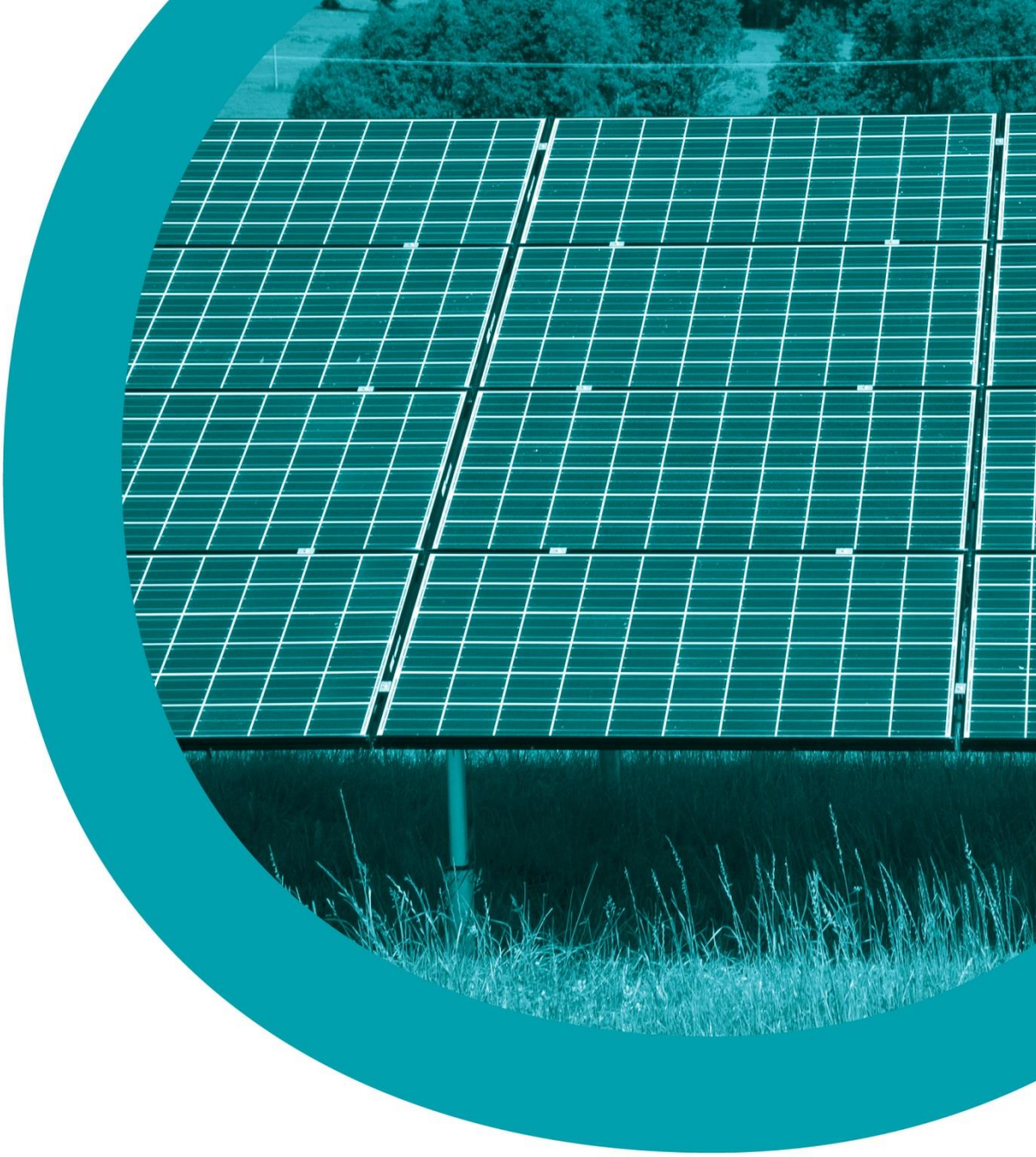


Brymbo Solar Scheme

Design and Access Statement

Brymbo Heritage Trust

Date: November 2024

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1.1 Introduction

1.1.1 This Design & Access Statement (DAS) outlines the design principles, concepts and access issues that have been considered and applied to the proposed community solar scheme at Wonderbank, Brymbo, Wrexham, see Figure 1: Site Location. This DAS is based on the guidance presented in Welsh Government Technical Advice Note 12: Design (2016) and the CABE guide Design and access statements (2007).

