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Pentir to Trawsfynydd Reinforcement Project

Environmental Statement, Volume 3: Bryncir Works
September 2025

nationalgrid

Contents

Executive Summary 7

Introduction 18

1.1 Introduction 18
1.2 Previous Work 18
1.3 Structure of the Volume 18
1.4 Figures and Appendices 19

2. Bryncir Works 20

2.1 Introduction 20
2.2 Bryncir Location 20
2.3 Bryncir Works Description 21
2.4 Construction 24
2.5 Operation and Maintenance 30

3. Assessment of Alternatives 31

3.1 Introduction 31
3.2 Requirement for the Consideration of Alternatives 31
3.3 Design Alternatives 31

4. Landscape and Visual Amenity 35

4.1 Introduction 35
4.2 Legislation and Planning Policy 35
4.3 Study Area 36
4.4 Assumptions and Limitations 37
4.5 Baseline 37
4.6 Consultation and Scope of Assessment 42
4.7 Methodology 44
4.8 Potential Effects 45
4.9 Mitigation and Residual Effects 49
4.10 Summary 54

5. Ecology and Nature Conservation 55

5.1 Introduction 55
5.2 Legislation and Planning Policy 56
5.3 Study Area 58

5.4 Assumptions and Limitations 59
5.5 Net Benefits for Biodiversity 61
5.6 Baseline 63
5.7 Consultation and Scope of Assessment 94
5.8 Methodology 102
5.9 Potential Effects 102
5.10 Mitigation and Residual Effects 130
5.11 Summary 133

6. Historic Environment 134
6.1 Introduction 134
6.2 Legislation and Planning Policy 134
6.3 Study Area 135
6.4 Assumptions and Limitations 136
6.5 Baseline 136
6.6 Consultation and Scope of Assessment 138
6.7 Methodology 139
6.8 Potential Effects 139
6.9 Mitigation and Residual Effects 143
6.10 Summary 143

7. Geology, Hydrogeology, Land Use and Agriculture (Soils) 145
7.1 Introduction 145
7.2 Legislation and Planning Policy 145
7.3 Study Area 148
7.4 Assumptions and Limitations 149
7.5 Baseline 149
7.6 Scope of Assessment 160
7.7 Methodology 164
7.8 Potential Effects 164
7.9 Mitigation and Residual Effects 167
7.10 Summary 184

8. Water Quality, Resources and Flood Risk 185
8.1 Introduction 185
8.2 Legislation and Planning Policy 185
8.3 Study Area 187
8.4 Assumptions and Limitations 187
8.5 Baseline 187
8.6 Scope of Assessment 190
8.7 Methodology 194

8.8 Potential Effects 194
8.9 Mitigation and Residual Effects 195
8.10 Summary 202

9. Traffic and Transport 203
9.1 Introduction 203
9.2 Legislation and Planning Policy 203
9.3 Study Area 204
9.4 Assumptions and Limitations 204
9.5 Baseline 205
9.6 Scope of Assessment 211
9.7 Methodology 213
9.8 Potential Effects 222
9.9 Mitigation and Residual Effects 231

10. Air Quality and Emissions 236
10.1 Introduction 236
10.2 Legislation and Planning Policy 236
10.3 Study Area 237
10.4 Assumptions and Limitations 238
10.5 Baseline 239
10.6 Scope of Assessment 240
10.7 Methodology 241
10.8 Potential Effects 241
10.9 Mitigation and Residual Effects 245
10.10 Summary 247

11. Noise and Vibration 248
11.1 Introduction 248
11.2 Legislation and Planning Policy 248
11.3 Study Area 249
11.4 Assumptions and Limitations 249
11.5 Baseline 249
11.6 Scope of Assessment 251
11.7 Methodology 251
11.8 Potential Effects 251
11.9 Mitigation and Residual Effects 255
11.10 Summary 256

12. Socio-Economics 257
12.1 Introduction 257

12.2 Legislation and Planning Policy 257
12.3 Study Area 258
12.4 Assumptions and Limitations 260
12.5 Baseline 260
12.6 Scope of Assessment 269
12.7 Methodology 270
12.8 Potential Effects 271
12.9 Mitigation and Residual Effects 278
12.10 Summary 279

13. Climate Change 280
13.1 Introduction 280
13.2 Legislation and Planning Policy 280
13.3 Study Area 281
13.4 Assumptions and Limitations 282
13.5 Baseline 283
13.6 Scope of Assessment 289
13.7 Methodology 289
13.8 Potential Effects 289
13.9 Mitigation and Residual Effects 292
13.10 Summary 293

14. Materials and Waste 294
14.1 Introduction 294
14.2 Legislation and Planning Policy 294
14.3 Study Area 295
14.4 Assumptions and Limitations 296
14.5 Baseline 296
14.6 Scope of Assessment 296
14.7 Methodology 298
14.8 Potential Effects 299
14.9 Mitigation and Residual Effects 300
14.10 Summary 301

15. In-Combination Effects 303
15.1 Introduction 303
15.2 Legislation and Planning Policy 303
15.3 Methodology 303
15.4 Assessment 303

16. Cumulative Effects 304

16.1 Introduction 304
16.2 Legislation and Planning Policy 304
16.3 Study Area 304
16.4 Methodology 304
16.5 Potential Effects 305
16.6 Summary 305

Bibliography 306

Figures 324

Executive Summary

Background

Introduction

i. This document (Volume 3 – Bryncir) forms part of the Environmental Statement which accompanies applications by National Grid Electricity Transmission plc to construct and operate developments which comprise parts of the Pentir to Trawsfynydd Reinforcement Project (the 'Project'). Volume 3 focuses on the works at Bryncir. It provides an assessment of likely significant effects that could arise from the decommissioning of elements of the existing equipment and the construction, operation and maintenance of new infrastructure forming this aspect of the Project.

Bryncir Location

ii. The proposed works would be on a series of open fields on the eastern side of the existing 400 kilovolt (kV) overhead line, approximately 1.4 kilometres (km) south of Bryncir and 1.4 kilometres (km) west of Garndolbenmaen, North West Wales, in the administrative boundary of Gwynedd Council ('Bryncir works site') (see **Figure 3.2.1**). The Bryncir works site is on relatively flat ground with a slight slope to the west and is characterised by pastoral fields with an area of marshy grassland to the south-west. Agricultural Land Classification data identifies the Bryncir works site as a mix of Grade 3b, Grade 4 and Grade 5. The existing Pentir – Trawsfynydd overhead line and an existing 132 kV overhead line owned by Scottish Power Energy Networks (SPEN) (the 'DB route') runs through the Bryncir works site. The Llystyn Isaf candidate Wildlife site (cWS), Afon Dwyfach cWS, Tyddyn-y-Felin cWS and Dolwar Heath cWS all partially fall in the Bryncir works site, with several others in the wider area.

Bryncir Works

iii. The Bryncir works site covers an area approximately 12 hectares (ha); however, the permanent Bryncir Substation compound would cover approximately 4 ha, with the substation covering approximately 1 ha.

iv. Works would include the construction of a new 400 kV substation including a permanent access road, a new section of 132 kV underground cable, the relocation of Tower 4ZC067 80 m north-west of its current position, realignment of the DB connection route to connect into the new substation and decommissioning and removal of the redundant section, permanent diversion of the Dolbenmaen No 18 footpath and a new landowner track.

v. Construction of the Bryncir Substation would include the installation of a super grid transformer, support and electrical equipment, ancillary buildings, an access road and security fencing. The relocated Tower 4ZC067 would be built with excavation, concrete foundations, steel assembly, and stringing of overhead conductors, followed by dismantling the existing tower. The DB connection route includes the installation of a 132 kV underground cables and overhead lines via trenching and pole erection. The redundant section of the DB connection route will be dismantled and the ground fully reinstatement. Dolbenmaen No 18 footpath where it intersects the Bryncir works site will be temporarily closed during construction and permanently diverted during operation. To allow the landowner access across field boundaries south of the proposed Bryncir

Substation, a hardcore track extending an existing track will be provided to the south-west of the proposed Bryncir Substation.

vi. Construction activities would take place between 7.00 am – 7.00 pm over an 18 – 20-month period, anticipated to be between Quarter 1 2026 – Quarter 3 2027. During the construction phase, the access into the Bryncir works site will be from the A487 in the north, the access track will be made permanent and the design of which shall be suited for the passage of an abnormal (AIL) load i.e. super grid transformer. A range of vehicle types will be required at each construction phase including 4x4 vehicles, towed trailers, small ground survey plant, heavy goods vehicles, concrete truck mixers, plant deliveries and an AIL for the transformer delivery. The proposed works will require two construction compounds, the main compound will be immediately north to north-east of the proposed Bryncir Substation and will contain site offices and welfare facilities, storage and laydown areas and car parking. The secondary compound will be west of the main site entrance, immediately south of the A487 and will be used for the earthworks phase.

vii. During operation the Bryncir Substation would typically be unmanned, maintenance works would be undertaken every three years and visual checks would be undertaken on a monthly basis.

Alternatives

viii. In accordance with the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, design alternatives have been considered for the proposed works.

ix. In 2012, NGET evaluated 12 potential locations for the proposed Bryncir Substation, ultimately shortlisting three options: Northern, Central, and Southern. Each option proposed access from the A487 and positioning the substation parallel to the existing 400 kV line, with overhead lines connecting via gantries. The Northern option was located north of Bryncir, the Central to the west of Bryncir, and the Southern 1.4 km south of Bryncir and west of Garndolbenmaen. Although not favoured from a landscape and noise perspective, the Southern site emerged as the preferred choice due to its advantages in ecology and cultural heritage, and it received public and Natural Resources Wales (NRW) support during the 2012 consultation period.

x. Two broad indicative routes were considered for the new 132 kV supply to the existing DB route. Route A, approximately 550 m in length, would head directly west from the proposed Bryncir Substation crossing agricultural fields and crossing the B4411 and Afon Dwyfach before connecting into the DB route 132 kV overhead line. Route B, approximately 880 m in length, would head south-west from the proposed Bryncir Substation, crossing agricultural fields to the B4411 before turning west to cross it and the Afon Dwyfach and then continuing west to connect to the existing DB route 132 kV overhead line. Three options were considered for both Route A and B: 132 kV underground cables with HDD used to cross the B4411 and Afon Dwyfach; 132 kV overhead line; and combining 132 kV underground cables and 132 kV overhead line. Route A, option 3 (combining 132 kV underground cables and 132 kV overhead line) was preferred as it was cost effective whilst having less effect on agricultural land and avoided the Tyddyn-y-Felin cLWS.

Key Findings of the Environmental Impact Assessment

Landscape and Visual Amenity

xi. The Study Area for Landscape and Visual Amenity encompasses land within a 3 km radius of the Bryncir works site. The Bryncir works site is not covered by any statutory landscape designations, however part of the Study Area falls with Eryri National Park which is 1.1 km east of the Bryncir works site at its closest point. The Bryncir works site is relatively flat with a slight slope to the west, the Study Area is gently undulating. Settlement in the Study Area comprises scattered farms and individual properties. Public Right of Way (PRoW) Dolbenmaen No 18 footpath passes through the centre of the Bryncir works site.

xii. The proposed works would introduce some new elements into the landscape, creating the potential for significant landscape and visual effects. The effects from the following activities could occur simultaneously or in isolation: vegetation clearance, utility diversions, temporary compounds, construction activities, temporary access tracks, low level lighting and new infrastructure. During operation, the proposed works has the potential to create landscape or visual effects due to the introduction of new infrastructure.

xiii. Embedded mitigation measures include minimising the extent of the proposed works, incorporation of new and additional planting such as hedgerows and trees, optimising zones with construction compounds, reinstating land used temporarily, confining lighting to locations where safety if a priority, minimise the use of tall equipment, design permanent structures i.e. overhead line poles in a way that minimises their visual impact and minimise construction duration.

xiv. No significant effects have been identified for landscape receptors during construction or operational phases. During construction receptors at viewpoints 1 and 2 would experience significant effects on visual amenity due to the introduction of construction activities. At operation year 1 (winter) significant effects would remain at viewpoints 1 and 2, close to the proposed works and with limited intervening vegetation. At operation year 15 (summer) impacts would reduce to non significant levels as a result of the established boundary planting. No significant effects have been identified for receptors at the remaining representative viewpoints, for all assessment phases.

Ecology and Nature Conservation

xv. The Study Area or Zone of Influence for the proposed works was defined to assess potential ecological risks from direct and indirect impacts. The Zone of Influence considers the nature of the proposed works, nearby land use, habitats, watercourses, species behaviours, and duration of effects. It incorporates designated sites, sensitive habitats, and protected and notable species within varying distances from the Bryncir works site, considering professional good practice and guidance. A desk study was carried out to identify sites designated for nature conservation and records of protected or notable habitats and species (important ecology features) and Invasive Non-Native Species (INNS) that are relevant to the Bryncir works site. The desk study also identified the status of water bodies covered by the Water Framework Directive (WFD) to identify those likely to be impacted from an ecological perspective. Cofnod, the local biological records centre, was contacted in June 2023 to gain information on pre-existing ecological data (i.e. locations of locally designated sites, HoPI, ancient woodland and existing records of protected and notable species, and INNS within 2 km of the Bryncir works site). A series of field surveys have been undertaken including an extended Phase 1 habitat survey, targeted habitat survey, aquatic scoping surveys,

hedgerow, aquatic macrophyte, aquatic macroinvertebrate, bats (ground level tree, potential roost features, roost, foraging and commuting), badger, riparian mammals and INNS surveys.

xvi. The Bryncir works site comprises various types of woodland, scrub, grassland, hedgerows, buildings and running water. There are five international statutory sites for nature conservation (Special Areas of Conservation, Special Protection Areas and Ramsar sites) within 10 km of the Bryncir works site. Nine other statutory designated sites (Site of Special Scientific Interest, National Nature Reserve and Local Nature Reserves) are present within 5 km of the Bryncir works site. There are 39 non-statutory sites designated for nature conservation within 2 km of the Bryncir works site, four of which are partially in the Bryncir works site. There are six areas of ancient semi-natural woodland, one site of restored ancient woodland and one site of ancient woodland of unknown category within 2 km of the Bryncir works site. Habitats of Principal Importance identified within 1 km of the Bryncir works site include purple moor grass and rush pastures, lowland heathland, lowland dry acid grassland, lowland fen and reedbed, lowland meadow, open mosaic habitat, traditional orchards, hedgerows, rivers and deciduous woodland. The following protected and notable species were identified within 2 km of the Bryncir works site: terrestrial invertebrates, aquatic macroinvertebrates (river skater only), fish, breeding birds, bats, badger, otter, hedgehog, brown hare, reptiles, flora and INNS.

xvii. The proposed works have the potential to affect ecology and nature conservation through habitat loss (temporary and permanent), disturbance (light, noise, vibration and human activity), habitat degradation, species mortality and spread of INNS during construction. During operation, no effects are anticipated. However, should maintenance works be intrusive and require refurbishment or replacement the sources of potential effects include species mortality, disturbance (light, noise, vibration and human activity) and spread of INNS. Embedded mitigation measures have been integrated into the proposed works to minimise potential ecological impacts from construction, operation, and maintenance. The proposed works have been designed to avoid impacts on designated sites and key habitats, with buffers applied to woodlands, hedgerows, trees, and watercourses. The Construction Environmental Management Plan will outline measures to address construction dust, pollution, water quality, light and noise. Vegetation clearance would be carried out in advance of the construction works commencing and would avoid the besting bird period, precautionary working methods will be adhered to in areas of habitat suitable for reptiles, common amphibians and common mammals. Sensitive habitats, such as the non-statutory sites in the Bryncir works site will be protected though the use of appropriate temporary ground protection trackway or matting, to limit damage. Lighting during construction will be minimal and comply with best practice guidelines to prevent disturbance to wildlife. Pre-construction surveys will ensure the latest data on protected species and INNS are used to inform mitigation measures, including wildlife protection and reasonable avoidance measures for badgers, otters and bats.

xviii. Additional mitigation for a veteran tree, marsh fritillary butterfly, roosting bats and migratory fish are required to minimise any potential residual adverse effects. With the implementation of suitable embedded mitigation and additional mitigation the assessment has concluded that the construction, operation and maintenance of the proposed works are unlikely to result in significant adverse effects to identified species, habitats and designated sites.

Historic Environment

xix. Two Study Areas were used for the Historic Environment assessment: a Study Area of 3 km from the Bryncir works site has been defined for designated historic assets and a 500 m Study Area for non-designated heritage assets. The settings of designated assets of the highest value (i.e. World Heritage Sites, scheduled monuments, Grade I and II* listed buildings, registered parks and gardens, conservation areas containing a number of assets of the highest value and registered historic landscapes) will be considered, up to 3 km from the Bryncir works site, this will be guided by the proposed works ZTV prepared as part of **Chapter 4: Landscape and Visual Amenity**.

xx. Most historic assets were scoped out of further assessment in the baseline study (**Volume 8, Appendix 3.6.A: Historic Environment Desk-based Assessment**) however, the proposed works could result in physical impacts or impacts on the setting of eight scheduled monuments, one Grade II listed building and nine non-designated historic assets.

xxi. The potential construction impacts associated with the proposed works include temporary short-term impacts to assets as a result of change to their setting, permanent impacts to assets as a result of change to their setting and permanent physical impacts to below ground archaeological remains.

xxii. While no significant effects have been identified on potential below ground archaeological remains, ground-breaking works will impact a non-designated historic asset of unknown date, the route of an old road (PRN 62128) from Garn Dolbenmaen. The potential additional mitigation measures include a programme of archaeological investigation, recording and reporting would not minimise the physical impact, as the archaeological evidence would still be removed, but would compensate for their loss by preserving them by record. No significant effects have been identified on the setting of designated historic assets during the construction or operation of the proposed works. Considerations of size, materials, distribution, lighting and screening in the final designs will ensure that impact on the setting of designated historic assets will be kept to a minimum.

Geology, Hydrogeology, Land Use and Agriculture (Soils)

xxiii. The Study Area comprises the Bryncir works site plus a 250 m and 500 m buffer extending to 1 km for water abstractions.

xxiv. The Study Area is underlain with Glaciofluvial Sheet Deposits, Alluvium, Peat and Till Superficial deposits and Llanbedrog Volcanic Group, Dwyfach Formation and Cwm Eigiau Formation Bedrock. There are no faults or linear features in the Study Area. There is one historic borehole log in the Bryncir works site. Ground stability classifies most of the Bryncir works site as stable, with some landslide, running sand and compressibility hazards. The Study Area sits on neutral and acid pastures and is in a Geological Landscape classed as outstanding. Under grass, the soils have a long grazing season. Free drainage reduces the risk of soil damage from grazing animals or farm machinery. A site survey of soils was carried out on 7 December 2016 for the previous application for the Bryncir Substation submitted in 2017. Although the survey extent does not coincide completely with the proposed works, Grade 3b, 4 and 5 agricultural land was identified, providing confidence that no best and most versatile land is present in the Study Area. There are no sites designated for geodiversity interest in the Study Area. A small section at the south-western most extent of the Bryncir works site falls within a Mineral Safeguarding Area (MSA) for sand and gravel. There is an area of surface ground workings including gravel pits, brit pits (detailed as ceased

gravel pits), refuse heals and a disused tip 15 m west of the Bryncir works site. There are other isolated areas in the Study Area (approximately 170 m west and 170 m south-west of the Bryncir works site) that are 'cuttings' and an area 125 m north of the Bryncir works site mapped as a 'pond'. There is a small area of underground workings approximately 15 m west of the Bryncir works site for 'Unspecified Melin' (dated 1913). In the Study Area there are three private water supplies, one commercial/industrial and two residential. There are two waste exemptions in the Study Area, one for the deposit of waste from dredging of inland water and another for spreading waste on agricultural land to confer benefit. There are no source protection zones, groundwater abstractions, historic landfill sites, sources of ground gas or licensed discharges in the Study Area.

xxv. The proposed works have the potential to cause geological and hydrological impacts. Construction activities have the potential to result in the loss or damage on the identified geological receptors i.e. bedrock. The Bryncir works site is predominantly within areas of low potential for ground instability, except for areas of Alluvium and Peat in the west where compressibility and uneven settlement hazards are likely present and also running sand conditions may be present. Temporary impacts on the sand and gravel MSA includes impediment of the MSA in the Bryncir works site. Construction activities could affect groundwater flow, quality, and levels, and create contamination risks from accidental spills, leaks, and the disturbance of existing contaminants. There is also a risk of importing potentially contaminated materials, exposing workers to harmful substances and temporary or permanent loss of soil resources. During maintenance works there is the potential for contamination of shallow groundwater from accidental leaks and spills, or plant breakdown. Other temporary impacts may also result from the use and storage of materials and substances (e.g. concrete, fuel, oils and soil) which have the potential to be mobilised to ground or controlled waters directly or within run-off. Maintenance workers could still be exposed to residual contamination, gases or vapours during excavations or in confined spaces.

xxvi. Mitigation measures including a Construction Environmental Management Plan, appropriate intrusive ground investigations of selected areas of the Bryncir works site, an inspection and discovery strategy, re-use of excavated materials onsite, soil and groundwater pollution control mitigation and a more detailed hydrogeological assessment should dewatering be required. Following the implementation of mitigation measures, no significant impacts on Geology, Hydrogeology, Land Use and Agriculture are anticipated.

Water Quality, Resources and Flood Risk

xxvii. The Study Area for the effects of the proposed works consists of the Bryncir works site and the immediate surrounding environs within 1 km of the Bryncir works site.

xxviii. There are one Main River, the Afon Dwyfach, in the Bryncir works site and the second, the Afon Dwyfor, in the Study Area. There are multiple unnamed ordinary watercourses in the Study Area which are tributaries of the Afon Dwyfach and the Afon Dwyfor. The Bryncir works site overlies freely draining, slightly acid loamy soils. There are four private water supplies, one licensed abstraction and six consented discharges in the Study Area. There is one water dependant designated site in the Study Area, the Llystyn Isaf SSSI is located approximately 320 m upstream of the Bryncir works site. The only permanent above ground infrastructure in Flood Zone 3 is an H pole to the west of the Afon Dwyfach, however there are several areas including the proposed Bryncir Substation at risk of flooding from surface water and small watercourses.

xxix. The potential Water Quality, Resources and Flood Risk effects during the construction phase includes: deterioration in the water quality of surface water bodies via generation

of sediment laden run-off from working areas and discharge of dewatered groundwater from excavations; potential effects on hydromorphology and flow regime of surface water bodies as a result of increased runoff, dewatering of excavations and sediment inputs from working areas; deterioration in the water quality of surface and groundwater bodies affected by disturbance of contaminated land, or accidental spillage of pollutants (e.g. fuel or oil); deterioration in water quality due to permitted discharges from construction (e.g. treated sewage effluent from welfare facilities) and impacts to groundwater levels for dewatering activities and the effects on underground infrastructure. During operation, effects include potential for accidental contamination entering watercourses associated with spillage or leakage of fuels, lubricants or other chemicals and changes to surface water flood risk due to changes in flow pathways and runoff rates resulting from changed ground levels and creation of new impermeable surfaces for permanent above ground infrastructure.

xxx. Mitigation measures including an Environmental Management Plan, Flood Evacuation Plan, Pollution Prevention Plan and a Pollution Incident Response Plan will be produced. In additional construction works will take place during periods of normal to low flow conditions to avoid conveyance-related flood risk effects. Following the implementation of mitigation measures, no significant impacts on Water Quality, Resources and Flood Risk are anticipated.

Traffic and Transport

xxxi. Several roads on the local and strategic highway network could be used by traffic associated with the proposed works and could be subject to increases in traffic. The roads identified cover likely routes to the Bryncir works site from the Strategic Road Network (SRN) and from local and regional population centres between a 30–45-minute drive time of the Bryncir works site. This is the likely catchment area for construction traffic. The roads in the Study Area included the A487 north of the B4411, the A487 east of the B4411 and the B4411 south of the A487. Automatic Traffic Counts (ATCs) have been carried out at specific locations on the roads above which, collectively, form the Study Area.

xxxii. The roads in the Study Area form part of the SRN, local highway network and unclassified roads. One footpath runs through the Bryncir works site and a second footpath slightly encourages into the northern extent of the Bryncir works site. One additional footpath and NCR 8 are in the Study Area. The Study Area is served by two bus routes, the closest rail station Criccieth located 7.1 km south of the Bryncir works site. Between 2016 – 2022, there were nine collisions in the Study Area, one fatal, three serious and five slight. The ATCs were carried out at three locations between 26 September – 02 October 2024 concluded the 24-hour annual average daily traffic was 16,510, 632 of which were heavy duty vehicles.

xxxiii. The potential construction impacts associated with the proposed works include severance of communities, driver delay, non-motorised user amenity, fear and intimidation, road safety and accidents, total traffic increase, heavy goods vehicles (HGVs) increase. No operational effects are anticipated as operational traffic levels are expected to be no different from the baseline.

xxxiv. Embedded mitigation measures include establishing appropriate access points to facilitate vehicle movements, bell mouth junctions would be designed in accordance with relevant standards, swept path analysis would be carried out for abnormal indivisible loads (AILs) and HGVs, AILs and HGVs would follow designated routes, internal routes would be unitised where practicable to avoid using the existing road network, traffic management would be employed where construction vehicles need to

interact with the public road network, implementing a Delivery Management System to control deliveries, construction staff would be directed to take the most direct route to the proposed works, car sharing would be encouraged and a specialised haulage service would be employed to facilitated movement of the transformer via AIL.

xxxv. Based on the outcome of the assessments, no significant adverse effects are anticipated at any of the assessed links. Traffic levels are expected to increase only minimally, and none of the links will experience increases substantial enough to result in significant impacts.

Air Quality and Emissions

xxxvi. An area of 10 km from the Bryncir works site has been considered with respect to published baseline information on existing air quality. Specific Study Areas were used to assess dust emissions generated during construction activities: dust emissions from construction activities include amenity or human health receptors in 250 m of the construction site and 50 m of the construction route; and ecological receptors in 50 m of the site or construction route, up to 250 m from the Bryncir works site entrance.

xxxvii. The Tyddyn y Felin, Afon Dwyfach, Rhwnddwyryd and Llystyn Isaf cWSs all partially fall in the Bryncir works site which would be sensitive to the impacts of dust settling either directly or indirectly through increased stresses on the plants. There are multiple residential receptors, a public house, three PRoWs (two in the Bryncir works site) and NCR 8 within 250 m of Bryncir works site.

xxxviii. The source of potential Air Quality an Emissions effects during the construction phase includes construction dust emissions and site plant emissions. Dust emissions are assessed using Institute of Air Quality Management guidelines. Earthworks, construction activities and trackout are all classed as having a large emission dust magnitude whilst demolition is classed as having a medium dust emission magnitude. The area surrounding the Bryncir works site is predominantly rural with several human health and nature conservation receptors. It is deemed to have low sensitivity to dust soiling, human health and nature conservation impacts. Overall, this results in Low risks of amenity impacts, health and ecological impacts occurring. The impact of operational and maintenance emissions has been scoped out of this assessment.

xxxix. A series of mitigation measures recommended by the Institute of Air Quality Management would be adopted during construction. Regular site visits would be conducted to monitor compliance with the Construction Environmental Management Plan. Dust mitigation will be implemented on the Bryncir works site throughout the works, and the residual effects are anticipated to be negligible and not significant.

Noise and Vibration

xl. The Study Area has been defined as 300 m from the Bryncir works for construction noise site and 100 m for construction vibration. Baseline monitoring surveys were undertaken at three locations to establish the ambient noise levels. There are eight sensitive receptors in the Study Area which were all are defined as of medium sensitivity to noise.

xli. There are six key phases of construction works that may result in potential adverse noise and vibration effects including preliminary works, enabling works, underground cable installation, overhead line installation, landscaping works for reinstatement and demobilisation. It is predicted that the day-time construction noise levels would be highest during the enabling works and landscaping works for reinstatement. Noise levels from construction activities are all expected to result in negligible impacts on a

medium sensitivity receptors (not significant) with the exception of one receptor which has the potential to experience noise level of 66 dB LAeq,T (equivalent continuous sound level) during the landscaping works for reinstatement phase, representing a minor adverse and not significant impact. The highest levels of ground-borne vibration are likely to be generated from the use of vibratory rollers, surface plant such as cranes, compressors and generators may also cause some ground-borne vibration. No significant impacts are anticipated as a result of vibration.

xlii. For the operational noise assessment, a worst-case rating noise level of 24 dB LAr,Tr was predicted externally at sensitive receptors. This is approximately equivalent to the measure background sound level at night and is a very low level of noise that would not cause disturbance. Operational noise effects are not significant.

xliii. Measures to control noise as defined in Annex B of BS 5228-1 and measures to control vibration as defined in Section 8 of BS 5228-2 will be adopted where reasonably practicable. These measures will be implemented during the construction works and secured through the Construction Environmental Management Plan. The assessment does not identify any significant residual noise and vibration effects.

Socio-Economics

xliv. Various Study Areas were used for the Socio-Economics assessment: a 60-minute drive area (Principal Economic Impact Area) which applies to employment generation, skills and training and gross value added; a 30-minute and 60-minute drive area for temporary accommodation services; up to 500 m radius from the Bryncir works site for PRoW and agricultural land holdings, residential properties, business premises, visitor attractions and development land; and a 1 km radius from the Bryncir works site for community facilities.

xlv. The baseline outlines the population, economy and local resources in the various Study Areas. The Principal Economic Impact Area had a population of 315,251 in 2021, with 25.6% of the population aged over 65. Employment rates in the Principal Economic Impact Area has a smaller proportion of economically active individuals. Employment by industry is similar to Gwynedd and Wales, the largest industries include human health and social activities; wholesale and retail trade; and repair of motor vehicles and motorcycles. Gwynedd is relatively less deprived on average compared to Wales. Accommodation capacity in a 30-minute and 60-minute drive of the Bryncir works site is sufficient, although it varies seasonally. There are two PRoW in the Bryncir works site, one passes through the centre of the Bryncir works site and the second only marginally falls within the boundary. There are a further 10 PRoW within 500 m. There is one community facility within 1 km; two visitor attractions, four business premises and several residential properties within 500 m of the Bryncir works site. There are four landowners and one tenant in the Bryncir works site. There are no open space or development land in 500 m of the Bryncir works site.

xlvi. During construction, the proposed works will support, on average, 16 total net jobs per day. Of those, four jobs will be expected to be taken-up by residents in the Study Area. The Great Grid Partnership partners are committed to creating opportunities for training, education and apprenticeships to support the UL energy sector, therefore there will be a beneficial impact on the local workforce relating to training and skills uplift. The proposed works will generate approximately £1,280,000 to the national economy, of which approximately £320,000 would likely be in the Study Area. During peak workforce employment and typical seasonal occupancy levels, 100% of the construction workforce could be accommodated within a 30 and 60-minute drive time of the Bryncir works site. The Dolbenmaen No 18 footpath would be temporarily closed, requiring users to use

the B4411 and 487 as alternatives. Temporary land take would be required from the four landowners and the tenant farming the landholdings in the Bryncir works site. During operation, Dolbenmaen No 18 footpath would be diverted around the proposed Bryncir Substation which would increase the length of the PRoW by approximately 90 m. One landowner will be affected by permanent land take as acquisition of land is required for the proposed Bryncir Substation.

xlvii. No additional mitigation or enhancement measures are required, due to no significant adverse effects associated with Socio-Economics being identified. No likely significant residual effects of the proposed works on Socio-Economics receptors are found.

Climate Change

xlviii. The Study Area for the greenhouse gas (GHG) assessment includes direct greenhouse gas emissions (arising through works on the Bryncir works site) and indirect greenhouse gas emissions (occurring outside the Bryncir works site). The Climate Change Risk Assessment Study Area encompasses the temporary and completed works that make up the proposed works. The In-combination Climate Change Impact Assessment is determined by the other topic assessments.

xlix. The greenhouse gas (GHG) assessment uses the current condition of the Bryncir works site, which consists of the carbon stock and sources of greenhouse gas emissions as the baseline. Greenhouse gas emissions are reported in line with the life cycle stages (pre-construction, product, construction process and operation). It is estimated the 90% of all emissions from the proposed work will arise from the pre-product, product and construction process stages. Based on a qualitative assessment, the impact of greenhouse gas emissions associated with the proposed works is minor adverse and not significant. No additional mitigation is required.

l. The GHG assessment is consistent with the ruling of the UK Supreme Court in the case of Finch v Surrey County Council. That ruling requires that planning authorities take account of the indirect as well as the direct environmental effects of a proposed development. The qualitative GHG assessment for the proposed works includes all relevant direct and indirect environmental impacts.

li. The Climate Change Risk Assessment considers how resilient the proposed works and surrounding environment are to current and project climate hazards. The climate risks were assessed as moderate, unlikely, or rare. While the event is possible, its occurrence is infrequent, with some evidence suggesting a potential shift from business as usual. The likelihood of the event is estimated to be between 0% and 50%. The consequence of climate change impacts was identified as insignificant and minor in terms of their impact on the proposed works. Risks identified during the construction and operation phases are not significant and no specific mitigation measures are required.

lii. It is not anticipated there will be any In-combination Climate Change Impacts on the receptors in the surrounding environments, and this has been scoped out of the climate assessment.

Materials and Waste

liii. Assessment of Materials and Waste effects have been scoped out of this volume of the ES as the proposed works are not anticipated to have significant impacts on Materials and Waste.

In-Combination Effects

liv. In-combination effects occur where a single receptor is affected by more than one type of effect arising from different aspects of the proposed works. In-combination effects are not assessed in this Volume, an assessment of the potential in-combination effects is carried out at a Project level and is discussed in **Volume 7: The Project and Cumulative Effects**.

Cumulative Effects

lv. Cumulative effects occur when two or more planned developments have an effect on the same receptor leading to an increase in the effect, and possibly an effect of greater significance. A 2 km buffer from the Bryncir works site has been implemented to assess the cumulative effects.

lvi. There are no other developments within 2 km of the Bryncir works sire, however, a full assessment of the potential cumulative effects is carried out at a Project level and is discussed in **Volume 7: The Project and Cumulative Effects**.

1. Introduction

1.1 Introduction

1.1.1 Volume 3 (this document) forms part of the Environmental Statement (ES), which accompanies applications by National Grid Electricity Transmission plc (NGET) to construct and operate developments which comprise parts of the Pentir to Trawsfynydd Reinforcement Project (the 'Project').

1.1.2 This volume focuses on works at Bryncir. It provides an assessment of likely effects that could arise from the construction, operation and maintenance of this aspect of the Project. A description of the Bryncir works is provided in **Chapter 2: Bryncir Works**.

1.2 Previous Work

Bryncir Substation Planning Permission

1.2.1 Planning permission for the Bryncir Substation was originally granted in 2017 and had a life of five years. In 2022, planning permission was approved to extend the period for starting the work for a further five years, provided a start on site was made before 07 March 2028.

1.2.2 The Project requires an amended design for the proposed Bryncir Substation and a new planning permission is needed.

North Wales Connection

1.2.3 The North Wales Connection (NWC) project, which proposed replacement conductors on part of the existing overhead line, replacement of the Glaslyn Cables and a new 400/132 kV substation (Bryncir Substation) south of the existing Tower 4ZC067, was cancelled after planning permission was granted. Findings of this project have been referenced in this document where appropriate.

1.3 Structure of the Volume

1.3.1 This volume is structured as follows:

- **Chapter 1: Introduction.**
- **Chapter 2: Bryncir Works.**
- **Chapter 3: Assessment of Alternatives.**
- **Chapter 4: Landscape and Visual Amenity.**
- **Chapter 5: Ecology and Nature Conservation.**
- **Chapter 6: Historic Environment.**
- **Chapter 7: Geology, Hydrogeology, Land Use and Agriculture (Soils).**

- **Chapter 8: Water Quality, Resources and Flood Risk.**
- **Chapter 9: Traffic and Transport.**
- **Chapter 10: Air Quality and Emissions.**
- **Chapter 11: Noise and Vibration.**
- **Chapter 12: Socio-Economics.**
- **Chapter 13: Climate Change.**
- **Chapter 14: Materials and Waste.**
- **Chapter 15: In-combination Effects.**
- **Chapter 16: Cumulative Effects.**

1.4 Figures and Appendices

1.4.1 All figures noted in this volume are in an appendix attached to this volume. All other supporting documents are compiled in Volume 8: Appendices.

1.4.2 The figure numbering system is as follows: Volume number, chapter number then 1, 2, 3 etc. For example, Figure 3.1.1.

1.4.3 The appendix numbering system is as follows: Volume number, chapter number, then A, B, C etc. For example, **Appendix 3.1.A**. All figures associated with a given appendix will follow the same system, followed by the figure number, for example, a figure to Appendix 3.1.A would be Figure 3.1.A.1, 2, 3 etc.

2. Bryncir Works

2.1 Introduction

2.1.1 This chapter provides a description of the works required at the Bryncir section of the Project (the 'proposed works'), the location and the construction (including decommissioning of existing infrastructure) and operation and maintenance details.

2.2 Bryncir Location

2.2.1 The proposed works would be on a series of open fields on the eastern side of the existing 400 kV overhead line, approximately 1.4 kilometres (km) south of Bryncir and 1.4 km west of Garndolbenmaen, North West Wales, in the administrative boundary of Gwynedd Council. The location of the proposed works is illustrated on **Figure 3.2.1,** ('the Bryncir works site'). The approximate centre of the Bryncir works site is Grid Reference SH485430.

2.2.2 The Bryncir works site is on relatively flat ground with a slight slope to the west. The north-eastern extent of the Bryncir works site, near the A487, lies at approximately 103 m Above Ordnance Datum (AOD) and it drops to 95 m AOD towards its southern extent. Moving east the Bryncir works site elevation continues to drop to approximately 80 m AOD on the western side of the Afon Dwyfach. Moving north of this location, the elevation increases to approximately 87 m AOD.

2.2.3 The Bryncir works site is characterised by pastoral fields with an area of marshy grassland to the south-west. The Bryncir works site is surrounded by a mix of field boundary types, being predominantly dry stone wall and post and wire fences, but with overgrown hedgerows and scattered hedgerow trees along the southern boundary and along the north-eastern boundary. Managed hedgerows line the southern boundary of the A487 as it faces the proposed works site. The Bryncir works site is on land which the Agricultural Land Classification (ALC) data identifies as a mix of Grade 3b (moderate quality), Grade 4 (poor quality) and Grade 5 (very poor quality) (Ref 2.1).

2.2.4 The existing Pentir – Trawsfynydd 400 kV overhead line runs along the western edge of the Bryncir works site and the pylons are visible from many views in the vicinity of the site and from elevated areas, including from the Eryri (Snowdonia) National Park to the north-east. A Public Right of Way (PRoW) Footpath 18 Dolbenmaen, currently runs through the Bryncir works site and will need to be permanently diverted to facilitate the proposed Bryncir Substation.

2.2.5 An existing 132 kV overhead line owned by Scottish Power Energy Networks (SPEN) ('the DB connection route') runs north to south through the western extent of the Bryncir works site, west of the Afon Dwyfach (see **Figure 3.2.2**). The DB connection route is approximately 600 m west of the proposed Bryncir Substation. The DB connection route runs south – south-west from Tower 4ZC070. The DB connection route is fed from downleads from Tower 4ZC070, which drop to a steel gantry. The DB connection route then runs for approximately 1.2 km before turning further west at another steel gantry

support and continuing. The DB connection route between the two steel gantries is suspended from eight wooden H-pole supports allowing three conductors to hang in flat formation.

2.2.6 The Llystyn Isaf candidate Wildlife Site (cWS), Afon Dwyfach cWS, Tyddyn-y-Felin cWS and Dolwar Heath cWS all partially fall in the Bryncir works site, with several others in the wider area. There is purple moor grass and rush pasture, lowland heath and lowland dry acid grassland in the Bryncir works site.

2.2.7 The Bryncir works site will be accessed from the north via the A487, which runs in a broadly east-west orientation. The B4411 runs in a broadly north-south orientation approximately 400 m to the west of the Bryncir works site and a local road passes approximately 875 m to the east, connecting the A487 to the B4411.

2.2.8 The Bryncir works site intersects one Public Right of Way (PRoW): the Dolbenmaen No 18 footpath (Ref 2.2)., A small part of a second PRoW, Dolbenmaen No 17 footpath, falls in the Bryncir works site at the north-eastern extent. National Cycle Route (NCR) 8 runs to the west of the Bryncir works site (Ref 2.3).

2.2.9 There are a number of isolated properties in the vicinity of the Bryncir works site; a small group is close to the junction of the B4411 and the A487, approximately 500 m north-west of the Bryncir works site.

2.3 Bryncir Works Description

2.3.1 The Bryncir works site shown on **Figure 3.2.2** covers an area approximately 12 hectares (ha). However, the permanent Bryncir Substation compound would occupy approximately 4 ha, with the substation covering approximately 1 ha.

2.3.2 The proposed works are summarised below:

- New 400 kV substation, including a permanent access road.
- New section of 132 kV underground cable.
- Relocation of existing Tower 4ZC067 80 m north-west of its current position.
- Realignment of the DB connection route and decommissioning and removal of a redundant section.
- Permanent diversion of the Dolbenmaen No 18 footpath.
- New landowner access track.

2.3.3 The proposed works are described in more detail below.

400 kV Substation Compound

2.3.4 A secure compound will be required to accommodate the single electrical transformer that would ‘step down’ the 400 kV voltage of the Pentir –Trawsfynydd circuit to a voltage of 132 kV, ready for connection to DB connection route.

2.3.5 The compound footprint dimensions are approximately 100 m x 150 m and it will be surfaced with stone chippings. Under normal operating conditions the substation will be remotely monitored (unmanned). Visual checks would be undertaken on a monthly inspection visit to the substation compound. Whilst external lighting will be installed at

the substation for emergency work during hours of darkness, the substation will not normally be lit.

2.3.6 The principal components of the proposed Bryncir Substation are shown on **Figure 3.2.2** and the equipment to be installed at the proposed Bryncir Substation comprises:

- Super Grid Transformer (one x 400/132 kV) – required to change line voltage to a higher or lower level and regulate the voltage, housed in a noise enclosure.
- Ancillary Buildings – a small single storey amenities building approximately 33 m long and 5 m high, with a small single storey building housing the main control systems.
- Busbars and Air Insulated Switch Gear (AIS) (one x 400 kV and one x 132 kV) – busbars are similar in appearance to scaffolding poles and carry electrical power around the substation to various equipment.
- Earth Switches (nine x 400 kV and nine x 132 kV) – an earth switch enables safe maintenance of the substation equipment.
- Disconnectors (three x 400 kV and three x 132 kV) – a disconnector provides an electrical break between the circuits.
- Circuit Breakers (three x 400 kV and three x 132 kV) – a circuit breaker provides a high-speed method of isolating circuit components in the event of a fault on the transmission or distribution networks.
- Cable Sealing Ends (x three) – used where high voltage underground cable joins onto an overhead line or busbar.
- Current Transformers (x six) – converts system current to levels which can be safely measured by control and protection equipment. They are positioned so that no part of the network is left unmonitored by protection systems.
- Settlement Metering (x three) – provides a measurement of the power transferred from NGET (400 kV) to SPEN (132 kV) at Bryncir Substation.
- Diesel Generator – provides standby low voltage alternating current (LVAC) supplies in event of a power failure.
- Gantry – a structure, up to 10.5 m in height, which supports electrical conductors as they transition from an overhead line tower to busbars and equipment within a substation.
- LVAC Transformer – site electrical 230 voltage supplies.
- Surge Arresters (three x 400 kV and three x 132 kV) – a surge arrester provides a path to earth when triggered by an abnormal voltage condition (e.g. lightning strike) to protect key equipment.
- Voltage Transformers (three x 400 kV and four x 132 kV) – converts system voltage to levels which can be safely measured by control and protection.
- Water Tank – water source for firefighting.
- Oil Interceptor – separates water from contaminants such as oil, grease and sediment.

- Access Road – access to the Bryncir works site would be from the A487 using an upgraded existing access track located opposite Bryn-yr-efail-uchaf, before following field boundaries to the substation compound. The permanent access road would be approximately 250 – 300 m long with a maximum width of 6 m and would have a tarmacadam surface with crossing points to enable landowner access across the road.
- Security Fencing – 2.4 m high galvanised steel palisade fencing with an electric fence backing of 3.4 m height from ground level.

Drainage

2.3.7 Foul water generated from the new control building will be stored in a cess tank or similar which will be emptied via a tanker.

2.3.8 Surface water will drain via pipes and swales into an attenuation basin. The discharge from the attenuation basin will be to the existing ditch running south of the proposed Bryncir Substation location. The attenuation basin will be approximately 1.5 ha with a 3 m wide grass strip around the basin for access.

2.3.9 Rainwater from transformer bunds will be pumped into a Class 1 Full Retention Oil Separator, before entering the surface water network. Penstocks will be provided to allow discharge from the system to be shut off in emergencies or for sampling.

Landscape

2.3.10 The construction compounds will be reinstated to existing habitat.

2.3.11 The clawdd along the A487 will be reconstructed behind the visibility splay with native species hedgerow and stock proof fencing. The eastern side of the access road will consist of a combination of species-rich hedgerow, clawdd, willow trees and species-rich meadow. The western side of the access road will include a strip of species rich grassland with stock proof fencing.

2.3.12 An area adjacent to the western substation boundary will be returned to species rich meadow.

Tower 4ZC067

2.3.13 To provide a 400 kV supply into the proposed Bryncir Substation, the existing Tower 4ZC067 will be removed and a new one constructed 80 m up the line of its current position. The new tower will be the same design and height, 49 m, as the current Tower 4ZC067. Downleads 30 m long will be required from the new tower into a gantry within the proposed Bryncir Substation.

DB Connection Route

2.3.14 The DB connection route will connect to the proposed Bryncir Substation using part underground cables and part overhead line. As the DB connection route leaves the proposed Bryncir Substation to the east, the first part would be underground cables crossing beneath the 400 kV double circuit Pentir to Trawsfynydd overhead line. The underground cables would then turn north passing through two fields before turning west to meet a terminal structure described below. The underground section would be

approximately 600 m long. The 132 kV underground cables would be installed in either trefoil formation or flat formation.

2.3.15 A 250 m section of overhead line section of the DB connection route would cross the B4411 and Afon Dwyfach. The transfer mode between underground cables and overhead line would be a terminal structure approximately 125 m east of the B4411 close to a field boundary. This would require support guys to maintain appropriate support and tension as the overhead line heads west across the road. This cable termination structure would be as close as possible to the corner of the field. A further wood pole support would be required between the terminal structure and its connection to part of the existing DB connection route because of the length of span (approximately 144 m). This pole support would be an H pole approximately 15 m high.

2.3.16 The redundant part of the DB connection route, approximately 625 m in length, between the new connection and Tower 4ZC070 would be removed. There would be two secondary access points off a single track lane to the east of the B4411 that would provide access to the DB connection route on the eastern side of the Adon Dwyfach.

Footpath Diversion

2.3.17 PRoW Dolbenmaen No 18 footpath currently runs through the Bryncir works site and will need to be permanently diverted to facilitate the proposed Bryncir Substation. The footpath will be diverted initially along the proposed substation access track, then across a field to cross a field boundary via new kissing gates. The diversion would then follow the field boundaries to the east of the proposed Bryncir Substation before turning east to follow the southern boundary of the field. The field boundary would be crossed via a new kissing gate. The footpath would then join the existing alignment of the footpath south-west of the proposed Bryncir Substation. The footpath would not be surfaced. The diverted footpath will be approximately 95 m longer than the current route.

Landowner Track

2.3.18 To allow the landowner access across field boundaries south of the proposed Bryncir Substation, a hardcore track extending an existing track will be provided to the south-west of the proposed Bryncir Substation. The track will be approximately 250 m long.

2.4 Construction

General Construction Information

2.4.1 During installation, the appointed Contractor would be required to operate under a detailed site-specific Construction Environmental Management Plan (CEMP). It would implement the mitigation measures identified in this ES and the outline CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**). The CEMP would set out a variety of control measures for managing the potential environmental effects of the proposed works including control and management of noise, dust, surface water runoff, waste and pollution control and set out responsibilities for the preparation and implementation of the plan.

Construction Waste and Spoil

2.4.2 Subject to geotechnical testing, excavated materials will be re-used on site wherever possible. An Earthworks Material Management Plan will identify materials to be re-used, and material which will need either importing or exporting off site. Where waste materials are to be disposed of off-site this will be at licensed waste disposal facilities in accordance with a Site Waste Management Plan.

Site Lighting

2.4.3 During construction, general low-level lighting for access will be required at the temporary construction compounds and task lighting required as needed for the general works.

Installation Activities

Tower 4ZC067

2.4.4 A new 4 m wide stone road will be built around the northern perimeter of the new Bryncir Substation, which will provide access to the new Tower 4ZC067 and will carry on to a 40 m x 40 m working area immediately to the east of the new tower. The working area will comprise of a stone base and will be installed to provide the working area for new Tower 4ZC067.

2.4.5 The construction of the foundation installation for the new tower is currently scheduled for October 2026, and this will be constructed at the same time as the proposed Bryncir Substation. Construction of the foundation will take approximately four weeks.

2.4.6 The assembly and erection of the new Tower 4ZC067 will take place between June to August 2027, and this will include the downleads into Bryncir Substation and the removal of the existing Tower 4ZC067. The foundation for the existing Tower 4ZC067 will be cut 1 m below ground level, removed and re-instated during this period. Vegetation clearance will include low level strimming of grassland, and adequate fencing will be installed around the excavation using scaffolding rails, or Heras panels. Re-conducting of the route will take place August to October 2027.

2.4.7 Construction equipment required includes lorry low loaders, 32 tonne excavator, flat bed lorries and welfare vehicles for the foundation construction. For the tower erection and dismantle equipment required includes: 100 foot (ft) crane and 360 telehandler. For re-conducting this will be a machine site with Equipotential Zone set up in both directions from Tower 4ZC067.

DB Connection Route

2.4.8 The existing DB route will connect to the proposed Bryncir Substation using part underground cables and part overhead line (see **Figure 3.2.2)**.

2.4.9 The cables will be installed in trefoil formation and turn north passing through two fields before turning west to meet the terminal structure. Access would be via a temporary haul road or steel trackway running alongside the cable route. The cables would be laid via an open cut trench of approximate section 1 m x 1 m. The method of trenching will be via mechanical excavator with subsoil and topsoil stored separately and used during backfill to reinstate the surface as existing. The approximate length of cable route is 600 m.

2.4.10 An overhead line of approximately 250 m would cross the B4411 and the Afon Dwyfach. The method of installing the overhead line involves taking materials to each support site, assembling the support structure on the ground, excavating a trench approximately 1 m deep, 1 m wide and 4 m long, lifting the support structure into the trench and compacting and backfilling.

2.4.11 A minimum of two excavators and a 4x4 pick-up truck would be required to visit each support site for construction. Temporary access will be required along the route, with access points from the perimeter of the substation and the B4411. Aluminium trackway or 'bog mats' would be used to avoid or minimise ground disturbance from vehicles tracking to the working areas and around them as appropriate.

2.4.12 Scaffolding would be required to support netting strung to protect the B4411 and the Afon Dwyfach. The scaffolding will not be located within the Tyddyn-y-Felin cWS between the Afon Dwyfach and the B411, nor within 10 m of the Afon Dwyfach.

2.4.13 The connection to the existing DB connection route will require a new support structure. This would require excavation of pits for foundations and filling with concrete and the stub foundation on which the gantry would be constructed from sections delivered to the Bryncir works site.

Removal of Redundant Section of the DB Connection Route

2.4.14 The removal of the redundant part of the existing DB connection route would involve removing the conductors between the new connection and Tower 4ZC070 and removing fittings from the supports.

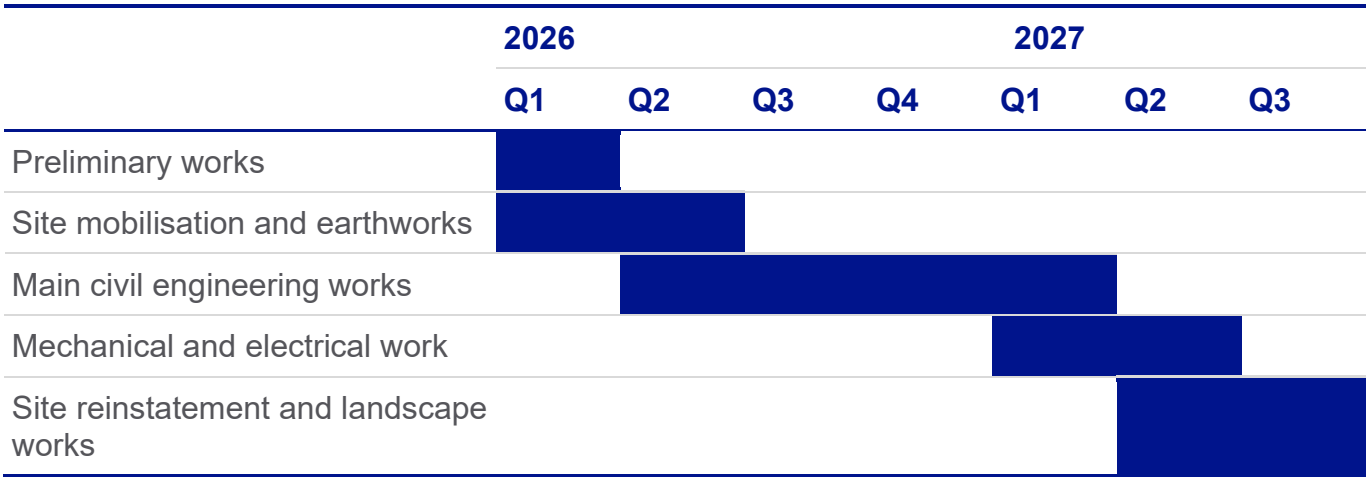
2.4.15 The timber supports may be removed by excavation. Steel supports typically are dismantled with foundations removed entirely or to a depth of 1 m. The vehicles anticipated at each working area are the same as those described in paragraph 2.4.7 for construction with similar means of avoiding or minimising damage to the ground surface.

