Fferm Solar Larnog

Environmental Statement

Volume IV, Appendix 2A: Indicative Grid Connection Appraisal

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Volume IV, Appendix 2A: Indicative Grid Connection Appraisal

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1. Indicative Grid Connection Appraisal

1.1. Introduction

1.1.1. An Environmental Statement (ES) has been produced on behalf of Trydan Gwyrdd Cymru (hereafter 'the Applicant') to consider the construction, operation and decommissioning of the proposed Larnog Solar Farm, comprising approximately 35 megawatts (MW) of direct current (DC) ground-mounted solar PV, including substation and Battery Energy Storage System (BESS), ancillary equipment and associated infrastructure (hereafter the 'Proposed Development').

1.1.2. The Proposed Development would be located on land approximately 500m south-west of Penarth and 550m east of Sully (hereafter 'the Site'). The Site is approximately 46.54 hectares (ha) in size and largely comprises agricultural land with defined field boundaries and pockets of woodland. The wider Land Ownership Boundary consists of 117 ha.

1.1.3. The location of the Proposed Development is presented in Figure 1.1: Site Location Plan of **Chapter 1** of the ES, which presents both the Site Boundary and wider Land Ownership Boundary. The Proposed Development is located within the administrative boundary of the Vale of Glamorgan Council.

1.1.4. This appendix provides a high-level appraisal of the indicative grid connection associated with Larnog Solar Farm. It has been prepared to provide a proportionate review of the environmental constraints associated with the currently identified connection options, thereby informing the cumulative assessment reported within the technical chapters of the ES (see **Chapters 6** to **9**).

1.2. Indicative Grid Connection

Overview

1.2.1. As described in **Chapter 5: Project Description**, the Proposed Development would require a connection to the electricity network in order to export electricity generated by the solar photovoltaic (PV) generating station.

1.2.2. The Applicant has undertaken discussions with National Grid Electricity Distribution (NGED) regarding the grid connection requirements for the Proposed Development. At the time of preparing this ES, it is understood that the Proposed Development may connect to either:

- Option 1: Penarth Primary Substation; or
- Option 2: Sully Grid Bulk Supply Point.

1.2.3. The final point of connection will be determined through the ongoing grid connection process and agreement with NGED. The Project Substation would be connected to the NGED substation via underground electrical cabling. The grid connection cable route is anticipated to be predominantly located within the public highway corridor. The indicative grid connection is shown on **Figure 1**.

Limitations and Assumptions

1.2.4. The appraisal presented within this Appendix has been undertaken on the basis of:

- The indicative grid connection routes shown on Figure 5.6 of **Chapter 5**.
- Installation via underground cable.
- The use of existing highway corridors where reasonably practicable.
- Temporary construction compounds and working areas being limited to those required for cable installation.
- Reinstatement of disturbed land and highway surfaces following completion of construction.
- No new overhead line infrastructure being required.

1.3. High-Level Environmental Appraisal

1.3.1. A desk-based appraisal of the indicative grid connection routes was undertaken using publicly available environmental datasets, including DataMapWales (2026)[1], WSP Environmental Constraints Screening Tool and Ordnance Survey Maps. The purpose of the appraisal was to identify any notable environmental constraints associated with the indicative grid connection options and to inform the cumulative considerations reported within the ES.

1.3.2. The following environmental topics have been considered:

- Landscape and visual
- Biodiversity, including:
    - Nationally and internationally designated sites;
    - Priority habitats;
    - Ancient or veteran trees; and
    - Arboriculture (tree protection orders (TPOs)).
- Noise and vibration
- Historic environment, including:
    - World heritage sites;
    - Listed buildings;
    - Scheduled monuments;

[1] Welsh Government (2026) DataMapWales. Available at: https://datamap.gov.wales/ (Accessed: October 2026).

- Registered parks, gardens and battlefields; and
- Conservation areas.