1.1.2 This DAS is submitted to Wrexham County Borough Council to describe and explain the design and access concepts and principles applied to the proposed development as advised in the guidance.

1.1.3 Accordingly, the DAS presents detailed information on the design approach applied to this Development, in order to demonstrate that the Applicant and consultants have considered the local environment, amenity and access in the formulation of this development proposal.

1.2 Context to the Development

1.2.1 The Applicant is Brymbo Heritage Trust, a community-led charity who are creating a new visitor attraction, due to open April 2026. The Applicant is undertaking a series of building repairs and restorations to the buildings on the former Brymbo Colliery, Ironworks and Steelworks site to preserve the heritage of the site. A new building is being erected over the Fossil Forest area to enable live excavation. Stori Brymbo will tell the story of how nature and industry and people have interacted over time and how the activity in the area has shaped the landscape. The site will also provide events spaces, community spaces and other facilities. Planning Consents have already been secured for all of the areas described as well as the associated car parking.

1.2.2 The primary purpose of the proposed solar scheme will be to provide renewable electricity to the Stori Brymbo, a community-led visitor attraction being developed on land at Brymbo, in line with their environmentally conscious, low carbon ethos.

1.2.3 Clear, scientific evidence has established that global warming is driving climate change across the planet. The Inter-governmental Panel on Climate Change (IPCC)

established in its Fifth Report on Climate Change that it is "unequivocal" that the earth's climate is warming due to human activity. The IPCC estimates that there is greater than a 90% likelihood that increased concentrations of man-made, heat-trapping gases caused most of the observed increase in global average temperatures since 1950. A primary cause of global warming is the burning of fossil fuels, whereby the resulting carbon dioxide emissions lead to increases in global temperatures.

1.2.4 The British government have committed to reaching net zero by 2050. In September 2023, Prime Minister Rishi Sunak reiterated the government's plan to curtail carbon emissions by 77% by 2035[1]. The proposed scheme has emerged as part of Brymbo Heritage Trust's sustainable development aspirations.

1.2.5 Renewable energy is identified in UK and devolved Welsh policy as an important element in tackling the effects of climate change through the displacement of power typically derived from fossil fuels. Planning Policy Wales Edition 12 (2024) states that "*Local authorities should facilitate all forms of renewable and low carbon energy development … planning authorities should seek to ensure their area's full potential for renewable and low carbon energy generation is maximised and renewable energy targets are achieved.*" We understand that this is the purpose of deposit draft LDP policy RE2: Renewable Energy Schemes, which seeks to support renewable and low carbon sources of energy, including from small scale and/or community–based proposals less than 5MW.

1.2.6 Planning Policy Wales (now Edition 12) includes guidance to local authorities in determining proposals for local ownership has been adopted, as follows:

Planning Policy Wales ed. 12

Local Involvement and Community Benefit

5.9.24 The Welsh Government supports renewable and low carbon energy projects which are developed by wholly Wales based organisations, including community groups, or provide proportionate benefit to the host community or Wales as a whole. In February 2020 the Welsh Government published a policy statement on local ownership of energy developments. This set out the Welsh Government's

[1] https://www.gov.uk/government/news/pm-recommits-uk-to-net-zero-by-2050-and-pledges-a-fairer-path-to-achieving-target-to-ease-the-financial-burden-on-british-families#:~:text=The%20UK%20has%20set%20the,target%20of%2077%25%20for%202035.

expectation for all new renewable energy projects in Wales to include at least an element of local ownership, to retain wealth and provide real benefit to communities. Locally owned generation provides a strong opportunity to retain economic value, contributing to prosperity.

5.9.25 The social, environmental and economic (including job creation) benefits associated with any development should be fully factored into, and given weight in the decision making process. However, planning decisions must be based on an assessment of the impacts of the proposed development, irrespective of who the applicant is.

5.9.27 Planning authorities should recognise that community groups, and organisations who seek to promote renewable energy projects, may require particular assistance in navigating their way through the planning system. Planning authorities should be as accommodating as possible when dealing with these projects.

