

Aberedw Grid Connection

Routeing Alignment Report

September 2024

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Glossary

Term	Explanation
All Aluminium Alloy Conductor (AAAC)	A conductor is the part of an overhead line which transmits the electricity and looks like a long wire. The conductors proposed will be made from an aluminium alloy.
Amenity	The term “Amenity” is not defined in the Holford rules but is generally interpreted as designated areas of scenic, nature conservation, scientific, architectural or historical interest (SHETL, 2004).
Backclothing	Describes the careful use of topography and the surrounding context in the routeing process to reduce the visibility of an overhead line.
Biodiversity Net Gain (BNG)	An approach to development, and/or land management, that aims to leave the natural environment in a measurably better state than it was beforehand. The Environment Act (2021) sets a minimum of 10% net gain is acceptable for developments in England, this is calculated using the Defra Biodiversity Metric. In Wales, Biodiversity Enhancement is a requirement, but there is no threshold or metric
Carbon budget	A cumulative amount of carbon dioxide emissions permitted over a period of time to keep in line with a legally binding amount set by UK law.
Criterion / criteria	A standard or principle for judging, evaluation of, or selecting something.
Development of National Significance (DNS)	DNS are infrastructure development projects of national importance, and the majority of planning applications for DNS are decided by the Welsh Ministers. The DNS consenting process is specific to Wales, and includes bespoke requirements for pre-application consultation to take place later in the connection project development process.
Decommissioning phase	Activity to remove the development from the environment once it is no longer in operational use.
Deviation	In an overhead line context, this is where an overhead line moves away from a parallel alignment with another overhead line.
Electrical conductor	An object or type of material that allows the flow of charge (electric current) in one or more directions
Environmental Impact Assessment (EIA)	The process used for describing, analysing and evaluating the range of environmental effects that are caused by a proposed development.
Energy Park	An area used and planned for clean energy development.
Greenhouse Gas (GHG)	Greenhouse Gases are gases in the atmosphere which raise the temperature of the Earth.
Grid Connection	Either an overhead line or an underground cable used to transmit electricity.
Holford Rules	Established practice for routeing overhead lines in the UK.
Independent Distribution Network Operator (IDNO) licence	The Electricity Act 1989 imposes a statutory duty on IDNO licence holders to develop a grid network. The licence is obtained from Ofgem
kV	Kilovolt (one thousand volts)
Micro-siting	The process through which the specific location of wood poles is determined
Minor Roads	B Roads and C Roads
Mitigation Measure	A measure to avoid or reduce adverse effects.
National Electricity Transmission System (NETS)	The national high voltage electricity transmission system operated by National Grid.
National Grid	National Grid operate the national electricity transmission network across Great Britain and own and maintain the network in England and Wales, providing electricity supplies from generating stations to local distribution companies. It does not

Term	Explanation
	distribute electricity to individual premises, but its role in the wholesale market is vital to ensuring a reliable, secure and quality supply to all.
Net zero	The target of completely negating the amount of greenhouse gases produced by human activity.
Office of Gas and Electricity Markets (Ofgem)	Ofgem is a non-ministerial government department and an independent National Regulatory Authority, who regulates energy (gas and electricity) for Great Britain.
Overhead line	Comprise the wood poles and the suspended conductors (wires) used to transport electrical power.
Operation Phase	In the context of the project, the comprises standard operation after commissioning.
Ornithology	The scientific study of birds.
Planning Policy Wales (PPW)	This document sets out the Welsh Government's policies on different aspects of land use planning. Local planning authorities must take PPW into account in preparing their development plans and the guidance may also be material to decisions on individual planning applications and appeals within Wales.
Preferred Route	Following a comparative environmental review of Route Options, the route following technical evaluation which is taken forward to initial consultations.
Proposed Route	Following consultation regarding the Preferred Route, the route taken forward for environmental impact assessment.
Quantitative	Describing something in a numerical way in terms of quantity.
Reinstatement	The actions undertaken to return
Route Alignment	The Proposed Route as detailed and refined during the environmental impact assessment and technical engineering review process and submitted for development consent.
Route Options	Potential connection routes identified within the strategic Corridors for comparative environmental appraisal to determine the Preferred Route.
Safety clearance	Specified minimum safety clearances that must be maintained between overhead lines and the ground, obstacles, buildings, roads, railways and other power lines.
Screening (Environmental Impact Assessment (EIA))	Initial process by which project proposals are assessed to decide whether they require a formal Environmental Impact Assessment.
Site of Special Scientific Interest (SSSI)	UK protected nature conservation sites, designated for their wildlife or geological value, under the Wildlife and Countryside Act 1981 (as amended).
Span length	The distance usually measured horizontally between two wood poles.
Substation	Controls the voltage and direction of electricity. Transforming stations are used to increase the supply of electricity to 275kV or 400kV into the national grid system for transmission, and to reduce the voltage to lower levels to 132kV for distribution. Switching, controls the direction of electricity and ensures fault protection.
Underground Cables	One or more electricity circuits buried below ground in cable trenches or troughs.
Unviable	This term is used to describe when something is not possible.
Visual Amenity	Value of a particular area or view in terms of what is seen
Walkover survey	A basic site survey which provides an initial site assessment that highlights potential ecological issues or constraints to development such as the presence of protected species.
Wayleave	An agreement granted by the owner or occupier of land whereby transmission equipment is permitted to be installed on, over or under the land so owned or occupied in return for annual payments.

Chapter 1: Introduction

Purpose of the Report

- 1.1. This document has been prepared on behalf of Green Generation Energy Networks Cymru Limited (Green GEN Cymru). It relates to the identification and appraisal of route options for a new 132 kilovolt (kV) overhead line (OHL) supported on wood poles from Bute Energy's proposed Aberedw Energy Park to Green GEN Cymru's proposed Towy Usk switching station, hereafter referred to as the '*Aberedw Grid Connection*'.
- 1.2. Figure 1.1 shows the indicative location of the proposed Towy Usk Grid Connection switching station, the proposed Aberedw Energy Park red line boundary and the indicative energy park substation siting area.
- 1.3. This report presents the methodology used to identify the preferred route for the Aberedw Grid Connection and provides an overview of the routeing work completed to date, culminating with a description of the preferred route. This report also sets out the proposed method by which consultation is to be undertaken to obtain feedback from relevant stakeholders on the preferred route.

Who is Green GEN Cymru?

- 1.4. Green GEN Cymru and Bute Energy are both part of the Windward Energy Group. Green GEN Cymru is based in Wales and develops electricity grid projects – to help meet the future needs of people, communities and businesses, by taking renewable energy safely and securely from where it is generated and connecting it into our homes, hospitals, schools, businesses, and communities.
- 1.5. To allow it to distribute electricity, Green GEN Cymru has obtained an Independent Distribution Network Operator (IDNO) licence from Ofgem. The Electricity Act 1989 imposes a statutory duty on IDNO licence holders to develop a grid network which balances technical, economic, and environmental factors whilst having regard to the desirability of preserving the environment and doing what can reasonably be done to mitigate any affect the proposals may have on the natural environment.
- 1.6. Green GEN Cymru intends to design, build and operate the proposed 132kV distribution network needed to connect Aberedw Energy Park to the electricity transmission network, helping to get green energy to homes and businesses across Wales and beyond.
- 1.7. Green GEN Cymru, subject to appropriate planning consents, will construct and maintain the new electricity distribution network. Green GEN Cymru, as a licenced IDNO, is required to offer

connections to third party developments in line with the licence conditions.

- 1.8. Green GEN Cymru is playing a pivotal role in providing a reliable and robust distribution network that will support tackling the energy crisis and climate crisis. In addition to supplying electricity, the proposed grid network has the potential to support technologies like 5G that could help farmers, schools and businesses be at the cutting edge of technology while being based in rural areas.

Background and Needs Case

- 1.9. In 2008, the Climate Change Act 2008¹ entered into force in UK law. Section 1 of the 2008 Act, which was amended in 2019, requires the Secretary of State to ensure that the net UK carbon account for 2050 is at least 100% lower than the 1990 baseline. This is often referred to as the net zero target. The 2008 Act also requires the Secretary of State to set, at five year intervals beginning in 2008, legally binding carbon budgets, which place a restriction on the total amount of greenhouse gases the UK can emit over those five year periods. The underlying objective of these carbon budgets is to set a trajectory towards the achievement of the net zero target by 2050. The sixth carbon budget², which relates to the period 2033-2037, was made in 2021. The UK Government's October 2021 Net Zero Strategy³ sets out its policies and proposals for decarbonising all sectors of the UK economy in order to meet its net zero target by 2050.
- 1.10. The Environment (Wales) Act 2016⁴ also requires the Welsh Government to reduce greenhouse gas emissions (GGEs) in Wales to net zero for the year 2050, with a system of interim emissions targets and carbon budgets.
- 1.11. In April 2019, the Welsh Government declared a climate emergency. As part of its plan to tackle this emergency, the Welsh Government has brought forward policies to encourage innovative ways of creating energy that are sustainable, secure and cost effective. This includes Future Wales⁵ and the twelfth edition of Planning Policy Wales⁶. As part of these new policies, the Welsh Government has confirmed that *"in determining planning applications for renewable and low carbon energy development, decision makers must give significant weight to the need to meet Wales' international commitments and our target to generate 70% of consumed*

¹ Climate Change Act 2008: <https://legislation.gov.uk/ukpga/2008/27/contents>

² The Carbon Budget Order 2021: <https://www.legislation.gov.uk/uksi/2021/750/contents/made>

³ Net Zero Strategy: Build Back Greener (2021): <https://www.gov.uk/government/publications/net-zero-strategy>

⁴ Environment (Wales) Act 2016: <https://www.legislation.gov.uk/anaw/2016/3/contents>

⁵ Future Wales: The National Plan 2040: <https://www.gov.wales/future-wales-national-plan-2040>

⁶ Planning Policy Wales (Edition 12): <https://www.gov.wales/planning-policy-wales>

electricity by renewable means by 2030 in order to combat the climate emergency”.

- 1.12. In 2023, the Welsh Government set out a target for all (100%) of its electricity needs to be met from renewable resources by 2035⁷. This is an updated target on the previous target set in 2017 for 70% of all electricity in Wales to be generated by renewables by 2030.
- 1.13. The proposed Aberedw Energy Park comprises of the construction and operation of up to 18 wind turbines with a maximum blade tip height of up to 200 metres (m) and associated infrastructure, including access tracks and cabling. The Proposed Development will be a ‘Development of National Significance’ (DNS), as the wind turbines will have a combined installed capacity of greater than 10 megawatts (MW).
- 1.14. The proposed grid connection will provide a key opportunity to help to address the climate emergency in a timely manner by connecting the proposed strategic renewable energy generation hub to the existing grid network.
- 1.15. Operation of infrastructure at 132kV within England and Wales is classified as ‘electricity distribution’. These assets are in the main owned and operated by Distribution Network Operators (DNOs). However, in order to increase competition in the electricity distribution market, the Office of Gas and Electricity Markets (Ofgem), as the UK’s energy regulator, now licences Independent Distribution Network Operators (IDNOs). Once licenced by Ofgem, IDNOs are able to develop, operate and maintain electricity distribution networks. IDNOs connect their networks onwards into the local distribution network or transmission network.
- 1.16. Green GEN Cymru as an IDNO licence holder is able to move forward with its plans to design, develop and construct the most appropriate solution for connecting the proposed new energy parks, ensuring the best solutions for the local area. It also enables Green GEN Cymru to deliver efficient and reliable grid infrastructure, opening broader opportunities for connections in the future.
- 1.17. As with DNOs, an IDNO holds an electricity licence under Section 6(1)(c) of the Electricity Act 1989⁸. DNO and IDNO licences also share the same Standard Licence Conditions. This places specific requirements on an IDNO, including *“the development, maintenance, and operation of an efficient, co-ordinated, and economical system for the distribution of electricity”*.