- Air quality
- Water environment and flood risk, including:
  - Presence of rivers, canals and transitional water bodies (including source protection zones (SPZ); and
  - Designated flood zones.
- Geology, soils and agriculture
- Traffic and transport
- Population and human health
- Major accidents and disasters

1.3.3. A Study Area extending 500m from the indicative grid connection routes was applied for the majority of environmental topics. For nationally and internationally designated sites, this was extended to 2km to account for the higher sensitivity of such receptors and ensure the identification of designated sites that could potentially be affected by construction activities associated with the indicative grid connection routes. These Study Areas were considered proportionate to the anticipated scale and nature of the works, which are expected to comprise temporary and localised underground cable installation works predominantly within existing highway corridors. Internationally designated sites with bats as qualifying features located beyond the 2 km Study Area were scoped out of assessment. Given the nature of the Proposed Development, which is not anticipated to affect vegetation, bridges or other structures with bat roosting potential, and would not affect habitat used by the qualifying bat populations, no credible impact pathways were identified.

1.3.4. The Study Areas applied to the appraisal are shown on **Figure 1**, which illustrates the two indicative grid connection route options (Options A and B), together with the 500m and 2km study area buffers applied to inform the environmental appraisal.

1.3.5. Both route options comprise underground cable connections that are anticipated to be installed predominantly within existing highway corridors. The description of each indicative route is described below:

- Option 1: Routed from the Project Substation to Penarth Primary Substation via St Mary's Well Bay Road, Lavernock Road (B4267), Dinas Road, St Peter's Road and St Paul's Avenue. The route would comprise an underground cable installed predominantly within existing highway corridors, with limited vegetation removal potentially required where the route exits the Site and passes through existing hedgerow. The route is approximately 3.35 km in length and passes through urban and residential areas in proximity to internationally and nationally designated

ecological sites, listed buildings, conservation areas and sensitive receptors including residential properties and schools.

- Option 2: Routed from the Project Substation to Sully Grid Bulk Supply Point via St Mary's Well Bay Road, Lavernock Road, South Road and Sully Moors Road. The route would comprise an underground cable installed predominantly within existing highway corridors, with limited vegetation removal potentially required where the route exits the Site and passes through existing hedgerow. The route is approximately 4.2 km in length and passes through urban and residential areas in proximity to internationally and nationally designated ecological sites and sensitive community receptors.

1.3.6. The key phases of the Grid Connection would include construction, operation and decommissioning:

- **Construction**: temporary trench excavation within existing highway corridors, installation of underground electrical cables followed by backfilling and reinstatement of road surfaces and affected areas.
- **Operation**: the grid connection infrastructure would comprise buried underground cables with no above-ground infrastructure along the route.
- **Decommissioning**: the underground cables are expected to remain in situ at the end of the operational lifetime of the Proposed Development and therefore, has not been considered further.

Table 1.1: High-level appraisal for the indicative Grid Connection for Larnog Solar Farm