1.2.7 This supportive policy guidance promotes the benefits of locally owned energy projects to communities and the local economy, alongside the environmental benefits of carbon offsetting. These factors are to be weighed in the balance of any planning decision, albeit that the determining authority must base any decision upon an assessment of the land-use impacts of the scheme regardless of the nature of the applicant.

1.2.8 As set out in 5.9.24, the Policy Statement on Local Ownership of energy developments was published in February 2020. The Minister explains that the intent of the policy is to retain the social and economic benefits of new energy developments within Wales and includes an expectation that all new energy projects in Wales are expected to include at least an element of local ownership, in order to retain wealth within Wales. The Policy Statement presents a “hierarchy” of models in terms of the value they deliver to Wales and explains that 100% locally owned projects are at the top of the hierarchy, where the organisation has the capability and capacity to manage the risks. The Stori Brymbo solar would be a community led Development, the economic benefits of which would remain in the local community.

1.2.9 The potential solar scheme at Stori Brymbo would make a useful contribution to the Authority’s renewable energy generation capacity and would provide generation to

the local area, thereby according with planning policy at the national and local levels whilst also embracing many elements of the seven well-being goals under the Well-being of Future Generations (Wales) Act 2015.

1.2.10 The estimated annual generation of 634MWh, saving in the region of 131,327kg[2] of CO_2 emissions a year, will in local terms, be a meaningful contribution to the government's national carbon emissions reduction policy and the Local Authority's objective of contributing towards national targets for renewable energy.

1.3 Design

Design Principles and Scheme Evolution

1.3.1 Solar photovoltaic (PV) modules are generally manufactured from silicon PV cells. These are typically categorised into either monocrystalline or multi-crystalline modules. This gives the panels a distinctive, shingled appearance. Most panels are in a rectangular format for ease and efficiency of installation. Following is an illustration of a typical solar panel:

Plate 1: Typical Solar Panel



1.3.2 A solar panel (PV module or PV panel) is a packaged, interconnected assembly of solar cells, also known as PV cells. The solar panel can be used as a component

[2] Calculated using PVSol Software

of a larger PV system to generate and supply electricity in commercial and residential applications. Because a single solar panel can produce only a limited amount of power, large scale installations contain many thousands of panels.

1.3.3 The final design of the module units, rows and arrays will depend on the final procurement of modules and detailed design of the scheme. Typically, the individual panels are expected to be arranged in module units comprising 3 panels in landscape orientation joined together on mounting frames, with multiple module units connected to form rows or arrays. Each row would be elevated above ground on the mounting frame, with the bottom (southern) edge at a height of up to 1m above ground level and the top (northern) edge at a maximum height of 3m. The module units are orientated both eastwards and westwards with an inclination/angle of 25 degrees.

1.3.4 Metal mounting frames would be installed on concrete ballast, so no intrusive works to the clay cap are required. A metal mounting system is affixed to the concrete ballast, on which the solar panels are installed. The heights of the ballast may vary across the solar arrays, particularly at the ends of some arrays, in order to achieve more uniformity in the heights of the solar panels and to account for lower ground. Following is an illustration of a typical metal mounting system:

Plate 2: Standard Metal Mounting Frame and Tables:



1.3.5 The mounting frames are usually fabricated from extruded aluminium.

1.3.6 The Brymbo solar scheme will comprise multiple solar tables arranged in arrays that will be orientated in a southerly direction and tilted at a 25° angle to maximise their potential to absorb the sun's rays. Multiple solar arrays are arranged as part of the overall solar scheme infrastructure, and the power output is directed through inverters to the gid connection point at the Machine Shop. A battery will be installed as part of the solar scheme, to store electricity generated by the solar scheme. This electricity can then be used when the solar is not generating, for example in the evening. Electricity that is not utilised on the Stori Brymbo site will be exported to the local distribution network. Such renewable energy generation and capacity reduces the UK's reliance on fossil fuel derived power generation and the associated contribution to global warming and polluting emissions to the environment.

1.3.7 The principal design components, as shown on Figure 2 – Site Layout, and Figure 3 Block Plan for the Brymbo solar farm scheme are:

- Solar panels on fixed mounting frames (Figure 4);
- Grid Cabinet (Figure 5);
- Battery Storage Container (Figure 6).

1.3.8 There is an existing fence around the proposed site, and the intention is that this fence will be utilised as the security fence for the solar scheme, with the addition of CCTV.