Dolbenmaen No 18 Footpath Diversion

2.4.16 During construction, the section of the Dolbenmaen No 18 footpath running through the Bryncir works site will be temporarily closed. Stiles and gates for the permanent footpath diversion would be installed during construction for proposed diverted footpath. The footpath including the diverted section will be reopened once operation commences.

Construction Programme

2.4.17 The proposed works are planned to be undertaken over a period of approximately 18 – 20 months from Q1 2026 to Q3 2027. Construction will occur in phases, which will include activities summarised below.



- Preliminary works – further site investigation preconstruction surveys required to be undertaken in advance of construction. The existing consent requires an archaeological investigation to be undertaken which remains an anticipated requirement.
- Mobilising to site – this will include development of the site access, forming a temporary hardstanding just off A487. Short term temporary facilities including site offices, welfare, laydown and plant storage will be in place to enable the construction of the earthworks phase of activities. Liaison with Gwynedd Highways Authority will be required to agree the temporary closure of the Dolbenmaen No 18 footpath and Traffic Management requirements on A487.
- Vegetation Clearance and Earthworks – this will include: the diversion of services, de-vegetation and topsoil strip, landowner track construction, new bellmouth construction, access road construction, earthworks drainage, substation platform construction, hardstandings to main temporary site and laydown areas.
- Main civil engineering works – all reinforced concrete works (foundations, slabs etc), below ground earthing, drainage, ducts, troughs, permanent buildings (including services), boundary fence, internal roads, footpaths and car parking etc.
- Mechanical and electrical work – this will include all primary and secondary electrical plant and equipment and all Stage 1 and Stage 2 testing and commissioning.
- Site reinstatement and landscape works – this will include removal of site offices and temporary facilities, land reinstatement and landscape works.
- Fencing – temporary Heras fencing will be used for the substation and cable construction works.
- Lighting and CCTV – low level temporary external lighting will be in place to the site establishment compound and task lighting to specific activities during the works. Permanent external lighting is proposed, but only in use when the site is visited by NGET personnel i.e. hours of darkness.
- Noise – for general construction work the background noise level should not be exceeding 70 decibels (dB), or that greater from levels obtained from main A487 road. No exceedances in the 70 dB threshold are expected, see **Chapter 11: Noise and Vibration** for further details.

Construction Access

Site Access

2.4.18 Prior to the main construction works, access to the Bryncir works site will be required off the A487, in co-ordination with Gwynedd Highways Authority. Partial road closures at off-peak times are envisaged to get a foothold onto site. The final methodology would be agreed with Gwynedd Highways Authority as part of detailed design.

2.4.19 The Bryncir works site will be accessed from the north via a new access track from the A487. The design of which shall be suited for the passage of an abnormal (AIL) load i.e. super grid transformer. The access track will have crossing points to enable landowner access across the track.

Vehicle Movements

2.4.20 During construction a range of vehicles will be accessing the Bryncir works site. **Table 2-1** provides an indication of the number and type of vehicle movements at each phase of the proposed works.

Table 2-1 – Number and types of vehicles movements at each phase of the proposed works

Phase	Type	Frequency	Approximate duration
Preliminary works	4x4 vehicles, towed trailers, small ground survey plant	-	Two weeks
Site establishment and earthworks	Plant deliveries, heavy goods vehicles (HGV's)	-	Four months
Main civil engineering works	Plant deliveries, HGV's, concrete truck mixer	Up to 15 per day	10 months
Mechanical and electrical work	Plant deliveries, HGV's, AIL transformer delivery	Up to five per day	Eight months
Site reinstatement and landscape works	HGV's	Up to 15 per day	One month

Note – staff and visitor vehicles are not included in this table.

Construction Site Layout

2.4.21 Following pre-construction surveys, initial preparatory works would include earthworks activities including the construction of the access track, bell-mouth, substation platform, site compound and laydown areas.

2.4.22 Following detailed design, an Earthworks Material Management Plan would detail the volume of material that can be re-used (stockpiled on site), imported (clean stone etc) and exported off site.

2.4.23 Temporary fencing, comprising 2.4 m galvanised steel palisade, would be erected around the Bryncir works site and associated compounds early in the programme to secure the construction area and site security would be in place during non-working hours.

2.4.24 Foundations will be excavated at the substation site and supporting slabs for substation electrical equipment will be made. Ducts and troughs will be constructed to contain the electrical systems and an earth grid would be installed below the ground to create an 'earth mat' to make the compound electrically safe. Civil works will continue with the completion of roads, footpaths and buildings at the same time as the mechanical and electrical phase of the works starts with the installation of steel support structures and electrical equipment, including the delivery and installation of the super grid transformer.

2.4.25 Prior to the substation being brought into service, commissioning tests would be required to individual items of electrical plant (Stage 1 commissioning), culminating with testing the installed system as a whole. Following successful testing, the substation would be connected to the electricity transmission system.

2.4.26 The proposed works will require two compounds (**Figure 3.2.2**). The main compound will be immediately north to north-east of the proposed Bryncir Substation and will contain site offices and welfare facilities, storage and laydown areas and car parking. The secondary compound will be west of the main site entrance, immediately south of the A487 and will be used for the earthworks phase. Both compounds will be accessed via an access track from the A487.

2.4.27 The construction site will be securely fenced during the construction phase. During the construction phase there will be a requirement for temporary facilities including:

- Site offices including offices and meeting rooms.
- Staff welfare facilities including toilets, kitchen and mess room.
- Storage areas for construction vehicles, plant, equipment, materials and (where required) for storage of waste items to be removed.
- Appropriately bunded areas to be used for the storage of oils, other fuels and waste material, where required.

Staffing and Employment

2.4.28 The number of staff on the Bryncir works site would vary according to the construction phase and activities being undertaken; some activities may be run concurrently. It is anticipated that the following would be required for each phase of work:

- Preliminary works – two staff and four operatives.

- Site establishment and earthworks – four staff and 10 operatives.
- Main civil engineering works – eight staff and 24 operatives.
- Mechanical and electrical work – four staff and 10 operatives.
- Site reinstatement and landscape works – two staff and six operatives.

Hours of Working

2.4.29 Generally, construction activities will be undertaken during daytime periods only, from Monday to Friday 7.00 am – 7.00 pm (including an hour set up and hour shut down). No bank holiday or weekend working will be undertaken, unless agreed with the Local Planning Authority.

2.4.30 There may be some periods of extended or 24-hour working, for example oil filling of the transformer. However, this would be by agreement with the Local Planning Authority.

2.5 Operation and Maintenance

2.5.1 The substation would typically be unmanned. Maintenance of the substation would be undertaken approximately every three years, involving electrical isolation of equipment before any works are undertaken. Visual checks would be undertaken on a monthly inspection visit to the site. If the substation required refurbishment or replacement works, vehicles would be used to carry workers in and out of the site and suitable vehicles would be used to bring new materials and equipment to site and remove old equipment.

2.5.2 Permanent lighting will be installed but only used when the proposed Bryncir Substation is occupied.

2.5.3 The underground cables and overhead line will require maintenance and possibly replacement should a fault arise.

Electric and Magnetic Fields

2.5.4 All equipment that generates, distributes or uses electricity produces electric and magnetic fields (EMFs). An EMF report has been produced that sets out the technical specifications of the proposed works and how the proposed works would comply with EMF exposure guidelines. This report is in **Volume 8, Appendix 7.1.A: Electric and Magnetic Field Assessment.**

3. Assessment of Alternatives

3.1 Introduction

3.1.1 This chapter outlines the alternatives to the proposed works that have been considered by NGET.

3.2 Requirement for the Consideration of Alternatives

3.2.1 Part 5, 17 (3)(d) of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (the '2017 TCP EIA Regulations') (Ref 3.1) states that an ES should include;

"a description of the reasonable alternatives studied by the applicant or appellant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the significant effects of the development on the environment." To accord with the 2017 TCP EIA Regulations (Ref 3.1), design alternatives have been considered for the proposed works.

3.3 Design Alternatives

Bryncir Substation Siting Options

3.3.1 In 2012, NGET undertook a design and appraisal process which considered the development of the proposed Bryncir Substation. Twelve options were considered, however only three options (the Northern, Southern and Central options) were shortlisted. These three options were summarised in the Design and Access Statement for the original Bryncir Substation application (Ref 3.2).

3.3.2 The Northern Option would be north of Bryncir and access to the site would be from the A487. The substation would be parallel to the existing 400 kV line and the overhead line would connect from the eastern circuit with lines being brought down on to a gantry before entering the substation. The Southern Option substation site is 1.4 km south of Bryncir and 1.4 km west of Garndolbenmaen. Access to the site would be from the A487 utilising and upgrading an existing access point opposite Bryn-yr-efail-uchaf before following field boundaries to the 400 kV overhead line. The substation would be located parallel to the existing 400 kV line and the overhead line would connect from the eastern circuit with lines being brought down on to a gantry before entering the substation. The Central Option substation was to be sited to the west of Bryncir. Access to the site would be from the A487 crossing existing hardstanding and highway access points associated with the Bryncir Agricultural Market. The substation would be connected directed from the 400 kV line from a new pylon on to a gantry.

3.3.3 The Southern site was the favoured site from an ecological and cultural heritage perspective. This site was also preferred by the public during consultations held between 03 October – 21 December 2012 and by Natural Resources Wales (NRW). Although it was not favoured in terms of landscape and noise, it was concluded that

appropriate mitigation could be employed to enable this site to be an acceptable solution.

DB Connection Route Options

3.3.4 The section of the existing DB route between the connection to the new 132 kV supply and Tower 4ZC070 would be redundant and will be removed. This will require excavators and vehicles to run along the route to allow removal of 132 kV conductors, fittings and supports. This activity will be required for all options although the length of existing DB route to be removed would depend on the point of connection to the new 132 kV supply.

3.3.5 Two broad indicative routes were considered for the new 132 kV supply to the existing DB route. Route A would head approximately directly west from the proposed Bryncir Substation, crossing agricultural fields to the B4411 before crossing it and the Afon Dwyfach and continuing west to connect to the existing DB route 132 kV overhead line.

3.3.6 Route B would head approximately south-west from the proposed Bryncir Substation, crossing agricultural fields to the B4411 before turning west to cross it and the Afon Dwyfach and then continuing west to connect to the existing DB route 132 kV overhead line.

3.3.7 The indicative routes the lengths of options would depend on detailed routeing and design. The indicative Route A is approximately 550 m and indicative Route B is approximately 880 m. Although Route B is longer, it would avoid working in the Tyddyn-y-Felin cLWS habitat for the new 132 kV connection (assuming HDD would avoid any encroachment).

3.3.8 The use of open trenching of the 132 kV underground cables to cross the B4411 and the Afon Dwyfach was discounted because of disruption to the road, drainage and biodiversity interest of the river and land adjacent.

3.3.9 Three options were considered for both Route A and B:

- 132 kV underground cables with HDD used to cross the B4411 and Afon Dwyfach.
- 132 kV overhead line.
- Combining 132 kV underground cables and 132 kV overhead line.

3.3.10 **Table 3-1** summarises the options considered and the reasoning for the preferred option.

Table 3-1 - Connection options considered

Option	Description	Summary Assessment
A1	The 132 kV underground cables beneath the 4ZC overhead line would continue as underground cables installed by open trenching to a point in the agricultural field east of the B4411. 132 kV underground cables would be installed beneath the B4411 and Afon Dwyfach by HDD and would come to the surface avoiding or minimising encroachment on Tyddyn-y-Felin cLWS habitat. The 132 kV	This option would avoid constraints on agricultural land and would minimise disturbance to Tyddyn-y-Felin cLWS habitat. However, it is not as cost-effective as A2 or A3.

Option	Description	Summary Assessment
	underground cables would rise to a terminal structure from which conductors would connect to the existing DB route 132 kV overhead line.	
A2	The 132 kV underground cables beneath the 4ZC overhead line would rise to a terminal structure west of the 4ZC and continue west as an overhead line crossing the B4411 and the Afon Dwyfach and the cLWS land before turning south to connect to the existing DB route 132 kV overhead line.	This would be the most cost-effective option but would involve more supports on agricultural land than option A3 and possibly a support in the Tyddyn-y-Felin cLWS.
A3	The 132 kV underground cables beneath the 4ZC overhead line would continue north-west to a point close to the field boundary before rising to a terminal structure. The overhead line would run south-west with a support east of the B4411 and the road and the Afon Dwyfach would be crossed. A new steel gantry would be needed where the new section of line turns south to connect to the existing DB route 132 kV overhead line but this structure would not be in Tyddyn-y-Felin cLWS habitat.	This is preferred because it is cost-effective whilst having less effect on agricultural land and avoiding Tyddyn-y-Felin cLWS.
B1	The 132 kV underground cables beneath the 4ZC overhead line would continue south-west installed by open trenching to a point in the agricultural field south-west of the farmhouse and buildings and east of the B4411. 132 kV underground cables would be installed by HDD beneath the B4411 and Afon Dwyfach and would come to the surface avoiding cLWS habitat. The 132 kV underground cables would rise to a terminal structure from which conductors would connect to the existing DB route 132 kV overhead line.	This would be most likely to avoid adverse effects on the Tyddyn-y-Felin cLWS habitat but would be the least cost-effective of the options considered.
B2	The 132 kV underground cables beneath the 4ZC overhead line would rise to a terminal structure from which a new section of 132 kV overhead line would run a point in the agricultural field south-west of the farmhouse and buildings and east of the B4411. The 132 kV overhead line would continue across the B4411 and Afon Dwyfach and a new steel gantry would be needed where the new section of line turns	This would avoid adverse effects on the Tyddyn-y-Felin cLWS but would introduce more supports in agricultural land than A3 and would not be as cost-effective.

Option	Description	Summary Assessment
	south to connect to the existing DB route 132 kV overhead line but this structure would not be in Tyddyn-y-Felin cLWS.	
B3	The 132 kV underground cables beneath the 4ZC overhead line would continue as underground cables installed by open trenching to a point in the agricultural field south-west of the farmhouse and buildings and east of the B4411. The underground cables would rise to a terminal structure from which a section of new 132 kV overhead line would cross the B4411 and the Afon Dwyfach. A new steel gantry would be needed where the new section of line turns south to connect to the existing DB route 132 kV overhead line but this structure would not be in Tyddyn-y-Felin cLWS.	This would avoid adverse effects on the Tyddyn-y-Felin cLWS and would introduce fewer supports on agricultural land than B2 but would not be as cost-effective as A3.

4. Landscape and Visual Amenity

4.1 Introduction

4.1.1 This chapter presents an assessment of the likely Landscape and Visual Amenity effects that could arise from the construction, operation and maintenance of the proposed works at Bryncir as described in **Chapter 2: Bryncir Works**.

4.1.2 This chapter describes the baseline conditions in the Study Area (as defined in **Section 4.3**), the scope of the assessment, the potential effects, the mitigation measures required to avoid, reduce or offset any significant negative effects, and the likely residual effects after these mitigation measures have been adopted.

4.1.3 This chapter is supported by figures and appendices as listed below:

- **Figure 3.4.1**: Landscape and Visual Impact Assessment (LVIA) Study Area.
- **Figure 3.4.2**: National Landscape Character Areas.
- **Figure 3.4.3**: Gwynedd Local Landscape Character Areas.
- **Figure 3.4.4**: Eryri National Park Local Landscape and Seascape Character Areas.
- **Figure 3.4.5**: LANDMAP Visual Sensory Landscape Character Areas.
- **Figure 3.4.6**: Landscape Relevant Statutory Designations and Recreational Routes.
- **Figure 3.4.7**: Zone of Theoretical Visibility.
- **Figure 3.4.8**: Representative Viewpoint and Visual Receptor Locations.
- **Figure 3.4.9**: Baseline Photography.
- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 3.4.A: Landscape Character Assessment Tables.**
- **Volume 8, Appendix 3.4.B: Visual Amenity Assessment Tables.**
- **Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan (LEMP).**

4.1.4 Other chapters that are useful to review in association with this chapter are as follows:

- **Chapter 5: Ecology and Nature Conservation.**
- **Chapter 6: Historic Environment.**

4.2 Legislation and Planning Policy

4.2.1 This section sets out the legislation and planning policy framework that is relevant to the Landscape and Visual Amenity assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

4.2.2 The following legislation is relevant to Landscape and Visual Amenity:

- European Landscape Convention (Ref 4.1).
- Environment Act 2021 (Ref 4.2).

National Policy

4.2.3 The following national policy is relevant to Landscape and Visual Amenity:

- Future Wales: The National Plan 2040 (Ref 4.3).
- Planning Policy Wales (PPW) – Edition 12 (Ref 4.4).
- Technical Advice Notes (TAN):
  - TAN 5: Nature conservation and planning (Ref 4.5).
  - TAN 6: Planning for sustainable rural and communities (Ref 4.6).
  - TAN 12: Design (Ref 4.7).

Regional Policy

4.2.4 The regional policy relevant to Landscape and Visual Amenity is the Strategic Development Plan – North Wales (Ref 4.8).

Local Policy

4.2.5 The following local policy is relevant to Landscape and Visual Amenity:

- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Ref 4.9).
- Gwynedd Council Supplementary Planning Guidance 'Landscape Character' (Ref 4.10).
- Eryri Local Development Plan 2016 – 2031 (Ref 4.11).
- Eryri (Snowdonia) National Park Authority Supplementary Planning Guidance – Landscapes and Seascapes of Eryri (Ref 4.12).
- Eryri (Snowdonia) National Park Authority Supplementary Planning Guidance – Landscape Sensitivity and Capacity Assessment (Ref 4.13).
- The Eryri National Park Partnership Plan 2020 (Ref 4.14).

4.3 Study Area

4.3.1 Guidelines for Landscape and Visual Impact Assessment (GLVIA3) Third Edition (Ref 4.15) suggest that the Study Area should be proportionate to the proposed works and may include refinement by professional judgement. GLVIA3 recommends *"The level of detail provided should be that which is reasonably required to assess the likely significant effects"* (paragraph 3.16).

4.3.2 GLVIA3 (Ref 4.15) also states that "The study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner".

4.3.3 In the case of the proposed works, the Study Area has been defined by a combination of the Zone of Theoretical Visibility (ZTV) (see paragraph 4.5.29 – 4.5.32), on-site appraisal and professional judgement.

4.3.4 The Study Area encompasses land within a 3 km radius of the Bryncir works site (see **Figure 3.4.1**). Beyond this distance it is anticipated that the proposed works would be unlikely to give rise to significant landscape or visual effects.

4.4 Assumptions and Limitations

4.4.1 ZTV maps have been used as a tool to inform the assessments. ZTVs present theoretical visibility of the proposed works based largely on a bare earth topographical model and although areas of woodland and buildings have been included, the ZTV tends to overstate actual visibility.

4.4.2 The visual assessment is based on a series of representative viewpoints related to receptor groups. The on-site evaluation of magnitude of impact and significance of effects has been undertaken from the nearest publicly accessible location, and assumptions as to the orientation of the main views from receptor locations have been made. For all locations the evaluation is based on an assumed worst-case location for each receptor group and the significance of effects on individual receptors may differ locally from that stated.

4.4.3 The assessment of potential effects on receptors at these locations is made based on a worst-case approach of a clear bright day in winter as per best practice. The assessment of residual effects on these and all other receptors is based on summer at year 15 of operation. This approach is consistent with best practice and allows proposed mitigation planting to be taken into consideration in the assessment of long-term residual impacts.

4.5 Baseline

4.5.1 The following section provides a baseline description of the existing conditions of each of the landscape and visual receptors identified in the Study Area.

Landscape Character Overview

4.5.2 Landscape character is a composite of physical, cultural, perceptual and aesthetic elements. Landform, hydrology, vegetation, land cover, land use pattern, cultural and historic features and associations combine to create a common ‘sense of place’ and identity, which can be used to categorise the landscape into definable types and areas. The level of detail and size of the types and areas can be varied to reflect the scale of definition required. It can be applied at a national, regional, and local level.

4.5.3 The landscape baseline across the Study Area is summarised below and includes descriptions under a series of headings, based on features and elements in the landscape. It also details the combination of elements, which make a particular contribution to distinctive character and includes a summary of published landscape character assessment work at the national, regional, and local levels. These are used by local planning authorities as part of their planning policy evidence base and often provide specific guidance or recommendations on managing landscape change.

4.5.4 GLVIA3 (Ref 4.15) indicates that broad-scale character assessments, such as those produced at the national level, can be used to set the scene and indicate the key

characteristics that may be apparent in the Study Area. It also suggests that local authority assessments provide more detail and that these can be mapped to show how the proposed works relates to them.

Landform and Hydrology

4.5.5 The landform of the Bryncir works site is relatively flat with a slight slope to the west at approximately 80 m to 103 m AOD. The Bryncir works site is in the Afon Dwyfach river valley. The landform of the Study Area is gently undulating and typical of the Llyn peninsula. Several small but prominent hills frame the wider landscape. This includes Craig-y-garn (363 m AOD) in the Eryri National Park in the east of the Study Area, Bryniau Ystumcegid (179 m AOD) to the south-east and Mynydd Cennin (262 m AOD) to the north-west.

4.5.6 Two rivers pass through the Study Area from north to south. The Afon Dwyfach passes through the Bryncir works site. The Afon Dwyfor is to the east of the Study Area.

Settlement and Vegetation Patterns

4.5.7 Settlement in the Study Area comprises scattered farms and individual properties.

4.5.8 The Bryncir works site is approximately 1.4 km south of the settlement of Bryncir, a linear settlement along the A487; the village of Garndolbenmaen is approximately 1.4 km to the north-east.

4.5.9 The landscape of the Bryncir works site is rural comprising small rectilinear agricultural fields bound by hedgerows, often with intermittent hedgerow trees. The distinctive field patterns are well defined.

Public Rights of Way and Access

4.5.10 There are numerous PRoW in the Study Area linking settlements and providing recreational routes. From the B4411, the Dolbenmaen No 18 footpath passes through the Bryncir work site in a north to south-west direction.

4.5.11 Land in the Study Area associated with the Eryri National Park is common and open access land, although none is in the Bryncir works site.

4.5.12 NCR 8 (Lôn Las Cymru) passes along the western extent of the Bryncir works site from north to south using the minor road near Tyddyn-y-felin.

National Landscape Character

4.5.13 The Bryncir works site and the majority of the Study Area is in the National Landscape Character Area (NLCA) 05 Tremadoc Bay (Ref 4.16 (see **Figure 3.4.2**) and exhibits some of the key characteristics of the NLCA:

- The NLCA *"forms the land between the sea and the mountains"*;
- *"Hemmed in by steeply rising uplands of both Llŷn and Snowdonia"*;
- Areas of *"Lowland pastoral and hill sheep grazing"* to the west where there is a *"more extensive lowland hinterland"*; and
- *"the landscape is broader, rolling and pastoral, with hedges, woodlands, scattered villages and a sense of quietness away from main roads"*.

4.5.14 A small part of the outer extents of the Study Area lies in NLCA 03 Arfon (Ref 4.17) where "Pastoral Land cover predominates" and in NLCA 06 Eryri (Ref 4.18). The NLCA 06 Eryri is a "sublime, picturesque, iconic visual and sensory landscape of great drama".

The rural upland areas include “numerous high ridges and peaks offer wider ranging panoramas across much of north-west Wales”.

Local Landscape Character – Gwynedd Council

4.5.15 At the Unitary authority level, the Bryncir works site and Study Area covers the Landscape Character Area (LCA) LCA 10 Central Llyn. LCA 05 Snowdon Massif lies to the north-east of the Bryncir works site and LCA 08 Pwllheli-Criccieth Coast lies to the south of the Study Area. These LCA are defined in the Gwynedd Landscape Strategy Update 2012 (Ref 4.19). These are shown on **Figure 3.4.3**. The Gwynedd Landscape Strategy was developed using the Countryside Council for Wales LANDMAP (Ref 4.20) methodology, refer to **Figure 3.4.5**.

4.5.16 LCA 10 Central Llyn is characterised by:

- *“Generally homogenous area interspersed by prominent hills”*.
- *“Essentially agricultural in nature”*.
- *“forms an important buffer zone between the Llŷn Area of Outstanding Natural Beauty to the west and Snowdonia National Park to the east.”*.
- *“Views into and out from the area from the two protected landscapes are therefore very important”*.

4.5.17 LCA 5 Snowdon Massif is characterised by:

- *“Small, fringe area on the western edge of Snowdonia National Park.*
- *Upland, mountain character.*
- *Includes former slate workings in Dyffryn Nantlle.*
- *Vernacular boundaries: dry stone walls.”*

4.5.18 LCA 8 Pwllheli-Criccieth Coast is characterised by:

- *“Narrow, lower lying coastal plain lying below the 50 metre contour*
- *Dissected by a number of small river valleys such as the Afon Erch, Afon Dwyfach and Afon Dwyfor*
- *Area exhibits a variety of habitats from outer tidal areas, dune systems extending inland to more typical agricultural landscapes*
- *Tourism is an important feature within the landscape ranging from the 19th century development of Pwllheli and Criccieth to the more recent holiday camp at Penychain.”*

Local Landscape Character – Eryri National Park Authority

4.5.19 LCA as defined in the Eryri (Snowdonia) National Park Supplementary Planning Guidance 7 – Landscape and Seascapes of Eryri (Ref 4.12) consider the setting of the National Park. These are shown on **Figure 3.4.4**. LCA 04 Moel Hebog Uplands lies in the north-east of the Study Area.

4.5.20 LCA 04 Moel Hebog Uplands is characterised by:

- *“Classic U-shaped valleys carving through the mountains”;*
- *“Unenclosed mountain summits surrounded by large-scale regular enclosures of ffridd”;*

- *"Rough common land grazing by sheep on the mountains, with semi-improved pastures and rough grassland fields on lower slopes"; and*
- *"Valleys defined by a small-scale historic field pattern".*

Landscape Designations

Statutory Designations

4.5.21 The Bryncir works site is not covered by any statutory landscape designations, however part of the Study Area is in the Eryri National Park. The boundary to the Eryri National Park is approximately 1.1 km east of the Bryncir works site at its closest point and is shown on **Figure 3.4.6**.

4.5.22 The Eryri National Park covers 823 square miles with 1,497 miles of routes to explore and is Wales' largest National Park. The Eryri (Snowdonia) National Park Authority published Cynllun Eryri, The Eryri (Snowdonia) National Park Partnership Plan 2020 ('the Plan') in September 2020: a "partnership plan to identify and protect Eryri's special qualities for the future" (Ref 4.14).

4.5.23 The Plan sets out an approach to conserve and enhance the National Park's natural beauty, wildlife and cultural heritage, which is a statutory function of National Parks. The plan seeks to promote opportunities for the understanding and enjoyment of the special qualities of National Parks by the public.

4.5.24 The Plan also sets out the special qualities of Eryri National Park. Those focused on landscape and visual elements are listed in **Table 4-1** below along with a summary description.

Table 4-1 – Special qualities of the Eryri National Park

Special quality	Summary
1. Diverse Landscapes	The special quality description in the plan sets out the "diverse mix of landscapes many of which are highly valued for their natural beauty and tranquillity" noting how this historically has, and continues to "inspire artists, scientists, residents and visitors".
5. Tranquillity & Solitude	The special quality description in the plan sets out the perceptual qualities of *"silence, tranquillity and solitude"* afforded by the landscape that promote *"vital aspects of health, well-being and personal reflection"*.
6. Extensive Recreational Opportunities	The special quality description in the plan sets out the *"Extensive opportunities for recreation, leisure and learning for people of all ages and abilities."* The plan also states how it will make activities in Eryri more accessible.
7. Historic Landscapes	The special quality description in the plan reinforces the cultural and perceptual benefits the National Park brings by connecting visitors to their historic identity and continuing to create a sense of place through our ongoing relationship and continued engagement with the landscape of the National Park.

Non-Statutory Designations

4.5.25 There are no non-statutory landscape designations covering the Bryncir works site and Study Area.

Visual Amenity Overview

4.5.26 Visual impacts are defined in GLVIA3 (Ref 4.15) as *"impacts on specific views and on the general visual amenity experienced by people"*. Visual receptors are people with the potential for views of either the construction or operation of the proposed works.

4.5.27 The identification of visual receptors is a two-staged process, beginning with interrogation of baseline mapping and the preliminary ZTVs and then moving onto fieldwork to refine and ascertain the actual inter-visibility between the proposed works and potential visual receptors.

Zone of Theoretical Visibility

4.5.28 A computer generated ZTV was run for the Bryncir works site generated using the 5 m Digital Terrain Model (DTM) from Ordnance Survey (OS) MasterMap. The ZTV incorporates screening from vegetation based on woodland from the National Forestry Inventory (NFI) using an assumed height of 10 m and screening from existing buildings from OS Open Map Local with an assumed height of 7.5 m. The ZTV is based upon a grid of points in the Bryncir works site at a height of 50 m (representing the replacement Tower 4ZC067) and 9 m (representing the proposed Bryncir Substation) with an observer eye height of 1.6 m. All heights are above ground level. The ZTVs generated for the Study Area are shown on **Figure 3.4.7**.

4.5.29 The ZTV indicates areas from where it may be possible to view part of or the entire proposed works, however:

- The ZTV is limited by the detail of the DTM data used and does not take account of local topographic variations.
- Some areas of theoretical visibility may comprise woodland (not accounted for in the NFI) or agricultural land, where there is effectively no public access and the likelihood of views being experienced is consequently low.
- The ZTV does not take account of the likely orientation of a viewer, such as the direction of travel and there is no allowance for reduction of visibility with distance, weather, or light.

4.5.30 These limitations mean that the ZTV tends to overestimate the extent of visibility, both in terms of the areas from which the proposed works are visible and the extent of the particular site which is visible. Consequently, the ZTV should be considered as a tool to identify areas of potential visibility for further targeted survey and assessment, and not a measure of the visual effect.

4.5.31 The receptors identified have been selected on the basis that they fall within the ZTV **Figure 3.4.7**. As illustrated by the ZTV, the pattern of theoretical visibility is mostly concentrated around the flat lowland areas of farmland. There are areas of theoretical visibility to the north-east from elevated upland areas from within the Eryri National Park.

Representative Viewpoints

4.5.32 Five representative viewpoint locations were selected to form the basis of the visual assessment. These have been identified to provide a representative cross section of

visual receptors in the Study Area. Representative viewpoints have been included in the assessment with visual receptors covered by a representative viewpoint.

4.5.33 **Table 4-2** provides a list of the viewpoint locations and the receptors they have been selected to represent. The locations of the viewpoints are provided on **Figure 3.4.8** and details of each, including a description of the baseline view and its value are provided in **Volume 8, Appendix 3.4.B: Visual Assessment Tables** including a summary of effects.

4.5.34 **Figure 3.4.9** provides panoramic photography of the baseline view from each of the viewpoint locations.

Table 4-2 – Viewpoint baseline and representative visual receptors

Viewpoint	Representative visual receptors	Grid reference	Location and baseline description
1	Representative view for local road users and outdoor places of work.	E: 247754 N: 343128	Garndolbenmaen local road
2	Representative viewpoint for scattered farms and individual properties in the vicinity of the Bryncir works site, recreational users of Dolbenmaen No 18 footpath, and outdoor places of work, and those travelling along the A487.	E: 248796 N: 343412	A487 settlement edge in near Glan-Dwyfach
3	Representative viewpoint for scattered farms and individual properties in the vicinity of the Bryncir works site and recreational users of Llanystumdwy No 62 footpath.	E: 248835 N: 342070	Llanystumdwy No 62 footpath
4	Representative viewpoint for scattered farms and individual properties in the vicinity of the Bryncir works site and recreational users of Dolbenmaen No 16 footpath.	E: 249769 N: 342435	Dolbenmaen No 16 footpath
5	Representative viewpoint for elevated scattered farms and individual properties in the vicinity of the Bryncir works site and recreational users of the PRoW system to the east of Garndolbenmaen.	E: 250184 N: 344288	Road from T^y Eiddew South-eastwards to Tyn y Ffridd, Bodwian

4.6 Consultation and Scope of Assessment

4.6.1 This section describes the scope of the assessment of effects on Landscape and Visual Amenity. A Scoping Opinion was not sought as explained in **Volume 1, Chapter 3: EIA Process**.

Consultation

4.6.2 Consultation in relation to Landscape and Visual Amenity has been undertaken with stakeholders. **Table 4-3** below provides an overview of consultation responses and the actions taken to address these within the assessment.

Table 4-3 – Consultation and stakeholder engagement log

Consultee	Summary of comments
Gwynedd Council (emailed [email dated 03 October 2024)	No response received.

Activities or Receptors Scoped Out of the Assessment

4.6.3 The proposed works would not have significant effects on landscape character at the NLCA scale and therefore these effects have not been assessed as part of this Landscape and Visual Amenity assessment.

4.6.4 There would be no direct change to the physical landscape elements in LCA 5 Snowdon Massif and LCA 8 Pwllheli-Criccieth Coast and therefore potential effects would be limited to indirect perceptual or aesthetic effects. Based upon the extremely limited geographical extent, the distance from the proposed works, their size and scale, and the intervening vegetation that creates a sense of enclosure and minimises the potential for these indirect effects, these LCAs will not be assessed as part of this assessment.

4.6.5 It is anticipated that there would be long distance views from elevated ground and panoramic viewpoints in the Eryri National Park. However, the scale of the proposed works would form a distant, barely perceptible element in the central background of the view. The proposed works would only be observable in periods of exceptional or very good visibility and are unlikely to be significant. Therefore, Eryri National Park panoramic views have been scoped out of this assessment.

4.6.6 **Table 4-4** summarises the potential landscape and visual receptors that have been reviewed and state whether they have been included or excluded from the landscape and visual assessment and provides justifications.

Table 4-4 – Scope of Landscape and Visual Amenity assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Landscape character	In	In	There will be highly localised effects on the landscape character and amenity during construction and operation.
Visual amenity receptors	In	In	There may be views of the new infrastructure from visual amenity receptors particularly from recreational routes, transport routes and a small number of scattered farms and individual properties in the vicinity of the Bryncir works site.

Future Baseline

4.6.7 Landscape change is an ongoing and inevitable process and will continue across the Study Area irrespective of whether the proposed works proceed. Change could arise through natural processes (for example, the maturity of woodlands) and natural systems (for example, river erosion) or as a result of human activity including land use and land management.

4.6.8 The landscape contains electrical infrastructure including pylons and overhead lines and it is anticipated that the landscape will continue to host energy-related developments including overhead lines and pylons.

4.7 Methodology

4.7.1 Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the Landscape and Visual Amenity assessment are in **Volume 8, Appendix 1.1.A: Topic Assessment Methodology**. This section provides a summary.

Introduction

4.7.2 The methodology for this assessment is based on guidance in GLVIA3 (Ref 4.15). This is the standard reference for undertaking landscape character and visual assessments in the UK.

4.7.3 Landscape and visual effects are related but distinct topics so have been considered and assessed separately. Landscape and visual effects can differ from one stage of the development to the next and change over time as mitigation planting establishes and matures. Effects as a result of the proposals on landscape character and visual amenity could include:

- Construction: temporary effects from the movement of construction plant, vehicle haul routes, excavations, temporary construction compounds, material stockpiles and the removal of vegetation.
- Operational Year 1 (winter): including consideration of potential medium to longer term effects associated with the proposed works following completion of the construction phase and associated reinstatement. This stage is intended to represent the potential worst-case operational effects prior to establishment of mitigation planting.
- Operation Year 15 (summer): including consideration of potential longer-term effects of the proposed works 15 years after becoming operational. This stage is intended to help demonstrate how proposed mitigation planting will influence effects once established.

4.7.4 The landscape and visual effects (and whether they are significant) are determined by an assessment of the sensitivity of each receptor or group of receptors and the nature of the effect or magnitude of change that will result from proposed works. The evaluation of sensitivity takes account of the value of the landscape character or view and susceptibility of the receptor to the proposed works. This is combined with an assessment of the magnitude of change which takes account of the size and scale of the proposed change from the proposed works and the geographical extent they cover. The duration and reversibility are stated separately in relation to the assessed effects. By combining assessments of sensitivity and magnitude of change, a level of landscape or visual effect can be evaluated and determined. The resulting level of effect is described in terms of whether it is significant or not significant and the type of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse.

4.7.5 The scope of the assessment covers the construction and operation phases of the proposed works. Embedded mitigation as described in **Volume 8, Appendix 3.2.A:**

Outline Construction Environmental Management Plan is considered for the operational phase of the proposed works.

4.7.6 The identification of visual receptors is a two-staged process, beginning with interrogation of baseline mapping and the preliminary ZTVs and then moving onto fieldwork to refine and ascertain the actual inter-visibility between the proposed works and potential visual receptors.

4.8 Potential Effects

4.8.1 The following sections set out a summary of the elements of the proposed works which may result in Landscape and Visual Amenity effects during construction and operation including maintenance.

Construction

4.8.2 The proposed construction works would introduce some new elements into the landscape, creating the potential for landscape or visual effects. The effects from the following activities could occur simultaneously or in isolation:

- Site clearance of vegetation: to include vegetation removal, soil stripping and mounding and erection of temporary security fencing.
- Utility diversions: to include any temporary or permanent diversion of overhead lines for safe working, or underground services crossing the Bryncir works site.
- Temporary compounds: to be used for storage of large plant and equipment, office accommodation and welfare facilities, parking facilities, material storage, spoil handling and spoil storage.
- Construction activity: including on-site staff on site during the construction phase. Movement of materials including HGVs accessing the Bryncir works site for delivery of cables and infrastructure elements.
- Temporary access tracks: to facilitate safe and efficient construction and reduce the impact of works upon the local area.
- Diversion of Dolbenmaen No 18 footpath.
- Erection of temporary scaffolding structures would be required to support netting strung to protect the B4411 and Afon Dwyfach.
- Low level construction lighting including task lighting to works areas and construction compounds.
- Construction of new infrastructure: to include a replacement tower for Tower 4ZC067, new section of 132 kV overhead line, 400 kV substation and section of underground cable.
- Decommissioning and removal of the existing Tower 4ZC067 and a redundant section of the DB connection route.

Operation and Maintenance

4.8.3 The proposed works would introduce new elements into the landscape during the operational phase creating the potential for landscape or visual effects. Potential operational phase effects may arise from the following activities:

- New infrastructure: to include the proposed Bryncir Substation, replacement tower for Tower 4ZC067 and DB connection route.
- New planting: to mitigate the visual impact of the proposed Bryncir Substation.
- The ongoing maintenance of the proposed Bryncir Substation and the mitigation scheme.

Embedded Mitigation

4.8.4 The primary aims of the landscape design are to reduce the visual prominence of the proposed works and assimilate it into the landscape context. The mitigation will also provide biodiversity enhancement.

4.8.5 The following embedded mitigation has been taken into consideration when assessing the landscape and visual impacts of the proposed works:

- Siting the substation where there is an existing valid planning permission for a 400/132 kV substation comprising similar development.
- The extents of the proposed works have been minimised as far as possible to reduce land take and allow greater retention of existing vegetation and other landscape features.
- Incorporation of new and additional planting such as hedgerow and tree planting to help tie the proposed works into the existing landscape character and provide localised screening.
- Optimising zones in construction compounds to minimise their temporary impact on the landscape and views, including at night.
- Returning and reinstating land used temporarily to its former condition and profiles, where appropriate.
- Confining lighting on the Bryncir works site and construction compounds to locations where safety is a priority to minimise the potential for light spill in night-time views.
- Keeping the use of tall cranes and plant machinery to the minimum practicable time to reduce the duration of any landscape and visual impacts.
- Designing permanent structures, such as the proposed Bryncir Substation and overhead line poles, in a way that minimises their visual impact and achieves good visual appearance.
- Construction programme to be kept to the minimum practicable time to reduce the duration of any landscape and visual impacts and areas will be cleared for construction as close as possible to works commencing and top-soiling, reseeding and planting shall be undertaken as soon as practicable after sections of work are complete.

4.8.6 The CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will set out the additional mitigation measures identified. This

section summarises the types of mitigation measures that will be considered to mitigate against the effects on landscape and visual receptors where required. These measures will be adopted during the construction phase:

- A Landscape and Ecological Management Plan (LEMP) (**Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan**) is to be produced prior to construction based on the Outline LEMP submitted with the planning application.
- A suitably experienced Environmental Manager will be appointed for the duration of the construction phase. In addition, a qualified and experienced Environmental Clerk of Works (ECoW) will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the CEMP. The ECoW will monitor that the works proceed in accordance with relevant environmental requirements and adhere to the required good practice and mitigation measures. The ECoW will be supported as necessary by appropriate specialists, including ecologists and arboriculturists.
- Land used temporarily will be reinstated where practicable to its pre-construction condition and use, unless agreed otherwise.
- Earthworks and stockpiled soil will be protected by covering, seeding or using water suppression where appropriate.
- Working areas will be appropriately fenced. The type of fencing installed may also serve to provide acoustic and visual screening of the Bryncir work site and reduce the potential for disturbance of users in the surrounding areas. Fencing will be regularly inspected and maintained and removed as part of the demobilisation unless otherwise specified.
- The contractor will retain vegetation where practicable. Where vegetation is lost and cannot be replaced due to restrictions associated with underground services or wayleaves, reinstatement in accordance with the Outline LEMP and outline Landscape Design shall be followed.
- The contractor will apply the relevant protective principles set out in British Standard (BS) 5837:2012: Trees (Ref 4.21) in relation to design, demolition and construction. This will be applied to trees in the Bryncir works site which will be preserved through the construction phase, and to trees outside where such measures do not hinder or prevent the use of the relevant working width for construction.
- A five-year aftercare period will be established for all reinstatement and mitigation planting.
- Separation and storage of subsoil and topsoil to ensure no degradation in quality and reinstatement undertaken as soon as possible after completion of construction of each section or area of works.
- Temporary and separate placement of topsoil and subsoil will be stored with the additional height of the subsoil storage used on whichever side of the Bryncir works site requires greater screening benefit, where practicable.
- To control the spread of invasive weeds in accordance with the Wildlife and Countryside Act 1981 (Ref 4.22), any plant or machinery that has been used in areas infested with invasive species (both terrestrial and aquatic), such as Japanese knotweed and Russian olive, will be thoroughly cleaned. Water used to

clean vehicles will be controlled to prevent the spread of the plant (through seeds, rhizomes, fragments, etc.). The area will be cordoned off to prevent any inadvertent spreading.

Assessment of Effects

4.8.7 This assessment of Landscape and Visual Amenity effects has been undertaken after the implementation of embedded mitigation. A detailed assessment of potential impacts on each of the identified landscape and visual receptors is provided in **Volume 8, Appendix 3.4.A: Landscape Character Assessment Tables** and **Appendix 3.4.B: Visual Assessment Tables**. A summary of the results of the assessment are provided below, including further details of those which are anticipated to receive moderate or major impacts, and therefore significant, effects.

Landscape Character

Local Landscape Character

4.8.8 Construction activity would influence a localised area in LCA10 Central Llyn. The scale of change and geographical extent of construction activity would be limited. The presence of construction activity including storage of materials, tall machinery and movement of plant would result in a slight impact to the rural landscape characteristics and would result in a loss of tranquillity over a localised area. Impacts would be limited in extent due to the relative containment provided by landform, tall hedgerows and woodland. The impacts would be temporary and of short-term duration.

4.8.9 Indirect perceptual impacts to other adjacent LCA and to the setting of the Eryri National Park LCA 04 Moel Hebog Uplands would be limited and would lead to a very slight alteration to the perceptual qualities of tranquillity from the perception of increased urban influence.

4.8.10 Construction impacts on LCA 04 Moel Hebog Uplands and LCA 10 Central Llyn would result in Minor adverse effects that are not significant.

4.8.11 At operation, the proposed works would locally extend the influence of electrical infrastructure within LCA 10 Central Llyn, where the presence of electrical infrastructure and industrial elements are already noted characteristics of the landscape. Effects on the landscape character would be Negligible Adverse. At Operation Year 15 Summer, the established reinstated and enhanced planting and landscape design elements would provide further softening of the proposed Bryncir Substation into the wider landscape resulting in Neutral effects that are not significant.

4.8.12 There would be no change to the aesthetic and perceptual aspects of the landscape receptor at other adjacent LLCA and to the setting of the Eryri National Park LCA 04 Moel Hebog Uplands and the Neutral effects would not be significant.

Visual Amenity

4.8.13 Receptors at representative viewpoints near the Bryncir works site would experience varying degrees of visibility of construction plant and activity depending on intervening landform, vegetation and structures.

4.8.14 For the majority of the identified receptors, there would be a small scale change in the view as a result of the introduction of construction activity over a small geographical area that would be short term resulting in Minor adverse effects. Viewpoint 1: Garndolbenmaen local road would experience a significant change in view as a result of

the introduction of construction activity, resulting in a Moderate adverse effect. Viewpoint 1: Garndolbenmaen local road and Viewpoint 2: A487 settlement edge in near Glan-Dwyfach would experience a significant change in view at operation year 1 (winter) due to the introduction of new permanent infrastructure resulting in a Moderate adverse effect.

4.8.15 Visibility of construction operations from elevated terrain to the north, and from the lower slopes within the Eryri National Park and its setting would be limited to tall plant in the background of the view that would be visible above the tree line, set against the backdrop of the hills of the Llyn Peninsula. The scale of the proposed work and long distance to the receptor would result in construction operations being a barely perceptible, small-scale addition within a large scale panoramic view. Impacts would be short term resulting a Negligible adverse effect.

4.8.16 The temporary closure of the Dolbenmaen No 18 footpath, which passes through the Bryncir works site, would result in no impact on visual amenity for users of the PRoW during construction. Although impacts for receptors at the north of PRoW would experience clear, open views of the construction operations, in the short term resulting in a Moderate adverse effect.

4.8.17 Once operational, the proposed Bryncir Substation would be visible within views, although set within a wider landscape that contains existing electrical infrastructure. The replacement tower and new length of overhead line would look similar in character to the existing baseline.

4.8.18 By operation year 15 (summer), the reinstated and enhanced planting would assimilate the proposed works back into the landscape and would result in a limited change in views from most locations with Minor adverse to Neutral effects.

4.9 Mitigation and Residual Effects

4.9.1 The residual effects on Landscape and Visual Amenity resulting from the proposed works would remain unchanged from those reported in **Section 4.8** above as all mitigation is embedded in the design of the proposed works. Effects are summarised in **Table 4-5,** Table **4-6** and

4.9.2 **Table 4-7** below.

Table 4-5 – Summary of residual Landscape and Visual Amenity effects during construction

Receptor	Sensitivity	Magnitude of impact	Significance of effect	Additional mitigation	Magnitude of impact	Residual effect
LCA 10 Central Llyn.	Medium	Low	Minor Adverse	All mitigation is embedded into the design of the proposed works and construction good practice identified in **Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**.	Low	Minor Adverse
LCA 04 Moel Hebog Uplands.	High	Very Low	Minor Adverse		Very Low	Minor Adverse
Viewpoint 1: Garndolbenmaen local road.	Medium	Medium	Moderate Adverse		Medium	Moderate Adverse
Viewpoint 2: A487 settlement edge in near Glan-Dwyfach.	Medium	Medium	Moderate Adverse		Medium	Moderate Adverse
Viewpoint 3: Llanystumdwy No 62 footpath.	Medium	Low	Minor Adverse		Low	Minor Adverse
Viewpoint 4: Dolbenmaen No 16 footpath.	High	Very Low	Negligible Adverse		Very Low	Negligible Adverse
Viewpoint 5: Road from T^y Eiddew South-eastwards to Tyn y Ffridd, Bodwian.	High	Very Low	Negligible Adverse		Very Low	Negligible Adverse

Table 4-6 – Summary of residual Landscape and Visual Amenity effects during operation year 1 (winter)

Receptor	Sensitivity	Magnitude of impact	Significance of effect	Additional mitigation	Magnitude of impact	Residual effect
LCA 10 Central Llyn.	Medium	Low	Negligible Adverse	All mitigation is embedded into the design of the proposed works and construction good practice identified in **Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**.	Low	Negligible Adverse
LCA 04 Moel Hebog Uplands.	High	Very Low	Minor Adverse		Very Low	Minor Adverse
Viewpoint 1: Garndolbenmaen local road.	Medium	Medium	Moderate Adverse		Medium	Moderate Adverse
Viewpoint 2: A487 settlement edge in near Glan-Dwyfach.	Medium	Medium	Moderate Adverse		Medium	Moderate Adverse
Viewpoint 3: Llanystumdwy No 62 footpath.	Medium	Low	Minor Adverse		Low	Minor Adverse
Viewpoint 4: Dolbenmaen No 16 footpath.	High	Very Low	Negligible Adverse		Very Low	Negligible Adverse
Viewpoint 5: Road from T^y Eiddew South-eastwards to Tyn y Ffridd, Bodwian.	High	Very Low	Negligible Adverse		Very Low	Negligible Adverse

Table 4-7 – Summary of residual Landscape and Visual Amenity effects during operation year 15 (summer)

Receptor	Sensitivity	Magnitude of impact	Significance of effect	Additional mitigation	Magnitude of impact	Residual effect
LCA 10 Central Llyn.	Medium	Very Low	Neutral	All mitigation is embedded into the design of the proposed works and construction good practice identified in **Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**.	Very Low	Neutral
LCA 04 Moel Hebog Uplands.	High	None	Neutral		None	Neutral
Viewpoint 1: Garndolbenmaen local road.	Medium	Low	Minor Adverse		Low	Minor Adverse
Viewpoint 2: A487 settlement edge in near Glan-Dwyfach.	Medium	Low	Minor Adverse		Low	Minor Adverse
Viewpoint 3: Llanystumdwy No 62 footpath.	Medium	Very Low	Negligible Adverse		Very Low	Negligible Adverse
Viewpoint 4: Dolbenmaen No 16 footpath.	High	None	Neutral		None	Neutral
Viewpoint 5: Road from T^y Eiddew South-eastwards to Tyn y Ffridd, Bodwian.	High	None	Neutral		None	Neutral

4.10 Summary

4.10.1 No significant effects have been identified for landscape receptors during construction or operation. During construction visual receptors at viewpoint 1 would experience significant effects on visual amenity. At operation year 1 (winter) significant effects would be experienced by receptors at viewpoint 1 and 2, who will be closest to the Proposed Works with limited intervening vegetation. At operation year 15 (summer) impacts would reduce to non-significant levels as a result of the established boundary planting scheme that will soften and assimilate the proposed works into the landscape and views. No significant effects have been identified for receptors at the remaining representative viewpoints, for all assessment phases.

5. Ecology and Nature Conservation

5.1 Introduction

5.1.1 This chapter presents an assessment of the likely significant effects on ecologically sensitive receptors that could arise from the construction, operation and maintenance of the proposed works, as described in **Chapter 2: Bryncir Works**.

5.1.2 This chapter describes the baseline ecological conditions in the Bryncir works site and associated Study Area (as defined in **Section 5.3**). The chapter also presents the scope of the assessment, potential impacts and resulting effects, the mitigation measures required to avoid, reduce or offset any significant negative effects, and the likely residual effects after these mitigation measures have been adopted.

5.1.3 Effects on ecology from infrastructure projects can arise from direct and indirect impacts on designated sites, habitats or species, and can be temporary or permanent. Indirect effects can occur through pollution of air and water and via changes in lighting, noise or hydrology.

5.1.4 This chapter is supported by the figures and appendices listed below:

- **Figure 3.5.1**: Statutory Designated Sites for Nature Conservation in the Wider Area.
- **Figure 3.5.2**: Statutory Designated Sites for Nature Conservation.
- **Figure 3.5.3**: Non-Statutory Sites Designated for Nature Conservation.
- **Figure 3.5.4**: Habitats of Principal Importance and Ancient Woodland
- **Volume 8, Appendices: Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan (CEMP).**
- **Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan (LEMP).**
- **Volume 8, Appendix 3.5.A: Bryncir Substation Ecological Appraisal Report.**
- **Volume 8, Appendix 3.5.B: Bryncir SPEN 132 kV Connection Preliminary Ecological Appraisal Report.**
- **Volume 8, Appendix 3.5.C: Bryncir Habitats.**
- **Volume 8, Appendix 3.5.D: Bryncir Hedgerows.**
- **Volume 8, Appendix 3.5.E: Bryncir Aquatic Survey Report**
- **Volume 8, Appendix 3.5.F: Bryncir Bat Survey Report.**
- **Volume 8, Appendix 3.5.G: Bryncir Riparian Mammals.**
- **Volume 8, Appendix 3.5.H: Bryncir Statutory Designated Sites Citations.**

- **Volume 8, Appendix 3.5.I: Arboricultural Impact Assessment.**
- **Volume 8, Appendix 3.5.J: Net Benefit for Biodiversity Assessment and Green Infrastructure Statements.**
- **Volume 8, Appendix 7.1.B: Report to Inform Habitats Regulations Assessment (HRA).**

5.1.5 Effects on ecology from infrastructure projects can arise from direct and indirect impacts upon designated sites, habitats or species, and be temporary or permanent. Indirect effects can occur through pollution of air and water and via changes in lighting, noise or hydrology. This chapter is supported by information in the following chapters of the ES:

- **Chapter 4: Landscape and Visual Amenity.**
- **Chapter 8: Water Quality, Resources and Flood Risk** (which includes hydrology and water pollution).
- **Chapter 10: Air Quality and Emissions.**
- **Chapter 11: Noise and Vibration.**
- **Chapter 13: Climate Change.**

5.2 Legislation and Planning Policy

5.2.1 This section lists the legislation, planning policy framework and guidance that is relevant to the ecology and nature conservation assessment. More information is in **Volume 8, Appendix 1.4.A: Legislation, Policy and Guidance.**

Legislation

5.2.2 The following legislation and treaties are relevant to Ecology and Nature Conservation:

- The Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) (Ref 5.1).
- Ramsar Convention (Ref 5.2).
- Convention on Biological Diversity 1992 (Ref 5.3).
- Wildlife and Countryside Act (WCA) 1981 (as amended) (Ref 4.22).
- Convention on the Conservation of Migratory Species of Wild Animals 1979 (or Bonn Convention) (Ref 5.4).
- The Trade in Endangered Species of Wild Fauna and Flora (Amendment) (EU Exit) Regulations 2018 (Ref 5.5).
- The Council of Europe's Convention on the Conservation of European Wildlife and Natural Habitats 1979 (or Bern Convention) (Ref 5.6).
- Environmental Protection Act 1990 (Ref 5.7).
- Natural Environment and Rural Communities (NERC) Act 2006 (Ref 5.8).
- UK Biodiversity Framework 2024 (Ref 5.9).
- The Environment Act 2021 (Ref 4.2).
- The Environment (Wales) Act 2016 (Ref 5.10).