Environmental Topic	Option 1 – Penarth Primary Substation	Option 2 – Sully Grid	Appraisal and Conclusions
Landscape and visual (including land use)	Option 1 and Option 2 Study Areas are located within the National Landscape Character Area (NLCA) 35 Cardiff, Barry and Newport, characterised by a predominantly urban and suburban landscape with extensive built development and infrastructure. The indicative Grid Connection routes pass through the following Aspect Areas: • Option 1: Lavernock hintedand (VLFGLVS787), Cosmeston Country Park Golf Course (VLFGLVS532), and Penarth (VLFGLVS152). • Option 2: Lavernock hintedand (VLFGLVS787), Barry (VLFGLVS219), Sully Ridge (VLFGLVS637), and Cog Moors (VLFGLVS480). Land use within and surrounding the indicative grid connection routes is dominated by existing highway corridors, residential development, community facilities and other urban land uses. Natural landscape features are generally fragmented and modified by urban expansion.		Both routes are located within an urbanised and heavily modified NCLA and multiple host Aspect Areas and are anticipated to be installed predominantly within existing highway corridors. As such, direct impacts on existing land uses are expected to be limited, temporary and localised to construction activities. The influence of construction works on the landscape character is likely to be contained within the highway corridor, with limited effects on the wider landscape character of host Aspect Areas. Potential visual effects arising due to the construction of the grid connection cables would be short-term and transient in nature. Therefore, it is expected that no significant visual effects would be anticipated. Following construction, the land would be reinstated with no above ground infrastructure. Therefore, there would be no potential for significant effects during the operational phase. No landscape, visual or land use constraints have been identified that would reasonably be expected to result in likely significant effects.
Biodiversity			
Internationally designated sites	Several internationally designated sites were identified within the Study Area (approximate distance from the indicative grid connection route): • Severn Estuary SPA (within 500m)	Several internationally designated sites were identified within the Study Area (approximate distance from the indicative grid connection route): • Severn Estuary SPA (within 2km) • Severn Estuary SAC (within 2km)	Internationally and nationally designated sites, priority habitats and arboricultural features occur within the Study Areas of both routes. However, the indicative grid connection routes are anticipated to comprise underground cable installation predominantly within existing highway corridors, thereby avoiding all internationally designated sites, nationally designated sites, priority habitats, ancient or veteran trees.. Localised vegetation removal may be required where the cable routes pass through existing hedgerows from the Project Substation. However, these areas are anticipated to be limited in extent.

Environmental Topic	Option 1 – Penarth Primary Substation	Option 2 – Sully Grid	Appraisal and Conclusions
	• Severn Estuary SAC (within 500m) • Severn Estuary Ramsar Site (within 500m)	• Severn Estuary Ramsar Site (within 2km)	The habitats and other ecological features located in close proximity to the indicative cable routes, including hedgerows, trees, grassland, aquatic habitats, as well as TPOs, would require consideration during detailed design and routing, including the application of appropriate stand-off distances, micrositing and standard construction best practice where necessary. Whilst temporary disturbance effects, including noise, dust and pollution risks, may occur during construction, these would be managed through the implementation of standard good practice measures. On this basis, the desk-based review has not identified any biodiversity constraints that would reasonably be expected to give rise to likely significant effects.
Nationally designated sites	Several nationally designated sites were identified within the Study Area (approximate distance from the indicative grid connection route): • Llynnoedd Cosmeston / Cosmeston Lakes SSSI (within 500m) • Severn Estuary SSSI (within 500m) • Penarth Coast SSSI (within 2km) • Cog Moors SSSI (within 2km) • Sully Island SSSI (within 2km)	Several nationally designated sites were identified within the Study Area (approximate distance from the indicative grid connection route): • Llynnoedd Cosmeston / Cosmeston Lakes SSSI (500m) • Cog Moors SSSI (within 2km) • Hayes Point to Bendrick Rock SSSI (within 2km) • Penarth Coast SSSI (within 2km) • Severn Estuary SSSI (within 2km) • Sully Island SSSI (within 2km)	
Priority habitats	Several areas of priority habitat were identified within the Study Area, including (approximate distance from the indicative grid connection route):	Several areas of priority habitat were identified within the Study Area, including (approximate distance from the indicative grid connection route): • Traditional Orchards (approx. 20m)	