⁷ Wales aims to meet 100% of its electricity needs from renewable sources by 2035:

<https://www.gov.wales/wales-aims-meet-100-its-electricity-needs-renewable-sources-2035>

⁸ Section 6(1)(c) of the Electricity Act 1989: <https://www.legislation.gov.uk/ukpga/1989/29/section/6>

- 1.18. As a licence holder, Green GEN Cymru is required to adhere to the Electricity Act 1989, including Schedule 9, which confirms that the licensee “*shall have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and shall do what he reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects*”.
- 1.19. As a Welsh-based company, and an IDNO licence holder, Green GEN Cymru is able to play a proactive role in the progression towards achieving Net Zero in Wales. Bute Energy Group will support the development of the proposed energy parks and, through the proposed connection to the National Electricity Transmission System (NETS) promoted by Green GEN Cymru, will also be able to support the efficient and timely connection of future renewable energy projects across Wales, demonstrating the benefits of the IDNO framework.

The Development and Consenting Process

- 1.20. This document reports on the routeing stage of the Aberedw Grid Connection, as described in the guidance document produced by ‘*Green GEN Cymru Approach to Routeing Grid Infrastructure in Wales*’⁹ in Stage 2B: Route Identification and Selection (available for review alongside this Routeing Alignment Report).
- 1.21. The routeing process is iterative in nature with the output of each stage informing the subsequent stages. However, feedback received from consultation and/or technical review can also result in earlier stages being repeated as necessary in an iterative manner.

The Developments of National Significance (DNS) Consenting Regime

- 1.22. The Aberedw Grid Connection will be a ‘*Development of National Significance*’ (DNS) according to the Planning (Wales) Act 2015. DNS are infrastructure development projects of national importance, and the majority of planning applications for DNS are decided by the Welsh Ministers. The DNS consenting process is specific to Wales, and includes bespoke requirements for pre-application consultation to take place later in the connection project development process.

⁹ Green GEN Cymru’s ‘*Approach.to.Routeing.Grid.Infrastructure.Across.England.and.Wales*’: A4_Approach+to+Routeing+Grid+Infrastructure+Across+England+and+Wales.pdf (d141qvydpnmd03.cloudfront.net)

Structure of the Report

1.23. This Routeing Alignment Report is structured as follows:

- **Chapter 2** introduces the proposed Aberedw Grid Connection;
- **Chapter 3** describes the overall methodological principles applied to the routeing stage of the connection project;
- **Chapter 4** describes the method used to identify and appraise route options;
- **Chapter 5** details the outcome of the route option appraisal process and describes the preferred route; and
- **Chapter 6** sets out the proposals for the consultation on the preferred route.

Chapter 2: The Proposed Grid Connection

Points of Connection

- 2.1. The purpose of the proposed new 132kV OHL, is to facilitate the connection to the Aberedw Energy Park to the grid network. On this basis the new 132kV OHL will start at the onsite substation for the Aberedw Energy Park. The Aberedw Energy Park is located in Powys, Mid Wales, approximately 3km east of Builth Wells (see Figure 1.1).
- 2.2. The application for consent for the onsite substation for the Energy Park will form part of the Energy Park DNS application, where its location and indicative design will be provided along with assessment of its environmental effects. This substation will not therefore be considered further in this report, however the indicative Aberedw Energy Park substation location (see Figure 1.1) forms the start point of connection for the Project
- 2.3. At the northern end of the route, the point of connection for the new 132kV OHL is the proposed switching station located north-east of Builth Wells at the foot of Aberedw Hill. This switching station is being proposed as part of the Towy Usk Grid Connection project and will not be considered further in this report, however the indicative Towy Usk switching station location (see Figure 1.1) forms the end point of connection for the Project.

OHL Infrastructure

- 2.4. The proposed OHL will be supported on wood poles, as shown in Figure 2.1. The OHL will be operated at a voltage of 132kV.
- 2.5. All Aluminium Alloy Conductors (AAAC) are proposed for the OHL. The connection will comprise a three-phase circuit without an earth wire but with the potential inclusion of an underslung communications wire.

Wood Pole Structure

- 2.6. The OHL will be supported on wood poles with galvanised steel cross-arms, appropriate to 132kV single circuit lines. Angle and terminal poles are stayed to balance loads acting on wood poles. Wood poles are made from pressure-treated softwood and preserved to maintain structural integrity.

Wood Pole Heights and Span Lengths

- 2.7. As with all OHLs, support heights and span lengths range, dictated by site specific constraints, topography, clearance requirements, support capacity and other factors.
- 2.8. Wood poles generally have a nominal height above ground of approximately 14 to 16 metres and nominal span lengths of approximately 110 metres.

Colouring of Wood Poles

- 2.9. Newly erected wood poles are generally a dark brown colour, which may discolour over time due to exposure to sunlight, rain, wind, moisture or other factors. Newly installed galvanised steel cross-arms have a shiny metallic finish, which dulls over time due to weathering.

Construction Works

- 2.10. In addition to the proposed wood poles, ancillary development will be required to facilitate the construction of the OHL. Ancillary development will include working areas around wood poles, temporary access tracks, access entrance upgrades or new entrances, winching/pulling areas and construction compounds/laydown areas. This ancillary development will be temporary and will be removed and the ground reinstated following completion of construction of the OHL.

Wood Pole Construction

- 2.11. The construction of the OHL will follow a well-established sequence of activities outlined below:
 - Felling of forestry (where required);
 - Preparation of accesses;
 - Excavation of foundations;
 - Delivery of poles;
 - Erection of poles and stays;
 - Delivery of conductors and stringing equipment;
 - Insulator and conductor erection and tensioning; and
 - Reinstatement.

Access

- 2.12. Prior to construction of the OHL, temporary access routes will be constructed, as needed, and laydown/storage areas set up.

- 2.13. Any trees which may have an impact on safety clearances will be removed or lopped. Following commissioning of the OHL, all equipment and temporary access of construction areas will be removed, with the land being reinstated.

Temporary Working

- 2.14. Temporary working areas will be required for the duration of construction works. There is a requirement for temporary vehicular access to every wood pole location.
- 2.15. Wood pole locations will have a working area of approximately 25m x 25m and could also extend to accommodate conductor pulling if required. In certain circumstances, the shape/size of the working area is controlled by the environmental/land-use constraints that are located nearby.
- 2.16. The temporary working areas will be returned and restored to former conditions following the completion of the construction works.

Operation and Maintenance

- 2.17. OHLs require periodic inspection and maintenance to ensure adequate levels of safety, reliability and efficiency are maintained over their lifespan.
- 2.18. The frequency of periodic inspections and maintenance activities may be influenced by environmental factors, exposure to the elements, or network planning requirements.
- 2.19. Any felled easement areas will also be managed to maintain the required clearances whilst the connection remains active. Walkover surveys or flyovers will identify where there is requirement to clear wayleaves of new growth.

Decommissioning

- 2.20. When the operational life¹⁰ of the proposed Aberedw Grid Connection ends, it is possible the OHL may be re-equipped with new conductors, insulators and refurbished. However, the OHL may also be decommissioned fully.

¹⁰ The operational life is 40 years, or when the operational life of the Aberedw Energy Park ends.

Chapter 3: Approach to Routeing

Introduction

- 3.1. This chapter provides an overview of the approach that Green GEN Cymru has undertaken to the routeing stage for the Aberedw Grid Connection. This stage is described as Stage 2b in the Approach to Routing Grid Infrastructure in Wales Guidance document.

Routeing Methodology

Overarching Approach to Routeing

- 3.2. A number of environmental and technical considerations are taken into account during the routeing process. The overall approach to routeing is based on the acknowledgement that the main effects of OHLs are visual, due particularly to scale of OHL wood poles relative to surrounding features within the landscape. As visual effects of OHLs cannot always be mitigated (for example via screening), careful routeing is the primary way in which visual effects may be minimised. Other environmental and technical constraints need to be taken into account alongside, and balanced with, visual effects.

The Holford Rules

- 3.3. It is generally accepted across the electricity industry that the guidelines developed by the late Lord Holford in 1959 for routeing OHLs (*'The Holford Rules'*) should continue to be employed as the basis for routeing high voltage OHLs. The Holford Rules were reviewed circa 1992 by the National Grid Company (NGC) Plc. (now National Grid Electricity Transmission Plc (NGT)) as owner and operator of the electricity transmission network in England and Wales, with notes of clarification being added to update the Rules. A subsequent review of the Holford Rules (and NGC clarification notes) was undertaken by ScottishHydro Electric Transmission Limited (SHETL) in 2003.
- 3.4. The Holford Rules are presented in Table 3.1. These guidelines for the routeing of new high voltage overhead lines provide the basis for the approach that has been taken to routeing of the Aberedw Grid Connection. Key principles of the Holford Rules include avoiding prominent ridges and skylines; following broad wooded valleys;

avoiding settlements and residential properties; and maximising opportunities for ‘backclothing’¹¹ and the screening of infrastructure.

- 3.5. The methodology is also informed by Green GEN Cymru and LUC experience of routeing OHLs and relevant national and local planning policy and guidance.
- 3.6. The routeing process can be represented in a simplified form as linear with the findings of each step informing the next step as the routeing design is progressively refined based on increasingly detailed assessment. However, in practice the process is iterative, due particularly to the consideration of the results of consultation at various individual steps. The iterative approach enables the validity of previously applied assumptions to be confirmed and ensures confidence in the findings of individual steps in the routeing process before subsequent steps begin.
- 3.7. Application of the routeing methodology, including the findings are set out in Chapter 4 and Chapter 5, culminating in the confirmation of the preferred route in Chapter 5.

Table 3.1: The Holford Rules

The Holford Rules
Rule 1: <i>Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the first line in the first place, even if the total mileage is somewhat increased in consequence.</i>
Rule 2: <i>Avoid smaller areas of high amenity value, or scientific interests by deviation; provided that this can be done without using too many angle poles, i.e. the more massive structures which are used when lines change direction.</i>
Rule 3: <i>Other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle poles.</i>
Rule 4: <i>Choose tree and hill backgrounds in preference to sky backgrounds wherever possible; and when the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.</i>
Rule 5: <i>Prefer moderately open valleys with woods where the apparent height of poles will be reduced, and views of the line will be broken by trees.</i>

¹¹ The term ‘backclothing’ means: the careful use of topography and surrounding context in the routeing process to reduce the visibility of an overhead line.

The Holford Rules

Rule 6: *In country which is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration or 'wirescape'.*

Rule 7: *Approach urban area through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of the undergrounding, for lines other than those of the highest voltage.*

Overview of Routeing Process

Study Area

- 3.8. A study area is first defined, which is large enough to accommodate all likely route options, taking account of the technical requirements (i.e. connection points) and factors such as topography. Baseline mapping of the routeing considerations outlined below then enables routeing constraints and opportunities to be identified.

Environmental Considerations

- 3.9. Statutory duties imposed by Section 38 and Schedule 9 of the Electricity Act 1989 require licence holders to seek to preserve features of natural and cultural heritage interest, and to mitigate where possible, any effects which their proposals may have on such features. The construction and operation of an OHL will have potential effects on people and the environment, including potential effects on (in no hierarchical order):
- Landscape and visual amenity (including recreation and tourism);
 - Cultural heritage (including archaeology);
 - Biodiversity (including ecology and ornithology designations);
 - Forestry and woodland (including areas of ancient woodland and native woodland);
 - Hydrology, hydrogeology, peat and water resources; and
 - Planning and land uses (including agriculture).
- 3.10. Some effects can be avoided or limited through careful routeing. Other effects are best mitigated through local deviations of the route, the micro-siting of wood pole locations and mitigation measures deployed during construction. These are reviewed as part of the ongoing design and environmental appraisal process.

- 3.11. There are other topics such as traffic and transport, noise and air quality that could be considered during the EIA/environmental appraisal stage of the development and consenting process but are not included within this document as they are not considered to materially influence the routing stage.

Technical and Engineering Considerations

- 3.12. In addition to environmental considerations, technical and engineering considerations also influence the alignment, pole positions, span lengths, pole heights, etc. Technical considerations include the existing electricity network, access requirements, slope gradient, altitude, waterbodies, and the presence of wind turbines and wind farms. The technical appraisal findings are in Appendix C.