1.3.9 The grid connection point for the solar scheme will be at the Machine Shop building, which is currently being renovated as part of a separate planning consent. There will be an overhead line or underground cable from the grid cabinet on the solar scheme to the Machine Shop. It is anticipated that the route of this will follow an existing track.

1.4 Character

Characteristics of the site and its context

1.4.1 The Site is contained within an existing fence area. There is also a drainage ditch around the perimeter. The site is an area of restored land, which was previously part

of the historic mine and steel industry in this area. The land was fully remediated 2004-2006. Works involved the removal of existing vegetation, construction of an access ramp and construction of domed low permeability capping.

1.4.2 The Clay cap was compacted using Coal measure clay from the main reclamation site. These were compacted across the whole of the reclamation site and achieved a minimum of 80KN/m2 across the site. These minimum Compaction rates were achieved on the wonder bank capping. This is suitable for House build, retail and industrial use and is a nationwide accepted standard, therefore the loading from any panels etc will easily be accommodated by this. The permeability of the clays was important to prevent the ingress of water into the top of the wonder bank. By preventing the ingress of water into the tip it meant that the water soluble heavy metals know to be present in the colliery soil tip would not be leached out in to the water migrating through the tip and subsequently entering the water course.

1.4.3 The initial risk assessment suggested that it would take in excess of 1,650 years for this to happen without the cap, by placing the cap this would be increased to over 10,000 years.

1.4.4 The Clay cap was also domed with drainage ditches running around the edge of the cap to capture any run off. This ditch water was them piped down the Wonder bank to the newt lagoons adjacent to the duck pond site. This was to prevent any erosion from run off from eroding the slopes of the wonder bank.

1.4.5 The existing drainage scheme continues to handle all surface run off without and evidence of additional run off despite very heavy recent flash storms in the area. The dwell time for rain / storm water by the nature of the design of the cap is negligible with retention kept to a minimum to further improve the factor of safety in regard to permeability.

1.4.6 The inclusion of Solar panels will have no effect on this dwell time or indeed the current drainage scheme which continues to work as designed.

1.4.7 Vegetation such as trees, is routinely cleared from the site, as this may have an adverse impact on the integrity of the cap. Levels vary between approximately 245m and 250m Above Ordnance Datum (AOD).

1.4.8 Based on available data, the Agricultural Land Classification (ALC) across the whole site is Grade 3b, therefore the site is NOT best and most versatile land. In addition,

given the previous use of the site, the land is not suitable for agriculture, and this is part of the reason this site was identified as suitable for the solar scheme.

1.4.9 The proposed total capacity of the scheme is approximately 585kW and annual generation would be approximately 634MWh/yr. Due to funding, it is expected that an initial 200kW of solar will be installed in early 2025, this will provide the electricity required to supply Stori Brymbo, with the rest installed as funding becomes available, future proofing the energy needs of the Applicant.

1.4.10 The total size of the site is 1.3 hectares.

Amount and Scale

1.4.11 The overall area required for the proposed solar farm will be approximately 1.3ha, including the areas between the arrays, fencing, and the grid connection cabinet (see Figure 2 Site Layout for siting of the individual components).

1.4.12 The proposed installed capacity of the entire installation is 584kW, comprising approximately 1425 solar PV panels. In addition, there will be site cabling, a grid cabinet and a battery storage container. String inverters, attached to the underside of the solar arrays, will be connected back to the grid cabinet which in turn is connected to the local distribution network, via the Machine Shop.

1.4.13 The solar panels, mounting frames and inverter will be delivered to site in approximately 10 articulated lorry loads, which themselves will be staggered throughout the construction period. Ground-mount steel frames will be required for the panels, which will be anchored to the ground using piles (see Figure 4 for details of the mounting system).

1.4.14 The output of electricity to be generated is estimated at 634,542 kWh annually, which is equivalent to the annual domestic electricity requirements of annual offsetting of carbon dioxide emissions associated with fossil fuels equal to approximately 131327 Kg / Year.

Layout

1.4.15 An overriding factor in selecting an appropriate, viable development site for a solar scheme is the proximity to local electricity grid infrastructure with sufficient capacity to accommodate the electricity output from new generating plant, especially where such sites do not conflict with other land use protections.