Environmental Topic	Option 1 – Penarth Primary Substation	Option 2 – Sully Grid	Appraisal and Conclusions
	• Lowland fens and reedbeds (approx. 150m) • Lowland meadows (approx. 300m) • Lowland calcareous grassland (approx. 300m) • Intertidal substrate (approx. 350m)	• Lowland calcareous grassland (approx. 250m) • Lowland fens and reedbeds (approx. 300m) • Lowland meadows (approx. 350m) • Intertidal substrate (400m)	
Ancient or veteran trees	Ancient semi-natural woodland associated with Glamorganshire Golf Club is located within the Study Area, approximately 350m west of the indicative grid connection route.	No ancient woodland or veteran trees identified within the Study Area.	
Arboriculture (TPO)	Several Tree Preservation Orders (TPOs) occur within the Study Area. The closest protected trees are located adjacent to the indicative grid connection route along St Mary Well Bay Road (TPO references 008-1952-06-G01 and 008-1952-06-G02).	Several Tree Preservation Orders (TPOs) occur within the Study Area. The closest protected trees are located adjacent to the indicative grid connection route along St Mary Well Bay Road (TPO references 008-1952-06-G01 and 008-1952-06-G02).	
Noise and vibration	Study Area is partially located within the Cardiff Built Up Area, and indicative grid connection	Study Area is partially within the Barry Built Up Area, and indicative grid connection route passes residential, recreational,	It is anticipated that Option 1 would be routed principally along Lavernock Road (B4267), whilst Option 2 would be routed along Lavernock Road, South Road and Sully Moors Road. Both routes pass through urban areas containing residential, community and commercial

Environmental Topic	Option 1 – Penarth Primary Substation	Option 2 – Sully Grid	Appraisal and Conclusions
	route passes residential, recreational, educational (including Evenlode Primary. and Stanwell schools) and commercial premises, along with international and nationally designated sites.	educational and commercial premises, along with international and nationally designated sites.	receptors and are located in proximity to internationally and nationally designated ecological sites. Given the proposed use of existing highway corridors, baseline noise levels are expected to be influenced by existing road traffic and associated urban activities. Construction-related noise and vibration effects would be temporary, transient and localised in nature, moving progressively along the route as works advance and ceasing following completion of the cable installation. These effects would be expected to be managed through standard construction good practice (Best Practicable Means), including the use of appropriately maintained plant, adherence to defined working hours, careful programming of works and implementation of appropriate noise and vibration control measures. The desk-based review has not identified any noise and vibration constraints that would reasonably be expected to preclude delivery of either indicative grid connection route or give rise to likely significant effects.
Historic environment			
World heritage sites	No World Heritage Sites identified within the Study Area for either grid connection route.		Designated historic assets, including listed buildings, scheduled monuments and conservation areas, occur within the Study Areas of both routes. However, the indicative grid connection routes are anticipated to comprise underground cable installation predominantly within existing highway corridors, thereby avoiding direct interaction with the identified heritage receptors. Furthermore, as the potential Grid Connection routes are largely confined to previously disturbed highway land, the potential for previously unrecorded archaeological remains to be present and affected is considered low.
Listed buildings	Several listed buildings are located within the Study Area, including (approximate distance from the indicative grid connection route): • Original House at Lower Cosmeston Farm (Record No. 87852) (60m)	Several listed buildings are located within the Study Area, including (approximate distance from the indicative grid connection route): • Limekiln (Record No. 26973) (300m) • Church of St John the Baptist (Record No. 13638) (60m)	

Environmental Topic	Option 1 – Penarth Primary Substation	Option 2 – Sully Grid	Appraisal and Conclusions
	• The Red House (Record No. 13380) (300m). • Remains of Cwrt-y-vil Grange (Record No. 13346) (50m) • Limekiln (Record No. 26973) (300m) • Church of St John the Baptist (Record No. 13638) (60m).	• Original house at Lower Cosmeston Farm (450m)	On this basis, the desk-based review has not identified any historic environment constraints that would reasonably be expected to give rise to likely significant effects.
Scheduled monuments	One scheduled monument is located within the Study Area - Cogan Deserted Medieval Village (Record No. 1610) located approximately 400m from the indicative grid connection route.	One scheduled monument is located within the Study Area - Middleton Moated Site (Record No. 187) located approximately 300m from the indicative grid connection route.	
Registered parks, gardens and battlefields	No Registered Parks, Gardens or Battlefields identified within the Study Area for either grid connection route.		
Conservation areas	One conservation area was identified within the Study Area - Penarth Conservation Area located approximately 300m from the indicative grid connection route.	No Conservation Areas identified within the Study Area.	
Air quality	No Air Quality Management Areas (AQMAs) identified for either grid connection route. However, both routes pass		No Air Quality Management Areas were identified in association with either route. Whilst both routes pass through urban areas containing