Economic Considerations

- 3.13. Section 9 of the Electricity Act 1989, states that *"It shall be the duty of an electricity distributor... to develop and maintain an efficient, co-ordinated and economical system of electricity distribution..."* This duty has been interpreted by Green GEN Cymru to mean that, as far as is reasonably practicable, and all other concerns being equal, the proposed OHL should be as direct as possible and the route should avoid areas which would render the scheme unviable on economic grounds.

Identification and Appraisal of Route Options

- 3.14. The Approach to Routing Grid Infrastructure in Wales document refers to using for example 200m width route options, which is not a prescriptive width and therefore the route options can be narrower or wider, dependent on the technology that is being proposed or at selected locations in response to identified pinch points or constraints.
- 3.15. The route options identified for Aberedw have a width of 100m to allow scope for further refinement of routing and wood pole locations during subsequent stages of the development process. In refining the wood pole locations, this 100m width is not a hard boundary and can be increased to ensure the best possible design solution for the OHL.
- 3.16. The appraisal of route options includes balancing of the environmental considerations, with this resulting in identification of an *'emerging preferred route'*. A technical appraisal is also undertaken, which may result in further modifications to the emerging preferred route (Appendix C of this report).
- 3.17. Following the identification of the preferred route, a desk-based exercise is undertaken to identify where indicative wood pole positions could be located. These have been included within this

Routeing Alignment Report (Figures 5.2 and 5.3) for the purposes of consultation, however these are subject to further detailed survey work.

Review of Preferred Route Post-Consultation and Confirmation of Proposed Route

3.18. Following consultation with stakeholders, including landowners and the community, and a careful review of all the feedback received, the preferred route will be reviewed and may be refined further to take account of feedback. Site surveys will also take place following consultation. This process results in confirmation of a proposed route for the purposes of progression to EIA screening or scoping. Statutory consultation on a detailed route alignment for the project, including locations for poles and for any ancillary development required such as temporary construction access tracks, laydown areas and construction compounds will also take place during the pre-application stage.

Chapter 4: Route Option Identification and Selection of Preferred Route

GIS Mapping and Identification of Route Options

- 4.1. The purpose of identifying route options is to allow comparison between alternative route options to identify a preferred route without having to develop detailed design proposals for each.
- 4.2. The aim of this stage was to define a proportionate number of route options for comparative appraisal against environmental and technical constraints. It is noted that the appraisal process may lead to route options being amended or combined as part of the iterative routing process. Three route options were identified between the two connection points and defined as having a width of 100m to allow for detailed design of the OHL alignment in subsequent development stages. The 100m width of each route option is a flexible boundary and can be increased when refining the alignment of the wood poles to ensure avoidance/minimisation of effects on the environment. The three route options are shown in Figures 4.1.1 to 4.1.3.
- 4.3. Reflecting guidance within the Holford Rules and planning policy, the presence of the following environmental routing considerations was used to inform the identification of route options, as shown on Figure 4.2:
 - Environment (Wales) Act 2016 Priority Habitats;
 - Residential properties (including a 150m buffer);
 - Scheduled Monuments;
 - Listed Buildings;
 - Non-Designated Heritage Assets;
 - Ancient Woodland;
 - National Forest Inventory (NFI); and
 - Watercourses and water bodies.
- 4.4. These constraints were avoided and/or interactions with them minimised where possible. Other potential constraints were mapped at this stage and considered within the route option identification process, without being considered necessarily as absolute constraints for the purposes of route option identification. These included flood risk zones, private water supplies (PWS), peat, and common land.

- 4.5. The route identification process reflected the Holford Rules, taking account of the environmental constraints listed above, topography/gradient; existing physical features and infrastructure (e.g. the presence of roads, buildings, and existing utilities); and technical and engineering considerations, including design parameters, to identify the most direct route possible.
- 4.6. Following a desk-based mapping exercise to define potential route options based on the environmental and technical constraints, site visits were undertaken by LUC's landscape planning team in February 2024 to further refine the potential route options for taking forward to the appraisal stage.

Appraisal of Route Options

Environmental Appraisal

- 4.7. The objective of the environmental appraisal of the route options was to identify a preferred route based on a transparent assessment of the options against a range of environmental considerations. These considerations needed to be sufficiently comprehensive whilst also being proportionate to the geographical scale of analysis and the degree of flexibility that would apply to any preferred route (i.e. with respect to detailed future siting of infrastructure) later in the development process.
- 4.8. The appraisal of route options was undertaken against a series of topic-based criteria comprising more detailed sub-criteria. These are set out in Table 4.1 below. Discrete objectives were also identified for each criterion and applied to appraise the route options.
- 4.9. The detail of the appraisal method varied by criterion. A full list of criteria, sub-criteria and objectives, together with a description of the appraisal methodology applied for each criterion, is provided in Appendix A. Where there was no potential interaction between individual sub-criteria and route options, these sub-criteria are not referenced in the appraisal tables.
- 4.10. The appraisal for each topic-based criterion included:
 - A professional judgement of the preferred route option by individual sub-criterion, with the objective of avoiding/minimising likely significant effects; and
 - A professional judgement of the preferred route option for the topic-based criterion overall, based on the balance of all sub-criteria for that topic.
- 4.11. The environmental appraisal findings are set out in Appendix B and supported by Figures 4.3 to 4.7 which show the environmental constraints as separate technical topics against the three route options.

Table 4.1: Summary of route option appraisal criteria and sub-criteria

Criterion	Sub-criterion	Figure
Approximate Length of Route Option	N/A	N/A
Biodiversity	<ul style="list-style-type: none"> • Special Areas of Conservation (SAC) • Sites of Special Scientific Interest (SSSI) • Environment (Wales) Act 2016 Priority Habitats 	Figure 4.3
Landscape Sensitivity and Visual Amenity	<ul style="list-style-type: none"> • LANDMAP areas with 'outstanding' or 'high' evaluations • Powys Landscape Character Areas • Analysis of Landscape Character¹² • Visual amenity from residential properties (Residential Visual Amenity) • Views from tourism and recreation sites and routes (including promoted viewpoints, cycle routes, public rights of way (PRoWs) and tourist attractions) • Visual amenity from transport routes i.e. public roads (including roads used by tourists) and railways 	Figure 4.4
Historic Environment	<ul style="list-style-type: none"> • Scheduled Monuments (SM) • Listed Buildings (Grades I, II*, II) • Non-designated historic assets including archaeological remains, structures and historic landscape areas/components 	Figure 4.5
Forestry and Woodland	<ul style="list-style-type: none"> • Ancient Woodland Inventory (AWI) 	Figure 4.6

¹² Since completion of the routeing and appraisal work, the Powys Landscape Character Assessment (2022) has been published by Powys County Council. This document provides updated evidence relating to landscape character, but does not supersede the site-specific analysis of landscape character undertaken to inform the routeing and appraisal.

Criterion	Sub-criterion	Figure
	<ul style="list-style-type: none"> Commercial conifer and other woodlands as identifies in the National Forestry Inventory (NFI) 	
Hydrology (including Flood Risk), Hydrogeology and Geology	<ul style="list-style-type: none"> Flood risk zones Waterbodies/watercourses Peat Geomorphology, historic mining and ground stability Private Water Supplies (PWS) 	Figure 4.7
Land Use	<ul style="list-style-type: none"> Infrastructure (existing OHL infrastructure, existing gas infrastructure, existing road (A roads and trunk roads), rail infrastructure and existing, consented or proposed wind energy developments) Local Development Plan (LDP) Allocations Common Land 	Figure 4.8

Determining the Overall Preferred Route Option

4.12. The final stage in the environmental appraisal of route options was identification of a '*preferred route option*' in environmental terms.

4.13. The decision-making process concerning the overall route preference involved making a professional judgement concerning the preferred route option in cases where preferences by topic-based criterion differed. This involved the consideration of the following questions:

- Can constraints be avoided through spanning or mitigated through detailed wood pole siting?** Whether constraints and associated significant effects can be avoided or reduced during wood pole siting, or if effects in relation to these constraints could potentially be mitigated. Considerations such as the scale over which unavoidable effects might occur were also taken into account. For example, landscape and visual effects may be experienced over large geographical scales and affect large numbers of people, and often cannot be avoided through wood pole siting. Considerations of this kind needed to be balanced, where appropriate, against the protection given to various

environmental features in principle via policy (for example ancient woodland).

- **What is the degree of preference for each environmental topic between each of the different route options?**

Consideration was needed of the degree of preference between different route options, as reflected in the appraisal text and whether any of the preferences were marginal.

- **If unavoidable, which environmental constraint would be impacted most?** Where conflicts could not be addressed via avoidance of constraint or other mitigation, the weighting and balancing of differing preferences were undertaken on the basis of professional judgement.

- **Would avoiding one criterion impact another criterion?**

Where the avoidance of one criterion might lead to impacting other criteria (and therefore the one criterion could not in fact be avoided in practice at the detailed routeing stage) professional judgement was used. This might include locations, for example, where avoiding an area of ancient woodland would involve encroaching on an area of peat. If conflicts of this kind were identified, a professional judgement was applied concerning the relative weight to be given to the differing constraints involved. This included consideration of the possibility of mitigating environmental effects by other means than avoiding the constraint through wood pole siting.

4.14. Professional judgements were informed by a workshop, allowing further clarification of the degree of preference between different route options and its basis, and the prospect of mitigating potential impacts via detailed design (including where conflicting constraints were present).

4.15. Whilst appraisals for individual criteria contained quantitative elements e.g. hectareage of a constraint present within the route option, the overall approach to decision-making concerning the route preference on environmental grounds was qualitative and based on professional judgement.

Technical Review

4.16. A technical review of the route options was also undertaken by Green GEN Cymru. Further information on this technical review is detailed in Chapter 5 and in Appendix C.

Chapter 5: Route Options

Appraisal Findings

Identification of a Preferred Route

- 5.1. The environmental appraisal table for the Aberedw three route options (as shown in Figure 4.1) is presented in Appendix B with all the environmental constraints for each of the three route options shown on Figure 4.2. This includes an environmental-led summary of the overall conclusions on emerging route preference. Figures 4.3 to 4.7 show the route options in relation to key environmental constraints, set out by environmental topic, that were taken into account during the environmental appraisal.
- 5.2. A technical appraisal table for the Aberedw three route options is presented in Appendix C.
- 5.3. A summary of the emerging route preference and key judgements reflecting the balancing and decision making made using professional judgement that informed this preference is provided below.

Environmental Appraisal

- 5.4. Route Option A is the shortest route option.
- 5.5. Route Options B and C are slightly preferred from a biodiversity perspective due to the absence of Priority Habitats (see Figure 4.3). However, for Route Option A wood poles could be positioned to avoid direct impacts to Priority Habitat via oversailing or detailed wood pole siting.
- 5.6. In relation to the landscape and visual criteria (see Figure 4.4), there is a marginal preference for Route Option A on the basis of LANDMAP. On landscape character and Residential Visual Amenity there is no preference as all routes would have similar adverse impacts. There is a marginal preference for Route Option A and B in relation to tourism and recreation, and a marginal preference for Route Option C in relation to views from roads. Overall, no clear preference has been identified on landscape and visual grounds, as adverse impacts on landscape character and views are likely to be similar for all three route options.
- 5.7. Route Options A and B are preferred on cultural heritage grounds (see Figure 4.5), as they have fewest interactions with designated assets which could lead to harm.
- 5.8. Route Option A is the marginally preferred route option in relation to forestry and woodland (see Figure 4.6) as all woodland can be avoided.

- 5.9. Route Option A is the preferred route option in relation to land use, as the route does not cross any overhead lines and interacts with the second smallest amount of common land.
- 5.10. Route Option A is the preferred route option in relation to flood risk (see Figure 4.7) due to limited interacting with floodplains, peat and PWS. However, Route Options B and C are preferred in relation to historic mining as they are not located above a historic mine entry.
- 5.11. On balance, from the environmental appraisal (see Figure 4.2 for all the constraints against the three route options), Route Option A is preferred as it is the shortest route option, has the fewest interactions with designated heritage assets which could lead to harm; does not cross any existing OHLs and interacts with a limited amount of common land; and avoids impacts on forestry and woodland; and has limited Flood Risk, impacts on peatland habitat and PWS. However, avoiding direct impact to Priority Habitat via oversailing or detailed pole siting will form a key consideration at the detailed alignment stage.