- The Countryside and Rights of Way Act 2000 (Ref 5.11).
- The Protection of Badgers Act 1992 (Ref 5.12).
- The Hedgerows Regulations 1997 (Ref 5.13).
- The Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended) (Ref 5.14).
- Animal Welfare Act 2006 (Ref 5.15).
- Salmon and Freshwater Fisheries Act 1975 (Ref 5.16).
- Salmon Act 1986 (Ref 5.17).
- Eels (England and Wales) Regulations 2009 (Ref 5.18).
- The Water Environment (Water Framework Directive) [WFD] (England and Wales) Regulations 2017 (Ref 5.19).

National Policy

5.2.3 The following National policy is relevant to Ecology and Nature Conservation:

- PPW – Edition 12 (2024) (Ref 4.4).
- The Nature Recovery Action Plan for Wales 2020 – 2021 (Ref 5.20).
- Future Wales: The National Plan 2040 (Ref 4.3).

Local Policy

5.2.4 The following Local policy is relevant to Ecology and Nature Conservation:

- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Ref 4.9).
- Anglesey and Gwynedd Joint Local Development Plan Review Report (Ref 5.21).

Guidance

5.2.5 The following guidance is relevant to Ecology and Nature Conservation:

- Environmental Improvement Plan 2023 (Ref 5.22).
- Cyfoeth Naturiol Cymru/NRW Protected Species Licensing (Ref 5.23).
- Birds of Conservation Concern (BoCC) (Ref 5.24).
- Birds of Conservation Concern Wales (BoCCW) (Ref 5.25).
- The International Union for Conservation of Nature Red List of Threatened Species 2025 (Ref 5.26).
- UK Biodiversity Framework (Joint Nature Conservation Committee (JNCC)) on behalf of the Four Countries' Biodiversity Group (2024) (Ref 5.27).
- Natur Gwynedd Biodiversity Action Plan (BAP) (Ref 5.28).
- Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for ecological impact assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.3. (Ref 5.29).

- Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction (Ref 5.30).
- Institute of Lighting Professionals Guidance Note 08/23 Bats and Artificial Lighting at Night (Ref 5.31).
- Institute of Lighting Professionals. Guidance Note 1 for the reduction of obtrusive light (Ref. 5.32).

5.2.6 Ecological Impact Assessment Methodologies are detailed in in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

5.2.7 Further relevant guidance and methodologies used for ecological surveys are detailed in their respective reports as include in **Volume 8, Appendices 3.5.A – 3.5.J** and in **Table 5-1.**

5.3 Study Area

5.3.1 The Study Area was defined in accordance with standard guidance and included ecological features which may be at risk from direct and indirect impacts that might arise from the proposed works and is the initial basis for determining a Zone of Influence (ZoI). CIEEM guidance (Ref 5.29) defines a ZoI as: *"…the area over which biodiversity features may be affected by biophysical changes as a result of the proposed project and associated activities".*

5.3.2 The ZoI is based on the:

- Nature of the proposed works, activities, and the potential for effects during construction, operation and maintenance.
- Nature of the land use and nearby habitats, the number of watercourses and water bodies, their connectivity within and outside of the proposed works area and how they may be used by different species or species groups.
- Habitats, behaviours and preferences of different species or species groups and whether these could be affected both spatially and temporally.

5.3.3 All designated sites, sensitive habitats, and protected and notable species that occur within the ecological ZoI of the proposed works have been considered in this assessment.

5.3.4 For this assessment, the ecological Study Areas are defined as:

- 10 km from the Bryncir works site for all statutory designated sites of international nature conservation value (e.g. Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites, as well as proposed or potential sites). This is extended to 30 km for SACs designated for bats, or where bats are listed as a qualifying feature.
- 5 km from the Bryncir works site for other statutory designated sites of nature conservation value (e.g. Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR)).
- 2 km from the Bryncir works site for non-statutory sites for nature conservation (e.g. Local Wildlife Sites (WS), candidate WS (cWS) and Sites of Importance for Nature Conservation (SINC)).
- 2 km from the Bryncir works site for ancient woodland.

- 2 km from the Bryncir works site for Habitats of Principal Importance (HoPI), as listed under Section 7 of the Environment (Wales) Act (2016) (Ref 5.10).
- 2 km from the Bryncir works site for records dated within the last ten years (2014 onwards) of protected species and notable species (see paragraph 5.6.7), or the closest hydrologically connected monitoring location in the case of aquatic ecological records.
- 2 km from the Bryncir works site for the status of water bodies subject to the Water Framework Directive (WFD) (Ref 5.19) which are assessed in **Chapter 8: Water Quality, Resources and Flood Risk**, and informed by the assessment of aquatic ecology receptors presented in this chapter. As water pollution may spread downstream or there could be downstream flood risk effects, to identify all the relevant ecological, chemical and physical features of water bodies that may be impacted and that contribute to the water bodies' overall importance, the Study Area was extended beyond 2 km for hydrologically-linked surface water bodies.
- 50 m from the Bryncir works site for ancient and veteran trees not in areas of ancient woodland.
- 50 m from the Bryncir works site for other habitats not covered above.

5.3.5 These distances reflect standard professional good practice for identification of features in and external to the Bryncir works site that could be affected.

5.3.6 The ZoI with regard to habitats and sedentary species lost to site clearance for construction are easiest to define as they should be restricted to the footprint of the proposed works in the Bryncir works site. However, for those biophysical changes that can extend beyond the Bryncir works site, the ZoI has been determined by the nature of the biophysical change and the sensitivity to this change of the ecological feature in question. For example, a badger may be subject to disturbance from light pollution impacting their sett or foraging area, whereas other species, such as certain bat species, may avoid lit areas by a much greater distance.

5.3.7 Taking account of this, the extent of the ZoI beyond the Bryncir works site was determined based on professional judgement, with reference to data (where available) relating to the sensitivity of specific ecological features, and in consultation with other environmental technical specialists (i.e. for air quality and water).

5.3.8 The Study Areas described are representative of the ZoIs for those receptors identified as important ecological features (IEF) in this chapter.

5.4 Assumptions and Limitations

5.4.1 The assessment presented in this chapter reflects the information obtained and evaluated at the time of reporting (April 2025), and has referenced published data, records and web-based information.

5.4.2 As noted in **Chapter 2: Bryncir Works**, the earliest construction could start is in Q1 2026. Construction is expected to require 18-20 months, with operation anticipated to commence in Q3 2027. Should the construction programme be extended this will not change the results of the Ecological Impact Assessment (EcIA) with respect to flora, as the impact is not affected by the duration of activity but rather the change or loss of any habitats. The impact on fauna is likely to be similar if the construction period is extended, with respect to any habitat loss. The assessment also represents a worst case in terms of impacts to species.

5.4.3 Construction of the proposed works is likely to lead to an increase in the number of vehicles on the local highway network (see **Chapter 9: Traffic and Transport**). IAQM guidance (Ref 5.30) sets out criteria to establish the need for an air quality assessment for the construction phase of a development as being a change of more than 200 Heavy-Duty Vehicles (HDV) (also known as Heavy Goods Vehicle (HGV)) or more than 1,000 total vehicles (as two-way annual daily average traffic flow).

5.4.4 As detailed in **Chapter 10: Air Quality and Emissions,** owing to the levels of traffic expected to be generated by the proposed works being below criteria set out in IAQM guidance (Ref 5.30) a detailed dispersion modelling exercise has not been undertaken as the effect is not anticipated to be significant. Therefore, this chapter does not consider potential effects on ecological features (i.e. habitats, sites and species) because of changes in air quality due to construction traffic, as no significant effects are anticipated.

5.4.5 Similarly, as described in **Chapter 2: Bryncir Works** there would be no normal requirement for HGV movements during the operation or maintenance of the proposed works. Maintenance inspections would be via Light Goods Vehicles (LGV) or cars, would not be frequent and no impacts to ecological features due to changes in air quality are anticipated during operation of the proposed works due to vehicle emissions. See also **Chapter 10: Air Quality and Emissions** which has scoped out assessment of the operational and maintenance effects of the proposed works on air quality due to the low level of traffic generated resulting in no significant effects being predicted.

5.4.6 For construction dust, the air quality assessment, as detailed in **Chapter 10: Air Quality and Emission,** has followed the IAQM construction dust guidance (Ref 5.30). That approach identifies the risk of dust impacts occurring, based on the scale of construction activities undertaken at each site and the sensitivity of the area, which is based on the type of statutory designation and its proximity to the proposed works. Once the risk is identified, the guidance suggests a range of mitigation measures that could be implemented to ensure the effect of any impact is not significant. These measures would be secured by a CEMP.

5.4.7 As outlined in **Chapter 2: Bryncir Works**, a new 132 kV steel gantry will be installed between two ditches immediately west of the Afon Dwyfach. It has been assumed that these water bodies will not be impacted during construction.

5.4.8 Specific assumptions and limitations relevant to each survey, including how any limitations have been overcome, are included in the relevant technical reports presented in **Volume 8, Appendices 3.5.A – 3.5.J**.

5.4.9 The Bryncir works site boundary was updated in July 2025, after completion of the ecology surveys. The works site has been extended to include longer sections of the A487 road verge (and adjacent habitats) to the east and west of the Bryncir works site entrance. The full length of verge inside the latest Bryncir works site to the east of the entrance was not captured during the Phase 1 habitat survey and badger survey as it fell outside of the survey extents and buffers from the previously identified works boundary. The absence of badger setts in this area cannot be confirmed. As no other evidence of badger was found during surveys it is unlikely that badgers are present in the small area of the works site that has not been covered, but this will be confirmed during a pre-construction badger survey. Habitats have been mapped based on desk top study using Google Street View and aerial imagery where survey data is unavailable, and supported from survey notes and photographs of adjacent and nearby surveys including Arboricultural surveys.

5.4.10 There are no survey-specific constraints that represent a significant limitation or data gap and the baseline that has been established is suitably robust, however pre-construction surveys are required to ensure up to date results are provided, in particular for badger and bat suitable trees that may be affected.

5.5 Net Benefits for Biodiversity

5.5.1 The Environment (Wales) Act 2016 (Ref 5.10) Part 1 – Section 6: Biodiversity and resilience of ecosystems duty states that public authorities "*must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions*".

5.5.2 PPW 12 (Ref 4.4) expands on this by stating: "*the planning system has a key role to play in helping to reverse the decline in biodiversity and increase the resilience of ecosystems. Recognising that development needs to take place and some biodiversity may be impacted, the planning system should ensure that overall, there is a net benefit for biodiversity and ecosystem resilience, resulting in enhanced well-being*".

5.5.3 PPW 12 (Ref 4.4) also states that: "*All development must deliver a net benefit for biodiversity and ecosystem resilience from the baseline state (proportionate to the scale and nature of the development proposed)*".

5.5.4 The assessment incorporates guidance from the following resources:

- PPW – Edition 12 (Ref 4.4).
- NRW's guidance note for local planning authority staff undertaking a green infrastructure statement (Ref 5.33).
- Welsh Government Approach to Net Benefits for Biodiversity and the DECCA Framework in the Terrestrial Planning System (Ref 5.34).
- NRW's Terrestrial and freshwater Resilient Ecological Networks: a guide for practitioners in Wales (Ref 5.35).

5.5.5 The following key themes have been identified to guide the NBB assessment for Bryncir:

- Stepwise approach to mitigation.
- Application of the DECCA (diversity, extent, condition, connectivity and aspects of ecosystem resilience) framework (Ref 5.34) to support ecosystem resilience with regards to green infrastructure. This involving consideration of both habitats and the species that are present.
- Explore opportunities for incorporating green infrastructure, paying due regard to the Building with Nature Standards Framework (Ref 5.36).

5.5.6 NRW's Terrestrial and freshwater Resilient Ecological Networks: a guide for practitioners in Wales (Ref 5.35) includes nine principles on the Sustainable Management of Natural Resources. These include:

- Adaptive management – to manage adaptively by planning, monitoring, reviewing and where appropriate changing action.
- Scale – to consider the appropriate scale for action.

- Collaboration and engagement – to promote and engage in collaboration and engagement.
- Public participation – to make appropriate arrangements for public participation in decision-making.
- Evidence – to take account of all relevant evidence and gather evidence in respect of uncertainties.
- Multiple benefits – to take account of the benefits and intrinsic value of natural resources and ecosystems.
- Long term – to take account of the short-, medium- and long-term consequences of actions.
- Preventative action – to take action to prevent significant damage to ecosystems.
- Building resilience – to take account of the resilience of ecosystems, in particular the following aspects:
  - Diversity between and within ecosystem.
  - The connection between and within ecosystems.
  - The scale of ecosystems.
  - The condition of ecosystems including their structure and function.
  - The adaptability of ecosystems.

5.5.7 Evidence of the application of these principles will be detailed within the NBB assessment report and Green Infrastructure Statement.

5.5.8 NRW's Terrestrial and Freshwater Resilient Ecological Networks: A Guide for Practitioners in Wales (Ref 5.35) also includes a stepwise decision framework. Outlining three logical steps to help identify priorities and keep the programme on track, these steps are:

- Understand the place.
- Create a vision and plan to build resilience through creating networks that reflect the landscape character.
- Organise the project delivery.

5.5.9 The Stepwise approach to mitigation (see **Volume 1, Chapter 4: Environmental Assessment Methodology**) will be followed throughout the lifecycle of the proposed works.

5.5.10 A review of the ecological survey data relating to protected and notable species has been undertaken to inform the NBB assessment. Reference will be made to areas that support protected and notable species and to highlight areas where populations of protected and notable species may be isolated due to poor connectivity across the landscape. Where connectivity across the landscape is limited, habitat enhancement and/or creation measures will be proposed where practical to inform the design of the proposed works.

5.5.11 A NBB assessment and Green Infrastructure Statement (**Volume 8, Appendix 3.5.J: Net Benefit for Biodiversity Assessment and Green Infrastructure Statement**s) summarises the findings of this process and accompanies the consent applications.

5.6 Baseline

5.6.1 This section sets out the baseline ecological characteristics of the Bryncir works site and Study Areas.

Data Sources

5.6.2 The sources of published information that have been used to establish the baseline conditions are set out in this section. The overall topic assessment methodology is provided in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

Methods

Desk Study

5.6.3 A desk study was carried out to identify sites designated for nature conservation and records of protected or notable habitats and species (important ecology features) and Invasive Non-Native Species (INNS) that are relevant to the Bryncir works site. The desk study also identified the status of water bodies covered by the WFD (Ref 5.19) to identify those likely to be impacted from an ecological perspective.

5.6.4 The Study Areas (as defined in **Section 5.3.4**) apply to different ecological features.

5.6.5 Cofnod, the local biological records centre, was contacted in June 2023 to gain information on pre-existing ecological data (i.e. locations of locally designated sites, HoPI, ancient woodland and existing records of protected and notable species, and INNS within 2 km of the Bryncir works site). This data was refreshed on a six-monthly basis; the latest refresh was November 2024, which has been used to inform the assessment.

5.6.6 Online data resources that were reviewed for the desk study comprise:

- NRW website (Ref 5.37) for information on statutory designated sites of nature conservation interest and to confirm reasons for their designation.
- JNCC website (Ref 5.38) for site information and designation details of SACs, SPAs and Ramsar Sites identified in the relevant Study Areas.
- DataMapWales website (Ref 5.39) for information on the location and extent of HoPI.
- Woodland Trust Ancient Tree Inventory website (Ref 5.40) for records of veteran and ancient trees in and up to 50 m from the Bryncir works site.
- National Biodiversity Network Atlas (Ref 5.41) for records of notable aquatic species and INNS, where data licensing conditions allow.
- NRW DataMapWales website for records of fish, macroinvertebrates and macrophytes (Ref 5.39).
- Natur Gwynedd BAP website (Ref 5.42) for BAP habitats and species.

5.6.7 Protected and notable habitats and species comprise those listed under Schedules 1, 5 and 8 of the WCA 1981 (as amended) (Ref 4.22); Schedules 2, 4 and 5 of the Habitats Regulations (Ref 5.1); and species and habitats of principal importance for nature conservation in Wales listed pursuant to Section 7 of the Environment (Wales) Act 2016 (Ref 5.10). Other habitats and species are also considered and have been assessed,

e.g. those included in national, regional or local Red Data Books and Lists but not protected by legislation.

5.6.8 Records of INNS, as listed under Schedule 9 of the WCA 1981 (as amended) (Ref 4.22), have been considered when assessing the likely significant ecological effects of the proposed works. The presence of such species generally has a detrimental impact on natural habitats and legislation is in place to control the spread of such species. It is important to consider the potential for the spread of any such invasive species and the likely significant effects resulting from this, and any mitigation that may be required to prevent its spread.

5.6.9 The removal of such species may be desirable and beneficial for ecology. Measures will be taken to ensure that such invasive species are not inadvertently brought onto the Bryncir works site. The species concerned are not relevant ecological features for the purposes of EcIA but need to be considered (see **Volume 8, Appendix 1.4.A: Legislation, Policy and Guidance**), for their potential for adverse effects arising from the proposed works, or their potential to conflict with biodiversity mitigation and enhancement proposals.

5.6.10 **Volume 8, Appendix 3.5.A Bryncir Substation Ecological Appraisal Report** and **Volume 8, Appendix 3.5.B Bryncir SPEN 132 kV Connection Preliminary Ecological Appraisal Report** were reviewed for relevant information regarding habitats and species previously recorded in the area.

Sources of Information – Field Surveys

5.6.11 The requirement for ecological field surveys was informed by the desk study and extended Phase 1 habitat survey (as presented in **Volume 8, Appendix 3.5.A: Bryncir Substation Ecological Appraisal Report, Volume 8, Appendix 3.5.B: Bryncir SPEN 132 kV Connection Preliminary Ecological Appraisal Report** and **Volume 8, Appendix 3.5.C: Habitats Report**) in addition to analysis of the proposed works design.

5.6.12 Ecological field surveys were carried out to characterise the ecological baseline within the relevant Survey Areas, as presented in Table **5-1.** Further details regarding the definition of these Survey Areas and any limitations are presented in the associated survey reports within **Volume 8, Appendices 3.5.A – 3.5.J.**

5.6.13 Aquatic scoping surveys were completed to assess the quality of water bodies in the Study Area. This involved conducting a habitat appraisal at locations where potential impacts were considered likely to assess the potential for the water bodies to support protected or notable species and inform further survey work. Where deemed suitable, targeted aquatic species surveys (macroinvertebrate, macrophyte, fish and freshwater pearl mussel (*Margaritifera margaritifera*)) were scoped in on selected water bodies (described within **Volume 8, Appendix 3.5.E: Aquatic Survey Report**).

5.6.14 Fish surveys were not carried out as pre-existing data was obtained through the desk study. Two NRW fish monitoring points at OS grid reference SH4806743329 and SH4809244438 (approximately 54 m east and 660 m north, respectively) provided contemporary data up to 2022.

5.6.15 Freshwater pearl mussel surveys were not conducted on the Afon Dwyfor as the Bryncir works site was deemed unsuitable for these species during the aquatic scoping surveys due to the abundance of large substrate (boulders and cobbles).

5.6.16 Surveys for breeding and non-breeding birds were not carried out for the proposed works due to the minimal predicted impacts on habitats suitable for birds, and following a review of breeding bird survey data from 2017 covering the Bryncir works site, and the wider surrounding area (conducted to support the National Grid North Wales Connection (NWC) Project). The 2017 bird survey data revealed that the Bryncir works site was infrequently used by low numbers of common and widespread bird species of typically low conservation concern or legal protection. Such bird species can be expected to use habitats in or adjacent to the Bryncir works site for occasional foraging or nesting (typically in trees and hedgerows) but are unlikely to depend on them for their survival or proliferation and will have access to habitat of equal and better quality in the surrounding landscape. Mitigation, including timings of works outside the typical bird nesting season (March to August, inclusive) and pre-construction vegetation checks, will be implemented into the proposed works and thus safeguard birds from negative effects.

5.6.17 Surveys for great crested newt (*Triturus cristatus*) (GCN) were not carried out following the desk study, the extended Phase 1 habitat survey and an analysis of the proposed works' design. No records of GCN were confirmed within 2 km of the Bryncir works site.

5.6.18 A review of online mapping and site survey information identified four water bodies within 500 m of the Bryncir works site. A 2016 field survey, carried out in relation to the original Bryncir Substation planning application, recorded one water body approximately 300 m south-west of the proposed works. However, this feature was ephemeral and deemed unsuitable for GCN breeding. OS maps record an additional water body approximately 320 m north-east of the Bryncir works site, but separated by the A487 carriageway, which presents a significant barrier to amphibian movement. Two further water bodies are recorded on OS maps in the Bryncir works site; however, neither was extant during the Phase 1 habitat survey. Based on these findings, GCN are unlikely to be present in the Bryncir works site. It is anticipated that NBB proposals (as presented in **Volume 8, Appendix 3.5.J: Net Benefit for Biodiversity Assessment and Green Infrastructure Statements**) and recommendations in **Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan (LEMP)** will be beneficial for amphibians.

5.6.19 Detailed field surveys for reptiles and common amphibians (e.g. common toad (*Bufo bufo*)) were not carried out following the desk study, extended Phase 1 habitat survey, and an analysis of the proposed works' design. While the Bryncir works site contains a range of habitats, the dominant habitat type that would be permanently affected comprises improved grassland which is sub-optimal for reptiles (and common amphibians). Most habitats capable of supporting significant reptile populations, such as riverbanks, woodland, and scrub) will be avoided during construction. Works in areas of marshy grassland, which may provide suitable reptile and amphibian habitat, will be localised and temporary. Embedded mitigation (as outlined in paragraphs 5.9.4 to 5.9.7), will be detailed in a CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) and implemented to safeguard reptiles from negative effects, which will also benefit common amphibians. It is anticipated that NBB proposals (as presented in **Volume 8, Appendix 3.5.J: Net Benefit for Biodiversity Assessment and Green Infrastructure Statements**) and mitigation in **Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan (LEMP)** will benefit reptiles and amphibians.

5.6.20 Detailed field surveys for terrestrial invertebrates were not undertaken following analysis of the proposed works' design in relation to habitats in the Bryncir works site. The dominant habitat type that would be directly and permanently impacted (improved

grassland) is unlikely to support notable invertebrate assemblages. Works in habitats that may support notable terrestrial invertebrates or invertebrate communities (e.g., riverbanks, wetland and species rich marshy grassland) will be localised and temporary. It is anticipated that NBB proposals (as presented in **Volume 8, Appendix 3.5.J: Net Benefit for Biodiversity Assessment and Green Infrastructure Statements**) and mitigation in **Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan (LEMP)**, will be beneficial for terrestrial invertebrates.

5.6.21 Separate species-specific surveys for hedgehog (*Erinaceus europaeus*), brown hare (*Lepus europaeus*) and polecat (*Mustela putorius*) were not carried out as part of the assessment, as observations of these species have been obtained through the desk study and recorded during other ecological field surveys of the Bryncir works site. Hedgehog, brown hare and polecat are assumed to be potentially present in the Bryncir works site. Consideration for any embedded mitigation required for hedgehog, brown hare and polecat, which would be secured through production of a CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**), is included in this chapter. It is anticipated that NBB proposals (as presented in **Volume 8, Appendix 3.5.J: Net Benefit for Biodiversity Assessment and Green Infrastructure Statements**) and mitigation in **Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan (LEMP)** will be beneficial for these species.

5.6.22 Table **5-1** presents details of the coverage, methods and survey periods of field surveys conducted within their relevant Survey Areas.

Table 5-1 – Ecological surveys undertaken to characterise baseline conditions

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
Extended Phase 1 habitat survey. INNS were also recorded where observed. Presented in **Volume 8, Appendix 3.5.C: Bryncir Habitats**	Extended Phase 1 habitat survey was conducted in accordance with the JNCC method (Ref 5.43).	Multiple site visits between July 2022 and March 2025.	The Bryncir works site and to a maximum of 50 m from the Bryncir works site, where viewable or access permitted.	Habitats likely to be impacted by the proposed works are in the Bryncir works site.
Targeted habitat survey. Presented in **Volume 8, Appendix 3.5.C: Bryncir Habitats**	Selected habitats of greater botanical interest, where likely to be impacted by the proposed works, were surveyed in greater detail (i.e. National Vegetation Classification (NVC) survey) to help inform mitigation.	July, August and September 2024.	The habitats subjected to enhanced vegetation survey in the Bryncir works site were identified from the initial Phase 1 habitat survey and desk study information.	Habitats likely to be impacted by the proposed works are in the Bryncir works site.
Hedgerow survey. Presented in **Volume 8, Appendix 3.5.D: Bryncir Hedgerows**	Hedgerows in the Bryncir works site, which are likely to be impacted by the proposed works, were surveyed and assessed for their Importance against the Wildlife and Landscape Criteria, detailed in the Hedgerows Regulations (Ref 5.13).	July 2022, November 2023, July 2024 and March 2025.	The Bryncir works site plus a 50 m buffer where a hedgerow adjoins the Bryncir works site.	Hedgerow that are likely to be impacted by the proposed works are in the Bryncir works site, but surveys of some hedgerows may go beyond the Bryncir works site.
Aquatic scoping surveys. Presented in **Volume 8, Appendix 3.5.E: Aquatic Survey Report**	Walking accessible and safe stretches of targeted water body banks, noting physical habitat features (such as riparian cover, channel substrate, habitat type, modifications, and in-stream	June – September 2024.	In the Bryncir works site.	The surveys targeted water bodies which are likely to be impacted by the proposed works.

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
	vegetation) to assess the potential for water bodies to support protected, notable or invasive species and inform further survey work.			
Aquatic macrophyte surveys. Presented in **Volume 8, Appendix 3.5.E: Aquatic Survey Report**	During the aquatic scoping surveys where the habitat was deemed suitable, surveys for macrophytes were carried out over a 100 m representable stretch of watercourses following the UK Technical Advisory Group (UKTAG) River Assessment Method for Macrophytes and Phytobenthos (Ref 5.44).	June – September 2024.	In the Bryncir works site.	The surveys targeted water bodies which are likely to be impacted by the proposed works.
Aquatic macroinvertebrate surveys. Presented in **Volume 8, Appendix 3.5.E: Aquatic Survey Report**	During the aquatic scoping surveys where the habitat was deemed suitable, surveys for aquatic macroinvertebrates were carried out over a 100 m representable stretch of the Afon Dwyfach following the UKTAG River Assessment Methods for Benthic Invertebrate Fauna (Ref 5.45).	Spring (March to May) and Autumn (September to November) 2024.	In the Bryncir works site.	The surveys targeted water bodies which are likely to be impacted by the proposed works.
Bats – Ground Level Tree Assessments (GLTA) and Potential Roost Feature (PRF) Inspection Survey	GLTA and PRF inspection surveys were carried out of targeted structures and trees, following guidance as described in the Bat Conservation Trust (BCT)	July 2022, November and December 2023, March 2025 and June 2025.	The Bryncir works site, plus targeted trees within 30 m of the Bryncir works site where the potential for	The surveys targeted structures and trees which are likely to be impacted by the proposed works.

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
Presented in **Volume 8, Appendix 3.5.F: Bryncir Bat Survey Report**	guidelines (Ref 5.46 and Ref 5.47).		impacts was identified.	
Bats – Roost Surveys. Presented in **Volume 8, Appendix 3.5.F: Bryncir Bat Survey Report**	Trees that could potentially be directly or indirectly impacted by the proposed works have been assessed for their suitability for use by bats. Those with bat roost suitability that could not be inspected at height or avoided by design adjustments were surveyed further. In 2022, two trees were identified as being impacted by the works proposed at that time. Emergence-re-entry surveys were carried out as described in the BCT guidelines (Ref 5.56), which were the current guidelines at the time. Due to a revision of the Bryncir works site, these trees will no longer be impacted by the works and no further survey is required.	August and September 2022.	In the Bryncir works site.	The surveys targeted trees which could be directly or indirectly affected by the proposed works.
Bats – Foraging/Commuting. Presented in **Volume 8, Appendix 3.5.F: Bryncir Bat Survey Report**	Targeted walked transect surveys were carried out of the Bryncir works site (high suitability for foraging and commuting bats). The surveys were conducted as described in the BCT guidelines (Ref 5.47) and were supplemented	May (spring), August (summer) and September (autumn) 2024.	Targeted suitable habitat in the Bryncir works site.	The bat activity Survey Area and level of survey was determined through consideration of the size of the Bryncir works site and the quality of habitat present which is suitable for bats, in

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
	by the deployment of two static bat detectors.			accordance with the criteria described in the BCT guidelines (Ref. 3.5.50).
Badger Presented in this chapter and in **Volume 8, Appendix 3.5.A: Bryncir Substation Ecological Appraisal Report** and **Volume 8, Appendix 3.5.B: Bryncir SPEN 132 kV Connection Preliminary Ecological Appraisal Report.**	A walkover survey searching for signs of badger activity as described in the Mammal Society's 'Surveying Badgers' publication (Ref 5.48). The survey was carried out in combination within the Phase 1 habitat survey.	July 2022, November and December 2023, March 2025.	The Bryncir works site and up to a maximum of 50 m from the Bryncir works site.	50 m is an appropriate Survey Area as it covers the 30 m distance at which direct effects could occur and acknowledges that setts present beyond this distance are unlikely to be impacted by the proposed works, e.g. through construction disturbance.
Riparian mammals. Presented in **Volume 8, Appendix 3.5.G: Bryncir Riparian Mammals**	The survey involved a habitat suitability assessment and searching for field signs for otter and water vole along Afon Dwyfach and connecting watercourses where impacts were likely, in accordance with standard guidance (Ref 5.49, Ref 5.50, Ref 5.51, Ref 5.52 and Ref 5.53).	June, July, September and November 2024	Between approximate OS grid references SH48144376 and SH47864225 of the Afon Dwyfach, which includes the section of the river that will be crossed by the new section of overhead line. The survey also covered connecting watercourses which are in the Bryncir works site. A section of the Afon Dwyfach to the north of the Bryncir works site (between	The Survey Area is sufficient to determine presence or likely absence of otter and water vole and to assess potential impacts on both species.

Survey	Survey method	Survey period	Survey Area	Justification for the Survey Area
			approximate OS grid references SH48064405 and SH48134373) was also covered during surveys carried out in relation to the Wider Works element of the Project (See ES **Volume 8 Appendix 6.5.E**).	
INNS. Presented in **Volume 8, Appendix 3.5.C: Habitats Report**	INNS observations were recorded when noted during the ecology field surveys. They will also be recorded during pre-construction surveys and construction work.	Multiple site visits between June 2022 and March 2025.	Within the Bryncir works site.	All areas of the Bryncir works site will require ongoing INNS monitoring to avoid the spread of any INNS species before, during and after construction.

Impact Assessment Method

5.6.23 The impact assessment detailed in this chapter has been carried out in accordance with CIEEM's guidelines (Ref 5.29). Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the Ecology and Nature Conservation assessment are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

Baseline Results

5.6.24 This section outlines the baseline ecological characteristics of the Bryncir works site and relevant Study Areas (as outlined in **Section 5.3** of this chapter).

Sites Statutorily Designated for Biodiversity Importance

5.6.25 There are five international statutory sites for nature conservation (i.e. SACs, SPAs and Ramsar sites) within the 10 km Study Area and one further SAC designated for bats within 30 km.

5.6.26 Nine other statutory designated sites for nature conservation (SSSIs, NNRs, LNRs) are present within the 5 km Study Area.

5.6.27 The locations of these statutory sites designated for nature conservation are shown in **Figure 3.5.1.** Designated sites are listed in **Table 5-2** in ascending order, with those closest to the Bryncir works site listed first, starting with internationally designated sites, then national and local statutory sites. Designation details are summarised in **Volume 8, Appendix 3.5.H: Statutory Designated Sites Citations**.

Table 5-2 – Statutory sites designated for nature conservation within 10 km (international) and 5 km (national and local) of the Bryncir works site (extended to 30 km for international sites designated for bats)

Site name	Approximate distance (km) and direction from closest point to the Bryncir works site	Importance/value
Corsydd Eifionydd/Eifionydd Fens SAC	1.88 km north-east	International (Very high)
Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	5.13 km south-east	International (Very high)
Gogledd Bae Ceredigion/Northern Cardigan Bay SPA	5.16 km south	International (Very high)
Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat SAC	7.62 km south-east	International (Very high)
Glynllifon SAC	9.23 km north-west	International (Very high)
Mwyngloddiau Fforest Gwydir/Gwydyr Forest Mines SAC	29.78 km north-east	International (Very high)
Llystyn Isaf SSSI	0.31 km north-west	National (High)
Ffriddoedd Garndolbenmaen SSSI	1.55 km north-east	National (High)
Cors Graianog SSSI	1.88 km east	National (High)
Rhosgyll Fawr SSSI	2.80 km south-west	National (High)
Talhenbont SSSI	3.39 km south	National (High)
Cors Gyfelog SSSI and Cors Gyfelog NNR	3.59 km north-west	National (High)
Afon Ddu SSSI	4.66 km east	National (High)
Cors y Wlad SSSI	4.95 km north-west	National (High)

Non-statutory Sites Designated for Nature Conservation

5.6.28 There are 39 non-statutory sites designated for nature conservation within the 2 km Study Area: all are cWS. It is noted that cWS have not yet been designated, but they are considered within this chapter, as they are being considered for designation and may become so within the lifetime of the proposed works.

5.6.29 These sites are shown on **Figure 3.5.2** and are summarised in **Table 5-3**. The non-statutory sites are listed in ascending order, with those closest to the Bryncir works site listed first.

Table 5-3 – Non-statutory designated sites for nature conservation within the 2 km Study Area

Non-statutory designated site	Reason for designation	Approximate distance (km) and direction from closest point to the Bryncir works site
Llystyn Isaf cWS	Marshy grassland and wet heath with acid grassland mosaic.	Partially in
Afon Dwyfach cWS	Running water.	Partially in
Tyddyn-y-Felin cWS	Marshy grassland.	Partially in
Rhwnddwyryd cWS	Marshy grassland, with wet heath and acid grassland mosaic and acid grassland.	Partially in
Dolwar Heath cWS	Marshy grassland.	Adjacent to
Bryn-yr-efail-uchaf cWS	Marshy grassland.	Adjacent to
Gwinllan Llystan cWS	Dry heath with acid grassland mosaic, acid grassland and acid neutral flush.	0.08 km north-east
Plas Lleicheiddior cWS	Marshy grassland.	0.13 km west
Bryn Eifion cWS	Acid grassland, marshy grassland and wet heath with acid grassland mosaic.	0.18 km north
Llecheiddior Ganol cWS	Marshy grassland, with acid and neutral flush and acid grassland.	0.30 km north-west
Llystyn Ganol cWS	Acid grassland, marshy grassland and dry heath with acid grassland mosaic.	0.42 km north
Bryn Ffynnon & Ynys Galed cWS	Marshy grassland.	0.50 km south-west
Hendy East cWS	Marshy grassland and wet heath with acid grassland mosaic.	0.51 km south-west
Fron-oleu cWS	Marshy grassland.	0.71 km south-west

Non-statutory designated site	Reason for designation	Approximate distance (km) and direction from closest point to the Bryncir works site
Muriau Bach cWS	Marshy grassland with wet heath and acid grassland mosaic.	0.71 km south
Ynys Galed cWS	Acid grassland and marshy grassland.	0.81 km north-west
Bryncir cWS	Marshy grassland.	0.85 km north-west
West bank of Afon Dwyfor cWS	Broadleaved woodland, marshy grassland and acid flush.	0.90 km south-east
Afon Dwyfor cWS	Running water.	0.95 km south-east
Ystumcegid-ganol cWS	Fen and broadleaved woodland.	1.03 km south-east
Hendy (South) cWS	Marshy grassland with wet heath and acid grassland mosaic.	1.12 km south-west
Ynys Graianog/ Gaerwen cWS	Wet heath with acid grassland mosaic and fen.	1.18 km south-west
Ty'n-rhos cWS	Wet heath with acid grassland mosaic.	1.23 km south
Gaerwen cWS	Coniferous woodland and wet heath with acid grassland mosaic.	1.24 km south-west
Below Derwin Bach cWS	Acid grassland with wet heath and acid grassland mosaic.	1.29 km north
Bryniau Ystumcegid cWS	Acid grassland, dry heath with acid grassland mosaic and broadleaved woodland.	1.29 km south-east
Blaen-y-cae cWS	Acid grassland.	1.35 km north
Coed Hendre Cennin cWS	Coniferous woodland.	1.38 km north-west
Bryniau'r Tyddyn cWS	Acid grassland, dry heath with acid grassland mosaic and fen.	1.44 km south-east
Below Hendre Cennin cWS	Wet heath with acid grassland mosaic and marshy grassland.	1.50 km west
Derwin cWS	Marshy grassland and wet heath with acid grassland mosaic.	1.51 km north-west
Afon Dwyfach at Bettws Bach cWS	Marshy grassland, broadleaved woodland and standing water.	1.53 km south-west
Llystyn Gwyn cWS	Acid grassland and bracken.	1.54 km north

Non-statutory designated site	Reason for designation	Approximate distance (km) and direction from closest point to the Bryncir works site
North of Gwinllan Rhos-ddu plantation cWS	Wet heath with acid grassland mosaic and marshy grassland.	1.60 km south-west
Gwinllan Rhos-ddu cWS	Coniferous woodland.	1.70 km south-west
Ystumcegid cWS	Marshy grassland, basin mire, acid flush, acid grassland and broadleaved woodland.	1.73 km south-east
Pont Dafarn Faig cWS	Marshy grassland, acid grassland and scrub.	1.82 km north
Ystumcegid-isaf cWS	Marshy grassland, wet heath with acid grassland mosaic, broadleaved woodland and acid flush.	1.83 km south-east
Hendy and Bettws Bach cWS	Marshy grassland.	1.92 km south-west

Habitats

Ancient Woodland

5.6.30 Cofnod records six areas of ancient semi-natural woodland, one site of restored ancient woodland and one site of ancient woodland of unknown category in the Study Area, as shown in **Figure 3.5.3.** The closest is 0.9 km north of the Bryncir works site.

Ancient or Veteran Trees

5.6.31 A review of the Woodland Trust Ancient Tree Inventory (Ref 5.40) does not indicate any individual ancient or veteran trees in the Study Area.

5.6.32 In December 2024, a preliminary visual survey was carried out from ground level to evaluate the quality and benefits of trees in the Bryncir works site, to the west of the Afon Dwyfach (this survey also covered trees outside of the Bryncir works site). This survey (**Volume 8, Appendix 3.5.I: Arboricultural Impact Assessment**) identified two trees in the Bryncir works site which meet the stem girth parameters of ancient tree status: (T121 and T125 (refer to the Tree Constraints Plan for locations). Trees which do not have the stem girth to be considered ancient, but which exhibited features associated with veteran status are: T41, T60, T95, T105 and T137. T105 is on the southern boundary of the Bryncir works site. T41, T60, T95 and T137 are outside of the Bryncir works site and the ZoI.

5.6.33 In February 2025, the tree survey was extended to cover the rest of the Bryncir works site, to the east of the Afon Dwyfach. During this survey, a further four trees were identified which exhibited features associated with veteran status (refer to **Figure 3.5.4**). This includes tree T211 which lies just to the west of the path of the undergrounded DB connection route, and tree T240 which is just in the Bryncir works site. T272 and T274 lie outside of the Bryncir works site to the east.

Habitats of Principal Importance (HoPI)

5.6.34 Data supplied by Cofnod and Datamap Wales (Ref 5.39) identified the following HoPI in the Study Area. The locations of these habitats are shown in **Figure 3.5.4** and the closest to the Bryncir works site are given in the following list:

- Purple moor grass and rush pasture is in the Bryncir works site.
- Lowland heathland is in the Bryncir works site. However, the Phase 1 habitat survey identified the vegetation in this area as comprising young semi-natural broadleaved woodland and marshy grassland.
- Lowland dry acid grassland is in the Bryncir works site. However, the Phase 1 habitat survey identified the vegetation in this area as comprising marshy grassland and fen.
- Lowland fen and reedbed is approximately 0.08 km north of the Bryncir works site.
- Lowland meadow is approximately 0.3 km north of the Bryncir works site.
- Open mosaic habitat of previously developed land is approximately 1.06 km north of the Bryncir works site.
- Traditional orchard is approximately 1.48 km south of the Bryncir works site.

5.6.35 Further HoPI present in the Study Area, but not currently identified by Cofnod or on the Datamap Wales website (Ref 5.39) are:

- Hedgerow.
- River.
- Deciduous woodland.

Broad Terrestrial Habitats

5.6.36 The broad terrestrial habitat types present in the Bryncir works site were identified during the Phase 1 habitat survey (see **Table 5-4**). These habitats were further defined by detailed habitat surveys, where required, such as for selected grassland areas and hedgerows (see **Volume 8, Appendix 3.5.C: Habitats Report** and **Volume 8, Appendix 3.5.D: Hedgerow report**).

5.6.37 **Table 5-4** presents a summary of the habitats in the Bryncir works site and an evaluation of importance.

Table 5-4 – Broad habitat types in the Bryncir works site and their ecological importance

Habitat	Area (ha)/ length (km) (Site Limits)	% Contribution to Site Limits (area only)	Biodiversity importance	Rationale
A1.1.1 Semi-natural broadleaved woodland A1.3.1 Semi-natural mixed woodland	0.39 ha -	1.98 -	Up to County (Medium) broadleaved woodland Up to Local (Low) mixed woodland	Some lowland mixed deciduous woodland is a HoPI listed under Section 7 of the Environment (Wales) Act (2016) (Ref 5.10). Wet woodland is listed in the Gwynedd BAP (Ref 5.42). An area of wet woodland is present to the north-west of the Bryncir works site. The locations of lowland mixed deciduous woodland HoPI are not yet provided on the DataMap Wales website (Ref 5.39). Broadleaved semi-natural woodland is in the Bryncir works site, but is unlikely to be Priority habitat (**Figure 3.5.4**).
A2.1 Dense or continuous scrub	0.07 ha	0.36	Site (Very Low)	Common and widespread. Not a HoPI. Occurs throughout the Bryncir works site.
A2.2 Scattered scrub	0.12 km	-	Site (Very Low)	Common and widespread. Not a HoPI. Occurs throughout the Bryncir works site.
A3.1 Scattered broadleaved trees A3.2 Mixed parkland or scattered trees	0.34 km 0.05 km	- -	National (High) for ancient or veteran trees. Otherwise of Site (Very Low) to Local (Low) importance	Not a HoPI. Ancient and veteran trees are irreplaceable habitat. (Refer to the Arboricultural Impact Report (**Volume 8, Appendix 3.5.I: Arboricultural Impact Assessment**) for details).
B4 Improved grassland	13.11 ha	66.83	Site (Very low)	Common and widespread. Not a HoPI. Present in the Bryncir works site.

Habitat	Area (ha)/ length (km) (Site Limits)	% Contribution to Site Limits (area only)	Biodiversity importance	Rationale
B5 Marshy grassland	3.46 ha	17.64	Up to County (Medium)	Purple moor grass and rush pasture is a HoPI listed under Section 7 of the Environment (Wales) Act (2016) (Ref 5.10). Rhos pasture is listed in the Gwynedd BAP (Ref 5.42). Present in the Bryncir works site.
B6 Poor semi-improved grassland	1.93 ha	9.64	Site (Very Low)	Common and widespread. Not a HoPI. Present in the Bryncir works site.
G2 Running water (including Rivers and field drains and streams)	0.18 ha and 0.77 km	0.91	The Afon Dwyfach is a cWS and therefore of County (Medium) importance. Drains (smaller watercourses and ditches) are of local (Low) importance only.	Rivers are HoPI listed under Section 7 of the Environment (Wales) Act (2016) (Ref 5.10). River corridors are listed in the Gwynedd BAP (Ref 5.42). The Afon Dwyfach and smaller tributaries are in the Bryncir works site.
J2.1.2 Intact and defunct hedge – species-poor J2.1.1 Intact and defunct hedge – native species-rich J2.3.1 Hedge with trees – native species-rich J2.3.2 Hedge with	1.63 km	-	Up to County (Medium)	Hedges are present in the Bryncir works site and are HoPI listed under Section 7 of the Environment (Wales) Act (2016) (Ref 5.10) and legally protected under the Hedgerows Regulations (Ref 5.13). Some hedgerows are present on cloddiau in the site.

Habitat	Area (ha)/ length (km) (Site Limits)	% Contribution to Site Limits (area only)	Biodiversity importance	Rationale
trees – species-poor				
3.4 Fence 3.5 Wall, 3.6 Dry ditch	4.12 km		Site (Very Low)	Not a HoPI.

Legally Protected and Notable Species and INNS

5.6.38 The desk study returned records of protected and notable species within the 2 km Study Area for the preceding 10 years. These protected and notable species, including species of biodiversity importance are summarised in relevant technical reports, included as **Volume 8, Appendices 3.5.A – 3.5.J.**

5.6.39 **Table 5-5** presents a summary of the protected and notable species that have been identified as present, or potentially present, in the Bryncir works site and an evaluation of importance of each species or species group and associated rationale. Full descriptions of the baseline conditions are presented in **Volume 8, Appendices 3.5.A – 3.5.J**.

Table 5-5 – Summary of baseline details for legally protected and notable species, alongside an assessment of biodiversity importance of ecological features

Species or species group	Baseline detail	Ecological importance	Rationale
Terrestrial invertebrates	The desk study returned records of marsh fritillary (*Euphydryas aurinia*) butterfly and the notable small pearl-bordered fritillary (*Boloria selene*) butterfly within the 2 km Study Area. The closest record of small pearl-bordered fritillary is approximately 1.47 km from the Bryncir works site (dated 2018). Marsh fritillary has been recorded approximately 1.94 km from the Bryncir works site (dated 2014). Corsydd Eifionydd/Eifionydd Fens SAC is approximately 1.9 km from the Bryncir works site. Marsh fritillary is one of the species that is a primary reason for selection of the site for designation. The desk study also returned records of buff Ermine (*Spilosoma lutea*), broom moth (*Ceramica pisi*), dot moth (*Melanchra persicariae*), galium carpet (*Epirrhoe galiata*), knot grass (*Acronicta rumicis*), mottled rustic (*Caradrina Morpheus*), Ashworth's rustic (*Gwladwr Cymreig*), Dark-barred twin-spot carpet (*Brychan Deusmotiog Tywyll*) small heath (*Coenonympha pamphilus*), small square-spot (*Diarsia rubi*), dusky brocade (*Apamea remissa*), garden tiger (*Arctia caja*), white ermine (*Spilosoma lubricipeda*), cinnabar (*Tyria jacobaeae*), blood-vein (*Timandra comae*) and wall (*Lasiommata megera*) within the 2 km Study Area. None of these records are from the Bryncir	County (Medium)	Some invertebrates are listed in Section 7 of the Environment (Wales) Act 2016 (Ref 5.10). The marsh fritillary receives full protection under the WCA (1981) (Ref 4.22) and is listed on the Species Action Plan (SAP) list of the Gwynedd BAP (Ref 5.42).

Species or species group	Baseline detail	Ecological importance	Rationale
	works site. The closest record is for wall butterfly; approximately 0.77 km from the site. The mosaic of semi-natural habitats in the Bryncir works site are considered to offer suitable habitat to support terrestrial invertebrates, including marsh fritillary. The areas of marshy grassland and scattered scrub abutting the watercourses and the damp grassland and wet heathland mosaic are most suitable. The area where permanent habitat loss will occur is predominantly improved grassland which is unsuitable for notable invertebrates.		
Aquatic macroinvertebrates as presented **Volume 8, Appendix 3.5.E: Aquatic Survey Report**	The desk study did not identify records of notable aquatic macroinvertebrates in the last 10 years and within the 2 km Study Area. The nationally scarce river skater (*Aquarius najas*) was recorded during the field surveys.	Local (Low)	No notable aquatic macroinvertebrate species were identified with the data search within the 2 km Study Area. The nationally scarce river skater was observed during field surveys however there is no legislation affording protection to this species.
Aquatic macrophytes as presented **Volume 8, Appendix 3.5.E: Aquatic Survey Report**	The desk study did not identify records of notable aquatic macrophytes in the last 10 years and within the 2 km Study Area. No notable aquatic macrophyte species were recorded during the field surveys.	Local (Low)	No notable aquatic macrophyte species were identified with the data search nor during field surveys within the 2 km Study Area.
Fish as presented **Volume 8, Appendix 3.5.E: Aquatic Survey Report**	The desk study returned records of five notable fish species: Atlantic Salmon (*Salmo salar*), European eel (*Anguilla anguilla*), brown/sea trout, and lamprey (*Lampetra* sp.) (within the last 10 years) and in the 2 km Study Area.	National (High)	The notable fish identified represent migratory species which are all protected by both national and European legislation (outlined below). In addition the salmonids (Atlantic salmon and brown/sea trout) are

Species or species group	Baseline detail	Ecological importance	Rationale
	Lamprey species (*Lampetra* spp.*)*, a genus of lampreys in the family Petromyzontidae which covers both brook lamprey (*L. planeri*) and river lamprey (*L. fluviatilis*) within the UK.		mentioned within the Afon Ddu SSSI citation. All fish and their habitats are protected under the Salmon and Freshwater Fisheries Act 1975 (Ref 5.16). It is an offence to wilfully disturb spawn, spawning fish or spawning areas, cause pollution likely to harm fish, and to cause impedance to fish passage (notably salmon or trout). There are other offences in relation to specific fish species. Atlantic salmon are protected under the Salmon Act 1986 (Ref 5.17), Habitats Directive (Annexes II and V; Ref. 5.2), Bern Convention (Appendix III; Ref 5.6), The Conservation of Habitats and Species Regulations 2017 (Schedule 4; Ref 5.1). They are also listed as a Section 41 species (previously UKBAP) under the NERC Act 2006 (Ref. 5.10) and listed as Species of Principal Importance included as Priority Species under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10). European eel are protected by the Eels Regulations 2009 (Ref. 5.20), Bonn Convention (Appendix II; Ref. 5.4), Section 41 species (previously UKBAP) under the NERC Act 2006 (Ref 5.8), listed in CITES Appendix II and in the EU implementation of CITES rules (Annex B to Council Regulation (EC) No 338/97; EU, 1996; Ref 5.55), and listed as Species of Principal

Species or species group	Baseline detail	Ecological importance	Rationale
			Importance included as Priority Species under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10). Brown/sea trout are the same species listed as a Section 41 species (previously UKBAP) under the NERC Act 2006 (Ref 5.8) and listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10). River lamprey are protected under the Habitats Directive (Annexes II and V; Ref 5.55), Bern Convention (Appendix III; Ref. 5.7), The Conservation of Habitats and Species Regulations 2010 (Schedule 4; Ref 5.1). They are also listed as a Section 41 species (previously UKBAP) under the NERC Act 2006 (Ref 5.18) and listed as Species of Principal Importance included as Priority Species under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10). Brook lamprey are protected under the Habitats Directive (Annex II; Ref 5.55) and the Bern Convention (Appendix III; Ref. 5.6). Local species action plans have been drawn together for salmonids (brown/sea trout and Atlantic salmon) and all lamprey species.
Breeding Birds	Records of three bird species listed on Annex 1 were identified during the desk study: red kite (*Milvus milvus*), chough (*Pyrrhocorax*	Local (Low)	

Species or species group	Baseline detail	Ecological importance	Rationale
	pyrrhocorax) and nightjar (*Caprimulgus europaeus*). Schedule 1 birds identified were barn owl (*Tyto alba*), redwing (*Turdus iliacus*), fieldfare (*Turdus pilaris*), snow bunting (*Plectrophenax nivalis*), red kite and chough. Nineteen Section 7 birds, 16 Red list (UK or Wales), and 25 Amber list (UK or Wales) were identified. No breeding bird surveys were carried out at the Bryncir works site. However, the scattered trees, hedgerows, river corridor and scrub within the works site and adjacent woodland provide nesting opportunities. The open fields and marshy grassland also offer suitability for ground-nesting bird species. Towers could potentially be used by nesting peregrines. There are no records of peregrine within the 2 km Study Area, and none were observed while conducting other field surveys		Breeding and non-breeding birds: All nesting birds are protected under the WCA 1981 (as amended) (Ref 4.22). Low numbers of common birds of no or low conservation concern may use the habitats within or adjacent to the Bryncir works site for occasional foraging or nesting but are unlikely to depend on these for their survival or proliferation and will have access to habitat of equal and better quality in the surrounding landscape.
Non-breeding (wintering) birds	No surveys for non-breeding (wintering) birds were carried out at the Bryncir works site. The semi-natural habitats in and adjacent offer limited foraging and sheltering opportunities for non-breeding birds.	Local (Low)	
Bats as presented in **Volume 8, Appendix 3.5.F: Bryncir Bat Survey Report**	The desk study returned roost records for lesser horseshoe (*Rhinolophus hipposideros*) (including a possible maternity roost), noctule (*Nyctalus noctule*) (maternity roost), soprano pipistrelle (*Pipistrellus pygmaeus*), common pipistrelle (*Pipistrellus pipistrellus*), Natterer's (*Myotis nattereri*) and brown long-eared (*Plecotus auritus*) within the 2 km Study Area. The closest	Up to County (Medium) for common pipistrelle, soprano pipistrelle, brown-long-	All bat species and their roosts are legally protected in the UK under the WCA 1981 (as amended) (Ref 4.22) and Habitats Regulations (Ref 5.1), which implemented the Habitats Directive (Ref 5.55). Four bat species are also included as Priority Species under Section 7 of the Environment (Wales) Act 2016 (Ref 5.8). Lesser horseshoe bat is listed on the

Species or species group	Baseline detail	Ecological importance	Rationale
	roost record was for lesser horseshoe bat approximately 0.67 km from the site. The desk study also returned activity records for the following species within the 2 km Study Area; lesser horseshoe, noctule, common pipistrelle, soprano pipistrelle, *Myotis* sp., Daubenton's (*Myotis daubentonii*), Natterer's and brown long-eared. These species have been recorded approximately 0.78 km from the Bryncir works site and beyond. Bat roosts were not detected during bat emergence and re-entry surveys carried out in 2022. These trees will not be impacted by the proposed works due to updates to the design. The veteran tree in the Bryncir works site that will be translocated as part of the works was inspected by a licensed bat worker using an endoscope in June 2025. No evidence of roosting bats was observed and the tree was assessed to be PRF-I. The remaining trees that will be removed to facilitate the works were assessed as having no potential bat roost features. Eight species of bat were recorded within the Survey Area during the walked transects and via automated bat detectors. Four of these are relatively common and widespread bat species (common pipistrelle, soprano pipistrelle, brown long-eared and *Myotis* species), one is widespread but locally distributed (noctule), and three are rarer and less common (serotine (*Eptesicus serotinus*), Leisler's (*Nyctalus leisleri*) and lesser horseshoe). Most activity was from	eared and *Myotis* species. The bat assemblage using the Bryncir works site achieves the threshold for County value for roosting and foraging.	Species Action Plan (SAP) list of the Gwynedd BAP (Ref 5.42). There are currently no known roosts in the trees or buildings in or adjacent to the Bryncir works site, however there is the potential for bats to roost in trees identified as having PRFs. Therefore, as a precaution the importance of roosts is of up to County importance for common pipistrelle, soprano pipistrelle, brown-long-eared and *Myotis* species. Lesser horseshoe can be discounted as there is no suitable roosting habitat for this species in the Bryncir works site. Only one Leisler pass and two serotine passes were recorded during the NBW/automated bat detector deployment so these species are likely to be commuting through the Bryncir works site and are not included.