Environmental Topic	Option 1 – Penarth Primary Substation	Option 2 – Sully Grid	Appraisal and Conclusions
	through urban and residential areas containing sensitive human receptors.		sensitive receptors, any construction-related air quality effects would be temporary and localised. It is also expected that construction dust would be managed through the implementation of standard good practice measures. No air quality constraints have been identified that would reasonably be expected to result in likely significant effects.
Water environment and flood risk			
Rivers, canals and transitional water bodies	One main river is located within the Study Area - Sully Brook. Sully Brook is located adjacent to Lavernock Road but is not crossed by the indicative grid connection route. No Source Protection Zones (SPZs) identified.	Several Main Rivers are located within the Study Area, including: • Sully Brook, which is crossed by the indicative grid connection route. • Sully Drain, which is crossed in two locations by the indicative grid connection route • Cadoxton River, located approximately 160 m north of the Sully Grid Bulk Supply Point (Option 2). No Source Protection Zones (SPZs) identified.	Both routes pass through areas of Flood Zone 2 and Flood Zone 3, whilst Option 2 would also traverse locations where the existing highway network crosses Main Rivers. However, the indicative grid connection routes are anticipated to comprise underground cable installation predominantly within existing highway corridors and associated infrastructure corridors and therefore would not require the creation of new watercourse crossings. Potential effects on the water environment would be expected to be avoided or minimised through the implementation of standard construction good practice, including appropriate pollution prevention measures, sediment control, management of surface water runoff and the careful management of works in close proximity to watercourses. On this basis, the desk-based review has not identified any water environment or flood risk constraints that would reasonably be expected to give rise to likely significant effects.
Designated flood zones	Areas of Flood Zone 2 and Flood Zone 3 occur within the Study Area, including sections that interact with the indicative grid connection route.	Areas of Flood Zone 2 and Flood Zone 3 occur within the Study Area, including sections that interact with the indicative grid connection route.	

Environmental Topic	Option 1 – Penarth Primary Substation	Option 2 – Sully Grid	Appraisal and Conclusions
Geology, soils and agriculture	Predominantly underlain by Triassic mudstones and Lower Jurassic limestone and shale sequences. Localised areas of made ground and reclaimed land associated with historical development and infrastructure. Land use within the route corridor is predominantly urban, transport infrastructure and managed greenspace.	Predominantly underlain by Triassic mudstones with localised limestone outcrops. Localised areas of made ground and reclaimed land associated with Barry Docks and surrounding infrastructure. Land use within the route corridor is predominantly urban and transport infrastructure.	No notable geological, soil or agricultural land constraints have been identified within the Study Area that would reasonably be expected to result in likely significant effects. Ground conditions identified are considered typical of the wider area and do not present any obvious restrictions to cable installation. Furthermore, the indicative grid connection routes are anticipated to be installed predominantly within existing highway corridors, thereby limiting interaction with agricultural land and reducing the potential for significant effects on geological, soil and land quality receptors.
Traffic and transport	Route follows St Mary Well Bay Road, Lavernock Road, Dinas Road, St Peter's Road and St Paul's Avenue before terminating at Penarth Primary Substation. Several PRoWs and a National Cycle Network route occur within the Study Area; none are crossed by the indicative alignment.	Route follows St Mary Well Bay Road, Lavernock Road, South Road and Sully Moors Road before terminating at Sully Grid Substation. Several PRoWs occur within the Study Area; none are crossed by the indicative alignment.	Both routes are anticipated to utilise existing highway corridors. Temporary traffic management measures would likely be required during construction, but no traffic and transport constraints have been identified that would reasonably be expected to result in likely significant effects.
Population and Human Health	Study Area is partially located within the Cardiff Built Up Area, and indicative grid connection	Study Area is partially located within the Barry Built Up Area, and indicative grid connection route passes residential and	Both routes pass through areas containing residential, recreational and community receptors. The anticipated works comprise temporary underground cable installation predominantly within existing highway corridors and are therefore expected to give rise only to temporary and

