intermittent generation that is now installed in the UK.

3.1.23 Furthermore, the site offers benefits with regards to the presence of a suitable access to/from the site.

3.1.24 The Site Selection Process Report submitted with the planning application provides further detail with regards to why the East Claydon site was selected by Statera.

3.1.25 As such, no alternative sites or locations have been considered by the Applicant for the Proposed Development.

3.4 Alternative Design and Design Evolution

3.1.26 During the process of the designing the Proposed Development, no reasonable alternative schemes or designs (as a whole) were identified or considered by the Applicant and project team, which would warrant a comparison of environmental effects. Instead, the design of the Proposed Development has evolved to reflect the site constraints and opportunities, including key environmental considerations, and the outcomes following pre-application consultation. The design has also been guided by the Applicant's practical experience in developing and delivering BESS sites.

3.1.27 The project team have worked extensively together to ensure that 'mitigation by design' principles have been incorporated into the evolving scheme, and so the evolution of the design has included, where relevant, consideration of environmental effects and issues. Where relevant, this has been set out below.

3.5 Key Design Considerations

3.1.28 Following analysis of the site and the surrounding context, initial design options were explored to test the site layout and design in order to assist in determining the most appropriate design for the site.

3.1.29 The key constraining factors considered during the design evolution of the scheme are presented below and include:

- Sensitive receptors in Granborough;
- Existing overhead lines that run through the site;
- Existing arboriculturally valuable trees on the site; and
- Flood risk areas on the site.

3.1.30 Key objectives and opportunities for the site and the proposals were established as follows:

- Opportunity for significant BNG on-site, including the planting of native species and a number of targeted ecological enhancements within the site (as discussed further within this ES chapter);
- Provision of extensive landscaping and visual screening through targeted planting within the site;
- Creation of suitable drainage features (SuDS) to accommodate the increase in surface water runoff as a result of increased impermeable surfaces at the site;
- Provision of a new permissive path to allow access to a newly landscaped area; and
- Safe and optimal access to the site from the adjacent road network allowing access for heavy goods vehicles (HGVs) and emergency vehicles.

Consultation

3.1.31 An EIA Screening Request was issued to Buckinghamshire Council in May 2022. Buckinghamshire Council provided a Screening Opinion (Reference: 23/01438/SO) on 8th June 2023. The consultation responses and feedback received as part of the EIA Screening Opinion recognised a number of constraints associated with the initial site layout and design (refer to Figure 2.2 which illustrates the designs issued to the Buckinghamshire Council Statera at the time of requesting an EIA Screening Opinion).

3.1.32 As noted in ES Volume 1, Chapter 1: Introduction and Methodology, an EIA Scoping Report was submitted to Buckinghamshire Council on 7th July 2023 to request an EIA Scoping Opinion from Buckinghamshire Council and statutory consultees in line with Regulation 18(4) of the EIA Regulations. The Scoping Opinion from Buckinghamshire Council (see ES Volume 1, Appendix 2.4), including responses from key consultees, was received on 18th September 2023, and set out potential site constraints associated with those topics 'scoped in' to the EIA.

3.1.33 Statera has held four public exhibition events promoting the battery project across-July and November 2023. The events were well attended by residents, with approximately 150+ residents in attendance over the 4 events.

3.1.34 The aim of these events was to make the residents aware of the Proposed Development allow them to give their view.

3.1.35 A website has been made available which contains all the same information which was shown at the public exhibition events (www.eastclaydonstorage.co.uk).

3.1.36 Statera also undertook an online survey between June and August 2023 to align with the initial public exhibition events and other stakeholder engagement activities. Advertising of the survey reached around 27,000 people and the survey was competed by over 700 of these. The survey results show that 48% of respondents either support or are neutral regarding the Proposed Development. The landscape was established as is the most important issue to respondents, with 70% identifying it as one of their favourite aspects of the local area, and 81% identifying landscape and biodiversity as important design considerations for the Proposed Development. It was

also established that 78% would like to see environmental improvements as part of the investment in the local community. The survey results also show support for the principles of the Proposed Development: the average strength of feeling towards the principle of Buckinghamshire being at the forefront of reliable, clean energy supply was 61% (positive). For more information, the detailed survey results are provided within Appendix 1 of the Planning Design and Access Statement submitted alongside the planning application.