Species or species group	Baseline detail	Ecological importance	Rationale
	common and soprano pipistrelles, which are the most commonly recorded species in both the county and in Wales. Lower activity levels were recorded from *Myotis* species, brown long-eared bat, noctule, unidentified pipistrelles, lesser horseshoes, Leisler's and serotine. Behaviours including foraging (with feeding buzzes) and commuting were recorded during the walked transects, occasionally with more than one bat present.		
Badger as presented here and in **Volume 8, Appendix 3.5.A: Bryncir Substation Ecological Appraisal Report** and **Volume 8, Appendix 3.5.B: Bryncir SPEN 132kV Connection Preliminary Ecological Appraisal Report**	The desk study returned seven badger records (dated in the last 10 years). The closest of these records is of a badger found dead on the A487 road in the Bryncir works site. No evidence of badger was identified within the Survey Area and large parts of the site appear to be permanently wet and unsuitable for sett building.	Local (Low)	Protected under The Protection of Badgers Act 1992 (Ref 5.12). However, they remain common and widespread.
Red Squirrel	The desk study returned no records of red squirrel within the 2 km Study Area. There are records for grey squirrel (*Sciurus carolinensis*) in the Study Area, which can indicate absence of red squirrel. The Bryncir works site does not offer optimal habitat for red squirrel.	N/A	Red squirrel are protected under Schedule 5 of the WCA 1981 (Ref 4.22) and are listed as a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10). Red Squirrel are of Endangered status in Wales under the Red List for Wales (Ref 5.54).

Species or species group	Baseline detail	Ecological importance	Rationale
Otter as presented **Volume 8, Appendix 3.5.G: Bryncir Riparian Mammals**	The desk study returned one otter record in the Bryncir works site. The record (dated 2021) is for an old spraint on a rock along the bank of the Afon Dwyfach. There are five other recent otter records in the Study Area. The Afon Dwyfach and its associated tributaries, field drains and the riparian vegetation growing alongside these features provide potential foraging, commuting, resting and breeding habitat for otter. The Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC is approximately 5.1 km downstream of the site and linked by the Afon Dwyfach. Otter is a qualifying feature of this SAC. Surveys carried out in 2024 confirmed that otter use the Afon Dwyfach, through the presence of spraints. However, no resting places or holts were recorded. No evidence of otter was recorded along the tributaries of the river, although otter could use these smaller watercourses for dispersal and seasonal feeding opportunities.	District (Medium)	Otter is protected under the Habitats and Species Regulations (Ref 5.1) and Schedule 5 of the WCA 1981 (as amended) (Ref 4.22). Otter is also a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10) and on the SAP list of the Gwynedd BAP (Ref 5.42). Otter is Vulnerable under the Red List for Wales (Ref 5.54)
Water vole as presented **Volume 8, Appendix 3.5.G: Bryncir Riparian Mammals**	The desk study did not return any recent water vole records in the Study Area. There are four historic records, the most recent being from 2005, approximately 1.28 km north-east of the Bryncir works site. The closest record (dated 2000), is approximately 0.83 km south-east of the Bryncir works site. No evidence of water vole was found during the survey which focused on the tributaries of the	N/A	Water vole are legally protected in the UK under Section 9 of Schedule 5 of the WCA 1981 (as amended) (Ref 4.22). Water vole is also a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10) and on the SAP list of the Gwynedd BAP (Ref 5.42). Water vole is of Endangered status under the Red List for Wales (Ref 5.54).

Species or species group	Baseline detail	Ecological importance	Rationale
	Afon Dwyfach and field ditches which lie in the site. A mustelid scat considered to be American mink (*Neogale vision*) was recorded on the Afon Dwyfach during the field surveys, suggesting that the species is potentially present in the area. This invasive non-native species is known to predate water vole.		The absence of recent water vole records, together with no evidence of water vole being identified through survey indicates that water vole are not present in the Bryncir works site.
Hedgehog (Erinaceus europaeus)	The desk study returned three hedgehog records in the Study Area, the closest is in the Bryncir works site and is associated with the A487. Hedgehog was not recorded during ecological surveys, but based on suitable habitats present in the works site and the geographical range of this species, an assumption has been made this species is likely to be present in the Bryncir works site.	Local (Low)	Hedgehog is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2006 (Ref 5.10). Hedgehog is of Vulnerable status in Wales under the Red List for Wales (Ref 5.54). An assumption has been made this species could be present across the Bryncir works site.
Brown hare (Lepus europaeus)	The desk study returned multiple brown hare records within the 2 km Study Area, the closest being approximately 0.95 km from the Bryncir works site. Bown hare was not recorded during ecological surveys but based on suitable habitats present in the works site and the geographical range of this species, an assumption has been made this species could be present in the Bryncir works site.	Local (Low)	Brown hare is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10) and listed on the SAP list of the Gwynedd BAP (Ref 5.42) and is widespread and abundant across the UK. An assumption has been made this species could be present across the Bryncir works site.
Polecat	The desk study returned no recent records of polecat within the 2 km Study Area.	Local (Low)	Polecat is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10) and listed on the SAP list of the Gwynedd

Species or species group	Baseline detail	Ecological importance	Rationale
	Suitable habitat for polecat in and close to the Bryncir works site includes vegetation along the river corridor, grassland and hedgerows. Polecat was not recorded during ecological surveys, but based on suitable habitats present in the works site and the geographical range of this species, an assumption has been made this species is likely to be present in the Bryncir works site.		BAP (Ref 5.42). Polecat is of Least Concern status in Wales under the Red List for Wales (Ref 5.54). Polecats are found throughout Wales where valleys and farms are favoured. Historically, Gwynedd is considered a Welsh stronghold for polecat (Gwynedd BAP (Ref 5.42). An assumption has been made this species could be present across the Bryncir works site
Reptiles	The desk study returned one grass snake (*Natrix helvetica*) record within the 2 km Study Area, approximately 1.91 km north-west of the Bryncir works site. Suitable reptile habitat in and adjacent to the works site includes marshy grassland, watercourses, stone walls and hedgerows. A juvenile adder (*Vipera berus*) was recorded 30 m north-east and a female adder was recorded approximately 98 m east of the Bryncir works site in May 2024 during surveys for the wider works. A suspected adder was disturbed (the individual moved out of view too quickly to confirm its species), in the Bryncir works site in July 2024. The habitat where permanent habitat loss will occur is predominantly improved grassland and suboptimal for reptiles.	Local (Low)	All reptiles are protected from intentional injuring or killing under the WCA 1981 (as amended) (Ref 4.22) and are Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.10). Adder (*Vipera berus*) is listed on the SAP list of the Gwynedd BAP (Ref 5.42). Only widespread species of reptile (such as slow worm (*Anguis fragilis*), common lizard (*Zootoca vivipara*), grass snake and adder) are likely to be present and are unlikely to occur in significant numbers or assemblages due to the suitability of the habitats present within the works site that will be impacted by the proposed works.
Other (more commonly recorded) amphibians	The desk study returned one record of common frog within the 2 km Study Area, approximately 1.66 km south-east of the Bryncir works site.	Site	Common amphibians are protected by from advertising and sale within the WCA 1981 (as amended) (Ref 4.22), prohibiting

Species or species group	Baseline detail	Ecological importance	Rationale
	The marshy grassland and tributaries and the Afon Dwyfach may support common amphibians, and the stone walls may provide opportunities for refuge. However, the intrusive works will be predominantly within grazed improved grassland, which has limited suitability for amphibians.		their advertisement and sale The common toad is a Species of Principal Importance under Section 7 of the Environment (Wales) Act (Ref 5.10).
Flora	There are two records of bluebell (*Hyacinthoides non-scripta*) within the 2 km Study Area. The closest record is approximately 1.67 km south-west of the Bryncir works site. No protected or notable plant species were recorded during habitat surveys carried out in the Bryncir works site.	N/A	Rare plants are protected by Schedule 8 of the WCA 1981 (as amended) (Ref 4.22). Notable plants are listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act (Ref 5.10). No protected or notable plant species were recorded during the surveys.
INNS	The desk study returned multiple records of Himalayan balsam (*Impatiens glandulifera*) (closest record is 0.03 km east), Japanese knotweed (*Reynoutria japonica*) (closest record is 0.07 km north-east), Pontic rhododendron (*Rhododendron ponticum*) (closest record is 1.31 km north), variegated yellow archangel (*Lamiastrum galeobdolon* subsp. *argentatum*) (closest record is 0.90 km south-east) and Montbretia (*Crocosmia x crocosmiiflora*) (closest record is 1.38 km south-west) within the 2 km Study Area. Himalayan balsam has been recorded in and close to the Bryncir works site. It is present along the Afon Dwyfach and tributaries, in adjacent marshy grassland and also in woodland to the west of the Bryncir works site. Japanese	N/A	Himalayan balsam is listed in Schedule 9 of the WCA 1981 (as amended) (Ref 4.22). There are statutory constraints regarding their potential spread (as set out in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance**) as it is illegal to deliberately spread invasive species, and therefore mitigation will be required during construction to prevent their spread in the Bryncir works site.

Species or species group	Baseline detail	Ecological importance	Rationale
	knotweed has also been recorded during aquatic macrophyte surveys. The non-native non-invasive *Crangonyx pseudogracilis*/*floridanus* and New Zealand mud snail (*Potamopyrgus antipodarum*) were recorded during aquatic macroinvertebrate surveys.		

Future Baseline

5.6.40 This section considers changes to the baseline conditions, previously described, that might occur in the absence of the proposed works and during the period over which the proposed works would have been in place.

Construction

5.6.41 If the proposed works were not constructed, the existing habitats are likely to continue being present. However, some changes in habitat extent, composition and structure would occur because of ecological succession e.g. the gradual establishment of tree and shrub in marshy grassland areas, woodland areas and along hedgerows. Himalayan balsam may also continue to spread across the site. These resultant gradual changes in habitat composition are unlikely to materially alter the ecological baseline and the habitats and species present are very unlikely to undergo significant change prior to the start of construction or during the construction period.

Operation (Including Maintenance)

5.6.42 In the absence of the proposed works being developed, it is unlikely that there would be any marked change in the existing habitats, other than potential changes in farming practices. It is noted, however, that changing climatic conditions resulting from climate change may influence the resilience of certain habitats and species adjacent to the Bryncir works site. Habitats such as broad-leaved trees and scrub would be more mature but are likely to support a broadly similar species assemblage and farmland will also be managed accordingly, maintaining broadly similar species assemblages.

5.7 Consultation and Scope of Assessment

5.7.1 This section describes Stakeholder consultation carried out and the scope of the assessment of effects on Ecology and Nature Conservation.

Consultation

5.7.2 Consultation in relation to Ecology and Nature Consultation has been carried out with stakeholders. **Table 5-6** provides an overview of consultation and the actions taken to address any responses within the assessment.

Table 5-6 – Consultation and stakeholder engagement

Consultee	Date and nature of consultation	Summary of response	How and where addressed
NRW	12 September 2024 – Introduction to surveys	Results to be shared with further consultation	n/a
Gwynedd Council	29 May 2024	Project introduction	n/a

Activities or Receptors Scoped Out of the Assessment

5.7.3 Table **5-7** summarises the potential ecological receptors that have been considered and states whether they have been scoped in (included) or scoped out (excluded) from the ecology assessment with a justification of the decision.

Table 5-7 – Scope of Ecology and Nature Conservation assessment

Receptor	Scoped in/out		Justification
	Construction	Operation	
Statutory designated sites within 10 km (international) and 5 km (national) of the Bryncir works site (extended to 30 km for international sites designated for bats).	**Scoped in:** • Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC. • Corsydd Eifionydd/ Eifionydd Fens SAC **Scoped out:** • Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat SAC. • Glynllifon SAC. • Cors Graianog SSSI. • Mwyngloddiau Fforest Gwydir/ Gwydyr Forest Mines SAC • Gogledd Bae Ceredigion/Northern Cardigan Bay SPA. • Llystyn Isaf SSSI. • Ffriddoedd Garndolbenmaen SSSI. • Talhenbont SSSI. • Rhosgyll Fawr SSSI. • Cors Gyfelog SSSI and Cors Gyfelog NNR. • Afon Ddu SSSI. • Cors y Wlad SSSI.	Scoped out: All sites.	Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC is approximately 5.1 km south of the Bryncir works site and therefore would not be directly impacted by the proposed works. At this distance, indirect disturbance impacts to species inside the SAC through increased noise, lighting or visual disturbance would not occur. The Afon Dwyfach (which bisects the Bryncir works site) provides a hydrological link between the Bryncir works site and the SAC, however it is not likely to have an effect at this distance given the absence of works within the watercourse. The river provides habitat for otter, which is an Annex II species present as a qualifying feature of this SAC. The home range of a male otter can be greater than 20 km, however otter along the coast can have smaller ranges (Ref 5.52 and 5.53). Therefore, there is potential for disturbance to this qualifying species should they pass through the works site. Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat SAC and Glynllifon SAC are approximately 7.62 km and 9.23 km from the Bryncir works site respectively and therefore would not be directly impacted by the proposed works. These SACs comprise maternity roosts and hibernacula for lesser horseshoe (*Rhinolophus hipposideros*) bats. Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC is also designated for lesser horseshoe bats and is located 29.78 km from the Bryncir works site. Bats are not only dependent on their roosts and foraging habitat inside the SAC, but potentially also on habitat that lies outside the designated site boundary. Feeding areas and

Receptor	Scoped in/out		Justification
	Construction	Operation	
			commuting routes (flightlines) outside the designation may therefore be integral to sustaining the bat population. The BCT have defined Core Sustenance Zones (CSZ) for different bat species (Ref 5.56). A CSZ, as applied to bats, refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. Generally, lesser horseshoe bats forage between 2 km and 3 km from their roost but they have been observed to range up to 4 km in their nightly foraging trips (Ref 5.57). The BCT identifies a weighted average CSZ of 2 km for lesser horseshoe bats. It is also a species that will forage during winter at which time its core foraging range is reduced to 1.2 km from the hibernation site. It is noted that some genetic interchange between the SAC populations and roosts far beyond the CSZs is likely to occur. However, as Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat SAC, Glynllifon SAC and Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SACare approximately 7.77 km, 9.23 km and 29.78 km from the Bryncir works site respectively, notable impacts to lesser horseshoe bats associated with the SACs are highly unlikely to occur, particularly as the majority of the Bryncir works site is dominated by grazed improved grassland, which is sub-optimal foraging habitat for this species. Surveys carried out in 2024 recorded low levels of lesser horseshoe bat activity; however, these bats are unlikely to be associated with the SACs. Corsydd Eifionydd/Eifionydd Fens SAC and Cors Graianog SSSI (which share the same boundary) are

Receptor	Scoped in/out		Justification
	Construction	Operation	
			approximately 1.88 km north-east of the Bryncir works site and therefore would not be directly impacted by the proposed works. There is a potential hydrological connection via tributaries of the Afon Dwyfach. However, the SAC and SSSI are upstream of the Bryncir works site and are a considerable distance away. Therefore, significant effects due to potential changes to water quality at this distance are unlikely. Indirect disturbance impacts to species inside the SAC and SSSI through increased noise, lighting or visual disturbance would also not occur. One of the qualifying features of the Corsydd Eifionydd/Eifionydd Fens SAC is the marsh fritillary (*Euphydryas aurinia*) butterfly, whose main habitat type in Wales is Rhôs pasture - a distinctive, Welsh marshy grassland habitat. This habitat is usually dominated by tussocks of purple moor grass (*Molinia caerulea*) and various rush (*Juncus)* species. "*Sites within 2 km of occupied sites are a priority, with up to 5 km being important. Not all sites are occupied in all years, but are still valuable; these sites can offer habitat in 'boom' years for the butterfly, and then provide source populations if those on core sites crash, improving network resilience*." (Ref 5.58). Therefore, areas of Rhôs pasture within 2 km of the SAC boundary could feasibly serve as functionally linked habitat (FLH). The SAC is just under 2 km from the Bryncir works site. During the 2024 NVC survey, devil's-bit scabious (*Succisa pratensis*), the foodplant of marsh fritillary butterfly, was only sparsely recorded within an area of marshy grassland habitat just within 2 km of the SAC and SSSI, with more suitable habitat further south, beyond 2 km. Therefore, the risk of this being FLH is reduced, thus Corsydd Eifionydd/Eifionydd Fens SAC is

Receptor	Scoped in/out		Justification
	Construction	Operation	
			taken forward for further assessment in this chapter, but Cors Graianog SSSI is scoped out. The Gogledd Bae Ceredigion/Northern Cardigan Bay SPA lies 5.16 km south of the Bryncir works site but is designated for red-throated diver (*Gavia stellata*), a species that would not be affected by the proposed works. The Bryncir works site does not offer suitable habitat for this species. At this distance, indirect disturbance impacts to species using the SPA through increased noise, lighting or visual disturbance would not occur. Llystyn Isaf SSSI (designated for its botanical interest) is approximately 0.31 km north of the Bryncir works site and therefore would not be directly impacted by the proposed works. The SSSI is connected to the Bryncir works site hydrologically via the Afon Dwyfach but is sited upstream and therefore no impact from the proposed works due to changes in water quality are expected. Ffriddoedd Garndolbenmaen SSSI and Cors y Wlad SSSI are approximately 1.55 km north-east and 4.95 km north-west of the Bryncir works site respectively and would not be directly impacted by the proposed works. There are no apparent hydrological links between the Bryncir works site and these SSSIs. At this distance, indirect disturbance impacts to species using the SSSIs through increased noise, lighting or visual disturbance would not occur. Rhosgyll Fawr SSSI is approximately 2.80 km south-west of the Bryncir works site and therefore would not be directly impacted by the proposed works. There is no apparent hydrological link between the Bryncir works site

Receptor	Scoped in/out		Justification
	Construction	Operation	
			and SSSI. At this distance, indirect disturbance impacts to species using the SSSI through increased noise, lighting or visual disturbance would not occur. Talhenbont SSSI is approximately 3.39 km south of the Bryncir works site. The Afon Dwyfach is hydrologically connected to this SSSI. However, it is not likely to have an effect at this distance given the absence of works within the watercourse. Cors Gyfelog SSSI and Cors Gyfelog NNR are approximately 3.59 km north-west of the Bryncir works site. The SSSI and NNR appear to be connected to the Bryncir works site hydrologically via the Afon Dwyfach but are sited upstream and therefore no impact from the proposed works due to changes in water quality are expected. This also applies to Afon Ddu SSSI, which is approximately 4.66 km east of the Bryncir works site.
Non-statutory designated sites (cWS) (within 2 km of the Bryncir works site)	**Scoped in:** For direct effects; • Llystyn Isaf cWS. • Tyddyn y Felin cWS. • Rhwnddwyryd cWS • Afon Dwyfach cWS. For indirect effects; • All sites within Bryncir work site and 50 m, and all with hydrological links.	**Scoped in** (maintenance) As per construction.	Non-statutory designated sites that are in the Bryncir works site could be directly impacted during construction through temporary habitat loss or disturbance. The introduction, or further spread (where already present), of INNS during construction through the movement of machinery, vehicles and people could also indirectly impact non-statutory designated sites through habitat degradation. Non-statutory designated sites which are hydrologically linked to the site (via the Afon Dwyfach and its associated tributaries) could potentially be indirectly impacted through changes to water quality. Sites within 50 m could potentially be indirectly impacted through construction dust, this would include sites within 50 m of

Receptor	Scoped in/out		Justification
	Construction	Operation	
			a public road used by construction traffic that is within 250 m of the Bryncir works site.
HoPI	**Scoped in:** • Marshy grassland if purple moor grass and rush pasture. • Running water (including rivers and streams). • Hedgerows. For indirect effects only: • Lowland dry acid grassland • Lowland heathland	**Scoped in** (maintenance) As per construction.	HoPI in the Bryncir works site could be directly impacted during construction through temporary habitat loss or disturbance. Those which are hydrologically linked to the Bryncir works site (via the Afon Dwyfach and its associated tributaries) could also potentially be indirectly affected through changes to water quality. The introduction or further spread (where already present) of INNS during construction through the movement of machinery, vehicles and people could also indirectly impact HoPI through habitat degradation. Dust and other pollutants must also be considered.
Habitats (non HoPI)	**Scoped in:** • Scattered trees (including ancient and veteran. • Semi-natural broadleaved woodland. • Semi-natural mixed woodland **Scoped out:** • Scrub. • Improved grassland. • Poor semi-improved grassland. • Buildings, fences, walls and dry ditches.	**Scoped in** (maintenance) As per construction.	Based on CIEEM guidelines (Ref 5.29) and using professional judgement, features of Site importance, i.e. less than Local (Low) importance, have been scoped out of further assessment. The majority of the working areas in the Bryncir works site, in particular the permanent habitat loss for the proposed substation and associated works, lies within improved grassland and poor semi-improved grassland of Site importance.
Ancient woodland	Out	Out	Areas of ancient woodland which are hydrologically connected to the Bryncir works site via the Afon Dwyfach could be indirectly impacted through changes to water quality. However, as none that have potential

Receptor	Scoped in/out		Justification
	Construction	Operation	
			hydrological links are within 2 km, impacts are not anticipated due to the distance and likely dilution.
Protected and notable species	**Scoped in:** • Terrestrial invertebrates. • Reptiles. • Bats. • Badger. • Otter. • Other mammals (hedgehog, brown hare and polecat). • Breeding and non-breeding birds. • Fish. • Aquatic macrophytes. • Aquatic macroinvertebrates. **Scoped out:** • GCN. • Water vole. • Common amphibians. • Red squirrel. • Protected and notable plant species (excluding INNS).	**Scoped in** (maintenance) As per construction.	Construction of the proposed works has the potential to impact protected and notable species (where present or potentially present) through habitat loss, fragmentation and disturbance. Construction activities also have the potential to result in incidental mortality of species and could also disturb protected and notable species through increased noise and vibration, lighting and through visual disturbance.

5.8 Methodology

5.8.1 Details of the technical methods used to determine the baseline conditions are provided in **Section 5.6** and **Volume 8, Appendices 3.5.A – 3.5.J.** Full details regarding assessment methods including sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the ecology assessment are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

5.9 Potential Effects

5.9.1 The proposed works have the potential to affect IEFs (positively or negatively), during construction, operation and maintenance.

Construction

5.9.2 The sources of potential effects during construction include:

- Habitat loss (temporary and permanent) – direct impacts associated with changes in land use resulting from the proposed works.
- Disturbance – indirect impacts resulting from a change in normal conditions (i.e. increased light, noise, vibration, human activity) that result in individuals or populations of species changing behaviour or range.
- Habitat degradation – direct or indirect impacts resulting in the reduction in the condition of a habitat and its suitability for some or all of the species it supports, e.g. changes in air quality affecting woodland from construction dust or changes in water quality due to contamination.
- Species mortality – direct impacts on species populations associated with mortalities due to construction activities, e.g. site clearance.
- Spread of INNS – construction methods resulting in spread of INNS.

Operation and Maintenance

5.9.3 No effects during operation are anticipated, other than those relating to maintenance. Should maintenance works be intrusive and require refurbishment or replacement works then impacts and resulting effects would likely be similar to, but no worse than those during construction. The source of potential effects on IEFs (based on **Section 5.6**) are likely to include:

- Species mortality – direct impacts on species populations associated with mortalities due to operation and maintenance activities, e.g., routine vegetation maintenance, mowing and strimming.
- Disturbance – indirect impacts during operation and maintenance resulting from a change in normal conditions (i.e., light, noise, vibration, human activity) that result in individuals or populations of species changing behaviour or range.
- Spread of INNS – operation and maintenance methods resulting in spread of INNS.

Embedded Mitigation

5.9.4 Some ecological mitigation measures will be embedded into the proposed works design and methods of construction. Potential impacts have been predicted on this basis and

opportunities to mitigate them identified with the aim of preventing or reducing impacts as far as practicable. This approach provides the opportunity to prevent or reduce potential adverse impacts from the outset. This embedded mitigation and mitigation by design approach has been considered when evaluating the significance of the potential effects on IEFs.

Construction, Operation and Maintenance

5.9.5 The primary mitigation measures that will be embedded into the proposed works to avoid or minimise construction, operation and maintenance impacts on IEFs are presented in the following sections.

Proposed Works Design and Habitat Avoidance Measures

5.9.6 The root protection areas (RPA) of trees will be protected where practicable. However, some tree removal will be unavoidable and one veteran tree will need to be relocated to avoid loss. Details regarding unavoidable works in tree RPAs is contained in the Arboricultural Impact Assessment report (**Volume 8, Appendix 3.5.I: Arboricultural Impact Assessment**). Precautionary measures discussed in that report include protective fencing and temporary ground protection measures (where necessary) and ensuring all soil storage remains outside tree RPAs.

5.9.7 Hedgerows will be retained and buffered by a minimum of 5 m where possible. However, some hedgerow loss will be unavoidable.

5.9.8 Watercourses will be protected by 10 m buffers as far as practicable. However, works to remove two of the redundant DB connection route supports will fall within 10 m of the Afon Dwyfach (cWS) as this is where the supports are located. Excavations to remove the supports and their foundations will avoid affecting the banks of the river, with working areas, laydown areas, positioning of vehicles and machinery on the west side of the DB connection route support away from the river. Works to remove two further DB connection route poles will be required within two tributaries of the Afon Dwyfach, to the west of the river. This cannot be avoided as the supports are immediately adjacent to them.

Construction Environmental Management Plan (CEMP)

5.9.9 A CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will detail the measures required to manage the environmental effects of the proposed works and demonstrate compliance with environmental legislation will be implemented. The CEMP will detail the measures required to mitigate construction related effects on IEFs, including those associated with construction dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration.

Landscape Environmental Management Plan (LEMP)

5.9.10 A LEMP (**Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan (LEMP)** will be implemented which will include post construction monitoring of habitat reinstatement, enhancement and creation to be undertaken in line with landscape provisions and NBB requirements.

Vegetation Clearance and Construction Works

Nesting birds

5.9.11 Vegetation clearance will mainly be carried out in advance of construction and will avoid the nesting bird period which is from March to August inclusive. This will prevent birds nesting in the proposed construction works area prior to construction.

5.9.12 Where vegetation clearance (including grassland and scrub habitats that may support ground-nesting bird species) cannot be scheduled outside the bird breeding season, the area will be surveyed by a suitably experienced ornithologist prior to any works. If active nests are identified, appropriate buffer zones will be established, and the area will be monitored until the young have fledged. Confirming the absence of nesting activity can be particularly challenging in habitats such as marsh and grassland, which may result in potential localised project delays.

Roosting Bats

5.9.13 A pre-construction check for roosting bats will be carried out by a suitably licensed ecologist on the veteran tree in the Bryncir works site that will be translocated and any other trees that are identified as requiring removal or trimming or pruning. If the presence of a bat roost is confirmed a licence from NRW will be required prior to any works affecting the tree.

Reptiles, Common Amphibians and Common Mammals

5.9.14 Precautionary working methods will be adhered to in areas of habitat suitable for reptiles, common amphibians and common mammals (including tall grassland, marshy grassland, hedgerows and riparian habitat) to avoid the incidental killing or injury of any such species that may be present. All habitats suitable for reptiles, common amphibians and common mammals will be subject to two-stage habitat manipulation. Firstly, vegetation will be cut to approximately 150 millimetres (mm) (with the arisings removed), overseen by a suitably experienced appointed ecologist and the area left for a minimum of one day to allow any such species to naturally disperse. Secondly, vegetation will be cleared down to ground level, which will be overseen by the ecologist. Vegetation will be cleared using appropriate equipment based on the type of vegetation to be removed, the area affected, and the risk of killing or injuring reptiles, common amphibians and common mammals. Construction works can commence immediately after completion of the second stage. Reptile hibernacula will be retained and protected during construction where practicable. Any habitat features which could be concealing sheltering reptiles and amphibians (e.g. log piles, rubble mound bunds, any other debris) would not be dismantled during their inactive season (i.e. November to February inclusive) if they cannot be retained.

5.9.15 Sensitive habitats, including within areas of WS and cWS will be protected by appropriate temporary ground protection trackway or matting, to limit damage to the existing habitat and to ensure that vehicles use the same route through the site and stay within defined working areas.

Lighting

5.9.16 It is anticipated that construction works will be restricted to daylight hours wherever practicable, to remove the need for artificial lighting, with focussed task-specific lighting provided where this is not practicable. Task-specific and fixed general lighting will likely be required in months with reduced daylight hours (early mornings and up to 7.00 pm for general workforce) to meet safety requirements. During construction, general low-level lighting for access will be required at the temporary construction compounds.

5.9.17 During operation, whilst external lighting will be installed at the proposed Bryncir Substation for emergency work during hours of darkness, the substation will not normally be lit. The site will not require artificial lighting, other than potentially during temporary periods of maintenance or repair. All routine maintenance activities will be scheduled for daylight hours as far as is practicable, and focussed task specific lighting

should only be required in the event of emergency works or equipment failure requiring night-time working.

5.9.18 Where lighting is required, it will conform to best practice guidelines with respect to minimising light spill into adjacent habitats and preventing disturbance to bats and other species, including Institute of Lighting Professionals Guidance Notes (GN) (in particular GN08/23 Bats and Artificial Lighting at Night (Ref 5.31). This guidance, produced in collaboration with the BCT, and GN-1: Reduction of Obtrusive Light (Ref 5.32), will be followed in so far as it is reasonably practicable.

Soil Handling

5.9.19 Please refer to **Chapter 7: Geology, Hydrogeology, Land Use and Agriculture** for measures to ensure the sustainable management of the soil resources which are disturbed by the proposed works (and their associated seedbanks) and which support the habitats in the Bryncir works site.

Hedgerow and Cloddiau

5.9.20 Hedgerow and cloddiau removal will be kept to a minimum to minimise habitat fragmentation. Where temporary removal of a section is required, new sections of hedgerow (with the same species mix and of the same or improved condition) or cloddiau with hedgerows on top will be created, to maintain habitat connectivity and connectivity for species, such as commuting bats. It is acknowledged that these sections will take some years to mature.

Habitats

5.9.21 Where grassland vegetation removal is required, underlying topsoil and subsoil will be stripped and stored appropriately, omitting the use of glyphosate. Once the works are completed, the topsoil and subsoil will be backfilled promptly, retaining the original soil profile and seed bank. Correct handling of soils and associated seedbanks and reinstatement of the habitat will ensure that for most of the Bryncir works site, any loss is temporary for the duration of the construction period only. Further detail on the methodologies will be in the LEMP (**Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan**). Permanent habitat loss will be compensated with the creation of replacement habitats or habitat management in the Bryncir works site through NBB as described in **Volume 8, Appendix 3.5.J: Net Benefit for Biodiversity and Green Infrastructure Statement.**

Wildlife Legislation Compliance

5.9.22 To comply with relevant wildlife legislation, pre-construction surveys, such as an updated Phase 1 habitat survey, check for badger setts, otter resting sites or holts and bat roost assessments of any affected trees or structures near to the proposed works, will be undertaken. Checks for nesting birds (including nesting peregrine on towers) will also be undertaken. The purpose of these pre-construction surveys is to ensure mitigation during construction is based on the latest protected species information. This will also be required for any protected species licensing necessary prior to commencement of works. These surveys will also provide an update on the presence and location of any INNS, the findings of which will inform the implementation of measures to prevent their spread into the wild and will be secured through the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).

5.9.23 During construction, operation and maintenance, Reasonable Avoidance Measures (RAM), including 15 m buffers around trees with bat roost suitability, will be implemented where possible.

5.9.24 Implementation of measures to avoid animals being injured or killed within construction working areas, such as through the inclusion of perimeter fencing and covering excavations or providing a means of escape, will exclude them from such areas and prevent them from becoming trapped or injured. Such measures will be included in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).

Construction Effects

5.9.25 Table **5-8** provides a summary of the magnitude of impacts and likely significance of effects on IEFs during the construction of the proposed works, taking into account the embedded mitigation described in paragraphs 5.9.4 to 5.9.24.

5.9.26 Effects related to air quality upon sensitive receptors, such as local non-statutory designated habitats are detailed within **Chapter 10: Air Quality and Emissions**.

Table 5-8 – Assessment of construction impacts and significance of effects on IEFs during construction

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (yes/no)
Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	International (Very High)	Temporary disturbance to qualifying species of the SAC (otter) through noise, visual disturbance or lighting	Works directly impacting the Afon Dwyfach and associated riparian corridor (where otter are known to be present) will be avoided by oversailing the river, where the new DB connection route will cross. New supports will be constructed at least 30 m from the bank top of the river. A minimum 10 m stand-off buffer (from the bank top of the watercourse) will be maintained to minimise visual, lighting and noise disturbance for most of the works apart from the removal of at least the northern most existing DB connection route support, which is within this distance. The decommissioning and removal of the redundant section of the existing DB connection route is unlikely to result in noise levels that would disturb otter, particularly as night working will be avoided, when otters are generally more active. As these works will be undertaken during the daytime, this will avoid the requirement for any artificial task specific lighting near to the river. Pre-construction surveys will be carried out as required to support the baseline survey findings and inform any additional mitigation or licencing requirements.	Very Low	Minor Adverse	No

Corsydd Eifionydd/ Eifionydd Fens SAC	International (Very High) for the SAC	Loss of FLH for marsh fritillary	The SAC is just under 2 km from the Bryncir works site (the distance that has been applied when considering FLH). During the 2024 NVC survey, devil's-bit scabious, the foodplant for marsh fritillary butterfly, was sparsely recorded in an area of marshy habitat just within 2 km of the SAC. Further locations were found at distances greater than 2 km. Therefore, the risk of habitats within Bryncir works site being FLH is low. Works inside habitat potentially suitable for marsh fritillary is minimal within 2 km of the SAC. No permanent habitat loss will be required. The use of suitable trackway or matting will limit damage to the existing habitat where it is appropriate and it will be ensured that vehicles use the same route through the Bryncir works site, and stay within defined working areas. Pre-construction surveys to check for the presence of marsh fritillary larval webs will also be carried out at a suitable time of year (mid to late August or September (Ref 5.59)) prior to any works taking place. If confirmed to be present, then further measures will be taken to avoid damaging food plants where they are present.	Very Low	Minor Adverse	No
Llystyn Isaf cWS	County (Medium	Temporary habitat disturbance and loss	Works to remove the redundant section of the DB connection route will temporarily disturb existing habitat inside the boundary of Llystyn Isaf cWS, through the use of vehicles and machinery. Some temporary habitat	Low	Minor Adverse	No

	clearance may also be required to enable access to the working areas. Working areas will be limited to only around the existing DB connection route supports that require removal, with excavation of foundations if required. The use of a suitable temporary ground protection trackway or matting will limit damage to the existing habitat where it is appropriate, and ensure that vehicles use the same route through the Bryncir works site, and stay within defined working areas. All habitats will be reinstated on completion. Where top soil and sub soil require removal, these will be returned to the same location as taken from, and kept separately for different habitat types.	

Tyddyn y Felin cWS	County (Medium)	Temporary habitat disturbance and loss	In line with the assessment for Llystyn Isaf cWS, works to remove the redundant section of the DB connection route will temporarily disturb existing habitat inside the boundary of Tyddyn y Felin cWS (section of the cWS west of the Afon Dwyfach), however this will be limited to the removal of one DB connection route support on the edge of the cWS with a very small working area. Some temporary clearance of boundary habitats may also be required within the working area, however vehicles and machinery will remain in the field immediately north of the cWS. The new DB connection route will oversail the section of the cWS east of the Afon Dwyfach, however no works will be required in the habitats here. Supports for the new DB connection route will be installed east of the road and outside of the cWS to the west of the Afon Dwyfach, with scaffolding temporarily installed if required to protect the crossing of the road in the same areas. No scaffolding will be required in the case of a road closure, and no scaffolding will be in the cWS between the road and the river.	Low	Minor Adverse	No
Running water – the Afon Dwyfach (which is a cWS in part - Afon	Up to County (Medium)	Habitat loss or degradation. Temporary habitat degradation due to	Works to remove two of the redundant DB connection route supports will fall within 10 m of the Afon Dwyfach (which at these locations, the river is part of Llystyn Isaf cWS) as this is where the supports are located. Excavations to remove the supports and their	Very Low	Negligible	No

Dwyfach cWS, also flows through Llystyn Isaf cWS and is a HoPI) and its tributaries		construction. pollution and siltation	foundations will avoid affecting the banks of the river, with working areas, laydown areas, positioning of vehicles and machinery on the west side of the DB connection route support away from the river. Although the new DB connection route will cross the river (at a location where it is designated as the Afon Dwyfach cWS), works at height will not directly affect it. Likewise the conductors between the existing DB connection route alignment and Tower 4ZC070 will be removed without directly affecting the river habitat. Works to remove two further DB connection route poles will be required within two tributaries of the Afon Dwyfach, to the west of the river. This cannot be avoided as the supports are immediately adjacent to them, however neither form part of the cWSs. Standard pollution prevention measures will be implemented and adopted during construction, formalised through the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).			
Rhwnddwyryd cWS	County (Medium)	Temporary habitat disturbance and loss	Although this cWS lies partly in the Bryncir works site, no works are proposed inside this cWS. Habitats will be suitably protected during construction. Vegetation clearance for the new visibility splay for the site entrance is identified as only being required south of the A487	N/A – No impact	No effect	No

			and although there is a very slight overlap of the works site and the cWS site boundary (potentially just due to draft site boundaries), no works are required in the cWS, nor vegetation clearance or management identified to the north of the road and no habitat loss or disturbance will occur.			
Non-statutory designated sites in the Study Area, both within (as listed above) and outside the Bryncir works site, of county importance (Refer to **Figure 3.5.3**)	County (Medium)	Degradation of habitat due to dust and pollution impacts	Standard environmental protection measures, formalised through the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will be implemented during the construction phase. This includes suitable measures to suppress dust, reduce site runoff and to contain any accidental spills.	Very Low	Negligible	No

Purple moor grass and rush pastures HoPI, in the Bryncir works site	County (Medium)	Temporary habitat disturbance and loss	Works to remove the redundant section of the DB connection route have the potential to temporarily disturb this HoPI, through the use of vehicles and machinery. Some temporary habitat clearance may also be required to enable access to the working areas. Working areas in the purple moor grass habitat will be limited to only around the existing DB connection route supports that require removal, with excavation of foundations if required. The use of suitable temporary ground protection trackway or matting will limit damage to the existing habitat where it is appropriate, and ensure that vehicles use the same route through the Bryncir works site, and stay within defined working areas. All habitats will be reinstated on completion. Where top soil and sub soil require removal, these will be returned to the same location as taken from, and kept separately for different habitat types.	Low	Minor Adverse	No
HoPI (purple moor grass rush pasture, both within (as listed above) and outside, up to 50 m of,	County (Medium)	Degradation of habitat due to dust and pollution impact	Standard environmental protection measures formalised through the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will be implemented during the construction phase. This includes suitable measures to suppress dust, reduce site runoff and to contain any accidental spills.	Very Low	Negligible	No

the Bryncir works site. Lowland dry acid grassland and lowland heathland up to 50 m of, the Bryncir works site						
Semi-natural broadleaved woodland. Veteran or ancient trees, marshy grassland, Hedgerows and semi-natural mixed woodland	Up to National (High)	Degradation of habitat due to dust and pollution impacts	Standard environmental protection measures formalised through the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will be implemented during construction. This includes suitable measures to suppress dust, reduce site runoff and to contain any accidental spills.	Very Low	Minor Adverse	No
Semi-natural broadleaved woodland	Up to County (Medium)	Habitat loss	Removal of the redundant section of the DB connection route will require works in the woodland to the north of the Bryncir works site. Some temporary habitat clearance may be required to enable access to the working areas. This is secondary woodland, but fairly young trees mixed with scrub, that has	Low	Minor Adverse	No

			colonised the drier parts of the marshy grassland. Working areas will be limited to only around the existing DB connection route supports that require removal, with excavation of foundations if required. Tree removal will be avoided where possible and only essential vehicles and machinery taken within the woodland to avoid unnecessary clearance. All habitats will be reinstated on completion of the works.			
Veteran and ancient trees	National (High)	Habitat loss or degradation	Appropriately sized buffers will be applied to veteran and ancient trees to protect them during construction where practicable. However, one veteran tree will be directly impacted as it lies within the proposed Bryncir Substation fence line.	Medium	Moderate Adverse	Yes
Marshy grassland	Up to County (Medium)	Temporary and permanent habitat disturbance and loss	Works to remove the redundant section of the DB connection route have the potential to temporarily disturb marshy grassland through the use of vehicles and machinery. Some temporary habitat clearance may also be required to enable access to the working areas. As per the purple moor grass, working areas within marshy grassland habitat will be limited to only around the existing DB connection route supports that require removal, with excavation of foundations if required. Works around Tower 4ZC70, will mostly be done at height to disconnect the existing DB	Low	Minor Adverse	No

			connection route 132 kV conductor from this tower. The use of a suitable temporary ground protection trackway or matting will limit damage to the existing habitat where it is appropriate, and ensure that vehicles use the same route through the Bryncir works site, and stay within defined working areas. All habitats temporarily affected will be reinstated on completion. Where top soil and sub soil require removal these will be returned to the same location as taken from, and kept separately for different habitat types. One small area of permanent habitat loss (approximately 56 m^2) will occur at the edge of the swale. The wider area to the swale will be reinstated as marshy grassland where it is currently present.			
Hedgerows, including those associated with cloddiau	Up to County (Medium)	Temporary and permanent habitat loss	The length of hedgerow to which the proposed access road would run parallel would be protected during construction of the road; however a section of this hedgerow, close to the A487, will require removal to accommodate a visibility splay and another small section will need to be removed to provide access into the adjacent field to the east of the new access road. Sections of the hedgerow (and associated cloddiau) which run alongside the A487 will require removal to accommodate the visibility splay. The species-poor hedgerows that will be	Low	Minor Adverse in the short term, increasing Minor Beneficial once new hedgerow has established	No

impacted are not classed as important under the Hedgerows Regulations 1997 (Ref 5.13). New sections of hedgerow will be planted in the grassland fields, behind the visibility splay and along a section of the new access road. Where the existing hedgerows lost comprise cloddiau, new hedges will be planted on a replacement cloddiau.

Small sections of a number of hedgerows along the line of the redundant section of the DB connection route will be temporary affected where works are required near the existing supports which sit within or adjacent to hedgerows, both species-poor and species-rich. On completion of the works, and removal of a number of these supports, the affected sections of hedgerows will be replanted on at least a like for like or better-quality basis.

The species-rich hedgerow along the east side of the B4411 will be oversailed by the new DB connection route, however the hedgerow will be retained. Other hedgerows in the Bryncir works site will be retained and protected by suitably sized buffers.

To compensate for the unavoidable loss of 0.23 km of species-poor hedgerow, a 3:1 planting ratio has been applied. A total of 0.69 km of species-rich hedgerow will be planted. Planting locations have been identified in the landscape plan to support both landscape mitigation and

			biodiversity net benefit and green infrastructure objectives. Newly planted habitat will be managed and monitored for 5 years, with management detailed in the LEMP.			
Semi-natural mixed woodland	Up to Local (Low)	Habitat loss	Some habitat clearance may be required for the visibility splay along the A487 to enable safe access to the Bryncir works site, which is also the permanent access to the new substation. This woodland comprises fairly young to semi-mature trees and overhangs the roadside grassland verge. Tree removal will be avoided where possible and only essential maintenance and pruning of the edge of the woodland where it overhangs the grassland verge will occur, for c.30 m where it falls within the required visibility splay. It is anticipated that at least some of this maintenance may already be undertaken occasionally by the highways department to ensure safe use of the road as was evidenced by piles of woodchips present during earlier surveys.	Low	Negligible	No

Small pearl-bordered fritillary butterfly and marsh fritillary butterfly	County (Medium)	Temporary habitat loss and disturbance of habitat, potentially used by terrestrial invertebrates resulting in species mortality	It is unconfirmed whether these butterfly species are present in the Bryncir works site, however the marshy grassland to the west of the Afon Dwyfach does offer potential habitat for these species. Devil's-bit scabious, the foodplant for marsh fritillary butterfly and marsh violet (*Viola palustris*), one of the primary larval foodplants for small pearl-bordered fritillary, in addition to other sources of nectar for the adult butterflies are scattered in this area. The marsh fritillary butterfly is also associated with statutory designated sites in the Study Area (Corsydd Eifionydd/Eifionydd Fens SAC and Cors Graianog SSSI both 1.91 km north-east of the Bryncir works site), with the closest record for this species approximately 1.94 km from the Bryncir works site (dated 2014). This also indicates that they may be present be in the area. Works to remove the redundant section of the DB connection route have the potential to kill or injure these butterfly species (if present) through the disturbance or clearance of suitable vegetation, including plants used for egg laying and feeding. Working areas within suitable habitat will be limited to only around the existing DB connection route supports that require removal, with excavation of foundations if required. Works around Tower 4ZC70, will mostly be done at height to disconnect the	Low	Minor adverse	No

	redundant section of the DB connection route 132 kV conductor from this tower. The use of suitable temporary ground protection trackway or matting will limit damage to the existing habitat where it is appropriate, and ensure that vehicles use the same route through the Bryncir works site, and stay within defined working areas. Temporary loss and disturbance of vegetation used by these butterflies could also reduce the availability of suitable foodplants.

Breeding and non-breeding birds	Local (Low)	Temporary direct loss and fragmentation of habitat used by breeding and non-breeding birds	Low numbers of common birds of no or low conservation concern may use the habitats within or adjacent to the Bryncir works site for occasional foraging or nesting but are unlikely to depend on these for their survival or proliferation and will have access to habitat of equal and better quality in the surrounding landscape. All active wild bird nests are protected under the WCA 1981 (as amended) (Ref 4.22), and mitigation, including timings of works outside the core bird nesting season (March to August, inclusive) and pre-construction vegetation checks, including for ground nesting species, will be implemented into the proposed works and thus safeguard birds from negative effects.	Low	Negligible	No
		Direct loss of nests and young through tree and vegetation removal or reduction, which could result in injuring or killing birds	Any vegetation works will avoid the nesting bird period (i.e. March to August inclusive) as far as practicable. Where this is not possible, vegetation will be checked for the presence of any nests by a suitably experienced ornithologist, prior to vegetation removal, and if active nests are found, then appropriate buffer zones would be put in place and the area monitored until the young birds have fledged.	Very low	Negligible	No
		Temporary noise and visual disturbance,	Some structures, such as towers, could potentially be used by nesting peregrine. A pre-construction check will be completed to confirm there are none at	Low	Negligible	No

		including to nesting WCA Schedule 1 birds such as peregrine	the time of the works. Best practice construction methods as detailed in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) includes implementation of measures to minimise noise, lighting and vibration disturbance to breeding and non-breeding birds.			
Bats	Up to County (Medium)	Direct loss of roosts through tree removal or reduction, which could result in injuring or killing bats	No buildings or structures will be lost. One veteran tree will be translocated as it is inside the Bryncir works site. When inspected in June 2025 by a licensed bat worker no evidence of roosting bats was observed. This tree was assessed as PRF-I, meaning that it could support individual or small numbers of bats in the future. A mature ash will be removed from along the new access road. This tree does not have bat roost suitability. No confirmed roosts will be lost to the Project and further surveys would be carried out prior to construction to confirm the continued absence of roosting bats. No other trees identified as having bat roost suitability will be lost to the development therefore retaining available roosting opportunities. All trees removed and trimmed or pruned would be subjected to pre-construction surveys by a suitably licensed ecologist.	Very low	Negligible	No
		Temporary disturbance	During construction, works will be restricted to daylight hours wherever	Low	Minor adverse	No

to roosting bats due to construction noise and lighting	practicable to remove the need for artificial lighting, with focussed task specific lighting provided where this is not possible. Where lighting is required, including at the temporary compounds, it will conform to best practice guidelines (Ref 5.46 and Ref 5.47) with respect to minimising light spill into adjacent habitats and preventing disturbance to bats and other species. These measures will be set out in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).			
Temporary loss of foraging or commuting habitat (e.g. grasslands)	A large proportion of the land inside the Bryncir works site is grazed improved grassland, which is sub-optimal for most foraging bats. However, the Afon Dwyfach and the marshy grassland west of the river offer potential suitable habitat. Impacts to the marshy grassland will be temporary and will be associated with the decommissioning and removal of the redundant section of the existing DB connection route. The river corridor will be retained and protected during construction. The new DB connection route will oversail the Afon Dwyfach, without directly affecting the watercourse, however it will also remove the redundant section of the existing DB connection route which currently oversails the Afon Dwyfach. Potential linear commuting routes such as hedgerows and walls will be retained, moved or enhanced, with additional hedgerows added for the new	Low	Minor adverse	No

			access road, which will not be lit.			
Badger	Local (Low)	Damage to active badger setts	No active badger setts have been recorded within 30 m of the Bryncir works site. A pre-construction badger survey will be carried out to confirm the presence or absence of badger setts within a 30 m buffer of the site. If an active badger sett was at risk of being disturbed or destroyed an NRW licence would be required, and mitigation measures would be updated accordingly.	N/A – No impact	No effect	No
		Species mortality	Measures will be implemented to avoid animals being injured or killed in construction working areas, through excluding them from such areas and preventing them from becoming trapped in excavations. This will be formalised through the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).	Very low	Negligible	No
		Temporary disturbance through construction noise and lighting	During construction, works will be restricted to daylight hours wherever practicable to remove the need for artificial lighting, with focussed task specific lighting provided where this is not possible. Where lighting is required, including at the temporary compounds, it will conform to best practice guidelines (Ref 5.46 and Ref 5.47) with respect to minimising light spill into adjacent habitats and prevent disturbance to badger and other species and formalised through the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction**	Very low	Negligible	No

			Environmental Management Plan).			
Otter	District (Medium)	Habitat degradation – impacts to water quality through pollution of watercourses	Standard pollution prevention measures will be implemented and adopted during construction and set out in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).	Very low	Negligible	No
		Temporary disturbance to commuting, resting or foraging otter through noise or visual disturbance or lighting of construction near to watercourses	The 2024 surveys did not identify any potential otter resting sites or holts. Works directly impacting the Afon Dwyfach and associated riparian corridor (where otter are known to be present) will be avoided by oversailing the river, where the new DB connection route will cross. New supports will be constructed at least 30 m from the bank top of the river. A minimum 10 m stand-off buffer (from the bank top of the watercourse) will be maintained to minimise visual, lighting and noise disturbance for the majority of the works (except for works to remove two of the existing DB connection route supports that are within 10 m of the Afon Dwyfach (cWS)). Excavations to remove the supports and their foundations will avoid affecting the banks of the river, with working areas, laydown areas, positioning of vehicles and machinery on the west side of the DB connection route support away from the river. The decommissioning and removal of the redundant section of the existing DB	Low	Minor adverse	No

			connection route is unlikely to result in noise levels that would disturb otter, particularly as night working will be avoided, when otters are generally more active. As these works will be undertaken during the daytime, this will avoid the requirement for any artificial task specific lighting near to the river. Pre-construction surveys will be carried out as required to support the baseline survey findings and inform any additional mitigation or licencing requirements.			
Reptiles	Local (Low)	Temporary loss and disturbance of terrestrial habitats which may be used by reptiles and incidental killing, injury or disturbance of reptiles	A large proportion of the land inside the Bryncir works site is grazed, improved grassland, which is sub-optimal for reptiles. However, the marshy grassland west of the Afon Dwyfach offers potential suitable habitat for reptiles, including grass snake and adder. Impacts to the marshy grassland will be temporary and will be associated with the decommissioning and removal of the redundant section of the existing DB connection route. Precautionary working methods will be adhered to in areas of suitable reptile habitat. This will include any works which impact stone walls and cloddiau which could offer refuge for reptiles.	Low	Negligible	No
Other mammals (hedgehog, brown hare, polecat)	Local (Low)	Permanent and temporary loss and disturbance	Permanent habitat loss will be minimal and will mainly comprise of grazed improved grassland, which is sub-optimal for these species. Precautionary working methods for other species, including	Low	Negligible	No

		of habitats which may be used by these species	badger, reptiles and birds when impacting areas of more suitable habitat (e.g. hedgerows, woodland, scrub) will also be of benefit to other mammals.			
Protected and notable species in the Study Area	Up to County	Temporary degradation of habitat due to dust and other pollutants	Standard environmental protection measures formalised through the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will include dust suppression and pollution prevention measures to prevent effects on habitats potentially utilised by protected or notable species.	Very low	Negligible	No
Aquatic macroinvertebrates and macrophytes	Local (Low)	Habitat degradation and species mortality – impacts to water quality through pollution of watercourses	A minimum 10 m stand-off buffer (from the bank top of the watercourse) will be maintained to minimise visual, lighting and noise disturbance for the majority of the works (except for works to remove two of the existing DB connection route supports that are within 10 m of the Afon Dwyfach (cWS)). Excavations to remove the supports and their foundations will avoid affecting the banks of the river, with working areas, laydown areas, positioning of vehicles and machinery on the west side of the DB connection route support away from the river. These works will be undertaken during the daytime, which will significantly reduce or eliminate the requirement for any artificial task specific lighting. Standard pollution prevention measures will be implemented and adopted during	Very low	Negligible	No

			construction and set out in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).			
Fish.	National (High)	Habitat degradation and species mortality – impacts to water quality through pollution of watercourses	A minimum 10 m stand-off buffer (from the bank top of the watercourse) will be maintained to minimise visual, lighting and noise disturbance for the majority of the works (except for works to remove two of the existing DB connection route supports that are within 10 m of the Afon Dwyfach (cWS)). Excavations to remove the supports and their foundations will avoid affecting the banks of the river, with all wider working areas, laydown areas, positioning of vehicles and machinery being on the west side of the DB connection route support away from the river. These works will be undertaken during the daytime, which will significantly reduce or eliminate the requirement for any artificial task specific lighting.	Very low	Minor adverse	No
			Standard pollution prevention measures will be implemented and adopted during construction and set out in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).			
		Temporary disturbance to migration and, or spawning	For the works, a minimum of 10 m from watercourses (bank top), has been proposed to be maintained to minimise visual, lighting and noise or vibration disturbance. That said, works at Tower	Low	Moderate adverse	Yes

	through noise or visual disturbance or lighting of construction near to watercourses	4ZC070, notably the removal of old, and the installation of new, connections between 132 kV DB connection route and the 400 kV network will be completed < 10 m from the Afon Dwyfach. These works could disturb the resident and migratory protected fish assemblage in the Afon Dwyfach. These activities represent a potential temporary impact to a single cohort of the migratory fish assemblage. As these works will be undertaken during the daytime, this will significantly reduce or eliminate the requirement for any artificial task specific lighting. Where lighting is required, specifications will be set out in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**). Pre-construction surveys will be undertaken as required to support the baseline survey findings and inform any additional mitigation requirements.	