Environmental Topic	Option 1 – Penarth Primary Substation	Option 2 – Sully Grid	Appraisal and Conclusions
	route passes residential and commercial premises. Of note includes Evenlode Primary and Stanwell schools, Glamorganshire Golf Club, Comeston Lakes Country Park.	commercial premises. Of note includes Comeston Lakes Country Park and Sully Sports Fields.	localised disruption during construction. Potential effects on population and human health would be expected to be minimised through standard construction good practice, including traffic management, dust control, noise management and the maintenance of safe access arrangements. On this basis, no population and human health constraints have been identified that would reasonably be expected to give rise to likely significant effects.
Major accidents and disasters	Both indicative grid connection routes are located predominantly within existing highway corridors in an urban and suburban environment and would connect to existing electricity network infrastructure.		No environmental conditions or receptors have been identified that would indicate a heightened susceptibility to major accidents or disasters beyond those typically associated with utility infrastructure works. Risks associated with construction would be managed through established health, safety and environmental management procedures, whilst detailed design would account for existing utilities, flood risk and other relevant engineering considerations. Consequently, no major accident or disaster constraints have been identified that would reasonably be expected to give rise to likely significant effects.

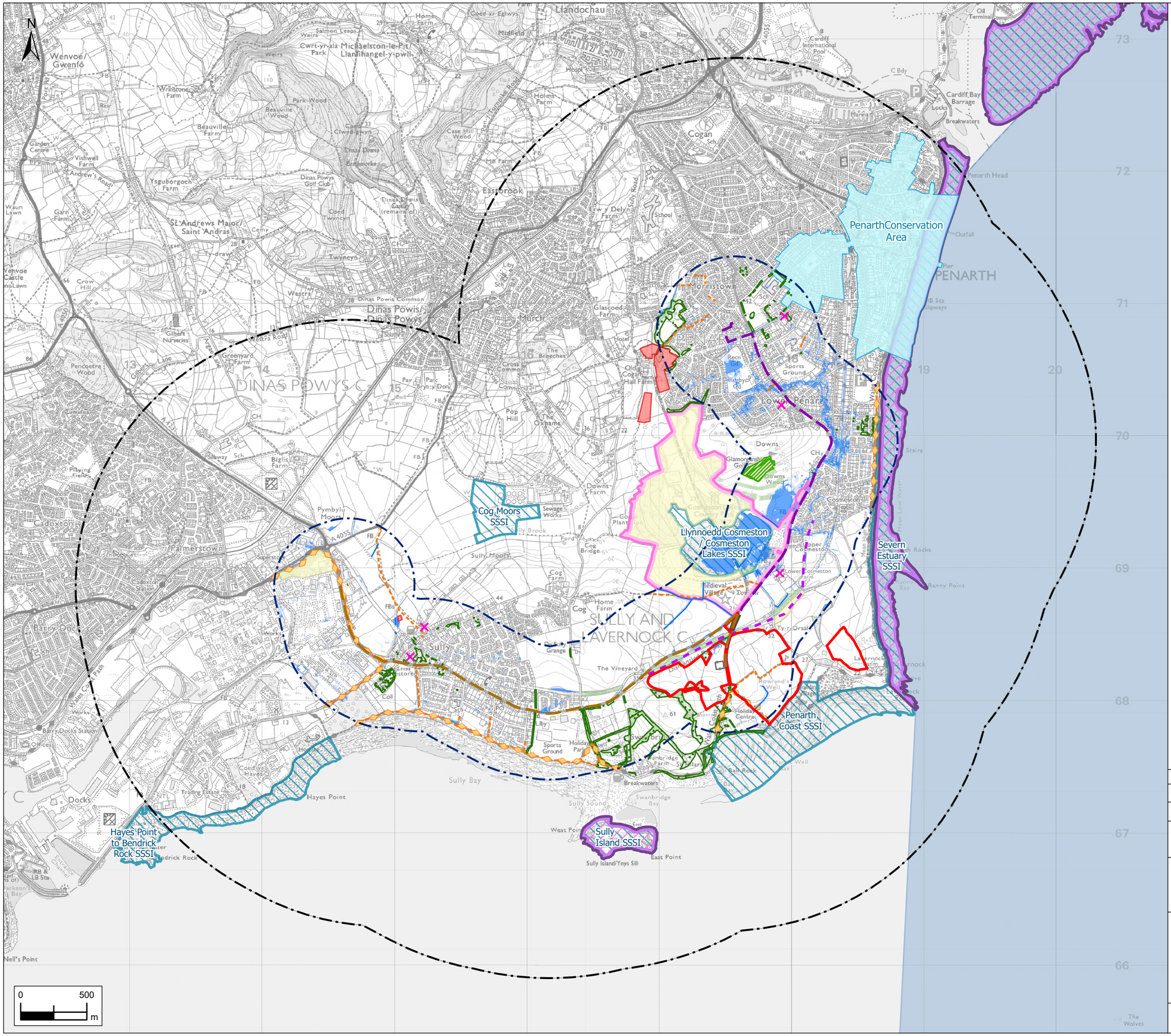
1.4. Summary and conclusions

1.4.1. This appraisal is intended solely as a high-level environmental review of the indicative grid connection routes to inform the Environmental Statement, including the cumulative effects assessment. It does not constitute a route feasibility study and has not considered engineering design, cost, planning and other technical considerations. Consequently, the conclusions of this appraisal should not be relied upon for route selection or wider project decision-making purposes.