Technical Review

- 5.12. A high-level technical appraisal of the three route options was undertaken, and the findings provided in Appendix C. The conclusion of this appraisal is, in summary, that Route Option A is the engineering preference as the option offers a shorter, more direct route with no apparent OHL crossings. Though all route options are deemed to be technically feasible, from the desk-based work undertaken to date.

Confirmation of the Preferred Route Option

- 5.13. In conclusion, the overall route preference is Route Option A (see Figures 5.1 and 5.2) as it would result in the least impact on the environment and is considered technically viable.
- 5.14. An initial wood pole OHL alignment has been developed for preferred Route Option A which is shown in Figure 5.3. This has been based on a desk-based assessment only and further site survey assessment work (including detailed ground survey) will need to inform the final wood pole positions. Furthermore, the refinement of the proposed switching station location and layout as part of the Towy Usk Grid Connection will also inform the wood pole siting of the Aberedw Grid Connection alignment. Therefore, the initial draft alignment is indicative at this stage and subject to change following surveys, the consideration of consultation feedback, and the finalisation of the switching station location.

Chapter 6: Consultation Process and Next Steps

The Consultation Process

The Consultation Strategy

- 6.1. Planning and Environment Decisions Wales ('PEDW') has set out its expectations for public consultation and engagement on infrastructure projects in its document Pre-Application Community Consultation: Best Practice Guidance for Developers (December 2021)¹³, in which Section 3.1 states "*The challenge is for a developer to consult widely and clearly to capture a balanced and informed response. When executed well, engagement should increase the level of transparency, develop relationships, and shape the project by considering and responding to feedback*".
- 6.2. As a company based in Wales, and investing in Wales, Green GEN Cymru attaches great importance to the effect that its work may have on the environment and local communities in Wales. Green GEN Cymru is committed to providing clear and up-to-date information on its proposals, and listening to local people and consulting them at each stage where their views can help to shape Green GEN Cymru's proposals before a consent application is submitted.
- 6.3. Green GEN Cymru recognises that finding a route for the Aberedw Grid Connection is a complex process, and its consultation strategy goes beyond the PEDW good practice guidance to ensure that local people have the opportunity to comment at each stage of the routing process. Therefore, two rounds of pre-application consultation will be carried out, as follows:
 - Stage One: Non-statutory public consultation on the preferred route for the Aberedw Grid Connection, during Autumn 2024.
 - Stage Two: Statutory public consultation on the proposed DNS application for the Aberedw Grid Connection, including proposed wood pole locations, temporary access routes, working areas, and construction works expected in Autumn 2026.
- 6.4. Following submission of the consent application, PEDW will carry out further statutory consultation with the public and stakeholders before making any decisions on the plans.

¹³ Welsh Government (2021) Pre-application Community Consultation: Best Practice Guidance for Developers: <https://www.gov.wales/sites/default/files/publications/2021-12/planning-major-developments-guidance-on-pre-application-consultation.pdf>

- 6.5. The overall objective of the consultation process is to ensure that all parties with an interest in the project have access to up-to-date information and are given clear and easy ways in which to comment, so they can help to shape and inform Green GEN Cymru's proposals at the pre-application stage.
- 6.6. The key issues identified through the pre-Scoping consultation process will be recorded and presented to decision makers in the Consultation Report to be submitted with the DNS application.
- 6.7. To ensure that all residents and stakeholders potentially affected by the proposals are consulted, Green GEN Cymru has defined a consultation zone. In considering the consultation zone for the Aberedw Grid Connection, Green GEN Cymru has also taken into account its proposed Bryn Gilwern Grid Connection as both will connect to the local network at the same location.
- 6.8. These are two separate projects, requiring individual applications to PEDW, but they are being consulted on together due to their shared connection point.
- 6.9. To ensure that all residents and stakeholders potentially affected by the proposed connections are consulted, a combined consultation zone has been defined. The consultation zone includes all residential and business addresses within 100 metres of the preferred routing corridors and extends up to 3 kilometres on either side of the outermost route options for both projects.
- 6.10. Where the boundary of the zone may bisect a community, it will be extended to include the whole settlement. However, any member of the public (whether living within or outside the consultation zone) is welcome to participate in the consultation, attend an event, or provide feedback through any of the channels outlined within this document.
- 6.11. The consultation will include the following broad groups:
 - Statutory and non-statutory consultees, including PEDW, community councils, Natural Resources Wales (NRW), Cadw, archaeological trusts and local planning authority (Powys County Council);
 - Approximately 750 homes and businesses in the combined consultation zone;
 - Known local interest and community groups operating in the area affected by the proposals;
 - Elected members of Powys County Council, Members of the Senedd (MSs) and Members of Parliament (MPs) whose constituencies are within the consultation zone; and
 - The public in general.

6.12. Green GEN Cymru will also consult fully with affected landowners and occupiers, who will have an ongoing opportunity to comment on proposals as they progress.

6.13. Details of the consultation process are set out below.

Consultation Dates and Duration

6.14. The consultation will run for six weeks, from Wednesday 11 September to Wednesday 23 October 2024.

6.15. Prior to the start of consultation, adverts will appear in local weekly newspapers promoting the consultation events and explaining where to find information and how to take part. A news release will be issued to local media announcing the impending start of the consultation. Information leaflets explaining the project and the consultation will be posted to homes, businesses, and known local interest and community groups within the local area making them aware of the start of the consultation and inviting them to take part. Other stakeholder groups will also be contacted directly, informed and invited to take part.

6.16. The closing date for sending responses to Green GEN Cymru will be Wednesday 23 October 2024.

6.17. Following this date, the information will remain accessible online on the project website and available to download from www.greengenaberedw.com.

The Focus of the First Round of Consultation

6.18. This report presents the outcome of the routeing stage of the Aberedw Grid Connection, resulting in the identification of a preferred route.

6.19. The focus of the first round of consultation will be to invite people to provide their views on:

- The preferred route and indicative wood pole positions;
- Any of the alternative route options considered during the appraisal process; and
- Any other issues, suggestions or feedback; particularly views on the local area (for example, areas used for recreation, local environmental features, and any plans to build along the OHL route).

Sources of Information about the Consultation

Project Website

6.20. The project website will be accessible via the following link and will contain publicly available consultation documents available for

viewing or download, and an online feedback form. The feedback form will be available from Wednesday 11 September until the deadline for receipt of feedback at 11.59 on Wednesday 23 October 2024.

- www.greenenaberedw.com

Project Leaflet

6.21. The project leaflet will be posted to every home and business in the consultation zone (within 3km of the outermost route option). It will include details of the scheme, the consultation process, how to find out more and how to submit comments by feedback form, website, post or email, and by when.

How People can make Comments

6.22. There will be a number of ways for people to make comments:

- In person at a consultation event;
- Online, using the feedback form on the website www.greenenaberedw.com;
- By post, using a paper feedback form, or by letter to FREEPOST GREEN GEN ABEREDW;
- By email to the project email address info@greenenaberedw.com; or
- By phone to the project contact centre Freephone number 0800 0129 884.

In Person

6.23. Green GEN Cymru will hold three public consultation exhibitions within the local area where people can view project maps and documents, talk to members of the project team and pick up a feedback form and FREEPOST envelopes.

6.24. Locations have been chosen so that people within the consultation zone are only a short distance from their nearest exhibition by car or public transport. The dates and venues are listed in full in the project leaflet and on the website. The format will be an afternoon/evening drop-in.

6.25. The exhibitions will be held at the following locations at the dates and times stated:

- Thursday 26 September 2024, 2pm to 7pm: Howey Village Hall.
- Friday 27 September 2024, 2pm to 7pm: Hundred House Village Hall.
- Saturday 28 September 2024, 10.30am to 3.30pm: Aberedw Church Hall.

Online

6.26. People will be able to make comments online at www.greengenaberedw.com using an interactive online version of the feedback form, which will be available until 11.59 on Wednesday 23 October 2024.

By Post

6.27. A hard-copy feedback form will be available at public exhibitions, for download from the website, by request to the project contact centre on 0800 0129 884 or by email to info@greengenaberedw.com.

6.28. Completed forms must be returned to FREEPOST GREEN GEN ABEREDW by 11.59 on Wednesday 23 October 2024.

By Email

6.29. Green GEN Cymru will also accept consultation responses by e-mail to info@greengenaberedw.com by 11.59 on Wednesday 23 October 2024.

By Phone

6.30. Green GEN Cymru prefers to receive comments in writing as this helps avoid the risk of misinterpretation. However, where no other means are available, people can comment via phone call free on 0800 0129 884. The project contact centre is open Monday to Friday (except bank holidays) between the hours of 9am and 5.30pm. There is a voicemail facility outside of these hours where people can leave messages.

After the Consultation

6.31. The responses received in the first round of consultation will be evaluated by Green GEN Cymru and reported back in the form of a Consultation Summary Report. Although Green GEN Cymru may not be able to respond to all individual comments, people will be able to request to be informed by email as and when there are project developments, such as the availability of the Consultation Summary Report.

6.32. People interested in being kept informed in this way can register on the website or send their email address to info@greengenaberedw.com.

Next Steps: Route Alignment and EIA Screening/Scoping

6.33. The responses received from the consultation process will be considered in combination with the findings of the environmental and technical work undertaken to date and the findings of various

environmental and technical surveys following their completion, as well as feedback from landowners. Green GEN will revise the alignment, resulting in a 'proposed' alignment that will be progressed to the next stage in the development process.

- 6.34. The wood pole locations will be revised through the design process as further environmental, technical, and landowner information becomes available and the alignment, including all ancillary development will be included in the application to PEDW for planning permission.
- 6.35. Green GEN Cymru intends to consult fully with affected landowners and occupiers on all aspects of the Aberedw Grid Connection and will give them opportunity to comment on the proposals as they progress. This will include the statutory consultation on the alignment.

Appendix A: Routeing Methodology

Table A.1: Routeing methodology

Criterion	Sub-criteria	Objectives	Methodology
Length of Route Option	N/A	<ul style="list-style-type: none"> To choose the shortest and most direct route. 	<p>Holford Rule 3 states "other things being equal, choose the most direct line". Although this rule primarily relates to avoiding sharp changes in direction, and therefore the need for more visually intrusive angle towers, choosing the most direct route may result in fewer adverse effects than a longer, less direct route (taking due consideration of other constraints). The length of the centre line of each route option is calculated using Geographical Information Systems (GIS).</p>
Biodiversity	<ul style="list-style-type: none"> Special Areas of Conservation (SAC) Sites of Special Scientific Interest (SSSI) Local Nature Reserves Wildlife Reserves managed by Radnorshire Wildlife Trust Environment (Wales) Act 2016 Priority Habitats Local Wildlife Sites/Sites of Nature Conservation Importance/Designated Road Verges 	<ul style="list-style-type: none"> To seek to avoid/minimise, as far as practical, effects on the qualifying features of designated sites of ecological and ornithological conservation importance and priority habitats. 	<p>Physical effects on designated sites and priority habitats are identified based on the size/location of the designated sites/habitats within or overlapping the route option, reflecting the potential to avoid locating the towers supporting the overhead line (OHL) within the designated site at the detailed design stage. Where a site cannot be avoided due to its size or geographic location, the general preference is to route through the larger site as this is likely to be able to accommodate an OHL more readily than a smaller site (due to the smaller proportion of the overall site area that the OHL would affect). The qualifying features of the site and the nature of any potential effects on these qualifying features are also considered when determining preference.</p> <p>The appraisal considers the distance of the route options to ecological designations and their qualifying features and identifies a route preference taking into account distance from the designated areas. Where possible, the connectivity and pathways for impact (e.g. via watercourse or functionally-linked habitat) are also considered with the routes, with the lowest potential for pathway-related effects on designations being preferred. Where designated sites with non-avian qualifying species are located within 1km of a route option, these are considered within the appraisal. The habitats and species within the designation are considered, as well as any functional ecological connectivity to the route option and the likelihood of effects on the species' metapopulations within and beyond the boundaries of the designated sites.</p> <p>Local Nature Reserves and Wildlife Reserves managed by Radnorshire Wildlife Trust are considered within 1km of the route options. Powys County Council has designated LWS/SINCs.</p> <p>An ornithological 'trigger for consideration' zone of 2km is applied around designations for which birds are a qualifying feature including Colwyn Brook Marshes North and South SSSI, River Wye/Afon Gwy SAC & SSSI) . This 2km zone is used to select designations to consider within the appraisal with respect to ornithology. A 2km zone is applied because bird species that are qualifying features of designated sites are likely to be reliant on habitats adjacent to, but outside the designated site boundaries: for example, for foraging, and in some cases for nesting. Hence, the presence of a route within a 2km 'trigger for consideration' zone may present a risk of disturbance and collision for individuals of these species, and the risk is considered to be proportionate to the length of the route which intersects with the 2km zone. The appraisal states the length of route which intersects with the 'trigger for consideration zone' and considers whether this zone</p>