Operation and Maintenance

5.9.27 The operation of the proposed works is not anticipated to result in any adverse impacts or significant effects to relevant IEF.

5.9.28 Maintenance of the proposed works will comprise periodic checks and repairs of equipment and visits to the substation. These maintenance tasks are not likely to cause any adverse impacts or significant effects to the relevant IEF and are not discussed further. There is the potential for maintenance to include refurbishment or replacement of infrastructure, which would be more intrusive. However, impacts and resulting effects would be equal to or less than those associated with construction of the proposed works, which are set out in **Table 5-7** and are not assessed separately.

5.10 Mitigation and Residual Effects

Additional Mitigation

5.10.1 Additional mitigation measures are measures that will be carried out to further reduce the magnitude of effects for certain ecological features and are in addition embedded mitigation measures (as detailed in paragraphs 5.9.4 to 5.9.24). Additional mitigation will be required where significant effects are identified following the application of embedded mitigation measures.

5.10.2 Residual effects following the implementation of additional mitigation measures are given. Where additional mitigation measures are not required for a certain ecological feature, the residual effect will not differ from the effect provided in Table **5-8**.

Construction

Veteran Trees

5.10.3 One tree in the area of the proposed substation has been identified as exhibiting features associated with veteran status (tree T240, as shown in **Volume 8, Appendix 3.5.I Arboricultural Impact Assessment**) and is an irreplaceable natural resource.

5.10.4 This tree will be translocated to a suitable location, outside the proposed working areas, prior to construction. In the absence of translocation, the tree would be lost. However, as the success of translocation is uncertain it cannot be guaranteed that this tree will be saved and retained long term. Suitable compensation planting of a minimum ratio of 6:1 will be carried out to mitigate against the loss (see **Volume 8, Appendix 3.5.I Arboricultural Impact Assessment**.

5.10.5 All other veteran (and ancient) trees will be retained and suitably buffered, ensuring no works occur in their RPAs.

5.10.6 With the implementation of suitable mitigation, the magnitude of impact to veteran trees is low, with a resulting Minor adverse effect in the long term, which is not significant.

Marsh Fritillary Butterfly

5.10.7 Additional mitigation measures will minimise any potential adverse effects on marsh fritillary butterflies, should they be present in the Bryncir works site. As detailed in **Table 5-8,** works to remove the redundant section of the existing DB connection route have the potential to kill or injure these butterfly species (if present) through the disturbance or clearance of suitable vegetation, including plants used for egg laying and feeding.

Temporary loss and disturbance of vegetation used by these butterflies could also reduce the availability of suitable foodplants.

5.10.8 Additional mitigation measures will include the following:

- A pre-construction check will be carried out at the appropriate time of year to look for any visible larval webs, with a view to avoid such areas, if possible.
- The use of appropriate temporary ground protection matting, to limit damage to existing habitat and to ensure that vehicles use the same route through the Bryncir works site. A suitably experienced ecologist will be on site to guide the implementation of the construction route through any potential suitable habitat, with a view to avoid or reduce potential impacts where possible.
- Machinery or materials will not be stored on site in areas of suitable habitat.
- Suitable timings of works, where practicable, to avoid impacting foodplants when eggs or larval webs may be present.
- Mitigation measures will be detailed in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).

5.10.9 With the implementation of additional mitigation, the magnitude of impact to marsh fritillary is very low, with a resulting Negligible effect, which is not significant.

Migratory Fish

5.10.10 Additional mitigation measures will minimise any potential adverse effects on the protected migratory fish assemblage identified within the desk study. Works to remove the redundant section of the SPEN DB route (including disconnection from Tower 4ZC070) and the installation of the new DB connection route are all taking place near the Afon Dwyfach as detailed in **Table 5-8**. These works have the potential to cause temporary disturbance to the migration and spawning of the protected fish assemblage through noise or vibration, visual disturbance or lighting of construction near to watercourses.

5.10.11 Additional mitigation measures will include the following:

- Suitable timings of works, where practicable, will be required to avoid impacting the migration and spawning of the protected migratory fish assemblage within the Afon Dwyfach. Suitable timings will be informed through pre-construction fish habitat surveys completed within the area of Tower 4ZC070 at Afon Dwyfach. These results will support the baseline survey findings and inform the presence of the suitability spawning habitat for the identified migratory fish assemblage and thus the required timing of works to avoid impacting the migration and spawning of these species. However, where these habitats are absent, then these timings will not need to be considered. A summary of these specific timings have been outlined below:
  - Migration
    - Atlantic salmon (smolt): March to May.
    - Atlantic salmon (adult – main run): August to November.
    - Sea trout (smolt): March to May.
    - Sea trout (adult): June to October.

        - River lamprey (adult): October to December.
        - River lamprey (transformer): January to March.
        - European eel (elver/glass eel): April to October.
        - European eel (silver eel): August to October.
    - Spawning
        - Brown/sea trout – October to December.
        - Atlantic salmon – November to December.
        - Brook lamprey – March to April.
        - River lamprey – March to April.

- These timings represent the worst-case scenarios by accounting for environmental variability that trigger migratory and/or spawning cues i.e. temperature and flow. Therefore, where suitable spawning habitat is present for all species, consultation with NRW is required to streamline these months based on their local expert knowledge to identify months that they are happy represent the least possible ecological harm.
- This provides a worst-case window of least ecological sensitivity between December - February to complete these works. There is scope to reduce the seasonal restrictions following the results of habitat surveys and NRW consultation.
- Although river lamprey transformers migrate during this window, their presence was not found in the desk study but records were only recorded to genus level (*Lampetra*), which also covers brook lamprey. That said, a lack of suitable ammocoete habitat (fine sediment/silt beds) was recorded in the Afon Dwyfach in the Bryncir works site and therefore the risk to migrating river lamprey transformers is believed to be low – to be confirmed through the pre-construction surveys.

5.10.12 With the implementation of this additional mitigation, the magnitude of impact to the migratory fish assemblage is Very low, with a resulting Minor adverse effect, which is not significant.

Biosecurity Management Plan

5.10.13 The implementation of a Biosecurity Management Plan that will set out procedures to ensure that no INNS are brought onto the Bryncir works site or areas of existing INNS are spread, will demonstrate compliance with legislation. Pre-construction surveys will be carried out to provide an update on the presence and location of any INNS previously identified. This will inform the implementation of measures to prevent their further spread, such as biosecurity measures, exclusion zones or treatment. These procedures will be outlined in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Methodology Statement**).

Operation and Maintenance

5.10.14 No additional mitigation measures have been proposed over and above the application of embedded mitigation measures described in paragraphs 5.9.4 to 5.9.22.

Monitoring

Pre-construction

5.10.15 Pre-construction surveys will be carried out during the appropriate seasons prior to the construction of the proposed works. These will inform detailed design where needed, provide up to date status of protected species that require mitigation during site clearance, and inform any protected species licensing that may be required should species distribution change or detailed design result in licencing requirements for species such as bats and otter.

Construction

5.10.16 Ongoing monitoring of habitats and species will be carried out throughout construction, over seen by an appointed ECoW of suitable qualifications and experience. The ECoW will have the appropriate authority to review reasonable avoidance measures, oversee works and recommend action as appropriate, including temporarily stopping works where non-compliant working is observed, e.g. to safeguard protected species and their habitats, or where any other breaches of environmental legislation are likely to occur.

Post-Construction

5.10.17 Post construction monitoring will be carried out in accordance with protected species licences granted for the works.

5.10.18 Post construction monitoring of habitat reinstatement, enhancement and creation will be undertaken in line with landscape provisions and NBB requirements as per the LEMP (**Volume 8, Appendix 3.4.C: Outline Landscape and Ecological Management Plan**).

5.11 Summary

5.11.1 This chapter of the ES outlines the results of an assessment of the potential significant effects on Ecology and Nature Conservation associated with the proposed works.

5.11.2 The assessment concludes that, with the incorporation of embedded and additional mitigation measures, significant effects are unlikely for statutory and non-statutory nature conservation sites, ancient woodlands, and HoPI in the Study Area. Similarly, significant effects are considered unlikely for protected and notable species and habitats identified in the Study Area.

6. Historic Environment

6.1 Introduction

6.1.1 This chapter presents an assessment of the likely Historic Environment effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Bryncir Works.**

6.1.2 This chapter describes the baseline conditions currently existing in the Study Area (as defined in **Section 6.3**), the scope of the assessment, the potential effects, the mitigation measures required to avoid, reduce or offset any significant negative effects, and the likely residual effects after these mitigation measures have been adopted.

6.1.3 This chapter is supported by appendices as listed below:

- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 3.6.A: Historic Environment Desk Based Assessment.**
- **Volume 8, Appendix 3.6.B: Gazetteer of Historic Assets**.

6.2 Legislation and Planning Policy

6.2.1 This section summarises the legislation and planning policy framework that is relevant to the Historic Environment assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

6.2.2 The following legislation is relevant to Historic Environment:

- Ancient Monuments and Archaeological Areas Act 1979 (Ref 6.1).
- Planning (Listed Buildings and Conservation Areas) Act 1990 (Ref 6.2).
- Historic Environment (Wales) Act 2023 (Ref 6.3)

National Policy

6.2.3 The following national policy is relevant to Historic Environment:

- PPW – Edition 12 (Ref 4.4).
- Future Wales: The National Plan to 2040 (Ref 4.3).
- TAN 24: The Historic Environment (Ref 6.4).

Local Policy

6.2.4 The following local policy is relevant to Historic Environment:

- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Gwynedd Council) (Ref 4.9).

Guidance

6.2.5 The following guidance is relevant to Historic Environment:

- Conservation Principles for the Sustainable Management of the Historic Environment in Wales (Ref 6.5).
- Heritage Impact Assessment in Wales (Ref 6.6).
- Managing Change to Listed Buildings in Wales (Ref 6.7).
- Managing Change to Registered Historic Parks and Gardens in Wales (Ref 6.8).
- Managing Conservation Areas in Wales (Ref 6.9).
- Managing Historic Character in Wales (Ref 6.10).
- Managing Lists of Historic Assets of Special Local Interest (Ref 6.11).
- Setting of Historic Assets in Wales (Ref 6.12).
- Chartered Institute for Archaeologists Standard and guidance for historic environment desk-based assessment (Ref 6.13).

6.3 Study Area

Designated Historic Assets

6.3.1 A Study Area of 3 km from the Bryncir works site has been defined to provide historical and archaeological context and to identify designated assets with the potential to be affected by the proposed works (refer to **Figure 3.6.A.1** of **Volume 8, Appendix 3.6.A: Historic Environment Desk Based Assessment**).

6.3.2 The settings of designated assets of the highest value (i.e., World Heritage Sites, scheduled monuments, Grade I and II* listed buildings, registered parks and gardens, conservation areas containing a number of assets of the highest value and registered historic landscapes) will be considered, up to 3 km from the Bryncir works site. These assets will be considered as the proposed works has the potential to result in long-term change to the settings of designated assets, depending on their characteristics and distance from the Bryncir works site.

6.3.3 This will be guided by the proposed works (ZTV (prepared as part of **Chapter 4: Landscape and Visual Amenity** of the ES) but will also consider physical and historical connectivity and relationships with other assets and the wider landscape.

Non-designated Historic Assets

6.3.4 A Study Area of 500 m from the Bryncir works site has been defined to provide historical and archaeological context and to identify non-designated historic assets with the potential to be affected by the proposed works (refer to **Figure 3.6.A.2** of **Volume 8, Appendix 3.6.B: Gazetteer of Historic Assets**). This Study Area will allow for non-designated historic assets to be set within their wider context and allow for the assessment of archaeological potential in the Bryncir works site.

6.4 Assumptions and Limitations

6.4.1 The current assessment examines possible physical impacts resulting from the proposed works during construction and operation only.

6.5 Baseline

6.5.1 A detailed baseline is set out in **Volume 8, Appendix 3.6.A: Historic Environment Desk-based Assessment (DBA).** The DBA sets out a chronological narrative of known assets and assesses the potential for unknown heritage assets to be present in the Bryncir works site.

6.5.2 Most historic assets (the designated historic assets and non-designated historic assets) were scoped out of further assessment in the baseline study (**Volume 8, Appendix 3.6.A: Historic Environment Desk-based Assessment**) due to the lack of potential for impacts resulting from the proposed works. Only those assets that have the potential to be impacted by the proposed works are discussed in this chapter.

6.5.3 The principal historic assets to be considered are listed in **Table 6-1**. It has been assessed that there will be physical impacts or impacts on settings as a result of the proposed works.

Table 6-1 – Assets scoped into further assessment

Reference	Designation and grade	Name	Location
CN280	Scheduled Monument	Hut Circle East of Taleifion	1.14 km north-east of Bryncir works site
CN281	Scheduled Monument	Enclosed Hut Group North-East of Llystyn Uchaf	890 m north-east of Bryncir works site
CN154	Scheduled Monument	Standing Stone North of Bettws Fawr	2.8 km south-west of Bryncir works site
CN003	Scheduled Monument	Cefn-Isaf Burial Chamber	1.95 km south of Bryncir works site
CN021	Scheduled Monument	Llystn Gwyn Inscribed Stone	1.74 km north of Bryncir works site
CN029	Scheduled Monument	Ystum-Cegid Burial Chamber	2 km south-east of Bryncir works site
CN044	Scheduled Monument	Castell Caerau	1.93 km north-east of Bryncir works site
CN046	Scheduled Monument	Craig-y-Tyddyn Camp	1.60 km east of Bryncir works site
Cadw 21543	Grade II listed building	Pont y Felin	40 m east of Bryncir works site
PRN 62168	Non-designated historic asset	Route of old road, Garn Dolbenmaen	Within Bryncir works site

Reference	Designation and grade	Name	Location
PRN 101053	Non-designated historic asset	Bryn-Refail-Isaf, Dolbenmaen	180 m south-west of Bryncir works site
PRN 101063	Non-designated historic asset	Bryn-yr-efail-uchaf, Dolbenmaen	70 m north-east of Bryncir works site
PRN 62170	Non-designated historic asset	Field Barn, Bryn-'refail-ganol	20 m east of Bryncir works site
PRN 101386	Non-designated historic asset	Gwindy (Gwyndy), Dolbenmaen	360 m north-west of Bryncir works site
PRN 101511	Non-designated historic asset	Llystyn-isaf, Dolbenmaen	470 m north-east of Bryncir works site
PRN 2813	Non-designated historic asset	Melin Llecheiddior, Watermill, Pont y Felin	50 m north-west of Bryncir works site
PRN 101767	Non-designated historic asset	Outfarm, South of Gwyndy, Dolbenmaen	400 m west of Bryncir works site
PRN 101994	Non-designated historic asset	Plas-Llecheiddior, Dolbenmaen	480 m north-west of Bryncir works site

Future Baseline

6.5.4 This section considers any changes to the baseline conditions described above that might occur over the lifespan of the proposed works, but in the absence of the proposed works (i.e. in the event that it is not installed). There is planning permission for a similar substation to that proposed on the site although a change in design is needed.

Existing Baseline (2025)

6.5.5 Based on available information, there are no reasons to expect that there would be any marked change in the historic environment baseline in the absence of the proposed works. Land-uses in the Bryncir works site would remain as they are currently which would retain the existing settings of built historic assets and impacts to below ground archaeological remains would be minimal and limited to taphonomic processes (i.e. erosion, degradation, corrosion etc.).

Future Baseline

6.5.6 This assessment of future baseline conditions recognises that below ground archaeological remains reach an equilibrium with their environment and tend to not experience noticeable change, unless their environment changes as a result of human or natural intervention. Similarly, it is recognised that for above ground historic assets, there may be some decay over time in the absence of the proposed works as they near the natural end of their design lifespan It is not likely that significant numbers of historic assets will be added to the baseline during the future baseline scenario. The future baseline is unlikely to undergo significant change.

6.6 Consultation and Scope of Assessment

6.6.1 This section describes the scope of the assessment of effects on the Historic Environment.

6.6.2 **Table 6-2** summarises the date and nature of consultation with statutory stakeholders. Summary of responses is provided, and how and where these were added in the chapter.

Consultation

Table 6-2 – Historic Environment consultation responses

Consultee	Date and nature of consultation	Summary of response	How and where addressed
Senior Archaeologist Heneb	11 September 2024. Email correspondence.	AECOM sent an email to Heneb requesting feedback regarding the Study Areas to be used in the DBA and ES, and if a Written Statement of Investigation (WSI) was required in advance of Historic Environment Record (HER) data request.	The DBA (**Volume 8, Appendix 3.6.A: Historic Environment Desk-based Assessment** of the ES) has been carried out in accordance with a WSI agreed with Heneb. The DBA's Study Area has been agreed with Heneb.
HER Officer Heneb	11 September 2024. Email correspondence.	A data request for HER data in the Bryncir works site and within 500 m of the Bryncir works site was requested.	HER data received from Heneb was used in the DBA assessment (**Volume 8, Appendix 3.6.A: Historic Environment Desk-based Assessment**) and to support the ES.

Scope of the Assessment

6.6.3 The assessment considered in this chapter of the ES is as follows:

- Physical impacts to below ground archaeological remains during the construction phase of the proposed works.
- Changes to the setting of assets as a result of the proposed works during the construction and operation of the proposed works.

6.6.4 This chapter focuses solely on the historic environment and assesses potential impacts as a result of the proposed works.

6.6.5 The following aspects have not been considered within the scope of the assessment in this chapter of the ES:

- Potential impacts on below ground archaeological remains as a result of the operation of the proposed works have been scoped out of the assessment. This is because any impacts on below ground archaeological remains will have occurred and been mitigated during the construction phase.

6.6.6 **Table 6-3** summarises the potential Historic Environment receptors that have been reviewed and states whether they have been included or excluded from the Historic Environment assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 6-3 – Scope of Historic Environment assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Scheduled Monuments	In	In	Construction and operation activities have the potential to impact upon the character and setting of scheduled monuments.
Listed Buildings	In	In	Construction and operation activities have the potential to impact upon the character and setting of listed buildings.
Conservation Areas	Out	Out	There would be no intervisibility between the Bryncir works site and the conservation areas, and the proposed works would not result in changes to the setting of the assets. No additional impacts through changes to setting are predicted as a result of operation of the proposed works.
Historic non-designated assets	In	In	Construction activities have the potential to impact or remove route of old road (PRN 62168) as well as result in changes to the setting of non-designated buildings. Operation of the proposed works has the potential to impact upon the character and setting of non-designated buildings.
Unknown archaeological/ buried archaeological remains	In	Out	There is a low potential to impact as yet unknown archaeological remains. Ground intrusive works have potential to truncate or remove previously unrecorded buried archaeological remains. During operation of the proposed works no additional impacts.

6.7 Methodology

6.7.1 Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the Historic Environment assessment are in **Volume 8, Appendix 1.4.A: Historic Environment Assessment Methodology.**

6.8 Potential Effects

6.8.1 The anticipated effects resulting from the loss or change to Historic Environment elements and features during construction, operation and maintenance of Bryncir are outlined as follows:

Construction

6.8.2 The source of potential Historic Environment effects during the construction phase includes:

- Temporary short-term impacts to assets as a result of change to their setting.
- Permanent impacts to assets as a result of change to their setting.
- Permanent physical impacts to below ground archaeological remains.

Operation

6.8.3 The source of potential Historic Environment effects during the construction phase includes permanent impacts to assets as a result of change to their setting.

Designated Historic Assets

Within 3 km Study Area

6.8.4 The significance of designated historic assets is fully described in V**olume 8, Appendix 3.6.A, Historic Environment Desk Based Assessment** (Section 5.4).

Hut Circle East of Taleifion (CN280)

6.8.5 This asset is approximately 1.14 km north-east of the Bryncir works site. The scheduled monument comprises the remains of an isolated hut circle with an adjoining enclosure or yard. The site probably dates to the Iron Age or Romano-British period.

Enclosed Hut Group North-East of Llystyn Uchaf (CN281)

6.8.6 The asset is approximately 890 m north-east of the Bryncir works site. The scheduled monument comprises the remains of a well-preserved enclosed hut circle settlement, which probably dates from the first millennium BC.

Standing Stone North of Bettws Fawr (CN154)

6.8.7 The asset is approximately 2.88 km south-west of the Bryncir works site. The scheduled monument is the remains of a standing stone, which probably dates to the Bronze Age.

Cefn-Isaf Burial Chamber (CN003)

6.8.8 The asset is approximately 1.95 km south of the Bryncir works site. The scheduled monument is the remains of a chambered tomb, dating to the Neolithic period.

Llystn Gwyn Inscribed Stone (CN021)

6.8.9 The asset is approximately 1.74 km north of the Bryncir works site. The scheduled monument consists of an inscribed stone, a commemorative monument which has been inscribed with letters and symbols, probably dating to the early-medieval period.

Ystum-Cegid Burial Chamber (CN029)

6.8.10 The asset is approximately 2 km south-east of the Bryncir works site. The scheduled monument consists of the remains of a chambered long cairn, dating to early Neolithic.

Castell Caerau (CN044)

6.8.11 The asset is approximately 1.93 km north-east of the Bryncir works site. The scheduled monument is the remains of a hillfort, which probably dates to the Iron Age period.

Craig-y-Tyddyn Camp (CN046)

6.8.12 The asset is approximately 1.60 km east of the Bryncir works site. There are two sites scheduled in the area; a small fort on top of a rocky ridge, and a settlement at the foot of the ridge containing the remains of two round huts and a length of walling. Both are likely to date to the Iron Age or Romano-British period.

6.8.13 The above-mentioned scheduled monuments hold archaeological interest, with their value derived from their ability to inform on past settlement patterns. These assets are of high value.

6.8.14 The existing 4ZC overhead line has already contributed to the erosion of the local landscape in which these assets lie and the proposed works, including the removal of Tower 4ZC067 and the construction of a replacement tower 80 m north-west up the line along with the construction of the proposed Bryncir Substation, will have minimal further impact to the erosion of their setting.

6.8.15 While the Bryncir works site is visible from these scheduled monuments, the site does not contribute to the understanding of the heritage interests of the assets.

6.8.16 Any construction and operational activities will result in minimal change in the ability to appreciate the archaeological value of these scheduled monuments. This is assessed as having a very low magnitude of impact on these assets which, on assets of high value, results in a Minor adverse effect, which is not significant.

Pont y Felin (Cadw 21543) (Grade II)

6.8.17 The bridge of Pont y Felin is approximately 40 m east of the Bryncir works site. The bridge carries a minor road, crossing the Afon Dwyfach near a road junction with the B4411 Penygroes to Criccieth road.

6.8.18 The bridge possesses architectural interest as a good example of an early 19th-century road bridge. The listed structure is of medium value.

6.8.19 The existing DB connection route and the 4ZC line have already contributed to the erosion of the local landscape in which the asset lies and proposed works, including the removal of the redundant section of the DB connection route, will have minimal further impact to the erosion of this setting.

6.8.20 While the bridge is visible from the Bryncir works site, the site does not contribute to the understanding of the heritage interests of the asset.

6.8.21 Any construction and operational activities will result in minimal change in the ability to appreciate the heritage value of the asset. This is assessed as having a very low magnitude of impact on the bridge which, on an asset of medium value, results in a Negligible effect, which is not significant.

Non-designated Historic Assets

Within the Bryncir Works Site

Route of old road, Garn Dolbenmaen (PRN 62168)

6.8.22 An old road running from Garn Dolbenmaen to Dafarn Faig is shown on the 1839 Dolbenmaen parish tithe map and early OS maps. Subsequent reorganisation of the field systems in the area saw the removal of the road, surviving only in places as a PRoW across fields. The value of the asset is derived from its archaeological interest as

part of the post-medieval agricultural settlement pattern in the area during the 19th century. The asset would likely hold local interest and is of low value.

6.8.23 The construction of the proposed Bryncir Substation and the removal of the existing Tower 4ZC067 and the construction of a replacement tower 80 m north-west along the line would result in physical impacts to archaeological remains of the old road. However, given the limited extent of the proposed works in this area, it is unlikely that total loss of this asset will occur. Therefore, the magnitude of impact is medium, which on assets of low value, would result in a Minor adverse effect, which is not significant.

Within 500 m Study Area

Bryn-Refail-Isaf, Dolbenmaen (PRN 101053)

6.8.24 A post-medieval farmstead. It is approximately 180 m south-west of the Bryncir works site. The buildings comprise a small farm complex with views of the surrounding land, including to the west and north towards the Bryncir works site.

Field Barn, Bryn-'refail-ganol (PRN 62170)

6.8.25 An existing barn comprising of coursed and mortared roughly dressed local stone under a slate roof. Depicted on 2nd OS six-inch series map. It is approximately 20 m east of the Bryncir works site. The buildings comprise a small farm complex with views of the surrounding land, including to the west towards the Bryncir works site.

Plas-Llecheiddior, Dolbenmaen (PRN 101994)

6.8.26 A post-medieval farmstead. It is approximately 480 m north-west of the Bryncir works site. The buildings comprise a small farm complex with views of the surrounding land, including to the north towards the Bryncir works site.

6.8.27 These farmsteads possess architectural and historic interest as surviving examples of the post-medieval farm industry which have persisted and are of local interest. The buildings are of low value.

6.8.28 These farmsteads would experience a permanent change in their settings due to the construction of the proposed Bryncir Substation, an access road and the replacement of the existing Tower 4ZC067 with another tower in its setting. This would have a medium magnitude of impact, which on an asset of low value would result in a Minor adverse effect, which is not significant.

Bryn-yr-efail-uchaf, Dolbenmaen (PRN 101063)

6.8.29 A post-medieval farmstead. It is approximately 70 m north-east of the Bryncir works site. The buildings comprise a small farm complex with views of the surrounding land, including to the south-west towards the Bryncir works site.

Gwindy (Gwyndy), Dolbenmaen (PRN 101386)

6.8.30 A post-medieval farmstead. It is approximately 360 m north-west of the Bryncir works site. The buildings comprise a small farm complex with views of the surrounding land, including to the south-east towards the Bryncir works site

Llystyn-isaf, Dolbenmaen (PRN 101511)

6.8.31 A post-medieval farmstead. It is approximately 470 m north-east of the Bryncir works site. The buildings comprise a small farm complex with views of the surrounding land, including to the south-west towards the Bryncir works site.

Melin Llecheiddior, Watermill, Pont y Felin (PRN 2813)

6.8.32 A post-medieval mill. It is approximately 50 m north-west of the Bryncir works site. The buildings comprise a small farm complex with views of the surrounding land, including to the east towards the Bryncir works site.

Outfarm, South of Gwyndy, Dolbenmaen (PRN 101767)

6.8.33 A post-medieval outfarm. It is approximately 400 m west of the Bryncir works site. The buildings comprise a small farm complex with views of the surrounding land, including to the south-east towards the Bryncir works site.

6.8.34 These farmsteads possess architectural and historic interest as surviving example of the post-medieval farm industry which have persisted and are of local interest. The buildings are of low value.

6.8.35 These farmsteads, watermill and outfarm would experience a permanent change in their settings due to the construction and operation of the proposed Bryncir Substation, an access road and the replacement of the existing Tower 4ZC067 with another tower in its setting. This would have a low magnitude of impact, which on an asset of low value would result in a Negligible effect, which is not significant.

6.9 Mitigation and Residual Effects

6.9.1 The existing consent for the Bryncir Substation requires an archaeological investigation to be undertaken which is line with the mitigation set out here

6.9.2 While no significant effects have been identified on potential below ground archaeological remains, ground-breaking works will impact a non-designated historic asset of unknown date, the route of an old road (PRN 62128) from Garn Dolbenmaen. Additional mitigation in the form of archaeological watching brief on selected ground works may be required to determine the value and spatial extent of these remains.

6.9.3 Potential impacts to historic landscape features that cannot be avoided by design can be mitigated through a proportionate programme of archaeological investigation, recording and reporting, such as archaeological excavation in advance of construction, which would form additional mitigation measures. This would not result in a reduction in the physical impacts to archaeological remains but would mitigate the impact by providing a greater understanding and appreciation of the evidential value of archaeological remains.

6.9.4 No significant effects have been identified on the setting of scheduled monuments, listed buildings and historic landscapes, during the construction or operation of the proposed works. Considerations of size, materials, distribution, lighting and screening in the final design will ensure that impact on the setting of designated historic assets will be kept to a minimum.

6.9.5 The scope of mitigation will be set out in a WSI and agreed with the Archaeological Advisor for Heneb prior to works commencing.

6.10 Summary

6.10.1 While no significant effects have been identified on potential below ground archaeological remains, ground-breaking works will impact a non-designated historic asset of unknown date, the route of an old road (PRN 62128) from Garn Dolbenmaen.

6.10.2 The potential additional mitigation measures described in **Section 6.9** comprising a programme of archaeological investigation, recording and reporting would not minimise the physical impact, as the archaeological evidence would still be removed, but would compensate for their loss by preserving them by record. This would reduce the magnitude of impact, resulting in no significant residual effects.

6.10.3 No significant effects have been identified on the setting of designated historic assets during the construction or operation of the proposed works. Considerations of size, materials, distribution, lighting and screening in the final designs will ensure that impact on the setting of designated historic assets will be kept to a minimum.

6.10.4 Due to the nature of the development of the proposed works, there will be no additional impacts on the setting of assets during the operational phase, beyond what has been identified for the construction phase.

7. Geology, Hydrogeology, Land Use and Agriculture (Soils)

7.1 Introduction

7.1.1 This chapter presents an assessment of the likely Geology, Hydrogeology, Land Use and Agriculture (Soils) effects that could arise from the construction, operation and maintenance of the works at Bryncir as described in **Chapter 2: Bryncir Works.**

7.1.2 This chapter describes the baseline conditions currently existing within the Study Area (as defined in **Section 7.3**), the scope of the assessment, the potential effects, the mitigation measures required to avoid, reduce or offset any significant negative effects, and the likely residual effects after these mitigation measures have been adopted.

7.1.3 This chapter is supported by figures and appendices as listed below:

- **Figure 3.7.1:** Made Ground and Superficial Geology.
- **Figure 3.7.2:** Bedrock Geology.
- **Figure 3.7.3:** Hydrogeology.
- **Figure 3.7.4:** Groundwater Vulnerability.
- **Figure 3.7.5:** Potential Sources of Contamination.
- **Figure 3.7.6:** Historic Potential Sources of Contamination
- **Figure 3.7.7:** Mining, Quarrying and Mineral Resources.
- **Figure 3.7.8:** Surface Ground Workings
- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 3.7.A: Initial Conceptual Site Model and Risk Assessment.**

7.1.4 Other chapters that are useful to review in association with this chapter are as follows:

- **Chapter 8: Water Quality, Resources and Flood Risk** (which covers surface water and hydrology).

7.2 Legislation and Planning Policy

7.2.1 This section summarises the legislation and planning policy framework that is relevant to Geology, Hydrogeology, Land Use and Agriculture (Soils) assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

7.2.2 The following legislation is relevant to Geology, Hydrogeology, Land Use and Agriculture (Soils):

- The Environment Act 2021 (Ref 4.2).
- The Environmental Protection Act 1990 and Part IIA (the Contaminated Land Regime) (Ref 7.1).
- The Water Act 2003 (Ref 7.2).
- The Environment Act 1995 (Ref 7.3).
- The Water Resources Act 1991 (as amended) (Ref 7.4).
- The Land Drainage Act 1991 (as amended) (Ref 7.5).
- The Building Act 1984 and the Building (Amendment) Regulations 2016 (Ref 7.6).
- The Water Environment (Water Framework Directive (WFD)) (England and Wales) Regulations 2017 (Ref 5.19).
- The Private Water Supplies (Wales) Regulations 2017 (Ref 7.7).
- The Environmental Permitting (England and Wales) Regulations 2016 (Ref 7.8).
- The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2015 (Ref 7.9.
- Contaminated Land (Wales) Regulations 2006 (Ref 7.10).
- Hazardous Waste (England and Wales) Regulations 2005 (as Amendment) (Ref 7.11).
- Anti-Pollution Works Regulations 1999 (Ref 7.12).
- Control of Asbestos Regulations 2012 (Ref 7.13).
- Construction (Design and Management) Regulations 2015 ("CDM Regulations") (Ref 7.14).

National Policy

7.2.3 The following national policy is relevant to Geology, Hydrogeology, Land Use and Agriculture (Soils):

- PPW – Edition 12 (Ref 4.4).
- Future Wales: The National Plan 2040 (Ref 4.3).

Local Policy

The Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Ref 4.9) is local policy relevant to Geology, Hydrogeology, Land Use and Agriculture (Soils)

Guidance

7.2.4 The following guidance is relevant to Geology, Hydrogeology, Land Use and Agriculture (Soils):

- Contaminated Land Statutory Guidance for Wales (Ref 7.15).
- Environment Agency's online guidance for the management of land contamination 'Land Contamination Risk Management' (Ref 7.16).

- National House Building Council, Environment Agency, Chartered Institute of Environmental Health report R&D Publication 66 ‘Guidance for the Safe Development of Housing on Land Affected by Contamination’ (Ref 7.17).
- CIRIA C552 ‘Contaminated Land Risk Assessment - A Guide to Good Practice’ (Ref 7.18).
- Welsh Local Government Association, Welsh Land Contamination Working Group: ‘The Development of Land Affected by Contamination: A Guide for Developers’ (Ref 7.19).
- BS 10175 (2011 + A2:2017), ‘Investigation of Potentially Contaminated Sites - Code of Practice’ (Ref 7.20).
- BS 5930 (2015 + A1:2020), ‘Code of practice for Site Investigations’ (Ref 7.21).
- BS 8576 (2013), ‘Guidance on Investigations for Ground Gas. Permanent Gases and Volatile Organic Compounds (VOCs)’ (Ref 7.22).
- CIRIA C811 (2015), ‘Environmental Good Practice On Site Guide’. 5th edition. (Ref 7.23).
- BS 8485 (2015+A1:2019), ‘Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings’ (Ref 7.24).
- CIRIA C665 (2007), ‘Assessing Risks Posed by Hazardous Ground Gases to Buildings’ (Ref 7.25).
- Design Manual for Roads and Bridges (DMRB), ‘LA109 Geology and Soils’ (2019) (Ref 7.26).
- DMRB, ‘LA104 Environmental Assessment and Monitoring’ (2020) (Ref 7.27).
- DMRB, ‘LA113 Road Drainage and the Water Environment’ (2020) (Ref 7.28).
- Contaminated Land Application in the Real Environment (CL:AIRE), ‘Definition of Waste: Development Industry Code of Practice’ (2011) (Ref 7.29).
- Ministry of Agriculture, Fisheries and Food, Agricultural Land Classification 1988 (Ref 7.30).
- Defra, Construction Code of Practice for the Sustainable Use of Soils on Construction Sites 2009 (Ref 7.31).
- Institute of Environmental Management and Assessment[1] (IEMA), A New Perspective on Land and Soil in EIA 2022 (Ref 7.32).
- Institute of Quarrying, Good Practice Guide for Handling Soils in Mineral Workings 2021 (Ref 7.33).
- Welsh Assembly Government, TAN 6: Planning for Sustainable Rural Communities 2010 (Ref 7.34).
- Welsh Assembly Government, The Code of Good Agricultural Practice for the Protection of Water, Soil and Air for Wales No. 20 2011 (Ref 7.35).

[1] The Institute of Environmental Management and Assessment (IEMA) changed its name to the Institute of Sustainability and Environmental Professionals on 17 July 2025. At the time of writing, guidance was still IEMA branded and will be referred to throughout this volume.

- British Society of Soil Science, Guidance Document 3 Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction 2022 (Ref 7.36).

7.3 Study Area

7.3.1 The Study Area for this assessment is the area over which the potential direct and indirect effects of the proposed works are predicted to occur during the construction and operation phases.

7.3.2 The direct effects on geology and hydrogeology are those that may arise during construction and operation (including maintenance).

7.3.3 The indirect effects involve disturbing the ground in such a way that contaminant linkages (source-pathway-receptor) are created, for example, introducing a new pathway allowing potentially contaminated dusts, during construction, to migrate off-site to nearby residential or commercial properties.

7.3.4 The Study Area for geology and hydrogeology is the entirety of the ground in the Bryncir works site (**Figure 3.2.2**), along with a buffer extending to 250 m around the Bryncir works site to identify potential off-site sources of contamination to inform the baseline condition within and adjacent to the proposed works, including temporary works. With regards to groundwater abstractions and Source Protection Zones (SPZs) the Study Area includes a buffer extending 1 km beyond the Bryncir works site.

7.3.5 Impacts from the proposed works on geological features and sites and mineral safeguarding and preferred areas, will typically occur directly in the Bryncir works site where construction activities would take place or interface directly with these receptors. However, for the purposes of determining the wider geological context, geodiversity and to support the conceptual understanding of the ground model, the geological features and sites and minerals baseline will consider an extended Study Area from the Bryncir works site.

7.3.6 Impacts to soils in relation to agricultural land typically occur only on the land directly impacted by the proposed works, including land used for access and compounds. A wider Study Area is not applied when describing and considering agricultural soils unless stripped soil is transported off-site.

7.3.7 These Study Areas are appropriate for the assessment of Geology, Hydrogeology, Land Use and Agriculture (Soils) in accordance with methodology set out in the DMRB LA 109 Geology and Soils (Ref 7.26), which although applicable to road schemes, is considered to provide a suitable framework within which to conduct EIA for assessing geology and hydrogeology on schemes which include linear elements (including the Project). It is also a well-established and tested methodology, familiar to the statutory consultees.

7.3.8 The Study Area distance has been used to identify potential receptors such as designated sites as well as identifying sources such as landfills. The environmental datasets obtained for the Bryncir works site include a 250 m, 500 m and 1 km (for water abstractions) buffer for the Bryncir works site. The Study Areas are also based on professional judgement by competent experts with relevant and appropriate experience of assessing land contamination.

7.4 Assumptions and Limitations

7.4.1 The assessment presented in this chapter reflects the information obtained and evaluated at the time of reporting (October 2024 to April 2025), and has referenced published data, records and web-based information obtained to date.

7.4.2 The baseline presented herein is based on data gathered through desktop research.

7.4.3 A worst-case approach to assess the potential effects to best and most versatile (BMV) agricultural land was adopted by applying buffers to design information and using Welsh Government's mapping of the preliminary model of ALC.

7.4.4 A geotechnical and geo-environmental ground investigation will be undertaken to inform the detailed design of the proposed works. This is a commitment which will be captured in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).

7.5 Baseline

7.5.1 The following section provides a summary of the existing ground conditions within the respective subtopic Study Area for the Bryncir works site. The information is presented based on the division of significant sources and receptors. Generally, the baseline conditions presented refer to sources and receptors in the Bryncir works site; however, relevant significant sources and receptors outside the Bryncir works site that may affect or be affected by the proposed works, are also identified in the baseline.

7.5.2 For the purposes of describing features in relation to the Bryncir works site, reference has been made, where relevant, to the 'western spur' which is the section located alongside the Afon Dwyfach (towards the A487 road) and the 'eastern spur' which is the section that leads from the proposed Bryncir Substation towards the A487.

Data Sources

7.5.3 The known or predicted current and future baseline environment described in this section has been informed by the following data sources:

- Groundsure Enviro, Geo and Map Insight data referenced GSIP-2024-16474-21178 and 21179 (provided as GIS data on 21 November 2024) (Ref 7.37).
- British Geological Survey (BGS) 1:50,000 mapping Sheet 118 Nefyn and part of Caernarfon (Ref 7.38).
- BGS 1:10,560 mapping, SH44SE (Ref 7.39).
- BGS GeoIndex Online Mapping Service (Ref 7.40).
- Groundsure Free Data Viewer (Ref 7.41).
- Natural Resource Wales (NRW), LANDMAP (Ref 7.42).
- Welsh Government (Data Map Wales) for geological SSSI, Geological Conservation Review (GCR) sites, Regionally Important Geodiversity Sites (RIGS), SPZ, Licensed Water Abstractions and LANDMAP Geological Landscape mapping (Ref 7.43).
- Unexploded Ordnance Risk Map Risk Maps | Zetica UXO (Ref 7.44).

- Mineral Safeguarding Areas (MSA) GIS data (provided by Gwynedd Council on 31 May 2024) (Ref 7.45).
- Mining Remediation Authority Map Viewer (Ref 7.46).
- Private Water Abstraction Records from Gwynedd Council received 26 November 2024 (Ref 7.47).
- Potential Land Contamination Points from Gwynedd Council received 23 January 2025 (Ref 7.48).
- Defra Multi-Agency Geographic Information for the Countryside (MAGIC) maps (Ref 7.49).
- National Library of Scotland historical mapping (Ref 7.50).
- UK Soil Observatory (UKSO) Soilscape Viewer (Ref 7.51).

Geology

Published Records

7.5.4 The published 1:50,000 scales geological map of the area Sheet 118 – Nefyn and part of Caernarfon (Ref 7.38), and the Groundsure data (Ref 7.41) indicate the Bryncir works site is underlain by the geological succession summarised in **Table 7-1**. This is shown on **Figures 3.7.1** and **Figure 3.7.2.**

Table 7-1 – Geological succession across the Bryncir works site and Study Area

Age	Group	Geological stratum
Quaternary period (116 thousand and 11.8 thousand years ago)	Superficial deposits	Glaciofluvial Sheet Deposits (mapped outcropping across the majority of the Bryncir works site and potentially beneath the peat and alluvium, extending off-site in various directions). Alluvium (mapped on-site across some of the western spur, extending off-site to the north and south). Peat (mapped on-site across the western spur, extending off-site to the north and south; and in the Study Area to the south and east of the eastern extent). Till (mapped off-site approximately 75 m north of the western spur).
Ordovician period (485.4 million and 443.8 million years ago)	Bedrock	Llanbedrog Volcanic Group – Tuff and Sandstone (on-site, extending off-site in various directions). Dwyfach Formation – Sandstone (on-site in the northern-most extent of the western spur, extending off-site to the north and east, and mapped off-site approximately 190 m south-east (comprising mudstone, siltstone and sandstone)). Cwm Eigiau Formation (off-site, 175 m north-east of the western spur).

Artificial Deposit

7.5.5 Artificial Deposits (Made Ground) is shown on the BGS Geoindex (Ref 7.40) approximately 15 m to the west of the Bryncir works site. No Artificial Deposits (Made Ground) are mapped on-site. However, it is expected to be present, albeit very localised, in the areas occupied by the roads and tracks (including the B4411 road that traverses the Bryncir works site in the western area) and existing towers.

Superficial Deposits – Glaciofluvial Sheet Deposits

7.5.6 Glaciofluvial Sheet Deposits (sand and gravel) are mapped outcropping across the Bryncir works site and potentially beneath the alluvium and peat deposits.

7.5.7 Glaciofluvial Sheet Deposits are described by the BGS as 'Sand and gravel, locally with lenses of silt, clay or organic material; characteristic 'sandur' (sheet) and valley train form; of glaciofluvial origin.'

Superficial Deposits – Alluvium

7.5.8 Alluvium (gravel, sand, silt and clay) is recorded to underlie the Bryncir works site in the western spur, following the Afon Dwyfach that traverses some of the western spur from north to south.

7.5.9 Alluvium is described by the BGS as 'a general term for clay, silt, sand and gravel. It is the unconsolidated detrital material deposited by a river, stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta.'

Superficial Deposits – Peat

7.5.10 Peat is recorded to underlie the Bryncir works site, mapped in proximity to the alluvium (also traversing the western spur of the Bryncir works site from north to south).

7.5.11 Peat is described by the BGS as '*a partially decomposed mass of semi-carbonized vegetation which has grown under waterlogged, anaerobic conditions, usually in bogs or swamps.*'

Superficial Deposits – Till

7.5.12 Till is not mapped across the Bryncir works site, but potentially present underlying the other superficial deposits. Till was recorded beneath gravel (Glaciofluvial Sheet Deposits) in a historical BGS borehole log located in the south-eastern-most extent of the Bryncir works site (see later '**Historical BGS Borehole Logs**' section).

7.5.13 Till is described by the BGS as 'unsorted and unstratified drift, generally over consolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape.'

Bedrock Geology – Llanbedrog Volcanic Group

7.5.14 Llanbedrog Volcanic Group bedrock is mapped across the majority of the Bryncir works site.

7.5.15 Described by the BGS as 'Basaltic trachyandesite-rhyodacite lavas and tuffs, with some ash flow tuffs and minor amounts of reworked sandstones, siltstones and conglomerates.'

Bedrock Geology – Dwyfach Formation

7.5.16 Dwyfach Formation bedrock is mapped in the northern-most extent of the western spur (extending off-site to the north and east of the northern spur, and mapped off-site approximately 190 m south-east).

7.5.17 Described by the BGS as 'Medium- to coarse-grained sandstones and subordinate interbedded mudstones (Bodwrog Member), passing upwards into grey calcareous mudstones and siltstones with subordinate sandstones (Plastirion Member).'

Bedrock Geology – Cwm Eigiau Formation

7.5.18 Cwm Eigiau Formation bedrock is mapped approximately 175 m north-east of the western spur. It is described by the BGS as '*Sandstones with siltstones and silty mudstones, tuffs and tuffites.'*

Faults & Linear Features

7.5.19 The published 1:50,000 scale geological map of the area does not indicate any faults or linear features within 250 m of the Bryncir works site.

Historical BGS Borehole Logs

7.5.20 There is one historical BGS borehole log on the BGS Geoindex (Ref 7.40) in the south-eastern-most extent of the Bryncir works site. Another is approximately 340 m south-west; this is outside the Study Area but has been summarised to get an idea of ground conditions in this area. A summary of these borehole logs is below. There are others within 250 m of the Bryncir works site, however, these records are private and confidential and therefore cannot be reviewed for input into this chapter.

- Borehole reference SH44SE19 (located within the south-eastern-most extent of the Bryncir works site):
  - Topsoil to 0.3 m below ground level (bgl).
  - Subsoil with gravel to 1.0 m bgl.
  - Gravel with occasional cobbles and boulders to 8.7 m bgl. Sandy gravel recorded between 2.2 m and 5.3 m bgl.
  - Silty sandy clay with occasional cobbles and boulders (recorded as 'boulder clay') to 10.5 m bgl (thickness not fully proven as borehole terminated at 10.5 m depth due to 'obstruction').
  - Water strike at 5.4 m depth.
- Borehole reference SH44SE24 (located approximately 340 m south-west of the Bryncir works site):
  - Topsoil to 0.3 m bgl.
  - Gravel to 3.0 m bgl (thickness not fully proven as borehole terminated at 3.0 m depth due to 'obstruction').
  - No groundwater encountered.

Ground Stability

7.5.21 The following information was obtained from the Groundsure data (Ref 7.40) for the Bryncir works site:

- Collapsible Ground Stability:
  - Majority of the Bryncir works site is Class B *'Deposits with potential to collapse when loaded and saturated are unlikely to be present'*, mapped in the area of the Glaciofluvial Sheet Deposits.
  - Western spur only is Class A *'Deposits with potential to collapse when loaded and saturated are believed not to be present'*, mapped in the area of the Peat and Alluvium.
- Compressible Ground Stability:
  - Majority of the Bryncir works site is Class A *'Compressible strata are not thought to occur'*, mapped in the area of the Glaciofluvial Sheet Deposits.
  - Most of the western spur is Class E *'Highly compressible strata present. Significant constraint on land use depending on thickness',* mapped in the area of the Peat.
  - Small areas of the western spur is Class C *'Compressibility and uneven settlement potential may be present. Land use should consider specifically the compressibility and variability of the site',* mapped in the area of the Alluvium.
- Ground Dissolution Stability:
  - Class A *'Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present'* mapped across the whole of the Bryncir works site.
- Landslide Ground Stability:
  - Class B *'Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered'* mapped across the whole Bryncir works site.
- Running Sand Ground Stability:
  - Class B *'Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly'* mapped across the majority of the Bryncir works site.
  - Small areas of the western spur are Class C *'Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water'* mapped in the area of the Alluvium.
- Shrinking or Swelling Clay Ground Stability:
  - Class A *'Ground conditions predominantly non-plastic'* mapped across the whole of the Bryncir works site.

Soils

7.5.22 The landcover in the Bryncir works site is principally grassland. The UKSO Soilscape viewer (Ref 7.51) identifies neutral and acid pastures, with the soil type also supporting deciduous woodlands and acid habitat communities, such as bracken and gorse in the uplands.

7.5.23 Under grass, the soils have a long grazing season. Free drainage reduces the risk of soil damage from grazing animals or farm machinery. Soils may also be suitable for

range of spring and autumn sown crops. Shortage of soil moisture is the most likely limiting factor on yields, particularly where stony or shallow.

7.5.24 A site survey of soils was carried out on 7 December 2016 by experienced soil scientists on behalf of National Grid to determine soil types and ALC. The survey was in preparation for an application for a substation in 2017 and the survey extent does not coincide completely with the proposed works. The survey followed the methodology, agreed with the Land Quality Advice Service of the Welsh Government's Department for Environment and Rural Affairs in Natural England's Technical Note 049, Agricultural Land Classification: protecting the Best and Most Versatile Land (Ref 7.52). This required a sample density of one per ha and a soil profile pit at a density of approximately one per 10 ha. The survey yielded 10 auger cores and one soil pit. Eight of the observations identified soils to have ALC subgrade 3b and three observations were Grade 5. These field observations match the predictive modelling of ALC which identifies the land for the substation to be Subgrade 3b and surrounding land to be Grades 4 and 5. The correlation between ALC field survey data and the predictive model provided confidence that there is no BMV land in the Study Area.