Proposed Development Layout and Design Evolution

3.1.37 The Proposed Development's layout has evolved in response to the key opportunities and constraints, and pre-application consultation as set out above. Furthermore, considerations with regards to functional requirements to ensure safe operation and optimum output and contractor specifications have also influenced the design evolution.

3.1.38 The key layout changes have been captured in Figure 3.1, Figure 3.2 and Figure 3.3 below, and a description of how the layout has evolved between iterations of design is provided below. The final Proposed Development layout is illustrated in Figure 3.3.

Iteration 1

3.1.39 The initial layout for the Proposed Development shown on Figure 3.1 (as presented within the EIA Screening Request) was used to identify the broad shape and size of the Proposed Development elements and how theses would fit and be functional within the defined boundary of the site. This design iteration included 1,204 battery units.

3.1.40 A number of spatial constraints were addressed in this initial design iteration, including:

- Avoiding electrical equipment under the overhead power lines;
- Avoiding the Flood Zone x associated with Claydon Brook.
- Landscaping the site, to create a visual buffer from the local villages.

3.1.41 A key consideration of the Proposed Development layout is limiting the visual and landscape impact upon surrounding sensitive receptors, such as the residents of Granborough, Botolph Claydon and East Claydon. This has led to establishing targeted areas of landscaping, alterations to the site topography such as the creation of earth bunds to be planted up to screen views of the infrastructure.

Figure 3.1 – Masterplan at Screening stage (Iteration 1)

Iteration 2

3.1.42 Iteration 2 (Figure 3.2) built upon the initial concept design and included refinement of battery storage and inverter/transformer container locations across the site. This design iteration included a reduction in the number battery units to 888 units. This was to allow more space for biodiversity enhancements and landscaping.

3.1.43 The design of the Proposed Development has tried to utilise the mitigation hierarchy by avoidance to any adverse impacts on habitats and species on-site. The layout has been designed to avoid impacts to trees and hedgerow where possible by using existing farm access tracks into the fields.

Figure 3.2 – Masterplan at Scoping stage (Iteration 2)

Iteration 3

3.1.44 A new temporary construction route for HGV movements has been proposed using the fields to the north from East Claydon Road. This route will form the main construction access during the build phase of the project and replaces the previous proposal which routed construction traffic through Granborough.

3.1.45 The on-site attenuation was further refined in the final layout iteration following the development of the Conceptual Drainage Strategy The layout of the battery compounds has been rearranged to avoid the flood zone and protect flood capacity.

3.1.46 The inverter house units now have flat biodiverse roofs to reduce visibility and benefit wildlife.

3.1.47 Biodiversity enhancements designed by Future Nature in conjunction with Berk, Bucks and Oxon Wildlife Trust along with proposed new orchard.

3.1.48 Furthermore, a new permissive path has been included within the final design iteration to allow for greater access to the site and new areas of habitat provision. The permissive path would link into the existing footpath network.

3.1.49 Improved emergency access, including a second point of access (using the existing farm track) and passing places and water tank positioned to improve circulation for emergency services.

Figure 3.3 – Masterplan at Submission stage (Iteration 3)

4 Conclusion

4.1.1 Statera has carried out a thorough site selection process to identify a suitable site for the Proposed Development. Each site was assessed against criteria that were specifically identified to ensure that the primary objectives of the scheme could be met.

4.1.2 In addition to finding the most suitable substation, Statera also considered the proximity of sites to an existing National Grid substation, a site of sufficient size to accommodate the infrastructure, the acceptability of environmental and planning constraints, the physical and visual separation from nearby properties and settlements and site access for construction.

4.1.3 For the reasons above the Proposed Development site was selected.