1.4.16 Another important factor specific to this scheme is its nature as a community led project, meaning that the scheme needed to be in close proximity to the Machine Shop and Stori Brymbo.

1.4.17 In this context, potential sites with a viable grid connection are increasingly rare, as the distribution network has become saturated and as it adapts to the necessity for distributed, decarbonised generation.

1.4.18 Consultations with Scottish Power Energy Networks (SPEN) have identified that a connection for the solar scheme is viable, with the connection point at the Machine Shop.

1.4.19 Following site identification, the Applicant undertook a detailed review of site conditions and national environmental constraints to confirm that the Site not only demonstrated the requisite technical and commercial characteristics for viable development but also to ensure that the Site was absent of sensitive environmental, technical and amenity features that may be conflicted by new development.

1.4.20 Following landowner agreements to explore the solar scheme potential of the Site, the Applicant has conducted environmental surveys of the available landholding to inform the layout of a well-designed solar scheme that limits affects to other on-site land-uses and receptors.

1.4.21 A number of hard constraints were applied at the early stages of design, as follows:

- A requirement for the solar scheme to be located within the existing fence and ditch;
- Adequate distance from the High Voltage grid line to the west of the site;
- A 6m buffer from the outer fence to the solar arrays to minimise shading.

1.4.22 *Site Compound and Delivery Area:* Due to the requirement under the Construction Design and Management (CDM) Regulations 2015 for the provision of on-site welfare facilities, a cabin would be needed in the construction compound. This would have welfare facilities for construction workers and would be self-contained. No discharge of sewerage would be made to the surrounding land – all waste will be removed from site after being stored in the appropriate waste and recycling containers here. The temporary compound would be located on land under the control of Stori Brymbo, on existing hardstanding areas, therefore this is not included within the planning application boundary.

1.4.23 Further surveys, including Landscape and Visual Assessment, Ecology and Archaeology assessments were undertaken. These reports accompany the application.

1.4.24 A Drainage strategy for the site is already in place to handle all surface run. The inclusion of Solar panels will have no effect on this dwell time or indeed the current drainage scheme which will continue to work as designed.