Sites Designated for Geodiversity Interest

7.5.25 According to the NRW LANDMAP (Ref 7.42), the overall valuation of the Geological Landscape Aspect Area where the Bryncir works site is located is 'Outstanding' which is defined as 'The Aspect Area contains features (including sites) of outstanding Earth heritage importance, including for national and international geological science. Generally, such areas also have a high actual or potential educational value, and many will also be of historical importance and contain classic, rare or unique features.' The justification for this 'Outstanding' valuation is specified by NRW LANDMAP (on the interactive mapping (Ref 7.42)) as the area 'Includes sites of national importance for geology and geomorphology including Quaternary studies and Ordovician stratigraphy.'

7.5.26 A review of currently available information on Data Map Wales (Ref 7.43) did not identify any specific sites of interest, including geological SSSI, GCR sites or RIGS in the Bryncir works site or within the Study Area.

Mineral Safeguarding Areas

7.5.27 The Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Ref 4.9) indicates that '*Safeguarding policies will be required to ensure that mineral resources which may be needed at some time in future are not sterilised by other forms of development, without consideration of that need. A decision to safeguard a particular mineral resource does not imply that planning permission will be granted for its working. The method of identification of the MSA will need to be explained and justified and the MSA's shown on the Proposals Maps.*'

7.5.28 Paragraph 5.14.7 of PPW (Ref 4.4) states that; '*It is important that access to mineral resources, including secondary, recycled and marine dredged materials, which society may need, as well as the minerals related infrastructure to deliver this need, is safeguarded in order to prevent sterilisation by other forms of permanent development. Planning authorities should consider the long term and the need for preventative action to avoid the creation of problems in the future. Safeguarding does not indicate an acceptance of mineral working, but that the location and quality of the mineral is known and that the environmental constraints associated with extraction, including the potential for extraction of mineral resources prior to undertaking other forms of development, have been considered.*'

7.5.29 According to MSA GIS data (provided by Gwynedd Council on 31 May 2024) (Ref 7.45), a very small section of the south-western-most extent of the Bryncir works site is in an MSA for sand and gravel. This MSA extends into the Study Area to the west and south-west of the Bryncir works site (see **Figure 3.7.7**).

7.5.30 According to the Anglesey and Gwynedd Joint Local Development Plan Proposals Map (Ref 7.53), there are no sand and gravel preferred areas in the Bryncir works site or Study Area.

Historical and Current Surface Ground Workings, Underground Workings and Non-Coal Mining

7.5.31 The following information was obtained from the Groundsure data and Mining Remediation Authority Map Viewer (Ref 7.46) for the Bryncir works site and Study Area and is shown on **Figure 3.7.7**.

Surface Ground Workings

7.5.32 In the Study Area, approximately 15 m west of the Bryncir works site, there is an area of surface ground workings including gravel pits, brit pits (detailed as ceased gravel pits), refuse heaps and a disused tip (**Figure 3.7.8**). These are generally in the area where Infilled Ground (Artificial Deposit) was mapped. There are also historical mineral planning areas[2] marked in this location; these are referred to as 'Felin Llecheiddior' and 'Gwyndy Llecheiddior'.

7.5.33 There are other isolated areas in the Study Area of the Bryncir works site (approximately 170 m west and 170 m south-west) that are 'cuttings' and an area 125 m north of the eastern spur mapped as a 'pond'.

Underground Workings

7.5.34 There is a small area of underground workings approximately 15 m west of the western spur for 'Unspecified Melin[3]' (dated 1913).

Coal Mining

7.5.35 The Mining Remediation Authority Map Viewer (Ref 7.46) does not show the Bryncir works site to be in a coal mining reporting area.

Non-Coal Mining

7.5.36 According to the Groundsure data, the Bryncir works site and Study Area are within an area where 'Underground mine workings may have occurred in the past or current mines may be working at significant depth to modern engineering standards. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered.'

[2] Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s and the mid-1980s. This Groundsure dataset holds information relating to:

- Planning permissions granted for mineral extraction and associated facilities
- Historic land use associated with permitted, withdrawn and refused mineral planning permission sites.

[3] Note that this underground working area is in the location of 'Melin Llecheiddior', which is what 'Melin' may refer to.

Hydrogeology

Aquifer Designation

7.5.37 The Study Area for hydrogeology is within 250 m of the Bryncir works site.

7.5.38 Aquifer designations in the Bryncir works site and in the Study Area are shown on **Figure 3.7.3**. The aquifers in the Study Area are summarised in **Table 7-2.**

Table 7-2 – Summary of aquifer designations

Stratum	Description	Aquifer designation
Superficial deposits	Glaciofluvial Sheet Deposits	Secondary A[4]
	Alluvium	Secondary A[4]
	Peat	Unproductive strata[4]
	Till	Secondary (undifferentiated)[4]
Bedrock	Llanbedrog Volcanic Group – Tuff and Sandstone	Secondary B
	Dwyfach Formation – Sandstone	Secondary B
	Cwm Eigiau Formation	Secondary B

Groundwater Vulnerability

7.5.39 The BGS Geoindex identifies the superficial deposits and bedrock beneath the majority of the Bryncir works site as being low vulnerability (see **Figure 3.7.4**). The BGS indicate that groundwater vulnerability identified as low relates to areas that provide the greatest protection to groundwater from pollution. They are likely to be characterised by low-leaching soils and/or the presence of low-permeability superficial deposits.

Source Protection Zones

7.5.40 There are no SPZ within 1 km of the Bryncir works site according to Data Map Wales (Ref 7.43).

Groundwater Abstractions

7.5.41 There are no licensed water abstractions within 1 km of the Bryncir works site according to Data Map Wales (Ref 7.43).

Private Water Supplies

7.5.42 According to Gwynedd Council, the following private water supplies (PWS) are within 1 km of the Bryncir works site:

- Felin Llecheiddior – commercial/industrial PWS approximately 60 m west of the western spur of the Bryncir works site.

[4] Note that superficial aquifer designation is not mapped by the BGS Geoindex or Groundsure in this region. The inferred aquifer designation is based on the designation for this particular stratum, mapped elsewhere in Wales.

- Bryn Efail Uchaf – residential PWS approximately 115 m north of the eastern spur of the Bryncir works site.
- Tŷ Cerrig – residential PWS approximately 890 m south-east of the Bryncir works site.
- Derwin Back – commercial (hotel) PWS approximately 960 m north-west of the Bryncir works site.

Hydrology

7.5.43 The Afon Dwyfach traverses the western spur of the Bryncir works site from north to south. There are multiple unnamed ordinary watercourses in the Study Area which are tributaries of the Afon Dwyfach and the Dwyfor (800 m south-east). The location of these watercourses can be seen in **Figure 3.8.1**. According to Groundsure data, the chemical, biological and overall quality of the Afon Dwyfach is 'good' (as of 2016).

7.5.44 Further details regarding hydrological features are presented in Chapter 8: Water Quality, Resources and Flood Risk.

Ground Investigation Information

7.5.45 No information has been received regarding previous ground investigations at the Bryncir works site.

Unexploded Ordnance

7.5.46 Online Zetica Unexploded Ordnance (UXO) risk mapping (Ref 7.44) shows "Low Risk" for the whole Bryncir works site and Study Area.

7.5.47 A Pre-Desk Study Assessment was obtained from Zetica, and this recommended that '*while always prudent, a detailed desk study is not considered essential in this instance*'.

Landfilling

7.5.48 According to Groundsure data (Ref 7.41), there are no active, recent or historical landfills in the Bryncir works site or Study Area.

Waste Sites

7.5.49 There are two waste exemptions detailed as follows:

- 40 m north of the eastern spur: for '*deposit of waste from dredging of inland waters*' on a farm.
- 185 m south of the Bryncir works site: for '*spreading waste on agricultural land to confer benefit*' on a farm.

Ground Gas

7.5.50 No significant potential sources of ground gas have been identified with the exception of an area of former surface ground workings (including gravel pits, brit pits (detailed as ceased gravel pits), refuse heaps and a disused tip) approximately 15 m to the west of the Bryncir works site. Other less significant potential sources of ground gas such as Peat and Alluvium have also been identified, mapped across the Bryncir works site.

7.5.51 The potential for gas generation has been assessed based on the possible sources identified using guidance provided in BS 8576 (Ref 7.54). BS 8576 (Ref 7.54) indicates

that natural soil strata such as Peat and Alluvium with a low degradable organic content would have a very low gas generation. Made Ground is present nearby to the west and across occasional areas of the Bryncir works site such as roads (albeit anticipated to be limited in thickness). These are anticipated to have low degradable organic carbon and, therefore, represent a very low gas generation potential.

Radon

7.5.52 The Groundsure data (Ref 7.41) shows that the Bryncir works site is within an area where between 1 and 3 % of properties are above the Action Level.

7.5.53 BR211 'Guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects)', dated 2023 (Ref 7.55) indicates that as the Bryncir works site is within an area with a radon risk of less than 3%, no radon protection will be required.

Regulated Activities

7.5.54 The following information was obtained from the Groundsure data (Ref 7.41) for the Bryncir works site and Study Area.

7.5.55 There are no radioactive substance authorisations, pollution incidents, List 1 or 2 dangerous substances, historical licensed industrial activities, Control of Major Accident Hazards sites, hazardous substance storage/usage, licensed industrial activities (Part A(1)), licensed pollutant releases (Part A(2)/B, to public sewer, or to surface waters (red list)), pollution inventories, sites determined as contaminated land or regulated explosive sites in the Bryncir works site or Study Area.

7.5.56 There are current industrial land uses and licensed discharges to controlled waters in the Bryncir works site and Study Area as detailed in the sections below.

Current Industrial Land Use

7.5.57 On-site current industrial land uses include towers in the northern-most extent of the northern spur, and in the south-east of the Bryncir works site.

7.5.58 Off-site current industrial land uses include towers and W H Evans (agricultural machinery and goods products) which appears to be at a residential and agricultural property 'Warws Felin Llecheiddior', approximately 60 m west of the western spur of the Bryncir works site.

Licensed Discharges to Controlled Waters

7.5.59 The are no licensed discharges to controlled waters on-site. There is one off-site licensed discharge to controlled waters point in the Study Area. This is for sewage discharges (final and treated effluent) to a tributary of the Afon Dwyfach and is approximately 90 m north of the western spur.

Environmental Sensitivities

7.5.60 A review of currently available information on MAGIC (Ref 7.49) and from Gwynedd Council did not identify any Ramsar sites, LNR, NNR, SPA, SPA or ecological SSSI in the Bryncir works site or Study Area.

7.5.61 There are cWSs and priority habitats in the Bryncir works site and Study Area. These are detailed further in **Chapter 5: Ecology and Nature Conservation.**

Site History

7.5.62 According to the Groundsure data (Ref 7.41) and National Library of Scotland historical mapping (Ref 7.50), the following are recorded in the Study Area:

- Corn Mill (1888) – 20 m west of the western spur.
- Smithy (1899 – 1949) – 150 m east of the western spur.
- Historical railway (1888 – still present on the 1962 map) – 85 m west at its closest point. Ran in a north to north-east to south-west direction.
- Gravel pits (in the area identified by the Groundsure data as surface ground workings) (1948 – still present on 1962 map).

Potential Sources of Contaminated Land

7.5.63 The Study Area is in a predominately rural setting. However, the following potentially contaminative land uses have been identified and are shown on **Figure 3.7.5**.

7.5.64 In the Bryncir works site:

- Farmland including a former sheepfold (enclosure) in the central area.
- Made Ground associated with the B4411 road (traversing the Bryncir works site from north to south in the western area) and towers (in the northern-most extent of the northern spur, and in the south-east of the Bryncir works site).

7.5.65 Within the Study Area:

- Infilled Ground (Artificial Deposit) from approximately 15 m to the west of the Bryncir works site. Also identified as an area of surface ground workings including gravel pits, brit pits (detailed as ceased gravel pits), refuse heaps and a disused tip.
- Made Ground associated with the B4411 road and towers.
- Light industrial use associated with W H Evans (agricultural machinery and goods products), approximately 60 m west of the western spur of the Bryncir works site.
- Historical railway, 85 m west at its closest point. Ran in a north to north-east to south-west direction.
- Farmland.
- Historical corn mill 20 m west of the western spur.
- Historical smithy 200 m east of the northern spur.

Contaminated Land Risk Assessment

7.5.66 A qualitative risk assessment for land contamination has been undertaken for the construction and operational phase of the proposed works. The risk assessment assumes standard best practices would be implemented during the works and has been used to identify where additional mitigation measures would be required.

7.5.67 The initial Conceptual Site Model (iCSM) and qualitative preliminary risk assessment for the proposed works has been provided in **Volume 8, Appendix 3.7.A: Initial Conceptual Site Model and Risk Assessment.**

7.5.68 The potential risks include for on-site and off-site sources impacting controlled water (surface water bodies, Secondary B aquifers, Secondary Undifferentiated aquifers and Secondary A aquifers) through sub-surface migration.

7.5.69 The receptors identified in the iCSM and Risk Assessment have been brought forward into the potential effect assessment.

Future Baseline

7.5.70 The Bryncir works site is in predominantly agricultural or open land, with minor potential sources of contamination on-site (Made Ground associated with roads and towers).

7.5.71 Although there is the potential for the baseline presented in this chapter to change overtime; the data presented provides a good representation of geological, hydrogeological, land use and agriculture (soils) conditions at this stage of the proposed works; and thus the baseline presented provides a realistic platform upon which to base any impact assessment work.

7.5.72 With respect to land contamination, any future development in the Study Area is subject to appropriate consenting regimes. This requires consideration of the potential for contamination to be present. The developer would be required to carry out remediation to ensure the development is suitable for its proposed use.

7.5.73 Furthermore, natural attenuation processes have the potential to mitigate risks over time from any existing sources of contaminants present within soil and groundwater.

7.5.74 Changes in groundwater abstractions could affect the groundwater flow regime and climate change could influence the future baseline conditions, due to changes in the rainfall regime, recharge, groundwater levels and flow. However, these changes are long-term and are not predictable at this stage.

7.6 Scope of Assessment

7.6.1 This section describes the scope of the assessment of effects on Geology, Hydrogeology, Land Use and Agriculture (Soils).

7.6.2 A number of potential effects are associated with an assumed worst case relating to potential soil and groundwater contamination for the Bryncir works site, which have been derived by a qualitative assessment based on desk study research, iCSM and risk assessment presented in **Volume 8, Appendix 3.7.A: Initial Conceptual Site Model and Risk Assessment**. However, no sources of potential contamination have been noted in the Bryncir Works site. Where recorded they are west of the western extent of the Bryncir works site. A standalone ground investigation for contamination is not required but chemical testing of soil samples will be undertaken during geotechnical ground investigation to confirm the low risks from potential contamination.

7.6.3 The ground investigation will be done post-planning consent as it is reasonable that the worst-case has been assumed for the assessment presented in this chapter. See further details in **Section 7.9,** ‘Ground Investigation’.

7.6.4 **Table 7-3** summarises the potential Geology, Hydrogeology, Land Use and Agriculture (Soils) receptors that have been reviewed and states whether they have been included or excluded from the assessment. Justification is provided where receptors have been both included and excluded from the assessment.

Table 7-3 – Scope of Geology, Hydrogeology, Land Use and Agriculture (Soils) assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Geology (from physical works)			
Geology	In	Out	The overall valuation of the Geological Landscape Aspect Area where the Bryncir works site is located is 'Outstanding' which is defined as *'The Aspect Area contains features (including sites) of outstanding Earth heritage importance, including for national and international geological science. Generally, such areas also have a high actual or potential educational value, and many will also be of historical importance and contain classic, rare or unique features.'* In accordance with DMRB LA 109 (Ref 7.26), it is a 'very high' sensitivity receptor (*'geology meeting international designation citation criteria which is not designated as such'*). Construction impacts have been scoped in as disturbance of geology may occur through redevelopment.
Sites designated for geodiversity interest	Out	Out	No geological SSSI, GCR sites or RIGS in the Bryncir works site or the Study Area.
Ground stability	In	Out	Changes in subsoil or rock structure or shallow groundwater that could affect ground instability. Historical surface ground workings and a small area of underground mining have been identified in the Study Area close to the western extent of the Bryncir works site. The Bryncir works site is predominantly in areas of low potential for ground instability, except for an area of Alluvium and Peat in the west. Ground stability risks for the proposed works will be considered further as part of a detailed geotechnical Preliminary Sources Survey Report/Ground Investigation Report/ Geotechnical Design Report to inform the detailed design.
Hydrogeology (from physical works)			
Groundwater - Secondary A, B and undifferentiated	In	Out	Foundation and trench work may create a pathway for potential contaminants to

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
aquifers and nearby commercial/industrial PWS			groundwater during construction. No effect is anticipated during the operational stage. Water abstraction closest to the Bryncir works site is a commercial/industrial PWS approximately 60 m west of the western spur of the Bryncir works site. There are PWS for residential properties 115 m north of the eastern spur, and approximately 890 m south-east of the Bryncir works site. The geological strata from which the water is abstracted is unknown. Medium sensitivity for the aquifers and nearby commercial/industrial PWS. Very high sensitivity is based on the possibility this is being used for drinking water as it is identified as a residential PWS.
Groundwater - In vicinity of the residential PWS	In	Out	
MSA (from physical works)			
MSA for sand and gravel	In	In	Temporary and permanent impacts from the proposed works on the sand and gravel MSA (in the south-western most extent of the Bryncir works site) needs to be considered.
Preferred areas for minerals	Out	Out	No preferred areas for sand and gravel in the Bryncir works site or Study Area.
Agricultural Soils (from physical works)			
Agricultural land	In	In	Temporary and permanent loss of agricultural land would commence during the construction works and continue through the operational stage. None of the land affected is classed BMV.
Receptors to Land Contamination			
Construction workers	In	Out	Contamination may be present in localised areas i.e., Made Ground. Activities relating to foundation construction, earthworks and associated transportation activities and material storage have the potential to expose construction workers to contaminants in soil, dust, vapours or groundwater excavations. Potential impacts may result from the accidental leak of fuels, oils or chemicals from plant or from stored liquids. Other impacts may also result from the use of materials and substances polluting potential (e.g. concrete, fuel, oils and soil) which have the potential to be mobilised to ground or controlled waters. Risk of

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			encountering unexpected contamination during excavations. Potential for impact from ground gases to enclosed structures.
Maintenance workers	Out	In	As above (potential exposure to residual contamination).
Off-site human health receptors (nearby residential and farm users)	In	In	Potential exposure to contaminated land (known/unknown) during construction works, accidental leak of fuels, oils and chemicals. No effect is anticipated during the operational stage other than when maintenance works may be required (same potential impacts as during construction).
Off-site human health receptors (agricultural land users)	Out	Out	Risks will be mitigated during construction through compliance with guidance within C811 (Ref 7.23) (see paragraph 7.9.9 – 7.9.10). Therefore, these receptors are scoped out of the assessment.
Surface water	In	In	Works adjacent and over the Afon Dwyfach and associated tributaries. Potential for the creation of new contaminant linkages i.e. through foundation construction or excavations through an aquiclude into aquifers. Changes to the hydrogeological regime (as a result of ground disturbance and potential dewatering (if required) during construction) may mobilise existing contamination in soil, groundwater and to surface watercourses. Potential impacts may result from the accidental leak of fuels, oils or chemicals from plant or from stored liquids. Other impacts may also result from the use of materials and substances polluting potential (e.g. concrete, fuel, oils and soil) which have the potential to be mobilised to ground or controlled waters in run-off. Water abstractions (including commercial/industrial and residential PWS) are between 60 m and 950 m from the Bryncir works site. No effect is anticipated during operation other than when maintenance works may be required (same potential impacts as during construction – from residual contamination/ potential accidental leaks and spillages).
Groundwater - Secondary A, B and undifferentiated aquifers and nearby commercial/ industrial PWS	In	In	
Groundwater - In vicinity of the residential PWS	In	In	

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Development infrastructure (foundations and underground cables)	In	Out	Potential impacts from direct contact with contaminated land (known or unknown) – aggressive ground conditions. No further effect is anticipated during the operational stage.
Ecological sites /flora and fauna	In	Out	There are cWSs and priority habitats in the Bryncir works site and Study Area. Potential impact from contaminated land (known/unknown) during construction works, accidental leak of fuels, oils and chemicals.

7.7 Methodology

7.7.1 Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the Geology, Hydrogeology, Land Use and Agriculture (Soils) assessment are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

7.8 Potential Effects

7.8.1 The anticipated effects resulting from the loss or change to Geology, Hydrogeology, Land Use and Agriculture (Soils) elements and features during construction, operation and maintenance of the proposed works are outlined as follows:

Construction

7.8.2 The potential effects are associated with an assumed worst case relating to Geology, Hydrogeology, Land Use and Agriculture (Soils) for the proposed works, which have been derived by a qualitative assessment based on a desk study. To accurately mitigate the impacts of potential contaminants, if encountered, the nature, extent and magnitude of the presence of any significant potential contamination needs to be investigated and assessed during the construction works.

7.8.3 The potential effects for Geology, Hydrogeology, Land Use and Agriculture (Soils) are detailed below. Mitigation measures and the overall residual effect and its significance are presented in **Section 7.9**.

7.8.4 Potential receptors in the context of the Geology, Hydrogeology, Land Use and Agriculture (Soils) assessment are geology (superficial and bedrock geology), hydrogeology (aquifers and groundwater abstractions), human health (construction and maintenance workers and off-site users), development infrastructure, ecological sites, MSA and soils.

7.8.5 The source of potential Geology, Hydrogeology, Land Use and Agriculture (Soils) effects during the construction phase includes:

Geology

7.8.6 Site clearance and preparation works for installation of the proposed works has the potential to result in adverse impacts (loss/damage) on the identified geological receptors (i.e. the bedrock geology), without appropriate controls or mitigation.

7.8.7 There are no sites designated for geodiversity interest within 250 m requiring mitigation.

7.8.8 The overall potential for ground instability is considered low to moderate. Historical surface ground workings and a small area of underground mining have been identified in the Study Area near the western extent of the Bryncir works site. The Bryncir works site is predominantly within areas of low potential for ground instability, except for areas of Alluvium and Peat in the west where compressibility and uneven settlement hazards are likely present and also running sand conditions may be present (also in the area of Alluvium in the west).

Hydrogeology

7.8.9 Foundation and trench work may affect the hydrogeological regime such as groundwater flow, groundwater levels or groundwater quality, through earthworks and dewatering activities, for example.

Mineral Safeguarding Areas

7.8.10 Temporary impacts from the proposed works on the sand and gravel MSA (very slight overlap in the south-westernmost extent of the Bryncir works site) includes impediment of the MSA (inability to access this resource) within the footprint of any temporary works: temporary access road or laydown area, for example.

Land Contamination

During construction:

- Contamination of shallow groundwater from accidental leaks and spills, or plant breakdown. Other temporary impacts may also result from the use and storage of materials and substances (e.g. concrete, fuel, oils and soil) which have the potential to be mobilised to ground or controlled waters directly or within runoff.
- Risks from existing potential contamination from:
  - Creation of new contaminant linkages (e.g. foundation construction through existing Made Ground and into underlying natural soils or shallow bedrock or excavation through an aquiclude and into an aquifer creating a preferential pathway for contaminants to migrate).
  - Disturbance of potentially contaminated soils and perched groundwater and creation of new pathways allowing migration of such contaminants to reach sensitive receptors (including human health, controlled waters and ecological receptors) during construction.
  - The potential mobilisation of any existing contamination via the exposure of soils and/or increases in rainwater infiltration through changes in ground cover, in excavations or bulk earthworks.
- Importation of potentially contaminated fill materials such as aggregates posing a potential risk to human health and underlying groundwater quality.
- Requirement to remove and reinstate spoil resulting from construction of the buried cables posing a potential risk to human health and the environment.

- Exposure by construction workers to contaminants in soil or groundwater, gases or vapours during excavations or in confined spaces.
- Potential exposure of buried structures, building foundations and infrastructure, to aggressive ground conditions.

Effects Realised Post-construction:

7.8.11 It is anticipated that if the requirement for remediation due to contamination was identified in the Bryncir works site, there will, in most instances, be overall beneficial effects. If required, subject to ground investigation and subsequent assessment, site-specific remediation measures, which will focus on source removal, pathway breakage or receptor protection, will be developed during the detailed design stage and implemented during the construction phase. These measures would be agreed with the Local Authority and NRW to reduce risks to human health, controlled waters and property from contamination, including ground gases or vapours, to an acceptable level.

Agricultural Soils

7.8.12 Construction activity can result in a temporary disturbance and permanent loss of soil resources (adverse). The preparatory works would comprise the removal and storage of topsoil and subsoil from areas to be permanently sealed in the creation of foundations.

7.8.13 Along open cut cable route soils will be subject to temporary removal. Effects from the excavation, temporary storage, backfilling and compaction of soils during the proposed works would be managed through good practice measures to be in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**).

7.8.14 In this way, following the completion of the proposed works, land above the underground cable route will be restored to match the existing soil profile, including topsoil and subsoil horizons.

Operation and Maintenance

Mineral Safeguarding Areas

7.8.15 Permanent sterilisation of the MSA occurs when the MSA is underlying the footprint of any permanent works. For example, the underground and above ground DB connection route, access road, towers, would cause the mineral to become sterilised. There are no planned permanent works overlapping the MSA in the Bryncir works site.

Land Contamination

7.8.16 During operation, areas of the Bryncir works site will be covered by the proposed Bryncir Substation, gravel and internal roads which will form an effective barrier to potential residual contamination that may be present at the substation.

7.8.17 Mitigation will be implemented during construction phase of the proposed works, resulting in a negligible effect once the proposed works are complete and occupied. Therefore, no further mitigation measures would be required during the operational phase.

7.8.18 During maintenance works there is the potential for contamination of shallow groundwater from accidental leaks and spills, or plant breakdown. Other temporary impacts may also result from the use and storage of materials and substances (e.g. concrete, fuel, oils and soil) which have the potential to be mobilised to ground or controlled waters directly or within run-off.

7.8.19 Maintenance workers could still be exposed to residual contamination, gases or vapours in confined spaces.

7.8.20 Potential operational effects associated with permanent site infrastructure, particularly as infrastructure already exists at this location, are negligible (not significant).

Agricultural Soils

7.8.21 During operation, it is anticipated that routine maintenance of infrastructure would be required. It is not anticipated that there would be any excavation or stockpiling of soils. However, any excavation, handling and placement of material would be subject to the same safeguards that would be used during the construction phase of the proposed works.

7.8.22 Should any maintenance be required on-site which would involve construction activities, mitigation measures would be adhered to along with the measures in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**), with specific reference to soil management, to avoid potential adverse effects.

7.9 Mitigation and Residual Effects

7.9.1 Most of the effects and the mitigation required to reduce them to acceptable levels apply to all elements of the proposed works. The mitigation of these effects is considered jointly below, unless specifically stated.

Construction Phase Mitigation

Construction Environmental Management Plan

7.9.2 The main mitigation measure to prevent adverse effects on Geology, Hydrogeology, Land Use and Agriculture (Soils) during all phases of the proposed works would be good site practice and management. A CEMP (based on the Outline CEMP in **Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will be developed and implemented by the appointed Contractor and will form the basis of the approach to mitigating potential effects on the natural and built environment and the local community.

7.9.3 The CEMP will include a range of standard site management and construction methodology techniques which have been identified in Chapter 2: Bryncir Works to minimise the risk to construction workers, and pollution of uncontaminated strata and controlled waters (groundwater and surface waters). Measures contained in the CEMP will limit the potential for dispersal and accidental releases of potential contaminants, soil derived dusts and uncontrolled run-off to occur during construction. For example, the CEMP will set out how material is to be excavated, segregated, and stockpiled to minimise the potential for run-off, soil quality degradation and wind dispersal of dusts. The CEMP will also establish procedures for dealing with unexpected soil or groundwater contamination if encountered during construction.

Ground Investigation

7.9.4 An appropriate intrusive ground investigation of selected areas of the Bryncir works site will be undertaken in accordance with the relevant guidance including Eurocode 7 (BS EN 1997-2:2007) (Ref 7.56), BS 5930 (2015 + A1 2020) (Ref 7.21) and BS 10175 (2011 + A2 2017) (Ref 7.20) and using the UK Specification for Ground Investigation (2022) (Ref 7.57).

7.9.5 The ground investigation will be undertaken post-planning consent. The ground investigation will be designed to obtain geotechnical information to inform the proposed works including on the potential for ground instability and samples can be obtained for laboratory testing to confirm the low risk identified for potential contamination in the Bryncir Works site. Investigation will be undertaken to achieve the following objectives:

- Determine the ground conditions to allow design of foundations and structures.
- Confirmatory chemical testing of environmental samples to corroborate the risks identified (if any) from potential contaminants to human health and controlled waters.

7.9.6 If areas of the Bryncir works site are shown to pose a risk, infrastructure would be moved to a different location if feasible. However, if it is not possible to move the infrastructure in contact with the ground, remedial measures would be identified and implemented.

Dealing with Potential Contamination during Construction

7.9.7 An inspection and discovery strategy will be devised and agreed with the regulatory authorities (including the Local Authority and NRW) if required, for implementation during the construction works should unexpected contamination be identified.

7.9.8 Potential impacts specific to construction workers (and any adjacent site users) during the construction phase would be controlled and mitigated by the following measures and through working in accordance with CIRIA C811 (Ref 7.23):

- Measures to minimise dust generation and run-off.
- Provision of Personal Protective Equipment (PPE), such as gloves, barrier cream, overalls etc. to minimise direct contact with soils.
- Provision of adequate hygiene facilities and clean welfare facilities for all construction site workers.
- Monitoring of confined spaces for potential ground gas accumulations, restricting access to confined spaces, i.e., to suitably trained personnel only, and use of specialist PPE, where necessary.
- Preparation and adoption of a site and task specific health and safety plan as is required under Health and Safety legislation.

Excavated Materials and Soils and Waste Management

7.9.9 Materials excavated during construction will be re-used on-site where possible. An Earthworks Material Management Plan will be prepared which follows the protocols within the CL:AIRE Definition of Waste: Development Industry Code of Practice (Ref 7.29) to ensure that excavated materials are re-used appropriately, sustainably and remain outside the waste hierarchy. Materials which need to be removed from the Bryncir works site will be disposed of to an appropriately permitted facility. The materials management plan will be prepared along with a qualified person declaration to CL:AIRE prior to the construction works commencing.

7.9.10 Any material imported to the Bryncir works site, such as for supporting foundations, will be natural quarried stone or, if recycled, the material will undergo chemical testing. The suite of contaminants and site use criteria will be agreed with regulatory authorities, in order to demonstrate that the material is suitable for use on the Bryncir works site and does not pose a risk to human health or the environment.

7.9.11 There is potential for asbestos to be present in Made Ground in the Bryncir works site (albeit low). Any Made Ground found to be contaminated with asbestos will require suitable management if it is to be retained on-site or removed (in line with the CAR 2012 (Ref 7.13) and CAR-SOIL 2016 (Ref 7.58)). As asbestos only presents a risk if it is disturbed, it is considered that the highest risk would be during the construction stage of the proposed works. An asbestos management plan will need to be prepared by a suitably competent person before carrying out works involving asbestos and include methods to be used to prevent or reduce exposure to asbestos and clearly describe how disturbance and spread of asbestos will be minimised or prevented.

7.9.12 The disposal of soil waste contaminated or otherwise, to landfill sites would be mitigated by minimisation of the overall quantities of waste generated during construction, and by considering whether that excavated material consigned to landfill cannot, as an alternative, be put to use either on the Bryncir works site or on other sites.

7.9.13 Where there is a requirement to dispose of surplus excavated materials off-site as waste, the material will be characterised to determine firstly whether it is Hazardous or Non-Hazardous waste in accordance with the Technical Guidance WM3 (Ref 7.59) and then once this is established, the appropriate disposal facility will be determined through Waste Acceptance Criteria analysis, as required.

7.9.14 A Soil Management Plan will be prepared as part of the CEMP and followed, consistent with guidance in the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (or updated version thereof) (Ref 7.31) and other relevant documents such as The Institute of Quarrying's Good Practice Guide for Handling Soils in Mineral Workings (Ref 7.33).

Soil and Groundwater Pollution Control Mitigation

7.9.15 It is unlikely that the proposed works will require deep excavations although the foundation construction will be confirmed during detailed design. There will be a requirement (secured in the CEMP) to avoid creating flow paths between potentially contaminated soils and groundwater in the underlying superficial deposits and the bedrock aquifers.

7.9.16 Various fuels, oils and chemicals would be required during the construction of the proposed works. Measures to reduce potential effects associated with these substances during construction include (and are to be included in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**)):

- A Pollution Prevention Plan will outline key pollution mitigation measures to be adopted including Control of Substances Hazardous to Health, fuel inventory and key contacts to be notified in the event of a significant pollution incident, which may subsequently lead to the contamination of controlled waters or soils.
- Hazardous materials will be stored in designated locations with specific measures to prevent leakage and the release of their contents. This will include a requirement for storage areas to be set back an appropriate distance from surface water features and drains to prevent any uncontrolled discharge (and take into consideration the positions of any groundwater abstraction wells), on an impermeable base with an impermeable bund that has no outflow and is of adequate capacity to contain at least 110% of the contents. Valves and trigger guns will be protected from vandalism and kept locked when not in use.
- Only well-maintained plant and other equipment will be used during construction to minimise the potential for accidental pollution from leaking machinery or damaged

equipment. Static machinery and plant are expected to be stored on hardstanding areas when not in use and, where necessary, to make use of drip trays beneath oil tanks, engines, gearboxes and hydraulics. Spill response kits containing equipment that is appropriate to the types and quantities of materials being used and stored during construction will be maintained in the Bryncir works site for the duration of the works.

7.9.17 Reference should also be made to the mitigation measures detailed in **Chapter 8: Water Quality, Resources and Flood Risk**.

Hydrogeological Mitigation

7.9.18 An understanding of groundwater throughout the proposed works will be obtained from ground investigation and monitoring: including before, during and after construction.

7.9.19 A more detailed hydrogeological assessment will be undertaken where trenchless techniques or dewatering is required in higher sensitivity groundwater environments (Secondary A aquifer, for example) or where dewatering is required to facilitate open cut installation.

7.9.20 Where dewatering is required, a dewatering scheme will be developed prior to construction to demonstrate that there is an effective strategy to manage water arising from the operations and, where required, sufficient proposals to treat the water prior to controlled discharge. Any such assessment will consider the effects of any draw down or impacts on nearby abstractions or resources along with ground instability. Dewatering will be developed in consultation with NRW and other stakeholders if appropriate.

Mineral Safeguarding Areas

7.9.21 Construction of the proposed works has the potential to affect existing mineral resources, and proposed areas of mineral exploitation. This could occur by sterilisation of the resource through direct excavation during construction of the proposed works or through temporary and permanent severance or isolation that may occur during the construction phase of the proposed works. The mineral safeguarding area overlapping the Bryncir works site is very small and only temporarily impacted during construction.

Operational Phase Mitigation

7.9.22 Where possible, measures will be put in place during the construction phase through the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) which will mitigate the identified potential operational impacts, largely based on the findings of any ground investigation and risk assessments carried out. Potential impacts during the operational phase for which mitigation may be required would already have been implemented at construction phase.

Residual Effects

7.9.23 The potential effects assessment is detailed in **Table 7-4** along with the mitigation measures and the overall residual effect and its significance.

7.9.24 Effects categorised as ‘Neutral’ or ‘Slight’ are ‘Not Significant’. Effects categorised as ‘Moderate’ or ‘Large’ or ‘Very Large’ are potentially ‘Significant’.

7.9.25 The sensitivity of the receptor has been assigned a relevant rating in accordance with Table 5-1 presented in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

7.9.26 The magnitude of the potential impacts has been assigned the relevant rating according to Table 5-2 presented in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology** where appropriate examples have also been listed.

7.9.27 In relation to ground stability, the ratings are drawn from published policy and good practice guidance and based on professional judgements and have been successfully used on other assessments.

Table 7-4 – Residual effect

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
Geology						
Impact on geological receptors.	Potential adverse impact and/or damage to sensitive geological receptors (i.e. the bedrock geology).	Geology.	The overall valuation of the Geological Landscape Aspect Area where the Bryncir works site lies is 'Outstanding' (*'The Aspect Area can contain features of outstanding Earth heritage importance, including for national and international geological science'*), and is a 'very high' sensitivity receptor. There is very limited ground investigation information available for the Bryncir works site and therefore the extent and depth of superficial deposits above the bedrock is relatively unknown. The exception is a historical borehole in the south-easternmost extent which records superficial deposits to 10.5 m bgl. The proposed works at the Bryncir works site[6] are not anticipated to involve deep excavations (although the foundation construction will be confirmed during detailed design). Given the extent of this Aspect Area in this region of Wales, the size of the Bryncir works site, anticipated thickness of the superficial deposits above the bedrock and the unlikely potential for deep excavations, the magnitude of impact is 'negligible'. This is a 'Slight' adverse (not significant) effect.	✓	✓	

[5] C = Construction Phase, O = Operational Phase, M = Maintenance Works

[6] Including a new 400 kV substation, an access road, construction compound, laydown area and other works including tower replacement, underground cable and removal of supports

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
Ground instability.	Potential adverse impact and/or damage during excavations and to structures.	Structures, excavations.	Majority of the site is identified as low potential for ground instability except for where the Alluvium and Peat is present, and near the off-site surface and underground workings (western extent). Potential for encountering shallow groundwater within the superficial deposits during excavations which could require temporary dewatering which could lead to instability particularly if granular strata is present. Ground investigation will be undertaken to consider the potential for ground instability and requirement for mitigation during construction and also to inform the foundation design for structures. Mitigation will be implemented in accordance with the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**), such as during excavations and dewatering. This is considered to result in 'Neutral' (not significant) effect.	✓	✓	✓
Hydrogeology						
Requirement for dewatering, reducing flow to groundwater abstractions and	In order to excavate below groundwater, dry working will be required for the installations and foundations, and dewatering may be	Hydrogeology and hydrology.	It is possible that shallow groundwater could be encountered in the superficial deposits. To excavate below groundwater, dry working will be required for the installations and foundations, and temporary dewatering may be required within excavations.	✓		

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
surface water bodies.	required within the excavations during construction. Groundwater is likely to be extracted from sumps in the excavation and discharged to surrounding ground. Groundwater levels could be locally and temporarily affected, and a reduction in levels could lead to reduced baseflow to watercourses and to groundwater abstraction points. In addition, the quality of surrounding soils could be affected, through a reduction of soil water changing the soil structure.		The Bryncir works site is underlain by Alluvium, Peat and Till superficial deposits. Where these comprise predominantly clay or silt this should limit the potential for encountering significant quantities of groundwater and also the area of effect, although granular horizons could be present which could result in more groundwater being present. The impact of any dewatering would reduce considerably with the distance from the abstraction point. Under normal conditions it is unlikely that significant effects would be recorded more than 50 m from the point of abstraction, although effects may be recorded more than 100 m from the excavation. It is anticipated that there will be limited drawdown, and a relatively short duration of dewatering required. Dewatering will also be temporary and below ground structures which could have a significant impact on groundwater flow are not anticipated. Hydrogeological mitigation as indicated in paragraphs 7.9.20 – 7.9.22 will be adhered to. Any short-term changes to the quality of the surrounding soils due to lowering of the groundwater levels, would be of minor magnitude and given the medium sensitivity of the Secondary A, B and undifferentiated aquifers and commercial/industrial PWS 60 m west and 950 m north-west, the significance would be a ‘slight’ effect (not significant) for these receptors.			

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
			There are PWS for residential properties 115 m north of the eastern spur, and approximately 890 m south-east of the Bryncir works site. Given the distance, the magnitude of impact is negligible for these very high sensitivity receptors. The significance would be a 'slight' effect (not significant). The magnitude of impact on the high sensitivity watercourses in consideration of the mitigation measures identified in paragraphs 7.9.20 – 7.9.22 would be negligible. The significance would be a 'slight' effect (not significant).			
MSA						
Sterilisation of Mineral Resources.	Mineral resources (MSA) are present below the proposed works in the south-western most extent of the Bryncir works site.	Minerals Resources.	There may be temporary sterilisation of the MSA within the footprint of any temporary works: temporary access road or laydown area, for example. No permanent works are required that would result in any permanent sterilisation of the MSA. For example the underground and above ground DB connection route, access road, towers, would cause the mineral to become sterilised but these are not planned in the MSA extent that is in the Bryncir works site. The sensitivity of this receptor is 'medium', and the magnitude of impact is 'negligible' considering the sterilisation is over only a small area (approximately 0.24 ha) of the wider MSA and only temporary (see **Figure 3.7.7**). Therefore, the residual effect would be 'Slight' adverse (not significant).	✓	✓	✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
Land Contamination						
Groundwater and ground pollution due to chemical spillages and leaks.	Potential for plant to leak or spill oil and fuel. Leaks and spillages could occur in any area of the Bryncir works site in which the plant is operating and during refuelling. Additionally, the potential exists for spills and drips to occur associated with stored fuels and chemicals brought onto the Bryncir works site to facilitate construction. There is potential that such spillages could enter the underlying uncontaminated strata and contaminate shallow groundwater.	Groundwater and surface water courses.	Spillages or leaks are unlikely to occur due to the construction management measures in place as part of the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**), and if they did, they would be very unlikely to be widespread. The magnitude of impact of chemical spillages and leaks during construction and operation of the proposed works would be 'negligible'. The sensitivity of the groundwater is generally 'medium' (Secondary A, B and undifferentiated aquifers with nearby commercial/industrial PWS) and therefore the significance of effect would be 'Negligible or Slight' adverse (not significant) due to the negligible magnitude of impact. Groundwater sensitivity in vicinity of the residential PWS would be considered as 'very high', however these are 115 m north of the eastern spur and approximately 890 m south-east of the Bryncir works site and together with the 'negligible' magnitude of impact, the significance of effect would be 'Slight' adverse (not significant). This effect is driven by the 'very high' sensitivity of the receptor; however, the effect is unlikely to be realised. It is primarily the low risk of a leak or spillage that limits the impact significance, although it is recognised that the risk is not zero.	✓	✓	✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
			Afon Dwyfach crosses the Bryncir works site in the western area. Spills are unlikely to be widespread and mitigation management measures will be put in place as part of the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) should spills occur. Surface watercourses are 'high' sensitivity, and the significance of effect would be **'**Neutral or Slight' adverse (not significant).			
		Human health.	The most sensitive human health receptors are the residential (including farm) users off-site; these are 'very high' sensitivity receptors. The residual effect from chemical spillages and leaks during construction would be **'**Slight' adverse (not significant) as spillages would be unlikely and if they did occur would be managed to have no measurable impact on human health through appropriate incident response procedures (magnitude of impact of 'negligible'). This effect is driven by the 'very high' sensitivity of the receptor; however, the effect is unlikely to be realised. It is primarily the low risk of a leak or spillage that limits the impact significance, although it is recognised that the risk is not zero.	✓	✓	✓
Risks from existing potential contamination from: • Creation of new	The excavation and disturbance of the sub-soils during construction could lead to a number of effects	Soils (supporting ecological receptors), groundwater	The baseline assessment has identified potential contaminative land uses, in the Study Area, but not in the Bryncir Works site, and a number of potential effects associated with the presence of contaminated materials. The baseline has demonstrated that the potential scale and type of	✓		✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
contaminant linkages (e.g. foundation construction through existing Made Ground and into underlying natural soils or shallow bedrock and excavation through an aquiclude and into an aquifer. • Disturbance of potentially contaminated soils and perched groundwater and creation of new pathways allowing migration of such contaminants to reach	associated with contaminated ground: • Vehicles tracking over potentially contaminated soils have the potential to spread contamination and carry it off-site. • Construction and maintenance workers may be exposed during the excavation of material to potentially harmful contaminants and ground gases. • The surfaces of contaminated material may be exposed in excavations, which could cause mobilisation of contaminants by	and surface watercourses.	ground contamination in the Bryncir works site is a low risk with the majority of potential contamination sources being very localised, such as farms, localised Made Ground and adjacent infilled land. No ground investigation works have been undertaken to date. Areas of contaminated ground (if encountered during the ground investigation) would be avoided, where possible. Where this is not possible, remediation would be undertaken to either remove the source or prevent the creation of pathways to receptors as described in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**). There would be no significant residual effects. If unexpected contamination were to be encountered during the construction works this would be managed in accordance with the discovery strategy provided in the CEMP. As access tracks and working areas would follow the mitigation measures used during construction there is not a risk from ground contamination or a risk to groundwater from ground contamination during maintenance as contaminated ground would have been avoided, removed and/or mitigated during construction. It has been assumed that water bodies will not be impacted during construction. A CEMP will be produced and cover relevant mitigation measures for the on-site works, including mitigation for excavations and stockpiling.			

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
sensitive receptors (including human health, controlled waters and ecological the magnitude of impact would be negligible, and the significance of effect would be **'neutral to** receptors) during construction. • The potential mobilisation of any existing contamination via the exposure of soils and increases in rainwater infiltration through changes in ground cover or in	percolating rainwater. • Arisings from the excavation of ground could potentially result in the stockpiling of contaminated soils on the Bryncir works site, and reuse on-site. The exposed soils could lead to increased migration of potential contaminants both on-site and off the Bryncir works site through dust generation and to underlying soils and controlled waters through leaching and surface water runoff.		For the reasons indicated, there will be a 'negligible' magnitude of impact for the medium to high sensitivity receptors, resulting in a 'Neutral or Slight' adverse effect (not significant).			
		Human Health.	The risks posed to construction and maintenance workers during construction and remediation works (if any) would be mitigated by design and adherence to health and safety procedures as detailed in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**). As these measures would prevent measurable adverse health effects on construction and maintenance workers (medium sensitivity), the magnitude of impact would be negligible, and the significance of effect would be 'Neutral to Slight' adverse (not significant). The most sensitive human health receptors are the isolated residential land users (off-site); these are 'very high' sensitivity receptors. Disturbance or removal of the ground and groundwater could potentially remove, relocate or mobilise potential contaminants. However, the extent of the earthworks and excavations required for the proposed works is anticipated to be generally limited. The potential for ground gas from Made Ground is not considered sufficient to result in an increased risk to human health during construction (through displacement); however, this will be confirmed through proposed ground investigation.	✓		✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
excavations or bulk earthworks.			With appropriate design of the proposed works construction activities and the implementation of the mitigation measures, it is anticipated impacts would generally be 'negligible', resulting in a 'Slight' adverse (not significant) effect.			
Importation of contaminated aggregates posing a potential risk to human health and underlying soils, geology and groundwater quality.	Without controls in place natural or recycled stone imported to create access tracks and other working areas could be contaminated and pose a risk to construction workers, and underlying uncontaminated strata and groundwater.	Human health, soils (supporting ecological receptors) and groundwater.	The use of imported aggregates during construction and maintenance, for example for the construction of access tracks and compounds, etc, may pose a risk to underlying soils and groundwater quality, and to construction workers, if the aggregates were to be contaminated. However, the mitigation measures outlined in the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) would mean that only materials suitable for use would be imported. As a result, effects of the importation of aggregates would be at worst minimal, with no measurable effects on the identified receptors. The magnitude of impact would be negligible to the low to very high sensitivity receptors. The significance would be 'Neutral to Slight' adverse (not significant) effect.	✓		✓
Requirement to remove and reinstate spoil from construction of the buried cables posing a potential	Spoil from the excavations could be generated and be reused elsewhere within the Project or require removal from the Bryncir works site.	Soils (supporting ecological receptors), geology.	Topsoil and superficial deposits would be excavated as part of the proposed works. These materials may be re-used on-site for reinstatement and landscaping during the construction phase. Materials would be re-used under the Earthworks Material Management Plan to ensure they would be physically and chemically suitable for re-use. The natural	✓		✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
risk to the environment.			composition of the material in relation to the placement location will also be assessed for suitability for re-use. If material were to be unsuitable, they would be disposed of off-site to a suitable site in accordance with the Earthworks Materials Management Plan. Further details on Excavated Materials and Soils and Waste Management have been provided in paragraphs 7.9.11 – 7.9.16. As a result, the residual effects on soils and geology would be of negligible magnitude as the re-use of material in suitable locations within the proposed works would mean that changes from the baseline conditions would be barely distinguishable. The significance would be 'Neutral' (not significant) effect.			
Aggressive ground conditions.	Potential adverse impact and/or damage to structures and buried drinking water pipes.	Buried structures, drinking water pipes.	Ground investigation will be undertaken to consider the potential for aggressive ground conditions such as due to presence of sulphate for buried concrete or organic contaminants for plastic drinking water pipes. If the requirement for mitigation is identified, this will be implemented during construction. The requirement for drinking water pipes will be agreed with the relevant water authority as part of the construction works, and with the private water supply owner. This is considered to result in 'Neutral' (not significant) effect.	✓		

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
Effects from remediation (if required).	If required (subject to ground investigation), site-specific permanent remediation measures, which will focus on source removal, pathway breakage or receptor protection, will be developed during the detailed design stage and implemented during the construction phase. These measures will reduce risks to human health, controlled waters and property from contamination, gas and vapours in the ground, to an acceptable level.	Soils (supporting ecological receptors), groundwater and human health.	It is anticipated that if any remediation is carried out on potentially contaminated sites identified in the Bryncir works site (if encountered), there will, in most instances, be overall beneficial effects. Given the anticipated low potential for contamination, the magnitude of impact is anticipated to be no more than 'negligible' to the low to very high sensitivity receptors resulting in a 'Neutral' to 'Slight' beneficial (not significant) effect.	✓	✓	✓
Agricultural Soils						
Reduction of soil quality during handling and storage.	Excavation and storage of soils may result in changes to soil characteristics, such as soil hydrology and soil structure. Separate treatment and storage of topsoil and subsoil is required. Soils stored in	Soils.	With mitigation in place, there would no measurable reduction of soil quality during handling and storage resulting in an effect of low magnitude. As the sensitivity of the soils is low, the significance would be a Negligible effect (not significant). Excavated soils will be stored in accordance with the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management**	✓		✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[5]		
				C	O	M
	bunds may also be susceptible to erosion from run-off during heavy rainfall or wind erosion during dry periods unless protected.		**Plan**) and therefore degradation and disturbance will be kept to a minimum. The topsoil would be separated from any subsoil excavated and stored accordingly, with topsoil stored on topsoil and subsoil stored on subsoil from which the topsoil had been stripped. Medium- or long-term storage of soils would have bunds protected by seeding to prevent erosion. Excavated soils will be replaced as near as in-situ as possible when backfilling is undertaken, with topsoil reinstated lastly. As the sensitivity of the soils is low, the significance would be a Negligible effect (not significant).			
Reduction of soil quality and groundwater levels due to construction traffic.	The tracking of heavy plant across the site during construction could compact unprotected soils. Compaction decreases soil porosity and decreasing infiltration, limiting biological processes. Ponding and surface water runoff may increase. Heavy compaction may reduce local groundwater recharge by reducing or diverting flow pathways.	Soils and Groundwater.	Residual effects relating to compaction of soils and creating a decrease in infiltration rates are likely to be limited to temporary access tracks and the working areas. They would be short-term. With the mitigation measures detailed within the CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) in place there would not be a measurable reduction of soil quality or infiltration and the impact magnitude would be low. As the sensitivity of the soils is low and although the sensitivity of the groundwater is medium the significance would be a Negligible effect (not significant).	✓		✓

7.10 Summary

7.10.1 It has been demonstrated that the proposed works are not anticipated to have significant effects on Geology, Hydrogeology, Land Use and Agriculture (Soils) in the Study Area. The mitigation measures discussed in this chapter are expected to prevent any significant effects during construction, operation and maintenance.

8. Water Quality, Resources and Flood Risk

8.1 Introduction

8.1.1 This chapter presents an assessment of the likely Water Quality, Resources and Flood Risk effects that could arise from the construction, operation and maintenance of the proposed works at the Bryncir works site as described in **Chapter 2: Bryncir Works**.

8.1.2 This chapter is supported by the appendix listed below:

- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 3.8.A: Flood Consequence Assessment.**

8.1.3 Other chapters that are useful to review in association with this chapter are as follows:

- **Chapter 5: Ecology and Nature Conservation.**
- **Chapter 7: Geology, Hydrogeology, Land Use and Agriculture (Soils).**

8.1.4 This chapter is supported by the figures as listed below:

- **Figure 3.8.1**: Study Area and Hydrology
- **Figure 3.8.2**: Water Resources
- **Figure 3.8.3**: Fluvial Flood Risk
- **Figure 3.8.4**: Surface Water Flood Risk
- **Figure 3.8.5**: Water Framework Directive River Water bodies

8.2 Legislation and Planning Policy

8.2.1 This section summarises the legislation and planning policy framework that is relevant to the Water Quality, Resources and Flood Risk assessment. Full details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

8.2.2 The following legislation is relevant to Water Quality, Resources and Flood Risk:

- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 5.19).
- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (Ref 8.1)
- Floods and Water Management Act 2010 (Ref 8.2).
- Water Resources Act 1991 (Ref 7.4).
- Water Act 2003 (Ref 87.2).

- Environment Act 1995 (Ref 7.3).
- The Environment Act (Wales) 2021 (Ref 8.3).
- Land Drainage Act 1991 (Ref 7.5) and 1994 (Ref 8.4).
- Environmental Protection Act 1990 (Ref 5.7).
- Control of Pollution Act 1974 (Ref 8.5).

National Policy

8.2.3 The following national policy is relevant to Water Quality, Resources and Flood Risk:

- TAN 15: Development, flooding and coastal erosion (Ref 8.6).
- Future Wales: The National Plan 2040 (Ref 4.2).
- Planning Policy Wales (PPW) – Edition 12 (Ref 4.3).

Flood Zone Definitions

8.2.4 The TAN 15 2025 edition (Ref 8.6) provides guidance in relation to development and flooding, and is supported by the Flood Map for Planning (Ref 8.7) which incorporates flood risk extents based on predicted climate change over the next century.