Criterion	Sub-criteria	Objectives	Methodology
			<p>can be avoided during the alignment stage and/or whether suitable mitigation can be implemented during construction.</p> <p>Priority Habitats, listed under the Environment (Wales) Act 2016, Section 7 (Habitats of Principal Importance for the Purpose of Maintaining and Enhancing Biodiversity in Relation to Wales), are considered within 1km of the route option. It is recognised that the Priority Habitat data available from NRW is incomplete and mapped at a range of scales and resolutions; therefore, the data set is not considered a full and comprehensive source of Priority Habitat data. As far as possible, hydrology and forestry data sets are reviewed as they indicate the presence of Priority Habitats such as peat, open water and woodland. The appraisal considers the level of sensitivity of the Priority Habitat, the species this habitat is likely to support, and its distance from/degree of overlap with the route option. Ancient Woodland would also be considered within this category.</p> <p>Other species such as breeding Schedule 1 birds (outwith the boundaries of designated sites), European Protected Species (such as otters) and other nationally protected species (such as water vole and badger) will be considered during the detailed alignment and subsequent appraisal/assessment stage, informed by the findings of field surveys.</p> <p>The absence of an ecological feature from the datasets cannot be taken to represent actual absence. Habitat distribution patterns should be interpreted with caution as they may reflect survey/reporting effort rather than actual distribution.</p>
Landscape Sensitivity and Visual Amenity	<ul style="list-style-type: none"> • LANDMAP areas with 'outstanding' or 'high' evaluations • Powys Landscape Character Areas • Analysis of landscape character • Visual amenity from residential properties (Residential Visual Amenity) • Views from tourism and recreation sites and routes (including promoted viewpoints, cycle routes, Public Rights of Way (PRoW), and tourist attractions) • Visual amenity from transport routes i.e. public 	<ul style="list-style-type: none"> • To seek a positive fit between the OHL and the receiving landscape, informed by landscape character, and assessment of landscape and visual sensitivity and value. • Avoidance/minimisation, as far as practicable, of potential effects on views from residential receptors. • Avoidance/minimisation, as far as practicable, of potential effects on sensitive views from roads, cycle routes, PRoW, informal recreational areas and tourism features. 	<p>A study area of 1km has been applied for the Landscape Sensitivity and Visual Amenity Assessment.</p> <p>LANDMAP areas with overall 'outstanding' or 'high' evaluation are considered areas of relative higher landscape value. The length of each route within these areas is calculated using GIS and routes that minimise the length of OHL within such areas are favoured.</p> <p>Reflecting Holford Rules 4, 5 and 6, the appraisal considers aspects of landscape character including landform and the pattern or 'grain' of the landscape (e.g. in terms of topography or field boundaries). In all areas, routing should seek a positive fit between the type and scale of OHL and the receiving landscape character. Routes with a positive landscape fit are likely to give rise to fewer and less widespread effects on landscape character. Routes with a poorer landscape fit, for example running along ridge lines, or cutting across valleys, are likely to have greater effects on landscape character.</p> <p>Residential dwellings are mapped, and 150m buffers on these applied as a 'trigger for consideration' for residential visual amenity. Potential effects on residential visual amenity are considered with regard to locations where these buffers would overlap with each route option. Particular consideration is given to higher concentrations of residential receptors close to route options that may result in pinch points. The implications for principal views from individual properties are considered at these pinch points, informed by aerial photography and field work.</p>

Criterion	Sub-criteria	Objectives	Methodology
	roads (including roads used by tourists) and railways		<p>Approved and validated planning applications for residential dwellings which are not yet constructed are considered where they are within 150m of the route option, in which respect they are considered in the identification of pinch points.</p> <p>PRoW and long-distance walking routes are identified from Ordnance Survey maps and GIS datasets. Outdoor tourist attractions and promoted viewpoints are identified from Ordnance Survey maps, fieldwork and tourist information. Transport routes are identified from Ordnance Survey maps. The potential for effects on visual amenity of users of these features is considered in relation to professional judgements about the likely sensitivity of receptors, observations made during fieldwork and the type and scale of the proposed OHL.</p>
Historic Environment	<ul style="list-style-type: none"> Scheduled Monuments (SM) Listed Buildings (Grades I, II*, II) Non-designated historic assets including archaeological remains, structures and historic landscape areas/components 	<ul style="list-style-type: none"> To seek to avoid/minimise, as far as practical, direct physical change on designated features of historic environment interest ('historic assets') or change in their settings which would harm their significance or perception. 	<p>Legislation, policy and guidance seeks the preservation¹ of historic assets and the routeing appraisal therefore focuses on the ways in which harm could arise to assets via:</p> <ul style="list-style-type: none"> Direct physical change²; Change in the setting of assets which affects their heritage significance³; and Change in the setting of assets which affects how the asset and its heritage significance is appreciated⁴. <p>Powys County Council does not appear to maintain a local list of historic assets⁵ and so no locally listed buildings are known within or up to 3km from the route options. Locally listed buildings are therefore not included as a sub-criterion within the appraisal.</p> <p>The methodology for assessing potential direct physical effects comprises identifying the number, extent and nature of historic assets within the route option (designated historic assets⁶ and Historic Environment Record (HER) entries likely to constitute historic assets⁷ (hereafter referred to as non-designated historic assets)). These are then noted in relation to the opportunity, or otherwise, for avoiding direct effects at the detailed routeing stage.</p> <p>Potential effects of the OHL arising from how it may change the setting of historic assets are assessed by initially identifying assets within 3km of the route options. These are then reviewed to indicate those likely to be subject to effects related to setting change which lie within 1km of the route (the distance within which potentially significant effects are considered likely to occur). Further</p>

¹ Generally held, as a result of legal precedent, as meaning "to do no harm", i.e. an asset could change but if this change is not harmful then it would be understood as having been preserved.

² For example, this could include change to the key characteristics of a designated asset such as a registered historic park and garden.

³ For example, this could include blocking the line of sight from a defensive asset and a topographic feature it was sited to observe/control (e.g. from a medieval castle to the river crossing it policed).

⁴ For example, this could include placing infrastructure in a location which affects appreciation of an asset (e.g. a tower being visible on a hillside when the principal elevation of a listed building is seen from its approach road/drive).

⁵ Checks of PCC and CCC websites yielded no information on local lists. The CPAT and DAT HER data was reviewed and no values were identified in their record's 'status' field which flagged entries as locally listed.

⁶ i.e. World Heritage Sites (WHS), Scheduled Monuments (SM), Listed Buildings (LB), Conservation Areas (CA), Registered Historic Parks and Gardens (RHPG) and Registered Historic Landscapes (RHL).

⁷ Entries in HERs do not necessarily constitute historic assets for the purposes of planning and environmental assessment. It is therefore necessary for appropriately qualified and experienced professionals to undertake a sift of HER data to exclude, inter alia, find-spots, archaeological events (location of excavations, watching briefs etc.), assets previously lost/destroyed, records with insufficient spatial resolution, and other records not relevant to the purpose in hand.

Criterion	Sub-criteria	Objectives	Methodology
			<p>assessment/appraisal will use a Core Study Area of 1km from the route/alignment for all assets, and the wider study area of 3km will be used to identify any additional designated historic assets where views and vistas play a key part in their significance.</p> <p>With some exceptions, consideration is not given to effects related to setting change for non-designated assets at this stage. The non-designated assets where effects associated with setting change are considered are due to those assets forming part of a related system with a designated asset and where the proposed OHL may affect how these relationships can be understood (e.g. Roman fort SM and associated non-designated sections of Roman road).</p>
Forestry and Woodland	<ul style="list-style-type: none"> • Ancient Woodland Inventory (AWI) • Commercial conifer and other woodlands as identified in the National Forestry Inventory (NFI) 	<ul style="list-style-type: none"> • Avoid/minimise, as far as practical, effects on woodland/forest, and particularly areas of ancient woodland. 	<p>Forest and woodland areas within each of the route options are identified through the use of aerial photography, combined with digital data available from Natural Resources Wales (NRW) and the Forestry Commission.</p> <p>Forests and woodland are then divided into two broad groupings:</p> <ol style="list-style-type: none"> 1. Ancient Woodland (AW), which the Ancient Woodland Inventory (AWI) places into four sub-categories: <ul style="list-style-type: none"> ○ Ancient Semi-Natural Woodland (ASNW); ○ Plantation on Ancient Woodland Sites (PAWS); ○ Restored Ancient Woodland Sites (RAWS); and ○ Ancient Woodland Site of Unknown Category (AWSU). 2. Commercial conifer and other woodlands, which the National Forestry Inventory (NFI) places into the following categories: <ul style="list-style-type: none"> ○ Broadleaved; ○ Young trees; ○ Shrub; ○ Mixed mainly broadleaved; ○ Assumed woodland; ○ Conifer; ○ Mixed mainly conifer; and ○ Other (undefined conifer or broadleaved woodland). <p>It is recognised that there is often overlap between woodland types 1 and 2. Where such overlap occurred, the appraisal identifies the woodland as AWI and its sub-categories where applicable, with NFI categories used to identify woodland type for both AWI and non-AWI woodlands.</p> <p>Appraisal against the forestry and woodland topic includes analysis of the extent and location of each forest and woodland type within the route options to identify areas. A GIS-based calculation is run to identify the total area (hectares (ha)) of</p>

Criterion	Sub-criteria	Objectives	Methodology
			<p>woodland, of each forestry category listed above, present within each route option. As ancient woodland areas are included in the NFI, the total area of 'other' (non-ancient) woodland is calculated by subtracting the total AWI area from the total NFI area. Although the AWI and NFI datasets do not always precisely align in individual cases (it is possible for areas contained within the AWI to not feature in the NFI). Visual inspection indicates that the datasets are sufficiently aligned across the route options for the purposes of route option appraisal using this calculation method.</p> <p>In general terms, the objective in identifying a preferred route option is minimisation of loss of all types of forest and woodland. This reflects the importance of the local resource of all woodland types and as such, the implications of the proposed removal of these types of woodland within the wayleave (area of woodland felled to accommodate the OHL). However, the method of appraisal of route options seeks to avoid/minimise, as far as practical, the effects particularly on areas of ancient woodland, due to the value of this resource as reflected in Welsh national policy and guidance. In addition, for the identified AWI areas, consideration is given to whether this woodland type is currently commercial forestry planted on an ancient woodland site, rather than native woodland species.</p> <p>The GIS mapping is used to support commentary in the appraisal table as to whether woodland of different types can potentially be avoided through detailed design or whether it cannot e.g. if it spans the entire width of the route option, with observations being made concerning the implications of this. Due to the often scattered and broken nature of natural forests and woodland, for example, there is frequently the opportunity to avoid areas through careful consideration of the route alignment.</p> <p>Based on the above, a judgement is made as to which route option is preferred.</p> <p>Consideration will also be given to minimising impacts on forestry and woodland at the stage of detailed route alignment design, taking account of the need to create long term stable forest edges and to minimise impacts on any forestry and woodland management practices. During the alignment/EIA stage, consideration will be given to all forest and woodland types through:</p> <ul style="list-style-type: none"> • Taking account of existing, and planned, windfirm boundaries to minimise sterilisation of commercial forestry and woodland areas and reduce the requirements for additional felling outwith the wayleave; • Taking account of forest design plans and liaising with forestry owners/managers to avoid, or reduce restrictions on, forest management operations/techniques e.g. maintaining access to woodland blocks for harvesting/safety; and • Identification of opportunities to retain and/or plant particularly lower growing shrub species within the wayleave.
Hydrology (including Flood Risk),	<ul style="list-style-type: none"> • Flood risk zones • Waterbodies/watercourses 	<ul style="list-style-type: none"> • To cross flood zones at their narrowest point to minimise locating 	The sub-criteria within this topic would be categorised as either 'Category A' or 'Category B' development constraints. Category A constraints are those which the route options should avoid if possible; Category B constraints are those for which,