1.4.25 The final design and layout is presented in Figure 2 and Figure 3.

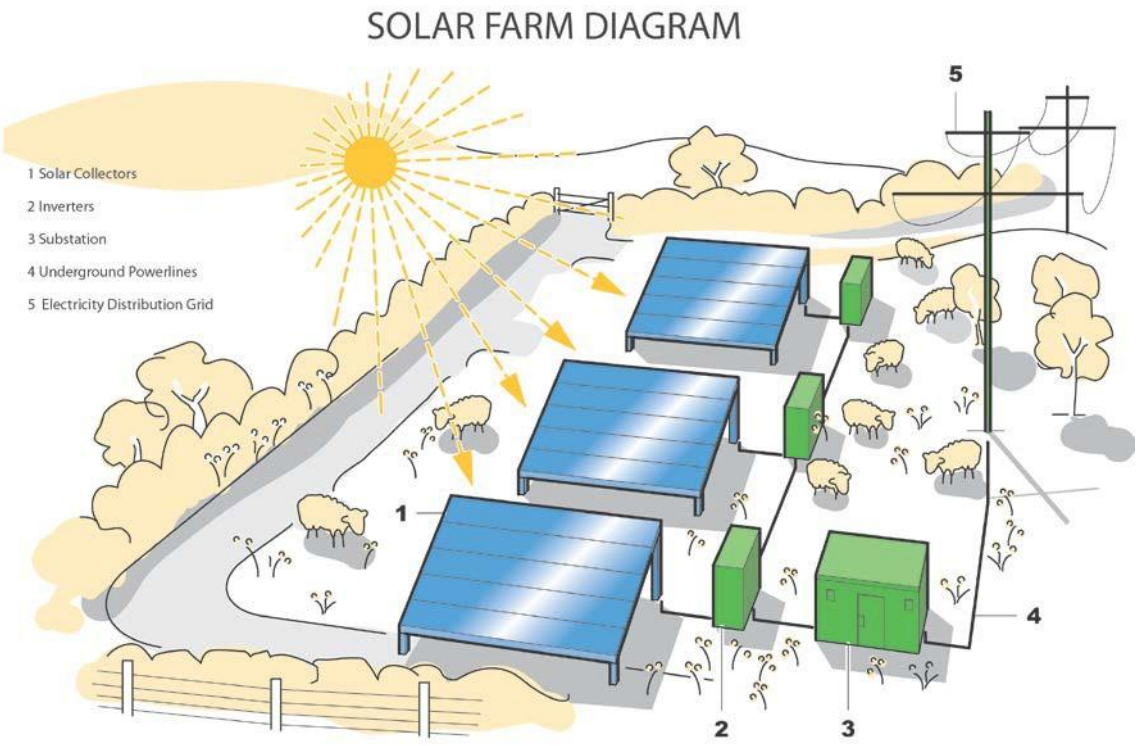
1.5 Scheme Design

Layout

1.5.1 The layout of the solar scheme has been designed to best harness the power of the sun's irradiation whilst ensuring that adequate separation distance is maintained between the arrays. The site was also designed within the existing fenced area, considering shading from the fence.

1.5.2 All panels will be south facing in order to maximise energy generation.

Plate 3: Typical Solar Arrangement



Landscaping and Appearance

1.5.3 A Landscape and Visual Appraisal (LVA) has been written by Viento Environmental to accompany the application.

1.5.4 The well vegetated nature of the landscape immediately surrounding the site as well as the low elevation of the solar panels within the array would limit the potential visibility of the proposal greatly. The visual analysis also indicates that fieldwork was unable to find any locations where the proposed solar array would be visible from publicly accessible points. Given the maturity and depth of tree cover surrounding the site, it is considered that this would also be the case in winter months.

1.5.5 Within this overall topographical arrangement, and given the fairly effective screening presence of hedgerows and individual trees, there is very restricted visibility of the Site from a publicly accessible areas, as confirmed in the LVA that accompanies the planning application.

1.5.6 The proposed development will not result in the removal of current landscape elements that contribute to landscape character, including hedgerows and trees.

Community Safety

1.5.7 It has been established that there will be no threat to community safety from the operation of the solar scheme as there are no mechanical moving parts accessible to the public. This is a private land holding with no public rights of way across the site, therefore access for the local community will be limited.

1.5.8 During construction, the principal contractor will have responsibility for implementation of the Applicant's health and safety requirements, which will include the safe management of the site and construction vehicles entering / leaving the site.

1.6 Environmental Sustainability

1.6.1 The purpose of the proposed scheme is to contribute towards the energy requirements of Stori Brymbo and hence reduce reliance on conventional forms of electricity generation. The scheme will therefore contribute towards the economic sustainability in the area.

1.6.2 The scheme would reduce the need for fossil fuel derived fuel and as such would contribute to reductions in greenhouse gases associated with such conventional generation. In addition to contributing to global measures to mitigate the effects of climate change, the scheme would also make a contribution to renewable energy targets in Wrexham.

1.6.3 As established through the reports accompanying the planning application, the scheme is not expected to not harm or adversely impact archaeological features, recreational assets such as rights of way, residential amenity or transport access.

1.6.4 The overall context of the proposed scheme has been considered by the applicant in making its decision on whether to proceed with a scheme at this site. It has been established that the social, economic and policy benefits will provide a significant benefit to the area without detriment to the local community or national interests.

1.6.5 Accordingly, the proposed scheme offers worthwhile benefits in the form of clean generation, community cohesion and economic generation without adversely affecting other environmental or planning aspects of the local area. As detailed further within the ecology report, enhancement and creation of habitats have been put forward as a Net Benefit for Biodiversity.

1.7 Access

1.7.1 For construction, access to the site will be via an existing entrance to the north west of the site. There is an existing track from this entrance into the site itself. An existing entrance into the fenced area will be utilised, so the existing gateway and track over the ditch can be used.

1.7.2 Where possible, deliveries will be planned to avoid peak traffic hours.

1.7.3 Overall, few modifications or improvements to existing site access arrangements will be required for the construction of the development.

Operational Movement to, from and within Development

1.7.4 Movement to, from and within the proposed development will be required for operational and maintenance purposes during the operational phase. It is anticipated that monthly visits will be required to the site to carry out inspections and any servicing required.

1.7.5 Vehicle movements associated with the operational period will be very minimal and will not affect highways movements or the safety of vehicle users.