1.4.2. A desk-based appraisal of the two indicative grid connection routes was undertaken to identify any environmental constraints that could reasonably be expected to influence route deliverability or give rise to likely significant environmental effects.

1.4.3. On the basis of the desk-based review, no environmental constraints have been identified that would reasonably be expected to prevent delivery of either indicative grid connection option or give rise to likely significant environmental effects. The identified environmental receptors represent matters requiring consideration during subsequent design development rather than fundamental constraints to development.

1.4.4. Accordingly, both indicative grid connection options are considered environmentally deliverable and no significant environmental effects are anticipated.



Legend

- Site Boundary
- 500m Buffer from Proposed Cable Route
- 2km Buffer from Proposed Cable Route
- Potential Cable Route - Option 1
- Potential Cable Route - Option 2
- Substation Fencing

Within 500m of Proposed Cable Route :

- Grade II Listed Building
- Proposed Active Travel Route
- Wales Coastal Path
- Public Right of Way
- Surface Watercourse
- Cosmeston Lakes County Park Local Nature Reserve (LNR)
- Sites of Importance for Nature Conservation (SINC)
- Ancient Woodland
- Tree Preservation Order
- Broadleaved Woodland
- Scheduled Ancient Monument
- Penarth Conservation Area
- Surface Water and Small Watercourses - Flood Zone 2
- Surface Water and Small Watercourses - Flood Zone 3

Within 2km of Proposed Cable Route :

- Severn Estuary Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)
- Severn Estuary Ramsar Site
- Severn Estuary Special Area of Conservation (SAC)

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0	04/11/2026	Initial Issue	AR	RJ	DP	SM

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Trydan Gwyrdd Cymru

Drawing No.: Figure 1