Criterion	Sub-criteria	Objectives	Methodology
Hydrogeology and Geology	<ul style="list-style-type: none"> • Peat • SSSI (with geodiversity features) • Geological Conservation Review Sites (GCRs) • Restored opencast mining sites/mining spoil heaps • Mine entries • Private Water Supplies (PWS) 	<p>infrastructure within flood zones where possible. Only high and medium flood risk zones would be considered in this respect as, based on the proposed development type, the OHL poles would be deemed to be Essential Infrastructure and therefore permissible in all flood zones, but subject to an exception test in high risk areas.</p> <ul style="list-style-type: none"> • To avoid locating infrastructure within watercourses and waterbodies. • To seek to avoid/minimise loss of peatlands in accordance with Welsh Planning and other Policy and using available resources such as the National Peatlands Action Programme. • To seek to avoid, as far as practical, effects on areas with highest amenity value, i.e. SSSIs and GCRs (Category A constraints). • To seek to avoid, as far as is practical, other features that may adversely affect OHL construction, i.e. areas of peat, private water supplies, restored opencast mining sites/mining spoil heaps and min entries (Category A constraints). 	<p>subject to suitable mitigation and design, inclusion of the constraint within the route would potentially be acceptable.</p> <p>Category A constraints are:</p> <ul style="list-style-type: none"> • Areas with highest amenity value (Holford Rule 1): <ul style="list-style-type: none"> ○ Sites of Special Scientific Interest (with geodiversity features). • Other sites/areas: <ul style="list-style-type: none"> ○ Peat deposits; ○ Restored opencast mining sites/mining spoil heaps; ○ Mine entries; and ○ Private Water Supplies (if route option with 250m). <p>There are no Category B constraints within the study area.</p> <ul style="list-style-type: none"> • Other sites/areas: <ul style="list-style-type: none"> ○ Flood risk – high and medium. <p>The category that sub-criteria fall into is then taken into account when applying professional judgement regarding the preference, and degree of preference, between route options.</p> <p>GIS is used in each case to identify the location of each constraint with respect to the route option; the length and/or area of intersection of the constraint with the route option. Professional judgement is applied to identify the possibility of avoiding effects upon the constraint via detailed design; and, where the constraint would be unavoidable, the severity of potential effects upon it, taking into account mitigation.</p> <p>It should be noted that, due to the lack of data available from Powys Council, safeguarded and active mineral sites are largely identified using a combination of 'flying' the route options using aerial imagery. BGS data and, where possible, the use of planning information for active sites are used to identify the presence of materials suitable for safeguarding. Therefore, it is acknowledged that a degree of uncertainty must necessarily attach to the appraisal in this respect.</p>
Land Use	<ul style="list-style-type: none"> • Infrastructure (existing OHL transmission and 	<ul style="list-style-type: none"> • Avoid existing, consented or proposed (with a valid 	<p>The land use appraisal identifies potential conflicts between the route options and existing and future, i.e. planned or consented but not yet constructed, land uses.</p>

Criterion	Sub-criteria	Objectives	Methodology
	<p>distribution infrastructure and existing road (A roads and trunk roads), existing, consented or proposed wind energy developments)</p> <ul style="list-style-type: none"> • Committed Development (Consented and Undetermined⁸ Planning Applications) • Local Development Plan (LDP) Allocations • Best and Most Versatile (BMV) Agricultural Land (Grades 1, 2 and 3a) • Common Land 	<p>planning application) wind energy developments due to the potential for line interactions with the wind turbines.</p> <ul style="list-style-type: none"> • Avoid/minimise, as far as practical, the crossings of or encroachment on infrastructure (including any 66kV and 33kV OHLs, and 'A'/trunk roads). • Avoid, where possible, land use conflict with committed development including consented and undetermined planning applications and land allocated within an LDP. 	<p>Potential land use conflicts can occur due to the presence of infrastructure within the route options such as overhead (OHL) transmission and distribution infrastructure and 'A'/trunk roads, as well as due to the presence of land types such as BMV agricultural land. Land which is already allocated for development within the route options, for example, through a Local Development Plan (LDP), and land which is subject to a valid planning application or planning permission, also presents the potential for future land use conflicts. Land of this type is referred to as 'committed development' in the appraisal, although it would be taken into account that the degree of likelihood of future land use conflict varies within this type (e.g. land with a planning consent as against land with a validated planning application that has not yet been determined).</p> <p>Developments consented prior to 2019 are considered either likely not to be constructed (as the consent will likely have expired⁹) or to have already been constructed and therefore captured as existing development within relevant data used to inform the appraisal across all topics. To ensure that all relevant planning permissions are captured in the appraisal, planning applications consented from 2019 onwards are appraised, as it is considered that this cut-off date allowed sufficient time for prior consents to be fully implemented and for the OS basemaps/data/aerial photography to be updated to include them as existing developments. Applications considered within the cut-off period include applications which have received full or outline planning permission; applications for reserved matters associated with outline planning permissions granted prior to the 2019 cut-off date; and applications which have been validated, i.e. are 'live' applications, but not yet determined. To avoid duplication, applications for Non-Material Amendments, Condition Variations, Discharge of Conditions or for Reserved Matters are not referenced in the appraisal where these relate to a planning application which has already been captured under other categories.</p> <p>When appraising the route options, where a committed development is located (fully or partially) within the route option, the implications of this for the detailed routeing/alignment design and/or subsequent environmental assessment stage is highlighted. Both residential and non-residential committed developments are considered within the appraisal: for example, residential dwellings, holiday lets, agricultural buildings, etc. The implications of committed development within 150m of the route options for residential visual amenity is assessed under the Landscape and Visual Amenity topic above. Route options with the lowest number of committed developments present, or where the committed developments can be avoided through detailed design, are preferred.</p> <p>As outlined above, the land use appraisal considers land which is allocated for a specific purpose within the Powys County Council LDP. The appraisal assesses the extent to which areas allocated within the LDP is present within the route options. These areas include residential allocations, employment allocations and</p>

⁸ Undetermined planning applications are those which have been validated, i.e. are 'live' applications, but have not yet been decided.

⁹ Under Section 36 of the Planning (Wales) Act 2015, a planning permission for the development of land in Wales expires after five years from the date on which the permission was granted. Generally, unless the planning permission states otherwise, planning permissions expire three years following the date granted to commence development.

Criterion	Sub-criteria	Objectives	Methodology
			<p>development limits/development boundaries. According to the Powys County Council LDP, a 'development boundary' is a boundary drawn around towns and large villages to control development. Through the Powys LDP's sustainable settlement hierarchy, growth is focussed upon towns and large villages through LDP land allocations and the designation of development boundaries, which are the locations with the greatest range of facilities and services. A judgement will be made as to whether areas allocated under either LDP can or cannot be avoided during the detailed design stage. Route options which avoid or cross fewer allocated areas within the Powys LDP are preferred.</p> <p>The appraisal considers whether existing infrastructure is sited within the route options. Infrastructure appraised include existing OHL transmission and distribution infrastructure, existing roads (A roads and trunk roads), and existing, consented or proposed (with a valid planning application) wind developments. A search will be conducted of Welsh Government¹⁰ and Planning Inspectorate¹¹ sources to identify whether any infrastructure projects present within the route options were subject to a current consent application. The land use appraisal also considers the Agricultural Land Classification (ALC) system which is used to rank land based on its potential productivity and cropping flexibility. This is determined by the extent to which the physical characteristics of the land (soil, climate and relief) impose long term restrictions on its use. Planning policy in Wales defines the BMV agricultural land as Grades 1, 2 and 3a. This is excellent to good quality land with respect to agricultural productivity and is protected as such in national planning policy. These grades of agricultural land are subject to predictive mapping and opportunities to avoid them during the routeing appraisal. The appraisal assesses the area of BMV agricultural land present within each of the route options and the route which avoids the most BMV agricultural land is preferred. Grades 3b, 4 and 5 are described as moderate, poor and very poor quality agricultural land, respectively, and are not treated as a constraint within the assessment.</p> <p>Common land is land for which a party other than the owner has certain rights: for example, to graze livestock. The Countryside and Rights of Way Act 2000 also extends public rights of access to all registered common land in England and Wales. There are additional consenting requirements for developments on common land, over and above the requirement for planning permission, and developers are either required or expected (depending on the development extent) to provide alternative land to compensate for any lost common land. When appraising the route options, areas of common land are mapped and opportunities to avoid, or minimise crossing them during routeing are appraised, with routes avoiding common land being preferred. The total area of common land within each route option is estimated by adding the area of 'Registered Common Land' within each route option with the area of 'Other Statutory Access Land' within each route option according to NRW data.</p>

¹⁰ Welsh Government (undated) Developments of National Significance Applications: <https://planningcasework.service.gov.wales/dnsapplications> and Welsh Government (undated), Current road improvement projects: <https://www.gov.wales/current-road-improvement-projects>

¹¹ The Planning Inspectorate (undated) National Infrastructure Planning – Projects: <https://infrastructure.planninginspectorate.gov.uk/projects/>

Appendix B: Route Options Environmental Appraisal Table

Table B.1: Aberedw route options appraisal

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C	Preference
Approximate Length of Corridor	N/A	1.21km	1.80km	2.20km	Route Option A is the preferred route as it is the shortest.
Biodiversity and Geological Conservation	Special Areas of Conservation (SAC)	At its closest point, Option A is located approximately 680m SE of the Afon Gwy/ River Wye Special Area of Conservation (SAC).	At its closest point, Options B and C are approximately 540m south of the Afon Gwy/ River Wye Special Area of Conservation (SAC).		All Route Options can avoid the Afon Gwy/ River Wye Special Area of Conservation (SAC), therefore there is no preference.
	Sites of Special Scientific Interest (SSSI)	All Route Options are c. 470m from the closest SSSI (Colwyn Brook Marshes). This is sufficient distance to avoid any impact to the SSSI.			All Route Options can avoid the Colwyn Brook Marshes SSSI, therefore there is no preference.
	Environment (Wales) Act 2016 Priority Habitats	Route Option A passes between two blocks of Ancient Semi-Natural Woodland S7 Priority Habitat which can be avoided through detailed pole siting. Route Option A includes two short sections of Upland heathland S7 Priority Habitat within the 100m wide route which can be over-sailed or avoided during detailed pole siting.	No Priority Habitats located within the 100m wide route options.		Route Options B and C are slightly preferred as there are no Priority Habitats present. However, Route Option A can also avoid interaction with Priority Habitats during detailed pole siting.
	Overall Preference for Biodiversity	Route Options B and C have a slight preference due to the absence of Priority Habitats. However, Route Option A could be positioned to avoid direct impact to Priority Habitat via oversailing or detailed pole siting.			
Landscape and Visual Amenity	<p>LANDMAP</p> <ul style="list-style-type: none"> Visual and Sensory Landscape Habitats Historic Landscape Geological Landscape 	Route Option A crosses two visual and sensory LANDMAP areas. The 'Upland moors, Glascwm Hill' has a high evaluation and the 'Rolling hills, central south-east' is given an overall moderate evaluation. The alignment crosses two landscape habitat LANDMAP areas. The upland moors to the south including Aberedw Hill,	Route Option B crosses two visual and sensory LANDMAP areas. The 'Upland moors, Glascwm Hill' has a high evaluation and the 'Rolling hills, central south-east' is given an overall moderate evaluation. The alignment crosses two landscape habitat LANDMAP areas. The upland moors to the south including Aberedw Hill,	Route Option C crosses two visual and sensory LANDMAP areas. The 'Upland moors, Glascwm Hill' has a high evaluation and the 'Rolling hills, central south-east' is given an overall moderate evaluation. The alignment crosses two landscape habitat LANDMAP areas. The upland moors to the south including Aberedw Hill,	<p>There is a slight preference for Route Option A in reference to LANDMAP.</p> <p>This is primarily because Route Option A avoids passing through any areas judged to have an 'outstanding' evaluation.</p> <p>It is worth noting that Route Option B and C only pass through approximately 850m</p>