8.2.5 In the Flood Map for Planning, Flood Zones are provided for different sources of flooding and are defined as follows:

- Rivers, Rivers and Sea combined, Surface Water and small watercourses:
  - Flood Zone 1 – areas with less than 0.1% chance of flooding in a given year, including the effects of climate change.
  - Flood Zone 2 – areas with between 0.1% and 1% chance of flooding in a given year, including the effects of climate change.
  - Flood Zone 3 – areas with greater than 1% chance of flooding in a given year, including the effects of climate change.
- Sea
  - Flood Zone 1 – areas with less than 0.1% chance of flooding from the sea in a given year, including the effects of climate change.
  - Flood Zone 2 – areas with between 0.1% and 0.5% chance of flooding from the sea in a given year, including the effects of climate change.
  - Flood Zone 3 – areas with greater than 0.5% chance of flooding from the sea in a given year, including the effects of climate change.

8.2.6 TAN 15 Defended Zones are areas that benefit from Risk Management Authority flood defences with the following minimum Standard of Protection, of 1% (present day) for rivers and 0.5% (present day) for the sea.

Local Policy

8.2.7 The following local policy is relevant to Water Quality, Resources and Flood Risk:

- West of Wales Shoreline Management Plan (SMP) (Ref 8.8):

- The documents are set to be reviewed on a ten-year cycle, however, the SMP3 which was due in 2020 has not yet been released and policies may change. If coastal change is observed to be progressing at different rates than previously estimated, the associated policy may be adjusted correspondingly.

- Anglesey and Gwynedd Joint Local Development Plan 2011-2026 (Ref 7.53) - Strategic Policy PS6: Alleviating and Adapting to the Effects of Climate Change. Proposals will only be permitted where it is demonstrated with appropriate evidence that they have fully taken account of and responded to the following:
  - Implementing sustainable water management measures in line with the objectives of the Western Wales River Basin Management Plan.
  - Locating away from flood risk areas, and aim to reduce the overall risk of flooding within the Plan area and areas outside it, taking account of a 100 years and 75 years of flood risk in terms of the lifetime of residential and non-residential development, respectively, unless it can be clearly demonstrated that there is no risk or that the risk can be managed.
  - Aim for the highest possible standard in terms of water efficiency and implement other measures to withstand drought, maintain the flow of water and maintain or improve the quality of water, including using sustainable drainage systems (in line with Policy PCYFF 6).

8.3 Study Area

8.3.1 The proposed works are approximately 1.4 km south of the settlement of Bryncir, adjacent to existing 400 kV and 132 kV overhead lines. The Study Area for the effects of the proposed works consists of the Bryncir works site and the immediate surrounding environs within 1 km of the Bryncir works site (see **Figure 3.8.1**).

8.4 Assumptions and Limitations

8.4.1 The assessment presented in this chapter reflects the information obtained and evaluated at the time of reporting (April 2025), and has referenced published data, records and web-based information obtained to date.

8.5 Baseline

Climate

8.5.1 The Meteorological Office (Met Office) website holds the latest set of 30-year rainfall averages, covering the period 1991-2020 (Ref 8.9). Average annual rainfall of 1988 millimetres per annum (mm/a) was recorded for the Cwmystradllyn climate station 6 km east of the Bryncir works site.

Hydrology

8.5.2 The Afon Dwyfach is an NRW Main River and in the Bryncir works site. The watercourse will be crossed via an overhead line, with new H-poles approximately 65 m to 70 m from the right and left banktops.

8.5.3 The Afon Dwyfor, an NRW Main River, is approximately 800 m south-east of the Bryncir works site. There are no proposed works crossing or close to the watercourse.

8.5.4 There are multiple unnamed ordinary watercourses in the Study Area which are tributaries of the Afon Dwyfach and the Afon Dwyfor. The location of these watercourses can be seen in **Figure 3.8.1.**

8.5.5 There are no notable ponds, lakes, canals or other surface water bodies in the Study Area.

Geology, Hydrogeology and Soils

Geology

8.5.6 The proposed works are shown to lie above the following geological classifications:

- Superficial – Glaciofluvial sheet deposits, Devensian.
- Bedrock – Llanbedrog Volcanic Group, Basaltic trachyandesite-rhyodacite lavas and tuffs, with some ash flow tuffs and minor amounts of reworked sandstones, siltstones and conglomerates. Underlain by sandstones and siltstones of the Dwyfach Formation and Overlain by mudstones and slates of the Nod Glas Formation.

8.5.7 Further details of the geology at the Bryncir Works Site is provided in **Chapter 7: Geology, Hydrogeology, Land Use and Agriculture (Soils).**

Hydrogeology

8.5.8 The underlying bedrock and superficial deposits are both Secondary aquifers with low aquifer vulnerability.

Soils

8.5.9 LandIS Soilscapes indicates that the Bryncir works site overlies freely draining slightly acid loamy soils.

Water Resources

Private Water Supplies

8.5.10 A request was made to Gwynedd Council for details of any Private Water Supplies (PWS) in the area. Based on the information received, there are four PWS sources in the Study Area, PWS locations are presented in **Figure 3.8.2**. No information was provided on whether these water supplies are from surface water or groundwater.

8.5.11 The available PWS data is not necessarily comprehensive and Gwynedd Council state that there may be properties that abstract water privately without their knowledge.

8.5.12 The four PWS in the Study Area are:

- PWS ID: 8818, ~115 m north-east of the Bryncir works site
- PWS ID:7086, ~60 m west of the Bryncir works site
- PWS ID: 10670, ~950 m north of the Bryncir works site
- PWS ID: 8761, ~890 m south-east of the Bryncir works site

NRW Water Resource Permits (Licensed Abstractions)

8.5.13 One NRW licensed abstraction is in the Study Area:

- Evans (permit number: 23/65/8/0011) - Water from Afon Dwyfach for mill wheel turning (Melin Llecheiddior) ~490 m north-west of the Bryncir works site.

NRW Water Quality Permits (Consented Discharges)

8.5.14 Six consented discharges are in the Study Area:

- The Goat Inn (ID: CG0442701) - Sewage (non Water Undertaker) discharge to unnamed tributary of Afon Dwyfach, ~95 m north-east of the Bryncir works site.
- Bryncir Sewage Treatment Works (ID: CG0014601) – Final/treated effluent discharges to unnamed tributary of Afon Dwyfor. ~380 m north of the Bryncir works site.
- Bryncir Sewage Treatment Works (ID: CG0014501) – Storm overflow discharges to unnamed tributary of Afon Dwyfor ~400 m north of the Bryncir works site.
- Chwarel Bryncir Quarry (ID: CG0101601) – Trade discharges (site drainage) to Afon Dwyfach ~860 m north of the Bryncir works site.
- Civic Amenity Bryncir Works Site - Rhwngddwyryd Recycling Centre (ID: CG0348701) discharge to unnamed tributary of Afon Dwyfor, ~915 m south-east of the Bryncir works site.
- Garndolbenmaen Sewage Treatment Works (ID: AB3495FT) - Combined Sewer Outflows to the Afon Dwyfor, ~1000 m east of the Bryncir works site.

Water Dependant Designated Bryncir Works Site

8.5.15 There is one water dependant designated site in the Study Area, the Llystyn Isaf SSSI approximately 320 m upstream of the Bryncir works site. The SSSI contains water dependant features including wet heath vegetation and wetland species.

Flood Risk

8.5.16 In accordance with the NRW Flood Map for Planning, the only permanent above ground infrastructure in Flood Zone 3 is an H-pole to the west of the Afon Dwyfach (see **Figure 3.8.3**). This area of Flood Zone associated with the Afon Dwyfach also covers the north-west of the Bryncir works site.

8.5.17 The NRW Flood Map for Planning indicates several areas, including the proposed Bryncir Substation, at risk of flooding from surface water and small watercourses (see **Figure 3.8.4**).

- A surface water flow path (high, medium and low risk) lies to the south-east of the Bryncir works site where the Bryncir substation is proposed.
- Narrow surface water flow path (Low Risk) along a field boundary in a field to the west of the Bryncir works site (crosses the route of the proposed trenched cable).
- A surface flow path (high, medium and low risk) across the north-western section of the Bryncir works site, west of the A487.
- Two small areas (high, medium and low risk) to the west of the Afon Dwyfach which flow across Bryncir works site and beneath the existing DB connection route, and into the river channel.

8.5.18 The Bryncir works site is outside of any NRW mapped reservoir flood extents and at a very low risk from this source.

Water Framework Directive Water Bodies

River Water bodies

8.5.19 The Bryncir works site is predominantly in the Dwyfach river waterbody catchment (see **Figure 3.8.5**), with the WFD river waterbody (and NRW Main River) Afon Dwyfach (GB110065053730) in the Bryncir works site. Under the WFD (Cycle 3) the Afon Dwyfach has achieved a Good Overall Status.

8.5.20 A small section of the eastern edge of the Bryncir works site is on the western catchment boundary of the Dwyfawr - Lower WFD river waterbody catchment (see **Figure 3.8.5**). The Dwyfawr – Lower (GB110065053660) river WFD waterbody is approximately 800 m south-east of the Bryncir works site, and under the WFD (Cycle 3) has achieved a Good Overall Status.

Groundwater bodies

8.5.21 The Bryncir works site and Study Area lies within the Llyn and Eryri WFD groundwater body (GB41002G204600) which retains a Poor overall status under the WFD.

Future Baseline

8.5.22 Climate Change is expected to influence hydrological processes in the Bryncir works site and elsewhere. Climate Change will impact rainfall intensity, tidal and coastal levels and peak river flows, which in turn will likely lead to increased flood risk.

8.5.23 Peak rainfall intensity is predicted to increase between 20 % and 40 % (Central and Upper estimate, respectively) by the 2080s (2070 to 2115). Peak river flows for the Western Wales river basin district are predicted to rise between 30 % and 75 % (Central and Upper estimate, respectively) by the 2080s (2070 to 2115).

8.6 Scope of Assessment

8.6.1 This section describes the scope of the assessment of effects on Water Quality, Resources and Flood Risk.

8.6.2 **Table 8-1** summarises the potential water receptors that have been reviewed and states whether they have been included or excluded from the water environment assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 8-1 – Scope of Water Quality, Resources and Flood Risk assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Afon Dwyfach Main River – fluvial flood risk	Out	Out	The Bryncir Works Site is outside the fluvial flood zone. A SPEN DB route connection H-pole will be in the fluvial floodplain. However, the volume of the post within the floodplain is minor and will have a negligible effect on floodplain

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			displacement. The section of trenched cable will be outside Flood Zone 2 and Flood Zone 3. There are no anticipated effects to fluvial flood risk from the Bryncir works site during construction and operation and it is therefore scoped out.
Surface water and small watercourses – flood risk	In	In	There are several areas at risk of flooding from surface water and small watercourses in the Bryncir works site. The substation is proposed in a location shown to be at risk of flooding from surface water. This will put it at risk during construction and operation from this source of flooding. Additionally, there will be an increase to the impermeable area of the Bryncir works site as a result of the proposed works which will lead to an increase in runoff and could lead to an increase in offsite flood risk. There are anticipated effects to flood risk from surface water and small watercourses from the Bryncir Works Site during construction and operation and it is therefore scoped in.
NRW Licensed Abstractions	In	Out	One licensed abstraction (permit number: 23/65/8/0011) is approximately 490 m from the Bryncir works site and approximately 1.3 km upstream of the Afon Dwyfach SPEN DB route connection. There is potential for accidental contamination entering surface water and groundwater catchments of these water resources. This may arise from leakage or spillage of fuels and chemicals from stores, and vehicles onsite. Additionally, there is potential that ground disturbance and mobilisation of sediments or contaminants could lead to silt laden or otherwise contaminated runoff entering watercourses. There are anticipated effects to licensed abstractions from the Bryncir Works Site during construction and it is therefore scoped in.

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			There are no anticipated effects to licensed abstraction from the Bryncir substation during operation and it is therefore scoped out.
NRW Consented Discharges	Out	Out	There are six consented discharges in the Study Area. However, the closest licensed discharge is approximately 95 m from the Bryncir works site, but 600 m from any intrusive works (trenched cable section) and 800 m upstream of the SPEN DB route connection. There are no proposed works close to any of the six licensed discharges in the Study Area that will cause physical disruption to existing discharge infrastructure. The location of statutory undertaker assets (including water supply and sewer pipes, water and waste treatment works etc.) will be confirmed through inspection of detailed plans from the undertakers. All assets potentially affected by the proposed works will be identified. There are no anticipated effects to consented discharges from the Bryncir works site during construction and operation and it is therefore scoped out.
PWS	In	Out	There are four PWSs and their associated catchments in the Study Area. During construction there is potential for accidental contamination entering surface water and groundwater catchments of these water resources. This may arise from leakage or spillage of fuels and chemicals from stores, and vehicles onsite. Additionally, there is potential that ground disturbance and mobilisation of sediments or contaminants could lead to silt laden or otherwise contaminated runoff entering watercourses. There are anticipated effects to PWSs from the Bryncir Works Site during construction and it is therefore scoped in. There are no anticipated effects to PWSs from the Bryncir substation during operation and it is therefore scoped out.

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
WFD river waterbody catchment - Afon Dwyfach	In	Out	The SPEN DB route connection crossing of the Afon Dwyfach as well as the proposed Bryncir Substation are predominantly in the Afon Dwyfach WFD river waterbody catchment. During construction there is potential for accidental contamination entering surface waters. This may arise from leakage or spillage of fuels and chemicals from stores, and vehicles onsite. Additionally, there is potential that ground disturbance and mobilisation of sediments or contaminants could lead to silt laden or otherwise contaminated runoff entering watercourses. There are anticipated effects to the WFD waterbody from the Bryncir Works Site during construction and it is therefore scoped in. There are no anticipated effects to WFD waterbody from the Bryncir substation during operation and it is therefore scoped out.
WFD river waterbody catchment – Dwyfawr Lower	Out	Out	The SPEN DB route connection is not within this WFD waterbody catchment. A small portion (south east corner) of the Bryncir works site intersects this WFD waterbody catchment. However, there are no proposed works within this catchment which would have the potential for negative impacts on water quality status as a result of construction or operation and it is therefore scoped out.
Llyn and Eryri WFD groundwater body (ID GB41002G204600)	In	Out	The Bryncir works site sits within the Llyn and Eryri WFD groundwater body catchment. During construction there is potential for a decline in groundwater levels arising from dewatering excavations (foundations and trenches). Theres is also potential for accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals. There are anticipated effects to the WFD groundwater body from the Bryncir Works

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			Site during construction and it is therefore scoped in. There are no anticipated effects to WFD groundwater body from the Bryncir substation during operation and it is therefore scoped out.
Llystyn Isaf (SSSI)	Out	Out	The SSSI is approximately 320 m upstream of the Bryncir works site but approximately 900 m upstream of the SPEN DB route connection crossing of the Afon Dwyfach. It is anticipated that no construction or operational activities will cause any effects to propagate upstream which would cause negative impacts to the SSSI and it is therefore scoped out.

8.7 Methodology

8.7.1 The purpose of the Water Quality, Resources and Flood Risk assessment is to determine the significance of any effect to any receptors resulting from the construction or operation of the proposed works.

8.7.2 Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the Water Quality, Resources and Flood Risk Environment assessment are in **Appendix 3.8.D**.

8.8 Potential Effects

8.8.1 The anticipated effects resulting from the loss or change to Water Quality, Resources and Flood Risk elements and features during construction, operation and maintenance of the proposed works are outlined as follows:

Construction

8.8.2 The sources of potential Water Quality, Resources and Flood Risk effects during the construction phase include:

- Aquatic environment and water resources receptors:
  - Deterioration in the water quality of surface water bodies via generation of sediment laden run-off from working areas and discharge of dewatered groundwater from excavations.
  - Potential effects on hydromorphology and flow regime of surface water bodies as a result of increased runoff, dewatering of excavations and sediment inputs from working areas.

- Deterioration in the water quality of surface and groundwater bodies affected by disturbance of contaminated land, or accidental spillage of pollutants (e.g. fuel or oil).
- Deterioration in water quality due to permitted discharges from construction (e.g. treated sewage effluent from welfare facilities).
- Impacts on groundwater levels from dewatering activities and the effects of underground infrastructure.

- Flood risk and building development receptors:
  - Changes to surface water flood risk due to changes in runoff rates and flow pathways resulting from ground disturbance, creation of new impermeable surfaces and diversion of flows from their natural path.

8.8.3 The source of potential flood risk effects during the construction phase are further detailed within the FCA (**Volume 8, Appendix 3.8.A: Flood Consequence Assessment**).

Operation and Maintenance

8.8.4 The source of potential Water Quality, Resources and Flood Risk effects on receptors during the operational phase includes:

- Aquatic environment and water resources receptors:
  - Potential for accidental contamination entering watercourses associated with spillage or leakage of fuels, lubricants or other chemicals.

- Flood risk receptors:
  - Changes to surface water flood risk due to changes in flow pathways and runoff rates resulting from changed ground levels and creation of new impermeable surfaces for permanent above ground infrastructure.

8.8.5 The source of potential flood risk effects during the operation and maintenance phase are also further detailed within the FCA (**Volume 8, Appendix 3.8.A: Flood Consequence Assessment**).

8.9 Mitigation and Residual Effects

Embedded Measures

8.9.1 A series of embedded measures will be implemented during in the construction, operation and maintenance.

- A Construction Environmental Management Plan (CEMP) will include measures to ensure surface and groundwater quality are not impacted by the proposed works.
  - The CEMP details that no works (in, over or under) will be undertaken within 20 m of a watercourse bank without technical environmental advice regarding the requirement for a permit (FRAP). Works will only proceed once appropriate mitigation (within technical environmental advice and/or FRAP) has been installed and all conditions have been met.

  - The CEMP also details that storage and handling of hazardous substances (including fuels) should not occur within 10 m of any inland freshwater or coastal waters, or within 50 m from a well or borehole.

- A Flood Evacuation Plan will ensure that all personnel will be evacuated before a potential flood event.
- Construction works will take place during periods of normal to low flow conditions to avoid conveyance-related flood risk effects.
- A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation and maintenance.
- In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors.

8.9.2 Further embedded measures will be set out in the CEMP **(Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan)**.

8.9.3 **Table 8-2** details the residual effects to flood risk, water resources and the aquatic environment during the construction and operation phases. The table details the potential water environment receptors and associated risks, along with the receptor sensitivity, anticipated magnitude of change and significance based on the methodology in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

8.9.4 The sensitivity/importance/value of a receptor is defined using the criteria set out in Table 7-1 in **Appendix 1.4.A: Topic Assessment Methodology** and is defined as very low, low, medium, high and very high.

8.9.5 The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in Table 7-2 of **Appendix 3.4.A: Topic Assessment Methodology** and is defined as very low, low, medium, high and very high.

8.9.6 The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in Table 7-3 of **Appendix 3.4.A: Topic Assessment Methodology**.

Table 8-2 – Flood risk, water resources and aquatic environment residual construction effects

Receptor and summary of predicted effects	Sensitivity/ importance/value of receptor	Magnitude of change	Significance	Summary rationale
Flood Risk				
Surface water flood risk	Low	Low	Negligible (Not Significant)	There are several areas at risk of flooding from surface water and small watercourses in the Bryncir works site. The Bryncir Substation itself is proposed to be within an area of surface water Flood Zone 2 and 3. This will put it at risk during construction and operation from this source of flooding. Additionally, there will be an increase to the impermeable area of the Bryncir works site as a result of the proposed works which will lead to an increase in runoff and could lead to an increase in offsite flood risk. However, the inclusion of SuDS will ensure that the post development runoff is the same as pre-development up to the design event for the operational lifetime of the development. For the other areas potentially at risk of surface water flooding, ground levels will be reinstated for trenched cable sections, there are no H-poles in areas at risk, the SPEN DB route connection will be elevated above any areas at risk. The substation is classed as 'Less Vulnerable' in the TAN15 flood risk vulnerability classification, and is of Low Sensitivity. While there is potential for a change in flood risk, the FCA identifies suitable mitigation to protect the site and result in no increase in flood risk to third parties, therefore, there is a Low magnitude of change. As a result the Significance is Negligible (Not significant).
Water Resources				
Licensed Abstractions	Low	Very low	Negligible	One licensed abstraction (permit number: 23/65/8/0011) from the Afon Dwyfach is approximately 490 m from the Bryncir

Receptor and summary of predicted effects	Sensitivity/ importance/value of receptor	Magnitude of change	Significance	Summary rationale
One licensed abstraction (permit number: 23/65/8/0011). Reduction of water availability to support existing surface water abstraction as a consequence of water quantity and quality effects. This could arise from ground disturbance for the development of the Bryncir Substation, temporary construction compound establishment, or the leakage or spillage of fuels and chemicals onsite.			(Not significant)	works site but approximately 1.3 km upstream of the Afon Dwyfach SPEN DB route connection. It is anticipated that there will be no activities that will propagate upstream as to cause negative effects to the quantity or quality of the surface water abstraction. There will be no effects on channel conveyance and water availability, and there will be no release of sediment into the watercourse that could affect the quality of the abstraction. A PPP will detail pollution prevention measures for all works to mitigate against water quality impacts that may impact the abstractions. The sensitivity of the abstractions is Low, the magnitude of change is Very low, the significance is Negligible (Not Significant).
PWS abstractions *4 PWSs in the Study Area* Reduction of water availability to support existing surface water and groundwater	Medium	Very Low	Negligible (Not significant)	The nearest PWS to the Bryncir work site is ~60 m north-east, however the PWS is ~625 m from any intrusive works (trenched cable section). There are no anticipated effects to the quality or availability of water supplies. Embedded environmental measures (detailed within the CEMP) will prevent any impacts on local groundwater quality, quantity or resource availability.

Receptor and summary of predicted effects	Sensitivity/ importance/value of receptor	Magnitude of change	Significance	Summary rationale
abstractions as a consequence of water quantity and quality effects. This could arise from dewatering of the trenched excavations for cabling, ground disturbance for the development of the Bryncir Substation, or the leakage or spillage of fuels and chemicals onsite. This includes the potential for breakout and leakage of bentonite during trenchless crossing.				In line with good practice, PPPs will be developed to detail how ground and surface waters will be protected from construction and operation related pollution. These will include information on the use and storage of any fuels, oils and other chemicals, and pollution incidence response planning. The sensitivity of the abstractions is Medium, the magnitude of change is Very low, the significance is Negligible (Not Significant).
Aquatic Environment				
WFD Groundwater bodies *Llyn and Eryri* A decline in groundwater levels arising from dewatering excavations (foundations and trenches). Potential	Low	Very Low	Negligible (Not significant)	Dewatering of excavations (foundations and trenches) will be carefully monitored, and groundwater flow disruption and drawdown would be minimised via good construction practices. The time any excavation is open would be kept to a minimum to minimise ingress of water and dewatering requirements. Dewatering of excavations will be undertaken in line with good practice. Effects of dewatering on potential receptors will be incorporated into the proposed approaches for each piece of infrastructure. Appropriate treatment would be installed before discharge to surface or groundwater, this would include the use

Receptor and summary of predicted effects	Sensitivity/ importance/value of receptor	Magnitude of change	Significance	Summary rationale
for accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals.				of siltbusters (or similar) before discharge to surface waters. Appropriate licences and permits will be applied for if required. As the WFD waterbody is of Poor Status, it is of Low sensitivity. Due to limited extent of proposed works compared to the area of the groundwater body and the low permeability of bedrock, and anticipated effectiveness of environmental embedded measures combine to limit magnitude of change to the baseline condition to be Very Low and subsequently the significance is Negligible (Not significant).
WFD River Water bodies (Good Status) *Afon Dwyfach (GB110065053730)* Potential for accidental contamination entering the watercourse. This could arise from cable installation or the leakage or spillage of fuels and chemicals from stores and vehicles onsite.	High	Very Low	Minor (Not significant)	The entirety of the SPEN DB route connection crossing of the Afon Dwyfach as well as the majority of the Bryncir Works Site (with the exception of a small portion of the south east corner where no works are proposed) are within the Afon Dwyfach WFD river waterbody catchment. The Bryncir Substation site is approximately 500 m from the Afon Dwyfach and is separated from the watercourse by the B4411 along with agricultural fields. Given the distance of the Proposed Bryncir Substation from the watercourse, and the anticipated effectiveness of embedded environmental mitigation measures, the likely magnitude of change to baseline conditions for the WFD water bodies is limited. Due to the scope and scale of the SPEN DB route connection crossing of the Afon Dwyfach itself, and the anticipated effectiveness of embedded environmental measures, the likely magnitude of change to baseline conditions for the WFD waterbody is also limited. In line with good practice, PPPs will be developed to detail how ground and surface waters will be protected from construction and operation related pollution. These will include information

Receptor and summary of predicted effects	Sensitivity/ importance/value of receptor	Magnitude of change	Significance	Summary rationale
				on the use and storage of any fuels, oils and other chemicals, and pollution incidence response planning. If water being pumped from excavations is suspected to be contaminated, appropriate measures would be taken in accordance with NRW guidance and the Environmental Permitting Regulations (Ref 7.8) to prevent uncontrolled or unauthorised releases of this water. A CEMP will be produced and cover relevant mitigation measures for the Bryncir Works Site. The WFD waterbodies are of Good Status and are classed as High sensitivity receptors. However, these the anticipated effectiveness of embedded environmental measures and considerable attenuation and dilution combine to limit magnitude of change to Very Low and significance to be Minor (Not significant).

8.10 Summary

8.10.1 It has been demonstrated that the proposed works at the Bryncir works site are not anticipated to have a significant effect on water quality and water resources receptors during construction or operation. For flood risk during construction and operation, the mitigations associated with surface water flood risk are outlined within the FCA and their successful implementation will ensure that there is no significant impact to any flood risk receptors.

9. Traffic and Transport

9.1 Introduction

9.1.1 This chapter of the ES presents the findings of an assessment of the likely significant Traffic and Transport effects that could arise from the construction, operation and maintenance of the proposed works at Bryncir as described in **Chapter 2: Bryncir Works**.

9.1.2 This chapter describes the baseline conditions currently existing in the Study Area (as defined in **Section 9.3**), the scope of the assessment, the potential effects, the mitigation measures required to avoid, reduce or offset any significant negative effects, and the likely residual effects after these mitigation measures have been adopted.

9.1.3 This chapter is supported by the following figures and appendices:

- **Figure 3.9.1:** Traffic and Transport Study Area and Traffic Survey Locations.
- **Figure 3.9.2:** Study Area Road Network.
- **Figure 3.9.3:** Traffic Accident Locations.
- **Figure 3.9.4:** Indicative HGV Routeing.
- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 3.9.A: Traffic Flow Diagrams.**
- **Volume 8, Appendix 3.9.B: Traffic Base Counts.**

9.2 Legislation and Planning Policy

9.2.1 This section summarises the legislation and planning policy framework that is relevant to the Traffic and Transport assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

9.2.2 Active Travel (Wales) Act 2023 (Ref 9.1) is legislation relevant to Traffic and Transport.

National Policy

9.2.3 The following national policy is relevant to Traffic and Transport:

- PPW – Edition 12 (Ref 4.4).
- Future Wales: The National Plan 2040 (Ref 4.3).
- National Transport Delivery Plan (2022 – 2027) (Ref 9.2).

Local Policy

9.2.4 The following local policy is relevant to Traffic and Transport:

- Eryri Local Development Plan 2016 – 2031 (Ref 4.11).
- Eryri Local Development Plan Review Report 2023 (Ref 5.21).
- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Ref 4.9).
- North Wales Joint Local Transport Plan (Ref 9.3).
- Mid Wales Local Transport Plan (Ref 9.4).

Guidance

9.2.5 The following guidance is relevant to Traffic and Transport:

- IEMA – Environmental Assessment of Traffic and Movement (2023) (hereafter referred to as the 'IEMA Guidelines') (Ref 9.5).
- DMRB CD 123 Geometric Design of at Grade Priority and Signal-Controlled Junctions (November 2021) (Ref 9.6).

9.3 Study Area

9.3.1 Based on the extent of the Bryncir works site, several roads on the local and strategic highway network have been identified as roads that could be used by traffic associated with the proposed works and could be subject to increases in traffic. The roads identified cover likely routes to the Bryncir works site from the Strategic Road Network (SRN) and from local and regional population centres between a 30–45-minute drive time of the Bryncir works site. This is the likely catchment area for construction traffic.

9.3.2 The roads in the Study Area were determined as follows:

- A487 north of B4411.
- A487 east of B4411.
- B4411 south of A487.

9.3.3 Automatic Traffic Counts (ATCs) have been carried out at specific locations on the roads above which, collectively, form the Study Area. ATCs collect data in relation to traffic flows passing a point on the road network in both directions. Further details of the ATCs are provided in paragraphs 9.5.33 – 9.5.38 and **Table 9-6** summarises the average annual daily traffic flows. A plan of the locations is provided in **Figure 3.9.1** which, collectively, defines the extent of the Study Area as shown in **Figure 3.9.2**.

9.4 Assumptions and Limitations

9.4.1 The details provided in this assessment are accurate as of the reporting date and are based on the maximum land area required for the proposed works' construction, operation and maintenance.

9.4.2 The Bryncir works site is in a rural area where access may be limited by highway design and the availability of public transport. It is assumed that the road network and local

services will remain unchanged, with the future baseline conditions closely reflecting the current baseline.

9.4.3 Baseline traffic surveys reflect average annual daily traffic conditions and construction traffic flows have been estimated based on the best assessment of likely construction needs.

9.4.4 This chapter's approach employs a worst-case scenario, focusing on 24-hour annual average daily two-way vehicle trips and the maximum daily two-way HGV and worker movements during the construction period.

9.4.5 A construction period of **24 months** is the shortest feasible timeline for completing the works and is used as a reasonable worst-case scenario for estimating maximum daily trips. If the construction period were extended, traffic impacts would remain the same or decrease. Additionally, the impacts would remain unaffected if construction were to commence later than modelled.

9.5 Baseline

9.5.1 This section describes the baseline conditions for the Traffic and Transport assessment, with specific reference to the highway network, walking, cycling and public transport facilities on the strategic and local highway network.

Existing Baseline

9.5.2 The existing baseline provides a description of the SRN, the local highway network, accessibility in terms of walking, cycling, and public transport, road safety, and the baseline traffic flows. This section is supported by the following figures:

- **Figure 3.9.1:** Traffic and Transport Study Area and Traffic Survey Locations
- **Figure 3.9.2:** Study Area Road Network.
- **Figure 3.9.3:** Traffic Accident Locations.
- **Figure 3.9.4:** Indicative Heavy Goods Vehicle (HGV) Routing.

9.5.3 This section is also supported by the traffic count data provided in **Volume 8, Appendix 3.9.B: Traffic Base Counts**.

Strategic Road Network

A487

9.5.4 The A487 runs to the north of the Bryncir works site, serving as a critical arterial route connecting Porthmadog in the east to Bangor in the north. This route is essential for both local traffic and long-distance journeys, linking various communities in North Wales. It plays a significant role in the regional transport network, providing access to key destinations, including Bangor and the Isle of Anglesey to the north, as well as Machynlleth and other southern regions.

9.5.5 In the Study Area, the A487 is a single carriageway road with one lane in each direction. The road has a predominantly rural character, bordered by fields and occasional residential properties. The speed limit varies, with stretches of 40 miles per hour (mph) in built-up areas, such as Bryncir, which reverts to the national speed limit in open countryside. The road is generally not equipped with footways or street lighting, reflecting its rural nature.

9.5.6 Given its strategic importance as a trunk road, the A487 is frequently used by HGVs, especially for freight traffic moving to and from the ports of Holyhead and Fishguard. This makes it a likely route for construction-related vehicles, including HGVs delivering materials to the Bryncir works site. The road also experiences an increase in tourist traffic during the summer months, as it serves as a primary route for accessing popular destinations in Eryri (Snowdonia) National Park and the Llyn Peninsula.

9.5.7 The section of the A487 near Bryncir is characterised by sharp bends and undulating terrain, which could present navigation challenges for larger vehicles such as HGVs. Drivers will need to exercise caution when navigating these areas, particularly where visibility is reduced. The road layout includes several minor junctions providing access to local farms and residential properties, as well as laybys that could be used for temporary stops by construction vehicles if necessary.

9.5.8 The primary access will be off the A487 to the east of the B4411 junction, as well as a secondary access for other works to the north of the B4411 junction.

Local Highway Network

B4411

9.5.9 The B4411 is a secondary road running primarily in an east-west direction, connecting the A487 with local communities such as Garndolbenmaen and Dolbenmaen. In the Study Area, the B4411 is a single carriageway road with one lane in each direction. The road is flanked by narrow grass verges, and in some sections, stone walls or hedgerows form the boundary. There are no formal footways along the road, typical for rural roads in this part of Wales.

9.5.10 The B4411 is subject to varying speed limits depending on its proximity to residential areas. Near the A487/B4411 junction, the road is subject to the national speed limit, while sections closer to residential zones, such as in Garndolbenmaen, are governed by lower speed limits, typically around 30 mph. The road alignment includes several bends and changes in elevation, which may limit visibility and require careful driving, particularly for larger vehicles such as HGVs.

9.5.11 This road is likely to see moderate traffic volumes from staff accessing the Bryncir works site, as it connects rural areas with the A487 and serves as a key link to broader regional destinations.

Unclassified Road

9.5.12 The B4411 provides access to several unclassified roads that serve local farms and small communities. These roads are typically narrow, single-lane tracks with minimal road markings, and are not suitable for high volumes of traffic or larger vehicles. Unclassified road (a), which runs south-east to north-west from the B4411, provides access to a farm. It is characterised by a single lane road with complex alignment and a lack of road markings.

9.5.13 While unclassified road (a), and others, play a role in local access, construction-related vehicles, particularly HGVs, should avoid using these minor roads due to their limited width and challenging alignments. Instead, the A487 and B4411 should be prioritised for construction traffic, with appropriate logistics planning to avoid congestion on these smaller routes.

Walking and Cycling

9.5.14 The Definitive Map for Gwynedd (Ref 2.2) has been reviewed in the Study Area, using a comprehensive dataset that is regularly updated by each county council or unitary authority in England and Wales.

9.5.15 An extract from the Definitive Map highlights the nearest PRoW to the Bryncir works site. However, two of these PRoW are not expected to be impacted by the proposed works:

- Dolbenmaen 17 footpath falls marginally in the Bryncir works site.
- NCR 8 (0.1 km north of the Bryncir works site).
- Dolbenmaen 86 footpath provides a connection between two unnamed minor roads (0.2 km north of the Bryncir works site).

9.5.16 One PRoW runs through the Bryncir works site, Dolbenmaen 18 footpath which provides a connection between the A487 and B4411, will require permanently diverting:

Public Transport Facilities

Bus

9.5.17 There are two services that may be affected by the proposed works due to temporary traffic management measures (e.g. temporary traffic signals) and the presence of construction traffic along bus routes. The Study Area is served by multiple bus routes that provide access to key locations (see **Table 9-1**). The primary route includes the A487 with varied levels of service frequency, which are essential for local connectivity.

Table 9-1 – Public transport services – bus

Route section	Bus route	Frequency
A487	T2 TrawsCymru	2 hours
	T22 TrawsCymru	1-2 hours

9.5.18 The variety of bus services in the extent and context of the Study Area demonstrate that the Bryncir works site is generally well-served by public transport, facilitating movement for residents, visitors and workers. However, it is noted that the intermittent frequency of services to the Bryncir works site itself may influence the convenience and reliability of public transport as a primary mode of travel, particularly during off-peak hours.

Rail

9.5.19 The nearest rail facilities to the Bryncir works site include Criccieth (7.1 km), Porthmadog (10.3 km) and Penychain (10.8 km), to the south, south-east, and south-west, respectively. Based on these distances and the lack of other public transport facilities alongside insufficient footway provision, using the train from these locations would likely be unviable for workers.

Summary

9.5.20 In summary, it can be concluded that opportunities to support sustainable travel are limited. People wishing to cycle will also be encouraged and accommodated, but not relied on in terms of trip assessment.

9.5.21 It has been assumed for assessment purposes that all staff working on-site will predominantly travel by private vehicles (sole occupancy or car sharing).

Road Safety

9.5.22 A review of road safety on the local highway network has been carried out. Personal Injury Collision (PIC) statistics have been obtained from CrashMap (Ref 9.7) for the local highway network in the Study Area for the most recent seven-year period available. The road network in the Study Area is shown in **Figure 3.9.2** and the accident locations are shown in **Figure 3.9.3.**

9.5.23 Over seven years, nine collisions occurred in the accident Study Area, categorised as either slight, severe, or fatal. A slight collision is one in which at least one person has been slightly injured. A serious collision is one in which at least one person has been seriously injured, and a fatal collision is one in which at least one person has been killed.

9.5.24 **Table 9-2** provides a summary of collisions by severity and year and shows that the greatest number of collisions occurred in 2016, 2018 and 2019 with a total of two collisions in each year (one serious, one fatal; one slight, one serious and one slight, one serious, respectively). There were no recorded collisions in 2017. The information also shows that since 2019, collisions have generally decreased with only one slight collision being reported in each year.

Table 9-2 – Collisions by year and severity

Year	Slight	Serious	Fatal	Total
2016	0	1	1	2
2017	0	0	0	0
2018	1	1	0	2
2019	1	1	0	2
2020	1	0	0	1
2021	1	0	0	1
2022	1	0	0	1
Total	**5**	**3**	**1**	**9**

9.5.25 The data has been split to show collisions on road links and collisions that occurred at, or near, junctions The highest number of collisions were recorded on the A487 north of B4411 (six), with the A487 east of B4411 and B4411 south of A487 having three and zero collisions, respectively.

Table 9-3 – Collisions by link and severity

Link	Slight	Serious	Fatal	Total
A487 north of B4411	4	2	0	6
A487 east of B4411	1	1	1	3
B4411 south of A487	0	0	0	0
Total	**5**	**3**	**1**	**9**

9.5.26 The information in **Table 9-4** further analyses the temporal variation in terms of collisions on A487 north of B4411 and A487 east of B4411.

Table 9-4 – Collisions on A487 north of B4411 and A487 east of B4411

Link	A487 north of B4411	A487 east of B4411
2016	1	1
2017	0	0
2018	1	1
2019	2	0
2020	1	0
2021	0	1
2022	1	0
Total	**6**	**3**

9.5.27 The collision record on the A487 north of B4411 shows that six collisions have occurred from 2016 to 2022. The highest number of collisions (two) occurred in 2019, while the lowest number of collisions (zero) was recorded in both 2017 and 2021. In terms of A487 east of B4411, there were a total of three recorded collisions. The years 2016, 2018 and 2021 each saw one collision, while the remaining observed years recorded no collisions.

9.5.28 **Table 9-5** shows the collisions that occurred at, or close to, junctions with those that occurred away from a junction discarded from the dataset.

Table 9-5 – Collisions by junction and severity

Link	Slight	Serious	Fatal	Total
A498/B4411	2	0	0	2
Total	**2**	**0**	**0**	**2**

9.5.29 The A498/B4411 junction was the only junction in the Study Area to experience collisions, with two slight collisions being recorded.

9.5.30 Based on the PIC data provided, there are no incidents occurring frequently at any location in the Study Area in any given year.

Baseline Traffic Flows

9.5.31 To understand baseline traffic levels, ATC surveys were carried out at three locations surveyed during the week of Thursday 26 September 2024 to Wednesday 02 October 2024. The surveys carried out during this period were undertaken to cover roads potentially affected by traffic associated with the proposed works.

9.5.32 The ATC locations form the extent of the Study Area are shown in **Figure 3.9.1**.

9.5.33 Data was recorded for seven days, 24 hours a day at 60-minute intervals. The surveys were undertaken during a neutral survey month, timed outside of the school holidays to provide representative traffic levels.

9.5.34 The following traffic data has been included: 24-hour Annual Average Daily Traffic (AADT).

9.5.35 Winter working hours for workers are expected to be shorter, with worker numbers expected to fluctuate. Worker hours may be reduced in winter depending on works timing. However, the worst-case scenario for traffic impacts is still expected to be in peak periods of the summer months.

9.5.36 **Table 9-6** below shows the baseline traffic flows for total vehicles and HGVs in 2024 that will be used as the basis for assessment.

Table 9-6 – 2024 baseline traffic flows (two-way) – total vehicles and HGVs

		24 hour AADT	
ATC	**Link description**	**Total vehicles**	**HGVs**
3.1	A487 north of B4411	7,693	305
3.2	A487 east of B4411	6,532	202
3.3	B4411 south of A487	2,285	125

Future Baseline

9.5.37 This section considers those changes to the baseline conditions, described above, that might occur in the absence of the proposed works during the period over which the proposed works would have been in place.

9.5.38 Subject to being granted consent, the earliest construction could start is **2026**.

9.5.39 The use of a short-duration construction period may overestimate the number of jobs during peak construction; however, the overall mount of construction activity, associated employment, and spending benefits would remain unchanged.

9.5.40 The peak year for traffic movements is assumed to be 2027 which has been used as the future assessment year.

9.5.41 Future baseline traffic flows for the assessment year of **2027** for the peak construction have been derived by applying the national standard Trip End Model Presentation Program v8.1 (TEMPro) to derive traffic growth factors, as indicated in **Table 9-7**. TEMPro factors include a forecast of local development growth and attempts to capture

growth attributed to these other developments. The growth factor also takes into account cumulative schemes which are captured in the future baseline. The following locations were used to apply a growth factor to the baseline data:

- Gwynedd 008 – W02000017 – Pen-y-groes, Tal-y-sarn & Dyffryn Nantlle.
- Gwynedd 010 – W02000019 – Porthmadog.
- Gwynedd 011 – W02000020 – Cricieth & Llanaelhaearn.

9.5.42 This growth factor as shown in **Table 9-7** has been considered when comparing the baseline and future traffic scenarios.

Table 9-7 – TEMPro growth factors (2024 – 2026)

Period	Region	Region growth factor	Average growth factor
2024 – 2026	Gwynedd 008	1.0286	1.02890
	Gwynedd 010	1.0290	
	Gwynedd 011	1.0291	

9.5.43 The 2026 baseline traffic flows are shown in **Table 9-8**. These are the anticipated baseline flows for the peak of the construction period, with the absence of the proposed works along local road links.

Table 9-8 – 2026 baseline traffic flows (two-way) – total vehicles and HGVs

ATC	Link description	24 hour AADT	
		All vehicles	HGVs
3.1	A487 north of B4411	7,915	314
3.2	A487 east of B4411	6,532	208
3.3	B4411 south of A487	2,351	129

9.6 Scope of Assessment

9.6.1 This section outlines the scope of the assessment for Traffic and Transport.

9.6.2 **Table 9-9** summarises the potential Traffic and Transport receptors that have been reviewed following the IEMA Guidelines and states whether they have been included or excluded from the Traffic and Transport assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 9-9 – Scope of Traffic and Transport assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Severance	In	Out	Construction could generate potentially significant impacts on severance due to an overall increase in

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			traffic volumes, which may disrupt local connectivity and access. Operational traffic volumes are expected to be minimal (for example, substation would be unmanned apart from during maintenance periods every three years, and there would be no regular HGV movements outside of installing replacement kit – this would equate to 4 two-way HGV movements for a number of months every 10 years). The traffic volumes will be significantly less than in construction, therefore operational impacts are scoped out. Further details explaining the justification to scope out operational impacts is included in paragraphs 9.8.16-9.8.19.
Driver delay	In	Out	Construction is likely to result in potentially significant impacts on driver delay, due to increased traffic levels and possible congestion at key junctions. Operational traffic volumes are expected to be minimal (as explained for the severance receptor), therefore operational impacts are scoped out.
Pedestrian delay	Out	Out	Significant effects related to pedestrian delay are unlikely during construction and operation due to low levels of pedestrian activity surrounding the Bryncir works site.
Non-motorised user (NMU) amenity	In	Out	Construction may generate potentially significant impacts on cyclist amenities due to increased traffic levels affecting the safety and comfort of non-motorised users. Operational traffic volumes are expected to be minimal (as explained for the severance receptor), therefore operational impacts are scoped out.
Fear and intimidation	In	Out	Construction could have potentially significant impacts on fear and intimidation, as higher traffic volumes may increase perceived risks for vulnerable road users. Operational traffic volumes are expected to be minimal (as explained for the severance receptor), therefore operational impacts are scoped out.
Road safety and accidents	In	Out	Construction is anticipated to result in potentially significant impacts on road safety due to increased traffic levels and potential changes in driver behaviour. Operational traffic volumes are expected to be minimal (as explained for the severance receptor), therefore operational impacts are scoped out.
Total traffic increase	In	Out	Construction could lead to potentially significant impacts on traffic levels as a result of increased vehicular activity associated with the proposed works.

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			Operational traffic volumes are expected to be minimal (as explained for the severance receptor), therefore operational impacts are scoped out.
HGV increase	In	Out	Construction may result in potentially significant impacts in relation to HGV numbers, contributing to overall traffic volume and potentially affecting road safety and local amenity. Operational traffic volumes are expected to be minimal (as explained for the severance receptor), therefore operational impacts are scoped out.
Hazardous loads	Out	Out	There are no nearby road features which suggest that the transfer of hazardous materials poses a risk beyond that which would be expected on the general highway network, indicating no significant impacts during the construction or operation.

9.7 Methodology

9.7.1 Details of the technical methods used to determine the baseline conditions, sensitivity of receptors, magnitude of effects and the significance criteria that have been used for the Traffic and Transport assessment are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

Sources of Information

9.7.2 In preparation of this chapter, the following sources of published information have been referenced:

- PIC data has been gathered from CrashMap (Ref 9.7).
- ATCs have been undertaken at three locations in the Study Area to identify the baseline traffic conditions on the surrounding highway network. The resulting traffic flow diagrams are presented in **Volume 8: Appendix 3.9.A: Traffic Flow Diagrams** and the traffic data is summarised in **Table 9-6**.
- Local travel information has been gathered from various sources including local bus and rail operators (Ref 9.8).
- OS and Architectural Base Mapping has been used to ascertain an accurate geographical representation of the areas in the vicinity of the proposed works.
- Population data from the City Population website (Ref 9.9).

9.7.3 A physical site visit was not conducted; instead, the transport and traffic technical team utilised Google Street View extensively. This virtual assessment allowed for a thorough review of the local road network and nearby facilities. The information obtained has been used to inform the baseline conditions contained in **Section 9.5** of this chapter. These observations were also used to support the road link sensitivity designations, as provided in **The road** link sensitivity has been based upon the worst-case sensitivity of

the whole link considering the criteria outlined in Table 7.1 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. The links are represented by the ATC locations.

9.7.4 Table **9-10**The road link sensitivity has been based upon the worst-case sensitivity of the whole link considering the criteria outlined in Table 7.1 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. The links are represented by the ATC locations.

Methodology

9.7.5 The purpose of the Traffic and Transport assessment is to evaluate the potential impacts of development-generated traffic on the surrounding road network during various phases of the proposed works, with a focus on construction. This assessment aims to identify and quantify the potential adverse effects on road users, non-motorised users, and local communities, ensuring that any significant impacts are recognised and appropriately mitigated. The assessment considers both the sensitivity of the receptors (e.g., communities, road users) and the magnitude of changes in traffic conditions to determine the overall significance of the effects.

9.7.6 The methodology used for this assessment is based on the IEMA Guidelines, which outline specific criteria for including highway links in the study, such as a 30% increase in traffic flows or a 10% increase in high-sensitivity areas. The assessment covers a range of potential effects, including severance, driver delay, non-motorised user amenity, fear and intimidation, and road safety. By systematically applying these criteria, the assessment provides a robust analysis of the potential impacts during construction, with consideration given to mitigation measures to reduce adverse effects.

Receptor Sensitivity

9.7.7 The methodology for assessing the impact of the proposed works generated traffic will be based on that outlined in the IMEA Guidelines and is stated in Table 7.1 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

Link Sensitivity

9.7.8 The road link sensitivity has been based upon the worst-case sensitivity of the whole link considering the criteria outlined in Table 7.1 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. The links are represented by the ATC locations.

Table 9-10 – Link sensitivity

ATC	Link description	Sensitivity
1	A487 north of B4411	Medium
2	A487 east of B4411	Very Low
3	B4411 south of A487	Very Low

Magnitude

9.7.9 The link sensitivities outlined above have been used to assess the significance of the impact of the proposed works by combining the magnitude of change. The impact magnitude criteria are outlined in Table 7.2 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

Significance

9.7.10 The significance of effects considering the sensitivity of the receptor, and the magnitude of impact are defined as beneficial or adverse and stated in Table 7.3 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. Effects predicted to be 'major' or 'moderate' are considered 'significant' whilst effects predicted to be 'minor' or 'negligible' are considered 'not significant'.

Trip Generation

9.7.11 This section outlines the trips generated by the proposed works during the construction and operation. It is important to highlight that there is limited data in the industry standard Trip Rate Information Computer System trip generation database for this type of development, and a first principles approach has been adopted to estimate the anticipated vehicle trip generation. This methodology relies on professional judgement and input from the project team. The forecasted vehicle trips for each phase are based on the peak activity levels expected throughout the 24-month construction period. The peak of construction in terms of generated trips is projected to occur between Months 12 – 16 of the construction programme.

9.7.12 The peak construction year is expected to be **2027**, which has been incorporated into the assessment.

Construction Staff

9.7.13 The current estimate is that a peak of 46 Full-Time Equivalent (FTE) workers will be on-site per day at the Bryncir works site. The peak of construction is likely to be during the main civils and mechanical/electrical works phase, which coincide for an approximate duration of four months. Activities will occur in the agricultural land approximately 750 m south of Bryncir, Garndolbenmaen, and will consider the proximity to PRoW and the presence of nearby farms and residential properties.

9.7.14 To minimise the number of vehicle trips generated, it is expected that car-sharing measures will be promoted by the contractor during peak construction stages. For the purposes of this assessment, it is assumed that a proportion of workers will participate in car-sharing schemes, based on the traffic distribution information derived from the population data (

9.7.15 **Table 9-12**). The percentage of workers that may engage in car-sharing has been estimated based on a review of other similar schemes and professional judgement.

9.7.16 It is assumed that approximately 50% of the workforce (23 out of 46 workers) will participate in car-sharing. This estimate is informed by car-sharing uptake observed at other relevant infrastructure projects in the wider area. A realistic car-sharing ratio of 1.5 workers per vehicle has been applied. This results in an estimated 15 one-way daily car movements for the car-sharing workers.

9.7.17 For the remaining 23 workers who do not engage in car-sharing, it is assumed they will travel individually by private vehicles. Adding these 23 movements to the 15 movements generated by car-sharing workers results in a total of 38 one-way daily vehicle movements, per day, for the workforce.

9.7.18 For the purposes of this assessment, it is assumed that the proposed works will generate a total of 76 two-way daily vehicle movements (38 in and 38 out).

Construction HGVs

9.7.19 In terms of HGVs, it is estimated there would be a peak of up to 40 HGV deliveries (including waste removal) per day (80 two-way, e.g. 40 inbound and 40 outbound). The peak of construction is likely to be during the mobilising and earthworks phase, which will have an approximate duration of four months.

9.7.20 During construction, there is expected to be one AIL movement associated with the transformer being delivered to the Bryncir works site.

9.7.21 **Table 9-11** provides a summary of the 24-hour AADT trip generation by vehicle type, presenting the number of private vehicles, HGVs and the total (two-way). This table outlines the overall traffic impact associated with the Scheme across a full 24-hour period, without breaking down specific time periods.

Total Vehicles

9.7.22 In summary, the total daily number of vehicles expected are shown in **Table 9-11** below.

Table 9-11 – 24-hour AADT trip generation by vehicle type

Vehicle type	In	Out	Total (two-way)
Cars	38	38	76
HGVs	40	40	80
Total	**78**	**78**	**156**

Vehicle Distribution

9.7.23 This section provides details of the anticipated characteristics of journeys generated by the construction of the proposed works. The below summarises the forecasting of how vehicle trips will be distributed across the road network.

Construction Staff

9.7.24 Construction staff will be encouraged to take the most direct route to the Bryncir works site using ‘higher’ order roads, such as A and B classified roads.

9.7.25 Construction workers will park in the site.

9.7.26 For this assessment, the distribution of construction worker trips has been determined using a gravity model approach, estimating the origins of their journeys from significant settlements within a 90-minute estimated drive time. This methodology has been applied to private car trips as it is a reasonable approach given that exact locations of the construction workforce are not known at this stage.

9.7.27 The locations, settlement weightings, and the resulting distribution are provided in

9.7.28 **Table 9-12**.

Table 9-12 – Worker distribution*

Town	Population	Distance (km)	Distance (squared)	Population/ distance (squared)	Distribution
Aberystwyth	16,413	104.1	10,837	1.5	1%
Porthmadog	3,970	11.1	123	32.2	20%
Anglesey	69,291	51.6	2,668	26.0	16%
Caernarfon	9,827	21.1	444	22.1	13%
Colwyn Bay	10,576	67.7	4,589	2.3	1%
Prestatyn	16,680	93.6	8,769	1.9	1%
Mold	9,891	116.7	13,608	0.7	0%
Bangor	15,060	36.7	1,346	11.2	7%
Llandudno	19,716	67.7	4,589	4.3	3%
Conwy	15,725	59.1	3,487	4.5	3%
Oswestry	17,509	106.5	11,346	1.5	1%
Barmouth	1,988	42.6	1,818	1.1	1%
Criccieth	1,738	6.8	46	38.1	23%
Pwllheli	3,622	16.4	269	3.4	8%
Blaenau Ffestiniog	3,449	29.8	886	3.9	2%

** Note, the numbers have been rounded to the nearest whole number*

9.7.29 The potential route choices from these origin points to the Bryncir works site have then been assumed using an iterative process with an online interactive mapping tool that shows the fastest route. No restrictions have been applied to possible routes workers could take to and from the Bryncir works site.