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C	Preference
	<ul style="list-style-type: none"> Cultural Landscape 	<p>has a high evaluation. The area to the north has a moderate overall evaluation.</p> <p>The alignment crosses two Historic Landscape LANDMAP areas. Aberedw Hill is given a high evaluation, whilst the northern area (Pentre) is given a moderate evaluation.</p> <p>The alignment crosses two geological landscape LANDMAP areas, the southern having an overall evaluation of high, with the northernmost having an overall evaluation of moderate.</p> <p>The alignment crosses two Cultural Landscape LANDMAP areas. the southern area (Uplands and Lowlands) has a high evaluation, whilst the northernmost area (River Edw Valley) has a moderate evaluation.</p>	<p>has a high evaluation. The area to the north has a moderate overall evaluation.</p> <p>The alignment crosses three Historic Landscape LANDMAP areas. The southern area Aberedw Hill is evaluated as high, with the route to the east where it enters Edw, is evaluated as outstanding. The northern area (Pentre) has a moderate evaluation.</p> <p>The alignment crosses two geological landscape LANDMAP areas, the southern having an overall evaluation of high, with the northernmost having an overall evaluation of moderate.</p> <p>The alignment crosses two Cultural Landscape LANDMAP areas. the southern area (Uplands and Lowlands) has a high evaluation, whilst the northernmost area (River Edw Valley) has a moderate evaluation.</p>	<p>has a high evaluation. The area to the north has a moderate overall evaluation.</p> <p>The alignment crosses three Historic Landscape LANDMAP areas. The southern area Aberedw Hill is evaluated as high, with the route to the east where it enters Edw, is evaluated as outstanding. The northern area (Pentre) has a moderate evaluation.</p> <p>The alignment crosses two geological landscape LANDMAP areas, the southern having an overall evaluation of high, with the northernmost having an overall evaluation of moderate.</p> <p>The alignment crosses two Cultural Landscape LANDMAP areas. the southern area (Uplands and Lowlands) has a high evaluation, whilst the northernmost area (River Edw Valley) has a moderate evaluation.</p>	<p>and 1.1km, respectively, of the area evaluated as 'Outstanding' for Historic Landscape.</p> <p>Therefore, the preference is considered to be marginal.</p>
	Landscape Character	<p>Route Option A crosses the ridge line and the hill plateau and will have an impact upon the undeveloped landscape character of the summit.</p> <p>The route descends Aberedw Hill in a north-westerly direction, cutting across the grain of the landscape. Going against the natural contours and flow of the scarp, the OHL would form a prominent feature on the hill face and skyline, impacting on local landscape character.</p> <p>The route runs north through a pasture field where it is likely</p>	<p>Route Option B crosses the ridge line and the hill plateau and will have an impact upon the undeveloped landscape character of the summit.</p> <p>The route proceeds to descend the steep slope from Aberedw Hill. The route cuts across the grain of the contours and natural flow of the land. It travels down a sparsely vegetated area, with some individual trees likely to be impacted. These factors mean the OHL will make a prominent feature on the hill face and</p>	<p>Route Option C crosses the ridge line and the hill plateau and will have an impact upon the undeveloped landscape character of the summit.</p> <p>The route descends in a north-easterly direction from Aberedw Hill. The OHL would form a prominent feature on the hill face and skyline, impacting on local landscape character. The route then passes east of a woodland block at Fynnonau Common, with potential impacts on trees at the edge of the woodland. Although routed where the slope is slightly</p>	<p>There is no clear preference between the three routes, all of which are likely to have adverse effects upon the local landscape character.</p> <p>Route Option A will have a lesser impact upon the pattern of enclosed agricultural fields and existing vegetation below Aberedw Hill. All routes will have a similar effect on the landscape as they cut across the scarp slopes and would be prominent on the skyline of the hill. The shallower route taken by Option C is marginally preferable, but this option also</p>

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C	Preference
		that some trees and mature hedgerow loss is necessary especially near the foot of Aberedw Hill. This may result in some impact on landscape character given the loss of existing well-defined field boundaries and trees.	skyline, impacting on local landscape character. The route then runs west through several agricultural fields with mature hedgerows and trees, as well as a large belt of woodland. This will have a negative impact upon landscape character, disturbing the pattern of enclosed agricultural fields and breaking well-defined field boundaries.	shallower to the north, it still cuts across the grain of the landscape. The route runs west through several agricultural fields with mature hedgerows and trees, as well as a large belt of woodland. This will have a negative impact upon landscape character, disturbing the pattern of enclosed agricultural fields, and breaking well-defined field boundaries.	has the greatest effect on woodland and trees below the hill.
	Residential Visual Amenity with '150m trigger for consideration zone'	Route Option A does not pass within 150m of any residential properties. Aberedw Hill is a prominent feature in this locale and given its high elevation, it forms the skyline to views for many on this northern side. The alignment is likely to be highly visible from a number of residential properties where it ascends across the steep hill face and would be visible on the skyline. This would affect views experienced from Ffynnonau Cottage and the scattered properties located along the A481, although they are up to 1km away. Although there may be adverse effects on views, this would not affect Residential Visual Amenity.	Route Option B does not pass within 150m of any residential properties. Aberedw Hill is a prominent feature in this locale and given its high elevation, it forms the skyline to views for many on this northern side. The alignment is likely to be highly visible from a number of residential properties where it ascends across the steep hill face, and would be visible on the skyline. This would affect views experienced from Ffynnonau Cottage and the scattered properties located along the A481 corridor. Given the southward approach this route takes to the hill, it is likely the wood poles would appear to be stacked when viewed from the north. This is true for properties such as Matts Farm, Colwyn Cottage and Springfield, although they are up to 1km away. Although there may be adverse effects on views, this would not	Route Option C does not pass within 150m of any residential properties. Aberedw Hill is a prominent feature in this locale and given its high elevation, it forms the skyline to views for many on this northern side. The alignment is likely to be visible from a number of residential properties where it ascends across the steep hill face and would be visible on the skyline. Although this route does cross a shallower part of the slope, this would affect views experienced from Ffynnonau Cottage and the scattered properties located along the A481 corridor. Although there may be adverse effects on views, this would not affect Residential Visual Amenity.	There is no preference, as while all options could give rise to adverse effects on views experienced by residential receptors, none fall within the 150m zone where effects on Residential Visual Amenity may occur.

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C	Preference
			affect Residential Visual Amenity.		
	Tourism and Recreation (visual amenity – viewpoints, cycle corridors, public rights of way (PRoW), long distance trails and tourist attractions)	<p>Route Option A crosses open access land to the south, on the Aberedw Hill slopes and summit. It runs for approximately 0.8km across open access land.</p> <p>Aberedw Hill is a locally popular hiking destination. The alignment crosses two PRoWs on Aberedw Hill, as well as several, evidently well-tracked, pathways which provide access to the hill summit and surrounding landscape. Where it runs up the hill slope, the OHL will run parallel to one of these pathways.</p> <p>Ffynnonau Cottage is a holiday cottage, attached to the Fforest Fields caravan and camping park. At its closest point the route is approximately 450m away from the cottage as it snakes up the hill face. The OHL would affect views from the back of the property, where steep-pitched views up the escarpment are available.</p>	<p>Route Option B crosses open access land to the south, on the Aberedw Hill slopes and summit. The route runs for approximately 0.7km across open access land.</p> <p>Aberedw Hill is a locally popular hiking destination. The alignment crosses two PRoWs on Aberedw Hill, as well as several, evidently well-tracked, pathways which provide access to the hill summit and surrounding landscape. The alignment crosses or runs alongside these pathways which either go southwards up the hill or run east-west towards Fforest Wood.</p> <p>Ffynnonau Cottage is a holiday cottage, attached to the Fforest Fields caravan and camping park. At its closest point the route is approximately 300m to the north and east, and may be visible in views from the cottage.</p>	<p>Route Option C crosses open access land to the south, on the Aberedw Hill slopes and summit. It runs for approximately 0.9km across open access land.</p> <p>Aberedw Hill is a locally popular hiking destination. The alignment crosses two PRoWs on Aberedw Hill, as well as several, evidently well-tracked, pathways which provide access to the hill summit and surrounding landscape. These include paths leading up the hill from Fforest Fields, and paths linking west to Fforest Wood.</p> <p>The alignment passes within less than 200m of Fforest Fields caravan and camping park, specifically an area of glamping pods which are situated south-westerly of the main campsite around a small lake. The alignment is around 200m from the main area of caravans. The OHL would be highly visible from the caravan and camping park as it ascends the steep slope immediately to the south-west, which forms a backdrop to the site.</p> <p>Ffynnonau Cottage is a holiday cottage, attached to the Fforest Fields caravan and camping park. At its closest point the route is approximately 300m to the north, and may be visible in views from the cottage.</p>	<p>There is a marginal preference for Route Options A and B.</p> <p>These two routes are further from Fforest Fields caravan and camping park, while Route Option C runs very close to part of the camp site. All three routes are likely to affect views from Ffynnonau holiday cottage, and all would impact on views experienced by recreational users of Aberedw Hill.</p>

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C	Preference
	Public Roads, including tourist corridors	<p>Route Option A would be highly visible in views from the A481 to Aberedw Hill. The escarpment is a distinctive feature in views from this road. Road users will experience passing views of the alignment as it snakes up the hill face and crosses the skyline.</p> <p>The route is approximately 0.2km from the A481. This is a major road and road users will likely be travelling at high speeds. Views of this closer portion are unlikely to lead to adverse effects.</p>	<p>Route Option B would be highly visible in views from the A481 to Aberedw Hill. The escarpment is a distinctive feature in views from this road. Road users will experience passing views of the alignment as it ascends the hill face and crosses the skyline. It is likely the wood poles would appear to be stacked when viewed from the A481 to the north.</p> <p>The route begins approximately 0.2km from the A481. This is a major road and road users will likely be travelling at high speeds. Views of this closer portion are unlikely to lead to impacts.</p>	<p>Route Option B would be highly visible in views from the A481 to Aberedw Hill. The escarpment is a distinctive feature in views from this road. Road users will experience passing views of the alignment as it ascends the hill face and crosses the skyline. However, where this route begins its ascent in a more easterly location, it is likely given the presence of intervening landforms and vegetation (including large woodland belts near Fforest Fields) that views from the road would be filtered, especially for road users travelling east to west on the A481. This route avoids any stacked formations as will be seen from the road with Route Option B.</p> <p>The route begins approximately 0.2km from the A481. This is a major road and road users will likely be travelling at high speeds. Views of this closer portion are unlikely to lead to impacts.</p>	<p>There is a marginal preference for Route Option C.</p> <p>This option crosses the highly visible escarpment of Aberedw Hill at a location where it may be less prominent from the road, compared to the other alignments.</p>
	Overall Preference for Landscape and Visual Amenity	<p>There is a marginal preference for Route Option A on the basis of Landmap. On landscape character and Residential Visual Amenity there is no preference as all routes would have similar adverse impacts. There is a marginal preference for Route Options A and B in relation to tourism and recreation, and a marginal preference for Route Option C in relation to views from roads.</p> <p>Overall no clear preference has been identified on landscape and visual grounds, as adverse impacts on landscape character and views are likely to be similar for all route options.</p>			
Historic Environment	Scheduled Monuments (Cadw (SMs))	<p>There are no SMs within Route Options A and B. 23 SMs lie within 3km of these Route Options.</p> <p>No SMs are predicted to be affected by these Route Options.</p>		<p>There are no SMs within this Route Option. 23 SMs lie within 3km of the Route Option.</p> <p>This Route Option is located approximately 200m to the west of Fforest Wood Mound & Bailey Castle (RD075). This</p>	<p>Route Options A and B are preferred since they have no interactions, and no obvious potential for harm to arise to, SMs.</p>

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C	Preference
				would potentially affect the contribution the asset's setting – including views out and over the surrounding landscape to the west – makes to its heritage significance. However, this will not affect the key elements of this asset's setting – its position within the south-facing narrow valley and is not likely to cause harm to the asset.	
	Listed Buildings (I, II*, II) (LBs)	There are no LBs within this Route Option A. 11 LBs lie within 3km of the Route Option. No LBs are predicted to be affected by this Route Option.	There are no LBs within this Route Options B and C. 14 LBs lie within 3km of these Route Option. No LBs are predicted to be affected by these Route Option.		No preference between Route Options as none appear likely to have a harmful interaction with LBs.
	Non-designated Historic Assets, including archaeological remains, structures and historic landscape areas/ components	There is one HER entry within the Route Option. There are 785 HER entries located within 3km of the Route Option. The majority of HER entries relate to post-medieval land-use and agriculture. A post-medieval quarry (PRN22447) is located within the Route Option. This asset will be avoided to prevent direct physical effects which could result in harm.	There is one HER entry within the Route Option. There are 837 HER entries located within 3km of the Route Option. The majority of HER entries relate to post-medieval land-use and agriculture. A post-medieval quarry (PRN36967) is located within the Route Option. This asset will be avoided to prevent direct physical effects which could result in harm.	There are no HER entries within the Route Option. There are 852 HER entries located within 3km of the Route Option. The majority of HER entries relate to post-medieval land-use and agriculture.	No preference between Route Options as none appear likely to have a harmful interaction with non-designated historic assets.
	Overall Preference for Cultural Heritage	Route Options A and B are preferred as they have fewest interactions with designated assets which could lead to harm.			
Land Use	Infrastructure	There are no existing, consented or proposed turbines (including the turbine tip height plus 10% buffer) located within the Route Options (all route options are located within the Aberedw Wind Energy Park site boundary). There are no National Gas Pipelines located within the Route Options. There are no A Roads or trunk roads located within the Route Options.			Route Option A is the preference as the route option does not cross any overhead lines (OHL).

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C	Preference
		Route Option A does not cross any overhead lines (OHL).	Route Options B and C cross an 11 kilovolt (kV) overhead line (OHL) which runs across the width of the Route Options.		
	Local Development Plan (LDP) Allocations	All Route Options cross an area allocated within the Powys LDP as a Resource Safeguarding Area (the relevant policy within the LDP is SP7).			There is no preference between the Route Options.
	Common Land	There is 8.59ha of common land present within the Route Option.	There is 7.38ha of common land present within the Route Option.	There is 9.15ha of common land present within the Route Option.	Route Option B is the preference as the routes contain the smallest area of Common Land.
	Overall Preference for Land Use	Route Option A is marginally preferred as the route does not cross any overhead lines and has the second smallest area of common land (8.59ha).			
Forestry and Woodland	Ancient Woodland (as per the Ancient Woodland Inventory (AWI))	The total area of AWI within the Route Option is 0.07ha of Ancient Semi Natural Woodlands (ASNW) which are located directly west of Ffynnonau. AWI within the Route Option can be avoided during detailed pole siting.	There is no AWI located within Route Options B and C.		No preference as all AWI woodland can be avoided at detailed wood pole siting stage.
	National Forest Inventory (NFI)	The total area of NFI within the Route Option is 0.4ha. The route option includes Broadleaved woodland. NFI within the Route Option can be avoided during detailed pole siting.	The total area of NFI within the Route Option is 0.53ha. The route option passes through a block of conifer woodland towards northern end (to the east of the switching station) which cannot be avoided during detailed pole siting.	The total area of NFI within the Route Option is 0.98ha. The route option includes Conifer, Young trees and Broadleaved woodland. The route option passes through gap in two blocks of woodland' in NFI which can be avoided during detailed pole siting. The route option passes through a block of conifer woodland towards northern end (to the east of the switching station) which cannot be avoided during detailed pole siting.	Route Option A is the preference as all NFI woodland can be avoided at detailed pole siting stage.

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C	Preference
	Overall Preference for Forestry and Woodland	Route Option A is the preferred route option as all woodland can be avoided.			
Flood Risk and Hydrogeology, PWS and Geomorphology	Flood Zones (High Risk) and Private Water Supplies (PWSs)	Route Option A crosses no significant flood zones. Although the route does not pass within the buffer of any Private Water Supplies the route passes upgradient of the PWS at Ffynnonau, standard construction environmental controls will be necessary.	Route Option B crosses no significant flood zones. The route passes within 250m of a Private Water Supply however topography would indicate the route is unlikely to affect this.	Route Option C crosses no significant flood zones. The route passes within 250m of two Private Water supplies and due to topography may impact the PWS marked at the campsite.	There is a slight preference for Route Option A due to the limited interaction with flood zones and PWS.
	Geomorphology, Historic Mining and Ground Stability	Route Option A crosses areas marked as historical quarries, these may be able to be spanned or avoided with the detailed pole siting (see technical appraisal). Due to the steep nature of the slope ground stability will need to be assessed for the alignment (see technical appraisal).	No interaction with historical mining along Route Options B & C. Due to the steep nature of the slope ground stability will need to be assessed for the alignment (see technical appraisal).		There is a slight preference for Route Options B and C due to the historical quarries sited within Route Option A (however these are likely to be able to be spanned or avoided during detailed pole siting).
	Peat	No peat is present in these route options.		Route Option C interacts with an area of peat which can be avoided during detailed pole siting.	Route Options A and B are preferred as these are likely to have less interaction with peat.
	Overall Preference for Flood Risk and Hydrogeology, PWS and Geomorphology	The overall preference is for Route Option A due to limited interacting with floodplains, peat and Private Water Supplies, however B and C are preferred in relation to historic mining.			
Overall Emerging Preference	Route Option A is preferred in terms of overall length as it is the shortest route. In relation to Biodiversity and Geological Conservation, Route Options B and C have a slight preference due to avoidance of Priority Habitat. However, Route Option A could be positioned to avoid direct impact to Priority Habitat. In relation to Landscape and Visual Amenity, no clear preference has been identified, as adverse impacts on landscape character and views are likely to be similar for all route options.				

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C	Preference	
		<p>In relation to Historic Environment, Route Options A and B are preferred as they have fewest interactions with designated assets which could lead to harm.</p> <p>In relation to Land Use, Route Option A is the marginally preferred Route Option as the route does not cross any overhead lines and interacts with the second smallest amount of common land (8.59ha).</p> <p>In relation to Forestry and Woodland, Route Option A is preferred as all woodland can be avoided.</p> <p>In relation to Flood Risk and hydrogeology, PWS and geomorphology, the overall preference is for Route Option A due to limited interacting with floodplains, peat and Private Water Supplies, however B and C are preferred in relation to historic mining.</p> <p>Overall, on balance, Route Option A is the emerging preferred Route Option.</p>				

Appendix C: Route Options Technical Review Appraisal Table

Table C.1: Aberedw route options appraisal

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C
Route Facts	Total Length	1.2km	1.8km	2.2km
	Length within Energy Park Red Line Boundary	880m	740m	930m
	Land Uses	Rural: Predominantly arable farming. 880m over bracken/heath/rough grassland (common land).	Rural: Predominantly arable farming. 740m over bracken/heath/rough grassland (common land).	Rural: Predominantly arable farming. 930m over bracken/heath/rough grassland (common land).
Engineering Technical	Potential Crossings and Type	Other: x4 paths/tracks (in common land – status TBC). None of the following crossings: <ul style="list-style-type: none"> • Utility (from desk data Jan 2024); • Rivers/watercourses; and • Roads (A, B and Minor). 	Roads: x1 minor. Other: x3 paths/tracks (shown on OS map, all in common land/Energy Park Red Line Boundary – status TBC). Utilities: x1 BT underground cable (UGC); x1 11kV overhead line (OHL). Watercourses: x2 (Flood Risk Surface Water Small Watercourses).	Roads: x2 minor. Other: x4 paths/tracks (shown on OS map, all in common land/Energy Park Red Line Boundary – status TBC). Utilities: x1 BT UGC; x1 11kV OHL. Watercourses: x3 (Flood Risk Surface Water Small Watercourses).
	Access (construction and maintenance)	High elevation at EP sub: 432m peak. Notable gradient down slope from energy park substation: extreme environment. This poses additional challenges for construction but is considered feasible. No road network south of switching station site serving Option A. Existing (but limited) track network at start of route near energy park substation: unclear if these are suitable for construction vehicle access.	High elevation at EP sub: 432m peak. Notable gradient down slope from energy park substation: extreme environment. This poses additional challenges for construction but is considered feasible. Some minor roads/ tracks (possibly private) south of A481 serving Option B. Existing (but limited) track network at start of route near energy park substation: unclear if these are suitable for construction vehicle access.	High elevation at EP sub: 432m peak. Notable gradient down slope from energy park substation: extreme environment. This poses additional challenges for construction but is considered feasible. Some minor roads/ tracks (possibly private) south of A481 serving Option C. Existing (but limited) track network at start of route near energy park substation: unclear if these are suitable for construction vehicle access.
	Technical Complexity/Commentary	Option includes altitudes above 300m and below 500m (extreme environment). Notable side slope on downward slope which will likely result in short spans (short spans results in more poles). Number of poles, angle poles, pole heights and Limits of Deviation (LoD) considerations to be determined if route taken forward.	Option includes altitudes above 300m and below 500m (extreme environment). Notable side slope on downward slope which will likely result in short spans (short spans results in more poles). Initial decent from escarpment appears steeper than Option A and Option C. Limits of Deviation considerations: <ul style="list-style-type: none"> • Need to consider Towy Usk LoD and Aberedw LoD when refining 	Option includes altitudes above 300m and below 500m (extreme environment). Descent down sloped area appears more gradual with little side slope in comparison to Options A or B. Limits of Deviation considerations: <ul style="list-style-type: none"> • Need to consider Towy Usk LoD and Aberedw LoD when refining alignments to switching station (once proposed location finalised).

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C
			alignments to switching station (once proposed location finalised). Number of poles, angle poles, pole heights and Limits of Deviation considerations to be determined if route taken forward.	<ul style="list-style-type: none"> X2 non-residential buildings in proximity. Number of poles, angle poles, pole heights and Limits of Deviation considerations to be determined if route taken forward.
	Benefits	Technically feasible route.	Technically feasible route.	Technically feasible route.
	Project Risks/Other Considerations	To consider: <ul style="list-style-type: none"> Extreme topography – likely to require more construction effort overall. Geotechnical attributes* of sloped area may influence construction requirements for planting of poles here. The estimated allowable wind span is mainly governed by foundation strength as opposed to pole strength. Conceptual design will assume standard planting depths of poles and baulk foundations for proposed pole sites are possible (i.e. Type 2 soil types). Special designs for rock areas or concrete caisson foundations have not been considered in this phase. Design assumptions and technical feasibility of pole positions would need to be confirmed in the detailed design once geotechnical data is available. Stay wire positions in sloped areas – practical limits of stay wire lengths to be considered in final bend point positioning. *Commentary on disused quarries in relation to Option A only (from high level desk based observations): It is noted that Option A crosses an area marked as 'Quarries (dis)' (on OS mapping) and that x2 NMRWs and x1	As for Option A.	As for Option A.

Criterion	Sub-criteria	Route Option A	Route Option B	Route Option C
		HER relating to disused quarries are in the vicinity.		
Overall Emerging Preference		Engineering preference: Route Option A. Route Option A offers a shorter, more direct route with no apparent crossings of existing overhead lines. Considerations for all options: Construction challenges to be noted.		

NOTE: The proposed switching station location will be confirmed as part of Green GEN Cymru’s separate Towy Usk Grid Connection Project. The Aberedw Grid Connection alignment into the switching station will be determined by the location of the switching station, and the proposed connection point: this will affect the alignment and pole positions leading into the switching station. The route options shown in the Figures, and the alignment and pole positions in the preferred Option (A) are therefore indicative only at this stage.