Construction HGVs

9.7.30 Construction HGVs will travel to the Bryncir works site firstly via the SRN, then use the most appropriate route to avoid unnecessary routing through local villages and rural areas.

9.7.31 HGVs have been distributed across the road network based on the routing set out below. The vehicle routing plan showing the routing strategy for HGVs is shown in **Figure 3.9.4**. Further details are also shown in **Volume 8, Appendix 3.9.A: Traffic Flow Diagrams**.

- A487 from the north – 50%.
- A487 from the east – 50%.

9.7.32 Travelling from the SRN to the Bryncir works site, HGVs will take the following routes to access the Bryncir works site, as shown in **Figure 3.9.4**:

- HGVs travelling southbound on the A487 will continue to the Bryncir works site access off the A487.
- HGVs travelling westbound on the A487 will continue to the Bryncir works site access off the A487.

Trip Assignment

Construction Staff Assignment

9.7.33 Based on the trip distribution exercise and the proposed trip generation outlined in the sections above, **Table 9-13** details the total number of expected construction workers to drive (private car and car share) from each location.

Table 9-13 – Trip Generation Overview*

Town	Total Workers	Total Private Car Journeys
Aberystwyth	0	0
Porthmadog	9	7
Anglesey	7	6
Caernarfon	6	5
Colwyn Bay	1	1
Prestatyn	1	0
Mold	0	0
Bangor	3	3
Llandudno	1	1
Conwy	1	1
Oswestry	0	0
Barmouth	0	0
Criccieth	11	9
Pwllheli	4	3
Blaenau Ffestiniog	1	1
Total	**46**	**38**

** Note, the numbers have been rounded to the nearest whole number.*

9.7.34 The traffic movements have been distributed across the ATC locations in the Study Area based on the distribution parameters outlined in **Section 9.3**. The daily two-way movements are presented in

9.7.35 **Table 9-14**. These are also shown in traffic flow diagrams provided in **Volume 8, Appendix 3.9.A: Traffic Flow Diagrams**.

9.7.36 The distribution is based on the access arrangements outlined earlier in **Section 9.7**.

Table 9-14 – Daily profile of total two-way construction traffic link by link*

ATC	Link	Daily (two-way)	
		All vehicles	HGV
3.1	A487 north of B4411	75	40
3.2	A487 east of B4411	58	40
3.3	B4411 south of A487	24	0

** Note, the numbers have been rounded to the nearest whole number.*

9.7.37 Individual junction assessments are not required at these locations as traffic will be zero during the network AM peak hour (8.00 am – 9.00 am) and will be minimal due to management of traffic movements during the network PM peak hour (5.00 pm – 6.00 pm). Further details of the management proposals will be provided within the Construction Traffic Management Plan (CTMP) that would support the application.

9.8 Potential Effects

9.8.1 The anticipated effects resulting from the increases in traffic associated with the construction of the proposed works are outlined as follows:

Construction

9.8.2 The peak construction traffic generated by the proposed works is anticipated to be between **Months 12 and 16**, with Month 12 coming as early as Q1 2027.

9.8.3 The main access to the Bryncir works site would be from the A487 using an upgraded existing access point opposite Bryn-yr-efail-uchaf, before following field boundaries to the location of the substation compound. The permanent access track would be approximately 550 m long with a maximum width of 6 m and would have a tarmacadam surface with crossing points to enable landowner access across the track.

9.8.4 A small number of staff will also use an access off the B4411 to construct a tower off this road, as well as an access on the A487 North. The proposed increase in two-way vehicle movements across the day (24-hours) in terms of actual increases and percentage increases relative to the future baseline traffic flows are presented in the tables below at each link location.

9.8.5

9.8.6 **Table 9-15** provides an overview of the total percentage increase for total vehicles on each of the links associated with the proposed works during the peak construction year (2027).

Table 9-15 – 2027 future year flows – 24 hour AADT (two-way)

ATC	Link	Base	Development	Total	All vehicles % Increase	HGV % increase
3.1	A487 north of B4411	7,915	75	7,790	0.9%	12.8%
3.2	A487 east of B4411	6,721	28	6,779	0.9%	19.2%
3.3	B4411 south of A487	2,351	24	2,375	1.0%	0.0%

9.8.7 With reference to the IEMA Guidelines (Ref 9.7), a two-rule approach can be used to assess the extent of any traffic assessment as follows:

- **Rule 1 –** Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%).
- **Rule 2 –** Include highway links of high sensitivity where traffic flows have increased by 10% or more.

9.8.8 The results in

9.8.9 **Table 9-15** indicate the following:

- None of the assessed links are predicted to experience an increase of more than 30% in total vehicles or HGVs during an average day.
- The largest proportional increase in average daily traffic is anticipated at ATC 3.3, with increases of 1.0%.
- ATC 3.2 is expected to have the highest proportional increase in daily HGV movements at 19.2%, with ATC 3.1 experiencing an increase of 12.8%. No HGVs are expected to travel along the B4411.

9.8.10 The following sections summarise the magnitude of likely effects on receptors in terms of severance, driver delay, NMU amenity, fear and intimidation, road safety and accidents and construction traffic increase. It is noted that the magnitude for NMU Amenity on the B4411 link has been amended to medium to account for PROW diversions.

9.8.11 **Table 9-16** indicates the magnitude of impact for the AADT measured against the criteria set out in Table 7.2 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

9.8.12 For the purposes of the highway safety analysis, should any links be estimated to experience increases in total traffic flows above 30%, they would be subject to further analysis on a case-by-case basis. However, no links displayed an increase of over 30%.

Table 9-16 – Magnitude of impact (construction) – 2027 AADT

ATC	Link	Sensitivity	All traffic increase %	Construction traffic	Severance	NMU amenity	Fear and intimidation	Driver delay	Road safety and accidents
3.1	A487 north of B4411	Medium	0.9%	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
3.2	A487 east of B4411	Very Low	0.9%	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
3.3	B4411 south of A487	Very Low	1.0%	Very Low	Very Low	Medium	Very Low	Very Low	Very Low

9.8.13 As shown in **Table 9-16**, none of the assessed links are predicted to experience a high magnitude of impact in any of the assessment criteria categories.

9.8.14 With reference to Table 7.2 (significance of effects matrix) in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology** in combination with the above impact magnitudes and applied sensitivity of the transportation links, project traffic and transport-related significance of effects are detailed in **Table 9-17** during the peak construction year (2027) in the average annual day.

Table 9-17 – Summary of the assessment (significance of effect) – 2027 + construction AADT

ATC	Link	Construction traffic	Severance	NMU amenity	Fear and intimidation	Driver delay	Road safety and accidents	Overall significance
3.1	A487 north of B4411	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Not Significant
3.2	A487 east of B4411	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Not Significant
3.3	B4411 south of A487	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Not Significant

9.8.15 As shown in **Table 9-17**, none of the links assessed are predicted to experience a significant effect across any of the assessment criteria.

Operation and Maintenance

9.8.16 The proposed Bryncir substation would be unmanned. Visual checks would be undertaken on a monthly inspection visit to the site. If the substation required refurbishment or replacement works, vehicles would be used to carry workers in and out of the site and suitable vehicles would be used to bring new materials and equipment to site and remove old equipment.

9.8.17 There should be no requirement for regular HGV movements during the operation and maintenance of the proposed works. Limited use of HGVs will be required for the replacement of damaged cables, inverters and transformers associated with the site's infrastructure. It has been assumed that during the replacement activity up to two pieces of equipment will be replaced per day (equating to four two-way HGV movements) over a period of several months, every 10 years of operation.

9.8.18 No AIL movements are anticipated during the operation and maintenance phase due to the delivery of spare cabling during the construction.

9.8.19 As traffic levels owing to the operation and maintenance phase are minimal, operation and maintenance effects have been scoped out of the assessment.

Summary

9.8.20 A summary table of the assessments of the potential effects for Traffic and Transport is provided in **Table 9-18**.

Table 9-18 – Summary of assessment effects – Traffic and Transport

Phase	Potential impacts	Duration	Embedded mitigation	Likely significance of effect
Construction	**Construction Traffic Increase** Negligible at all links.	Short Term Temporary (construction phase only)	Embedded mitigation is described in **Section 9.9**	Not significant at all locations.
	Severance Negligible at all links.	Short Term Temporary (construction phase only)	Embedded mitigation is described in **Section 9.9**	Not significant at all locations.
	NMU Amenity Negligible at all links.	Short Term Temporary (construction phase only)	Embedded mitigation is described in **Section 9.9**	Not significant at all locations.
	Fear and Intimidation Negligible at all links.	Short Term Temporary (construction phase only)	Embedded mitigation is described in **Section 9.9**	Not significant at all locations.
	Driver Delay Negligible at all links.	Short Term Temporary (construction phase only)	Embedded mitigation is described in **Section 9.9**	Not significant at all locations.
	Road safety and accidents Negligible at all links.	Short Term Temporary (construction phase only)	Embedded mitigation is described in **Section 9.9**	Not significant at all locations.
Operation and Maintenance	The traffic levels associated with operation and maintenance phase of the proposed works will be minimal. Operation and maintenance effects have been scoped out.			

9.9 Mitigation and Residual Effects

Embedded Mitigation

9.9.1 The proposed works have been designed, as far as practicable, to avoid and reduce impacts and effects on Traffic and Transport through the process of design development, and by embedding measures into the proposed works design. In addition, how the proposed works is constructed, operated and maintained would be appropriately controlled to manage and minimise potential environmental impacts.

9.9.2 Embedded measures that are part of the standard practice and proposed design have been incorporated into the assessment to ensure that likely environmental effects are realistic. This approach avoids assessing scenarios that do not account for these practical measures, providing a more accurate reflection of expected impacts.

Measures Embedded into the Works Design

9.9.3 The specific measures embedded into the proposed works design are outlined below with respect to the construction phase and operation/maintenance phases.

Construction Phase

9.9.4 During the construction phase the following embedded mitigation measures will be included:

- Establish appropriate access points to facilitate vehicle movements into the Bryncir work site, where necessary.
- Any access points requiring the creation of a junction bell mouth would be designed in accordance with the relevant standards outlined in the DMRB CS 123 Geometric Design of At-Grade Priority and Signal-Controlled Junctions (Ref 9.8), and in consultation with the local highway authority. This would help mitigate any potential safety risks associated with construction activities.
- Swept path analysis for AILs and HGVs would be carried out to ensure suitable routing.
- HGVs and AILs will follow the designated routes as shown in **Figure 3.9.4**.
- Utilising internal routes in the Bryncir works site to avoid using the existing road network where practicable.
- Traffic management would be employed where construction vehicles need to interact with the public road network, including providing adequate visibility splays between construction traffic and other road users. Measures such as advanced signage to notify the public of works, and temporary traffic signals or barriers will be implemented. Construction traffic should generally give priority to other road users.
- Restricting HGV movements as follows: A487 – B4411.
- Route inbound staff vehicles via: A487 – B4411.
- Restricting HGV movements to ensure arrivals/departures between 9.00 am and 5.00 pm to avoid increasing traffic levels on the surrounding highway network during the typical weekday peak hours.

- Implementing a Delivery Management System to control the bookings of HGV deliveries from the start of the construction period. This would be used to regulate the arrival times of HGVs via timed delivery slots, as well as to monitor compliance with HGV routing. In addition, adequate space would be made available in the Bryncir works site to ensure no queuing back onto the surrounding road network occurs.
- Implementing a monitoring system to record the route of all HGVs travelling to and from the Bryncir works site, to record any non-compliance with the agreed routing strategy and delivery hours and to communicate any issues to the relevant suppliers to ensure the correct routes and times are followed.
- Construction staff (e.g. non-HGV vehicles) would be directed to take the most direct route to the Bryncir works site using 'higher' order roads, such as A and B classified roads or the SRN.
- Encouraging construction workers to car share to reduce single occupancy car trips would promote the benefits of car sharing, such as reduced fuel costs and an environmental impact. A car share system should be implemented to match potential sharers and to help staff identify any colleagues who could potentially be collected along their route to and from the site.
- Providing limited (but sufficient) on-site car and cycle parking to accommodate the expected parking demand of workers at the Bryncir works site.
- A specialised haulage service would be employed to deliver the transformer (which will be an AIL). The contractor would provide the necessary escort, permits and traffic management, and would also consult with the relevant highways authorities to ensure the correct permits are obtained. The police will also be given advanced notification under the Road Vehicle Authorisation of Special Types Order 2003 (Ref 9.10).
- The above information would be secured in the supporting CTMP.

Additional Mitigation and Enhancement Measures

9.9.5 Additional mitigation measures would only be required where significant effects are identified following the application of embedded mitigation measures. No significant impacts have been identified.

Residual Effects

9.9.6 This section summarises the residual effects of the proposed works on Traffic and Transport following the implementation of embedded and additional mitigation.

Construction Phase

9.9.7 Based on the outcome of the assessments, no significant adverse effects are anticipated at any of the assessed links. Traffic levels are expected to increase only minimally, and none of the links will experience increases substantial enough to result in significant impacts.

9.9.8 Throughout the 24-hour period during construction, traffic increases across all links are projected to remain low, with percentage increases well below thresholds that would trigger concerns related to link sensitivity.

9.9.9 This indicates that the overall magnitude of impact (based on the magnitude of impact criteria information in Table 7.2 of **Volume 8, Appendix 1.4.A: Topic Assessment**

Methodology on the road network will be low at all link locations during an average day.

9.10 Summary

9.10.1 This chapter of the ES presents the findings of an assessment of the likely significant effects of Traffic and Transport as a result of the proposed works.

9.10.2 The assessment concludes that, following the implementation of embedded mitigation measures, impacts would not be significant at any of the assessed links. None of the links are predicted to experience substantial increases in traffic volumes that would lead to adverse effects.

9.10.3 The actual increase in traffic levels across all links due to the proposed works is minimal. Given that the assessed routes generally experience moderate baseline traffic flows, the projected increases in vehicle numbers result in relatively low percentage changes. Consequently, the overall magnitude of impact is considered low, and the resulting effects are assessed as 'Not Significant.' No further mitigation measures beyond those already embedded are deemed necessary, as the predicted impacts are in acceptable limits for the Study Area. This conclusion reinforces that the proposed works would not materially affect traffic conditions or road safety across the assessed network.

Table 9-19 – Residual effects – Traffic and Transport (construction phase)

Receptor	Description of impacts including duration	Embedded mitigation	Significance of effect with embedded mitigation	Additional mitigation/ enhancement measures	Residual effect
Road Links	Increase in construction phase traffic (short-term, temporary)	Embedded mitigation is described in **Section 9.9**	Negligible – Not Significant	None identified	Negligible – Not Significant
Road Links	Increase in construction phase HGV traffic (short-term, temporary)	Embedded mitigation is described in **Section 9.9**	Negligible – Not Significant	None identified	Negligible – Not Significant
Road Links	Severance during construction (short-term, temporary)	Embedded mitigation is described in **Section 9.9**	Negligible – Not Significant	None identified	Negligible – Not Significant
Road Links	Driver delay during construction (short-term, temporary)	Embedded mitigation is described in **Section 9.9**	Negligible – Not Significant	None identified	Negligible – Not Significant
Pedestrians and Cyclists	NMU amenities during construction (short-term, temporary)	Embedded mitigation is described in **Section 9.9**	Negligible – Not Significant	None identified	Negligible – Not Significant
Pedestrians and Cyclists	Fear and intimidation during construction (short-term, temporary)	Embedded mitigation is described in **Section 9.9**	Negligible – Not Significant	None identified	Negligible – Not Significant

Receptor	Description of impacts including duration	Embedded mitigation	Significance of effect with embedded mitigation	Additional mitigation/ enhancement measures	Residual effect
Road Users	Road safety during construction (short-term, temporary)	Embedded mitigation is described in **Section 9.9**	Negligible – Not Significant	None identified	Negligible – Not Significant
Road Users	Road safety during construction (short-term, temporary)	Embedded mitigation is described in **Section 9.9**	Negligible – Not Significant	None identified	Negligible – Not Significant

10. Air Quality and Emissions

10.1 Introduction

10.1.1 This chapter presents an assessment of the likely Air Quality and Emissions effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Bryncir Works.**

10.1.2 This chapter describes the baseline conditions currently existing in the Study Area (as defined in **Section 10.3**), the scope of the assessment, the potential effects, the mitigation measures required to avoid, reduce or offset any significant negative effects, and the likely residual effects after these mitigation measures have been adopted.

10.1.3 This chapter is supported by figures and appendices as listed below:

- **Figure 3.10.1:** Construction Dust Assessment.
- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

10.1.4 Other chapters that are useful to review in association with this chapter are as follows:

- **Chapter 5: Ecology and Nature Conservation.**
- **Chapter 9: Traffic and Transport.**

10.2 Legislation and Planning Policy

10.2.1 This section summarises the legislation and planning policy framework that is relevant to the Air Quality and Emissions assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

10.2.2 The following legislation is relevant to Air Quality and Emissions:

- The Environment Act 1995 (Ref 7.3).
- The Environment (Wales) Act 2016 (Ref 5.10).
- The Environment Act 2021 (Ref 4.2).
- Environment (Air Quality and Soundscapes) (Wales) Act 2024 (Ref 10.1).
- The Air Quality (Wales) Regulations 2000 (Ref 10.2).
- The Air Quality Standards (Wales) Regulations 2010 (Ref 10.3).
- The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (Ref 10.4).
- Well-being of Future Generations (Wales) Act 2015 (Ref 10.5).

10.2.3 **Table 10-1** provides the Air Quality Standards (AQS) and Air Quality Objectives (AQO) relevant to this assessment.

Table 10-1 – Relevant AQS and AQO

Pollutant	Averaging period	Value (micrograms per metre cubed (µg/m^3))
Nitrogen Dioxide (NO_2)	Annual mean	40
	1-hour mean (not to be exceeded more than 18 times per year)	200
Particulate Matter (PM_{10})	Annual mean	40
	24-hour mean (not to be exceeded more than 35 times per year)	50
$PM_{2.5}$	Annual mean	20
	Annual mean (by 2040)	10
	Interim target (by end of January 2028)	12

National Policy

10.2.4 The following national policy is relevant to Air Quality and Emissions:

- PPW – Edition 12 (Ref 4.4).
- The Clean Air Plan for Wales (Ref 10.6).
- Future Wales – The National Plan 2040 (Ref 4.3).
- The Air Quality (England) Strategy England, Scotland, Wales and Northern Ireland (Ref 10.7).

Local Policy

10.2.5 Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (Ref 4.9) comprises local policy relevant to Air Quality and Emissions:

Guidance

10.2.6 A summary of guidance relevant to Air Quality and Emissions is provided below:

- Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction (Reg 5.30).
- IAQM and Environmental Protection UK (EPUK) Land-Use Planning & Development Control: Planning For Air Quality (Ref 10.8).

10.3 Study Area

10.3.1 The Study Area for this assessment is the area over which potential direct and indirect effects of the proposed works on local air quality are predicted to occur during the construction period, noting that operational phase impacts have been scoped out of the assessment (see **Section 10.6**).

10.3.2 The methodological approach to defining the spatial extent of the Study Area for air quality has been informed by the IAQM (Ref 5.30 and Ref 10.8). An area within 10 km of the Bryncir works site has been considered with respect to published baseline information on existing air quality. The following Study Areas have been used where an assessment of dust emissions generated by construction activities is required:

10.3.3 An amenity or human health sensitive receptor in:

- 250 m of the limits of construction activity in the Bryncir works site; or
- 50 m of the construction route on the public highway, up to 250 m from the Bryncir works site entrance.

10.3.4 An ecological receptor in:

- 50 m of the limits of construction activity in the Bryncir works site; or
- 50 m of the construction route on the public highway, up to 250 m from the Bryncir works site entrance.

10.3.5 The Study Area is effectively 250 m from the Bryncir works site and this is illustrated in **Figure 3.10.1**, along with surrounding air quality-related constraints.

Sensitive Receptors

Dust Soiling Receptors

10.3.6 Dust soiling receptors are land uses that are susceptible to harm to amenity from the deposition of dust to property. Ten receptors have been identified within 250 m of the Bryncir works site that have sensitivity to dust soiling impacts. Some of these receptors have high or medium sensitivity, such as residential properties and a public house, whereas the rest have a lower sensitivity, such as a car park.

Receptors Sensitive to the Human Health Impact of PM_{10}

10.3.7 Receptors sensitive to human health impacts are land uses where members of the public are present for a period of time comparable to the averaging periods of the short-term PM_{10} air quality objective (24-hours). Nine receptors have been identified within 250 m of the Bryncir work site that have sensitivity to human health impacts of increased PM_{10} caused by construction dust. Some of these receptors have high sensitivity, such as residential properties, whereas the rest have lower sensitivity, such as a public house.

Ecological Receptors

10.3.8 Ecological receptors are designated nature conservations sites and priority habitats. There are no national designations within 250 m of the Bryncir works site. There are nine cWSs within 250 m of the Bryncir works site including marshy grassland habitats of Bryn-yr-efail-uchaf and Dolwar Heath and purple moor grass and rush pastures. Tyddyn y Felin, Afon Dwyfach, Rhwnddwyryd and Llystyn Isaf cWSs are in the Bryncir works site. These all have low sensitivity.

10.4 Assumptions and Limitations

10.4.1 The construction dust assessment methodology is informed by professional judgement, including consideration of estimates of construction activities, vehicle movements and number of plant at the worksite, the area of ground to be worked, and the volume of

structures erected. Where exact data has not been available, precautionary assumptions have been made so that the potential for impact is over-estimated, rather than under-estimated.

10.5 Baseline

Summary of Data Sources

10.5.1 The following data sources have been used to inform the air quality baseline:

- North Wales Authorities Collaborative Project 2023 Air Quality Progress Report (Ref 10.9).
- Mapped estimates of background concentrations provided by Defra's UK Air Information Resource (UK-air) (Ref 10.10).
- Designated ecological sites provided by Natural England's MAGIC maps (Ref 7.49).

Dust Deposition

10.5.2 A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can be affected by long range transport of dust from distant sources into the local vicinity. The concentrations of dust can vary depending on a range of parameters, such as meteorological conditions and time of year.

10.5.3 Ambient dust deposition rates are not monitored extensively in the UK. Monitoring that is undertaken is usually connected with specific activities, such as mining and mineral extraction operations, or specific large-scale construction programmes. Dust monitoring may also be undertaken to investigate specific complaints received by local authorities, who are then required to investigate dust nuisance under the Environmental Protection Act 1990 (Ref 7.1). Therefore, there is currently no quantitative baseline information for dust deposition available in the Study Area.

Pollutant Concentrations

10.5.4 The proposed Study Area for the air quality assessment covers an area within the local authority area of Gwynedd Council.

10.5.5 As part of Local Air Quality Management (LAQM) duties, local authorities are required to monitor pollutant concentrations. No Gwynedd Council monitoring sites are within 10 km of the Bryncir works site. The closest monitoring sites are 015 and 040, both approximately 14 km from the Bryncir works site.

10.5.6 The UK-AIR website provides data for background concentrations of nitrogen oxides (NO_X), NO_2, PM_{10} and $PM_{2.5}$. These background concentrations represent 1 kilometres squared (km^2) grid squares. **Table 10-2** shows the estimated background concentrations in the Study Area in 2024. As expected for all pollutants, background concentrations in the Study Area are low, due to the predominantly rural nature of the area.

Table 10-2 – Estimated annual mean background concentrations of selected pollutants in the Study Area In 2024 (as µg/m^3)

NO_2	NO_X	PM_{10}	$PM_{2.5}$
2.61 – 2.86	3.20 – 3.51	8.00 – 8.26	5.11 – 5.19

Future Baseline

10.5.7 Future baseline conditions are assumed to be similar to existing baseline conditions although concentrations of NO_2 and NO_X are expected to fall in future years, due to decarbonisation of the transport and energy sectors. This decrease is likely to be larger in urban areas and smaller in rural areas.

10.6 Scope of Assessment

10.6.1 This section describes the scope of the assessment of effects on Air Quality and Emissions.

10.6.2 **Table 10-3** summarises the potential Air Quality receptors that have been reviewed and states whether they have been included or excluded from the Air Quality assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 10-3 – Scope of Air Quality and Emissions assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Residential properties, farm workers, users of PRoW and NCR 8	In	Out	There are multiple residential properties and farms, as well as a public house, close to the Bryncir works site that have the potential to experience effects related to dust and construction emissions. In addition, there are two PRoWs close to the Bryncir works site and NCR 8 runs along the western boundary, which are also likely to experience reduced air quality in the form of dust and construction emissions. Air quality impact pathways include construction site emissions and construction road traffic emissions. The IAQM and Environmental Protection UK guidance (Ref 10.8) screens out road traffic emissions impacts on human health receptors where average development HGV flows are less than 100 two-way movements per day on any given road link. For nature conservation impacts, guidance is taken from the DMRB guidance LA 105 Air Quality (Ref 10.11), which screens out road traffic emissions where development HGV flows (and cumulative flows associated with committed and reasonably

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			foreseeable development in the area) are less than 200 two-way movements per day on any given road link. Operational emissions will be limited to intermittent and short-term maintenance activities. Therefore, these emissions will not contribute to significant effects on local air quality.
Ecological Receptors	In	Out	Four cWSs are in the Bryncir works site (Llystyn Isaf cWS, Afon Dwyfach cWS, Tyddyn-y-Felin cWS and Rhwddwyryd cWS). There is a potential for the construction works to generate dust emissions that may impact these sites. There are also additional cWSs in the wider area. Operational emissions will be limited to intermittent and short-term maintenance activities. Therefore, these emissions will not contribute to significant effects on local air quality.

10.7 Methodology

10.7.1 Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the Air Quality and Emissions assessment are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

10.8 Potential Effects

10.8.1 The anticipated effects resulting from the loss or change to Air Quality and Emissions elements and features during construction of the proposed works are outlined as follows:

Construction

10.8.2 The sources of potential Air Quality and Emissions effects during the construction phase include:

- Construction dust emissions.
- Site plant emissions.

10.8.3 Construction traffic emissions would also be considered in an Air Quality and Emissions assessment. However, they have been scoped out of this assessment as the expected number of vehicle movements will not to exceed the criteria, shown in Table **10-3**, above which significant air quality effects could occur.

Construction Dust Emissions

10.8.4 The assessment considers the potential impact for the area surrounding the Bryncir work site.

10.8.5 As described in **Section 10.4** and **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, the construction dust and particulate matter assessment follows the step-by-step approach set out in relevant IAQM guidance (Ref 5.30). This process is summarised in the sub-sections below.

Step 1: Screen the Requirement for a Detailed Assessment

10.8.6 Step 1 of the IAQM construction dust guidance is to screen the requirement for a more detailed assessment. According to the guidance, no further assessment is required if there are no receptors within a specified distance of the works. The screening distances set by the IAQM guidance are:

- Receptors sensitive to amenity and human health impacts within 250 m of the construction Bryncir works site and/or within 50 m of a public road used by construction traffic that is within 250 m of the Bryncir works site entrance; and
- Nature conservation receptors within 50 m of the construction Bryncir works site and/or within 50 m of a public road used by construction traffic that is within 250 m of the Bryncir works site.

10.8.7 **Figure 3.10.1** shows a 250 m buffer from the edge of the Bryncir works site in which human health and amenity receptors may be impacted by construction activities. The surrounding areas are predominantly rural, however there are a few residential properties, a pub, a car park and a PROW within 250 m of the Bryncir site works.

10.8.8 There are no SACs, SSSIs, SPAs, Ramsar sites or ancient woodland within 50 m of the Bryncir works site. There are four cWSs in the Bryncir works site (Llystyn Isaf cWS, Afon Dwyfach cWS, Tyddyn-y-Felin cWS and Rhwddwyryd cWS) and two additional cWSs within 50 m of the Bryncir works site (Dolwar Heath cWS and Bryn-yr-efail-ychaf cWS).

10.8.9 Due to the presence of the high sensitivity amenity and human health receptors and ecologically sensitive cWSs within the screening distances set by the guidance, more detailed assessment of construction dust is required and set out below.

Step 2: Assess the Risk of Dust Impacts

Step 2A: Determine the Dust Emissions Magnitude

10.8.10 Step 2A requires the determination of the dust emission magnitude, as set out in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, which the guidance states is based on the scale of the anticipated works with the following activities: demolition; earthworks; construction (i.e. the building and erection of structures); and trackout (the deposition of dust and particulate matter onto public roads by construction vehicles). The dust emission magnitude should be classified as Small, Medium, or Large.

10.8.11 Construction activities associated with the Bryncir works are described in **Chapter 2: Bryncir Works**. Works are limited to temporary establishment and operation of construction compounds, construction of a new substation, replacement of Tower 4ZC067, trench works and earthworks associated with the installation of new underground cables, overhead lines, and access road construction.

Demolition

10.8.12 Demolition works on site are limited to the removal of the existing Tower 4ZC067 as well as the removal of walls and fences likely required. In light of the above, and in line with the IAQM guidance criteria (Ref 5.30) summarised in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, the dust emission magnitude for the proposed demolition works is **Medium**.

Earthworks

10.8.13 The Bryncir works site is anticipated to require earthworks associated with the removal of topsoil and trench works for new underground cables. For the purpose of this assessment, the total site area will exceed the 110,000 metres squared (m^2) level set by the IAQM guidance (Ref 5.30) summarised in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. The dust emissions magnitude effect for earthworks is **Large**.

Construction

10.8.14 The Bryncir works site is anticipated to require construction works including on site concrete batching and construction of a new substation. For the purpose of this assessment, the volume of construction work is considered to exceed 75,000 metres cubed (m^3) level set by the IAQM guidance (Ref 5.30) summarised in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. The dust emissions magnitude for construction is **Large**.

Trackout

10.8.15 Trackout is associated with the deposition of mud and potentially dusty material onto the public network from construction vehicles leaving the Bryncir works site. The number of outward construction related HDV (all vehicles >3.5 tonnes) movements is anticipated to fall within the <20 per day level set by the IAQM guidance (Ref 5.30) summarised in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. However, it is also assumed that the access road surface used by these vehicles will be unpaved and will exceed 100 m in length. To be precautionary, the dust emission magnitude for trackout is assigned as **Large**.

Step 2B: Determine the Sensitivity of the Area

10.8.16 Step 2B of the IAQM construction dust guidance, as described in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, requires the determination of the sensitivity of the area to construction dust impacts. According to the guidance, this is based on the sensitivity of individual receptors, the proximity and number of those receptors, background PM_{10} concentrations and site-specific factors, such as local terrain, meteorology and natural and existing windbreaks.

10.8.17 The IAQM criteria breaks up sensitivity into determining the sensitivity of the area on dust soiling and based on human health sensitivities of PM_{10}. **Table 10-4** summarises the distribution of receptors to dust soiling, **Table 10-5** presents the distribution of receptors that are sensitive to the health effects of PM_{10}, and **Table 10-6** shows the distribution of nature conservation sites.

Table 10-4 – Receptors sensitive to dust soiling

Receptor sensitivity	Distance from the Bryncir works site			
	0 – 20 m	20 – 50 m	50 – 100 m	100 – 250 m
High	0	2	0	7
Medium	0	1	0	0
Low	0	0	1	1

Table 10-5 – Receptors sensitive to human health effects from PM_{10}

Receptor sensitivity	Distance from the Bryncir works site			
	0 – 20 m	20 – 50 m	50 – 100 m	100 – 250 m
High	0	2	0	7
Medium	0	0	0	0
Low	0	0	0	0

Table 10-6 – Receptors sensitive to ecological impacts

Receptor sensitivity	Distance from the Bryncir works site	
	0 – 20 m	20 – 50 m
High	0	0
Medium	0	0
Low	3	3

10.8.18 There are two high sensitivity amenity receptors between 20 m and 50 m of the Bryncir works site. In line with the IAQM construction dust guidance, 1 – 10 high sensitivity amenity receptors within 20 m to 50 m equates to an area of **Low** sensitivity for dust soiling amenity impacts. The two receptors are residential properties located to the north-east and west of the Bryncir works site.

10.8.19 The same "1 – 10 receptors" are also highly sensitive to potential human health impacts associated with construction site emissions. However, background PM_{10} concentrations are estimated to be below 24 $\mu g/m^3$. This, coupled with the limited number of receptors near the Bryncir works site, means that the sensitivity of the area to human health impacts is **Low**.

10.8.20 There are three low sensitivity ecological receptors within 20 m of the Bryncir works site. In line with the IAQM construction dust guidance, this equates to an area of Low sensitivity.

Step 2C: Determine the Risk of Dust Impacts

10.8.21 Step 2C of the IAQM construction guidance concerns the determination of the risk of dust impacts, which is informed by the dust emission magnitude identified in Step 2A and the sensitivity of the area identified in Step 2B.

10.8.22 In this instance, the Large dust emissions magnitude associated with earthworks, construction, and trackout and the Low sensitivity of the area to dust soiling equates to Low risk of amenity impacts occurring. The Large dust emissions magnitude and the Low sensitivity of the area to human health impacts and ecological impacts equates to a Low risk of health and ecological impacts occurring. The Medium dust emissions magnitude associated with demolition and the Low sensitivity of the area to dust soiling, human health impacts and ecological impacts equates to Low risk of amenity, health and ecological impacts occurring.

Construction Site Plant and Non-Road Mobile Machinery Emissions

10.8.23 According to the IAQM guidance (Ref 5.30) exhaust emissions from on-site plant (and Non-Road Mobile Machinery (NRMM)) and the Bryncir works site traffic are unlikely to make a significant impact on local air quality, and in the vast majority of cases, they will not need to be quantitatively assessed. This is the case for the construction of the proposed works, due to the distance between the Bryncir works site and the limited number of sensitive human health receptors and low sensitivity of nature conservation receptors which mitigate against the requirement for an assessment.

10.8.24 At each location, emissions from site plant and NRMM will be transient and intermittent in nature, operating as and when and where required.

10.8.25 A review of site plant and NRMM machines has deemed that the effect of impacts will not be significant on the receptors considered in this assessment, in line with the IAQM guidance, for the following reasons:

- The good standard of baseline air quality.
- The transient and intermittent nature of emissions.
- The limited duration of time in which site plant and NRMM emissions will be present in near sensitive receptors.
- The distance between emission sources and the nearest high sensitivity receptors at the majority of locations.
- The effectiveness of standard practice emission control measures, including:
  - Use of plant with low NO_X, PM_{10} and $PM_{2.5}$ emissions.
  - Prohibiting unnecessary idling.
  - Prohibiting unnecessary NRMM movements.
  - Keeping plant and NRMM in a good state of repair.

10.9 Mitigation and Residual Effects

10.9.1 As discussed in **Section 10.7**, the construction dust assessment follows a step-by-step approach to determine the level of mitigation required to ensure that a significant effect will not occur. Step 3 of the IAQM guidance relates to the level of mitigation required following consideration of the risk of impacts identified during Step 1 and Step 2, which are described in **Section 10.8**.

10.9.2 The following mitigation measures are highly recommended by the IAQM and will be adopted during the construction phase:

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the construction compound fence. This may be the environment manager or environmental engineer or the site manager.
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authorities when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.
- Undertake daily on-site and off-site inspection (including roads), where receptors are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked.
- Carry out regular site inspections to monitor compliance with the CEMP commitments, record inspection results, and make an inspection log available to the Local Authorities when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Sustainable power sources (solar panels etc.) to be used where practicable. Where available, generators are to be low emission with hybrid battery systems (or to current best practice).
- Use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust and particulate matter suppression mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors (if used) and covered skips.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Avoid site runoff of water or mud.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

10.9.3 A schedule of environmental commitments will be presented in the **Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan.**

Residual Effect

10.9.4 Step 4 of the IAQM construction dust guidance is to determine whether the effects, after the application of the identified level of mitigation (Step 3 – **Section 10.9**), are significant or not. The IAQM guidance states that:

> *"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant".*

10.9.5 Providing a sufficient level of dust mitigation is implemented on the Bryncir works site throughout the works, with reference to those presented in **Section 10.7**, which are considered standard practice on all well managed construction sites of this scale, the residual effects from the proposed works are anticipated to be Negligible and not significant.

10.10 Summary

10.10.1 Existing air quality in the Study Area is of a good standard, with pollutant concentrations well within the air quality objective values set for the protection of human health. Much of the land around the Bryncir works site is rural in nature with isolated residential properties within 250 m of the site.

10.10.2 There are cWSs within 50 m to the Bryncir works site. These locations are potentially sensitive to emissions to air and could be adversely impacted by the construction of the proposed works.

10.10.3 The assessment has followed the IAQM guidance on assessing construction site air quality impacts. It has determined that, providing all construction activities adhere to the mitigation measures listed in this chapter and in the CEMP, the potential magnitude of impacts will be negligible and not significant.

10.10.4 The impact of NRMM emissions is anticipated to be not significant. This is due to the good standard of baseline air quality, the transient and intermittent nature of emissions from this source, the limited duration of time in which such machinery will be operation, and the effectiveness of standard practice emissions control measures.

10.10.5 Construction road traffic emissions and operation road traffic emissions impacts were screened out of the assessment. The increase in traffic during construction is such that there is no potential for them to contribute to a significant effect on local air quality, additionally no change is expected for operational road traffic therefore there is no potential for a significant effect on local air quality from a change in emissions.

11. Noise and Vibration

11.1 Introduction

11.1.1 This chapter presents an assessment of the likely Noise and Vibration effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Bryncir Works**.

11.1.2 This chapter describes the baseline conditions currently existing in the Study Area (as defined in **Section 11.3**), the scope of the assessment, the potential effects, the mitigation measures required to avoid, reduce or offset any significant negative effects, and the likely residual effects after these mitigation measures have been adopted.

11.1.3 The chapter is supported by the following appendices and figures:

- **Figure 3.11.1:** Noise Monitoring and Sensitive Receptor Locations.
- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 3.11.A: Bryncir and Glaslyn Cables Baseline Noise Monitoring.**
- **Volume 8, Appendix 3.11.B: Operational Noise Assessment.**

11.1.4 Other chapters that are useful to review in association with this chapter are as follows:

- **Chapter 5: Ecology and Nature Conservation.**
- **Chapter 9: Traffic and Transport.**

11.1.5 This chapter should be read with reference to Acoustic Terminology that is defined in Table 14-1 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

11.2 Legislation and Planning Policy

11.2.1 This section summarises the legislation and planning policy framework that is relevant to the Landscape and Visual Amenity assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

11.2.2 The following legislation is relevant to Noise and Vibration:

- Control of Pollution Act 1974 (Ref 8.5).
- Environmental Protection Act 1990 (Ref 5.7).

National Policy

11.2.3 The following national planning policy is relevant to Noise and Vibration:

- PPW – Edition 12 (Ref 4.4).

- Future Wales: The National Plan 2040 (Ref 4.3).

11.3 Study Area

11.3.1 The Study Area has been defined to include construction noise and vibration receptors likely to be at risk from possible direct and indirect impacts that might arise from the proposed works. For construction noise effects, the area for which impacts are expected is 300 m from the Bryncir works site, based on guidance in BS 5228-1:2009+A1:2014 (Ref 11.1), which states construction noise predictions are generally reliable up to 300 m. For construction vibration, it is expected that receptors at a distance of at least 100 m would not experience perceptible levels of vibration. This Study Area is referenced from the DMRB LA 111 (Ref 11.2), which, although the document is aimed at road projects, is considered reasonable to reference in the absence of any other guidance on construction vibration.

11.3.2 The Study Area for operational noise covers receptors located within 500 m of the proposed substation boundary. This distance is based on experience of other substation noise assessments and the results of operational noise modelling.

11.4 Assumptions and Limitations

11.4.1 The measured ambient $L_{Aeq,T}$ noise level has been used to define construction noise assessment criteria at sensitive receptors. As it is not possible to measure noise levels at every sensitive receptor, a number of locations have been selected to provide an indication of the likely levels of baseline noise that sensitive receptors may experience. Where there is uncertainty over whether noise measurements are representative of a sensitive receptor, a conservative approach has been taken by applying noise data from a measurement location that is judged as being quieter. This approach ensures that the application of construction noise criteria (defined from ambient noise measurements) is suitably conservative.

11.4.2 Construction noise predictions have been carried out using plant lists provided by the Contractor. Noise predictions were carried out to represent a conservative scenario where all construction plant is operational on-site. Consequently, noise predictions may overestimate construction noise levels and can be considered as worst-case.

11.4.3 Details on assumptions and limitations applied in the operational noise assessment are provided in **Volume 8, Appendix 3.11.B: Operational Noise Assessment**.

11.5 Baseline

11.5.1 Details of the technical methods used to determine the baseline conditions are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. Results of the baseline monitoring methodology are presented **Table 11-1**. Full details of results are presented in **Volume 8, Appendix 3.11.A: Bryncir and Glaslyn Cables Baseline Noise Monitoring**. Baseline sound data used in the operational noise assessment are presented in **Volume 8, Appendix 3.11.B: Operational Noise Assessment**.

Table 11-1 – Baseline monitoring results

Location	Daytime (07:00 – 19:00)		Evening (19:00 – 23:00)		Night (23:00 – 07:00)	
	$L_{Aeq,12h}$ decibel (dB)	$L_{A90,15min}$ dB	$L_{Aeq,4h}$ dB	$L_{A90,15min}$ dB	$L_{Aeq,8h}$ dB	$L_{A90,15min}$ dB
LT3.1	45	37	41	36	38	34
LT3.2	67	46	64	40	59	35
LT3.3	61	44	57	39	53	29

11.5.2 Sensitive receptors have been identified within the 300 m Study Area using a commercial Ordnance Survey (OS) Addressbase Plus database (Ref 11.3). Sensitive receptor locations are illustrated in **Figure 3.11.1** and a summary of sensitive receptors identified for noise and vibration assessment are presented in **Table 11-2** below. These receptors are of 'Medium' sensitivity (as per Table 14-2 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**).

Table 11-2 – Sensitive receptors

Receptor ID	Receptor Description	Sensitivity	Representative Monitoring Location
R01	Glan Dwyfach A487(T) From Bryncir To Glan Dwyfach Junction, Bryncir, LL51 9LJ	Medium	LT3.2
R02	Glan Dwyfachdwyfach Farmfferm Dwyfach A487(T) From Bryncir To Glan Dwyfach Junction, Bryncir, LL51 9LJ	Medium	LT3.2
R03	Efail Glan Dwyfachchalet B4411 From A487(T) Glan Dwyfach Junction To Llangybi Road Near Rhiwafon, Garndolbenmaen, LL51 9LQ	Medium	LT3.2
R04	Bryn Efail Uchafbrynefail Uchaf A487(T) Glan Dwyfach Junction To Garndolbenmaen Junction, Garndolbenmaen, LL51 9LQ	Medium	LT3.3
R05	Noddfanoddfa A487(T) Glan Dwyfach Junction To Garndolbenmaen Junction, Garndolbenmaen, LL51 9LQ	Medium	LT3.3
R06	Bryn 'Refail Isafbryn Efail Isaf B4411 From A487(T) Glan Dwyfach Junction To Llangybi Road Near Rhiwafon, Garndolbenmaen, LL51 9PQ	Medium	LT3.1
R07	Felin Llecheiddior Road From North Of Capel Beirdd Passing Hendy And Tyddyn Y Felin And Melin Llecheiddior To B4411, Ynys, Criccieth, LL51 9EZ	Medium	LT3.2

11.6 Scope of Assessment

11.6.1 This section describes the scope of the assessment of effects on Noise and Vibration.

11.6.2 **Table 11-3** summarises the potential noise and vibration receptors that have been reviewed and states whether they have been included or excluded from the noise and vibration assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 11-3 – Scope of Noise and Vibration assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Noise and vibration sensitive receptors	In	In	There are multiple residential properties and farms within or immediately adjacent to the Bryncir works site that have the potential to experience construction related noise and vibration effects.
PRoW users	Out	Out	The PRoW Dolbenmaen No 18 footpath runs through the Bryncir works site from south to the north-east and is being diverted around the proposed Bryncir Substation. Construction noise would only affect PRoW users and leisure users for a limited time when they are close to a source of noise. Given the dynamic nature of PRoW users and leisure users, the range of noise impacts along PRoWs that form the ambient noise environment, and the transient usage, a material change in the experience of PRoW users and leisure users as a whole due to construction and operational noise emissions from the proposed works is not anticipated. An assessment of noise effects on PRoW users and leisure users as a result of the proposed works has been scoped out.

11.7 Methodology

11.7.1 Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the Noise and Vibration assessment are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

11.8 Potential Effects

11.8.1 The anticipated effects resulting from Noise and Vibration during construction, operation and maintenance of the proposed works are outlined as follows:

Construction

11.8.2 Key phases of construction works that may result in potential adverse Noise and Vibration effects at sensitive receptors have been identified as Noise Generating Activities (NGA), as follows:

- NGA1 – Preliminary works – establishment of compounds.
- NGA2 – Enabling works, substation construction and access routes construction.
- NGA3 – Cable installation – open cut cable laying.
- NGA4 – Overhead Line installation – overhead line installation and decommissioning.
- NGA5 – Landscaping works for reinstatement.
- NGA6 – Demobilisation – removal of construction compounds.

Construction Noise

11.8.3 Results of baseline noise monitoring (**Table 11-1**) have been used to define BS 5228-1 ABC categories (see Table 14.3 of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**) at each receptor. Receptors represented by measured noise levels at LT3.1 and LT3.3 will experience daytime baseline noise conditions equivalent to Category A. Receptors represented by measurement location LT3.2 are within Category B daytime baseline noise levels.

11.8.4 Results of the predicted construction noise levels in each phase of the construction programme are presented in **Table 11-4** below.

Table 11-4 – Predicted daytime construction noise levels

Receptor ID	ABC category	Daytime significance threshold $L_{Aeq,T}$ dB	Predicted daytime construction noise level $L_{Aeq,T}$ dB					
			NGA1	NGA2	NGA3	NGA4	NGA5	NGA6
R01	B	70	45	52	44	54	61	43
R02	B	70	48	52	44	50	57	46
R03	B	70	48	55	48	53	59	46
R04	A	65	51	58	39	43	57	49
R05	A	65	50	55	41	38	54	48
R06	A	65	43	51	45	44	56	41
R07	B	70	43	51	46	63	66	41

11.8.5 Noise levels from construction activities associated with NGA1 to NGA4 and NGA6 are predicted to be below the relevant significance threshold at each receptor by more than 5 dB. Construction noise levels of this magnitude are identified as a Very Low impact and a Negligible effect at Medium sensitivity receptors, which is not significant.

11.8.6 Noise levels from construction activities associated with NGA5 are predicted to be below the relevant significance threshold at each receptor by more than 5 dB with the exception of R07, which is 4 dB below. Noise levels from construction activities associated with NGA5 are therefore equivalent to a Negligible effect (not significant) at

all receptors with the exception of R07, which would experience construction noise levels equivalent to a Low impact. A Low impact at a Medium sensitivity receptor is equivalent to a Minor Adverse effect, which is not significant.

Construction Vibration

11.8.7 It is generally accepted that, without detailed understanding of the media waveform and frequency distribution, ground-borne vibration prediction methods are “beset with complexities and uncertainties” (Ref 11.4). Typical construction and working routines are unlikely to generate levels of vibration at local receptors at a level where cosmetic and structural damage would be expected; however, ground-borne vibration may be substantial enough to result in adverse effects for occupants of affected buildings. The level of impact at different receptors will be dependent upon several factors including distance between the works, ground conditions and the specific activities being undertaken. This section assesses the construction vibration effects based on the highest vibration generating activity likely to occur in each NGA.

NGA1 NGA3 and NGA5

11.8.8 The highest levels of vibration generated in NGA1, NGA3 and NGA5 would come from the use of vibratory rollers. Vibratory rollers may generate significant levels of vibration (i.e. Peak Particle Velocity (PPV) levels exceeding 1.0 millimetre per second (mm/s)) at receptors within 25 m and the 0.3 mm/s adverse effect threshold may be exceeded at receptors within 50 m of vibratory roller works. As no receptors are identified within 50 m of the site compounds, open-cut cable route or landscaping works, it is expected that the ground-borne vibration levels generated from construction activities associated with NGA1, NGA3 and NGA5 would be equivalent to a negligible effect at all receptors, which is not significant.

NGA2

11.8.9 The highest levels of ground-borne vibration generated in NGA2 are likely to arise from the use of vibratory rollers for construction of access routes and bored piling for construction of the substation foundation.

11.8.10 Calculations of representations bored piling vibration levels are presented in **Volume 8, Appendix 4.11.A: Construction Noise and Vibration Calculations and Results**. These calculations are based on analysis of data from Table D.6 of BS 5228-2. Calculations indicate that the 1 mm/s threshold of significance may be exceeded at receptors within 15 m of bored piles and the 0.3 mm/s adverse effect threshold would be exceeded within 40 m of bored piles.

11.8.11 As there are no receptors within 50 m of the proposed access routes or within 40 m of the substation foundation, it is expected that the ground-borne vibration levels generated from construction activities associated with NGA2 would be equivalent to a negligible effect at all receptors, which is not significant.

NGA4

11.8.12 There is not expected to be any vibratory plant in use for construction activities associated with NGA4, therefore no significant ground-borne vibration effects are expected at any receptor during this phase.

NGA6

11.8.13 Surface plant, such as cranes, compressors and generators, are not recognised as sources of high levels of ground-borne vibration. Reference to Figure C2 of 'Control of Vibration and Noise During Piling' (Ref 11.5) confirms that PPVs significantly less than 5 mm/s are generated by such machinery, even at distances of only 10 m. For example, the indication is that a bulldozer would generate a PPV of approximately 0.6 mm/s and a 'heavy lorry on [a] poor road surface' would generate a PPV of less than 0.1 mm/s at 10 m. These values are below the threshold of significant vibration effects of 1.0 mm/s (see **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**) where it is likely that vibration in residential environments will result in complaints but can be tolerated if prior warning and explanation is given to residents. No significant vibration effects are expected due to NGA6.

Construction Traffic Noise

11.8.14 Construction traffic is proposed to travel to the Bryncir works site via the strategic road network, then use the most appropriate route to avoid local villages and rural areas. The main access to the Bryncir works site would be from the A487 using an upgraded existing access point opposite Bryn-yr-efail-uchaf, before following field boundaries to the substation compound. A small number of staff would also use an access point off the B4411, as well as an access on the A487 north.

11.8.15 Potential changes in road traffic noise from road links as a result of the Bryncir works site have been considered by calculating the Calculation of Road Traffic Noise (Ref 11.6) Basic Noise Level (BNL) and comparing the change in $L_{A10,1h}$ noise levels. **Table 11-5** presents the results of the assessment. Road traffic flow data used in BNL calculations are presented in **Volume 8, Appendix 4.11.A: Construction Noise and Vibration Calculations and Results**.

Table 11-5 – Predicted construction traffic noise levels

Link	2026 baseline traffic BNL, $L_{A10,1h}$ dB	2026 baseline + construction traffic BNL, $L_{A10,1h}$ dB	Change in BNL, dB
A487 north of B4411	66.1	66.1	+0.0
A487 east of B4411	65.9	65.9	+0.0
B4411 south of A487	60.2	60.2	+0.0

11.8.16 It is calculated that the construction road traffic associated with the proposed works will result in a worst-case increase in road traffic noise of +0.0 dB along the B4411 to the south of the A487. This increase in noise is equivalent to a negligible effect and is not significant.

Operation and Maintenance

11.8.17 The operational noise assessment is presented in **Volume 8, Appendix 3.11.B: Operational Noise Assessment**. A worst-case rating noise level of 24 dB $L_{Ar,Tr}$ was predicted externally at sensitive receptors. This is approximately equivalent to the measure background sound level at night and is a very low level of noise that would not cause disturbance. Operational noise effects are not significant.

11.9 Mitigation and Residual Effects

Construction

Best Practicable Means

11.9.1 Measures to control noise as defined in Annex B of BS 5228-1 and measures to control vibration as defined in Section 8 of BS 5228-2 will be adopted where reasonably practicable. These measures represent Best Practicable Means (BPM) and will be secured within a CEMP for the construction phase. BPM that will be implemented during construction works and secured through the CEMP are presented below:

- Ensuring that all appropriate processes, procedures and measures are in place to minimise noise before works begin and throughout the construction programme.
- All contractors to be made familiar with current legislation and the guidance in BS 5228 (Parts 1 and 2) which should form a prerequisite of their appointment.
- Where reasonably practicable, noise and vibration are controlled at source (e.g. the selection of inherently quiet plant and low vibration equipment), review of the construction programme and methodology to consider quieter methods, consideration of the location of equipment on-site and control of working hours.
- Use of modern plant, complying with applicable UK noise emission requirements.
- Hydraulic techniques for breaking to be used in preference to percussive techniques, where reasonably practicable.
- Drop heights of materials will be minimised.
- Plant and vehicles will be sequentially started up rather than all together.
- Off-site pre-fabrication where reasonably practicable.
- Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturer's specifications.
- All construction plant and equipment to be properly maintained, silenced where appropriate, operated to prevent excessive noise and switched off when not in use.
- Loading and unloading of vehicles, dismantling of site equipment or moving equipment or materials around the works site to be conducted to minimise noise generation, as far as reasonably practicable.
- All vehicles used on-site shall incorporate reversing warning devices as opposed to the typical tonal reversing alarms to minimise noise disturbance where reasonably practicable.
- Provision of information to the relevant local authority and local residents to advise of potential noisy works that are due to take place.
- Unnecessary revving of engines will be avoided, and equipment will be switched off when not in use.
- Plant will always be used in accordance with manufacturers' instructions. Care will be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading will also be carried out away from such areas.

11.9.2 Whilst these BPM measures will not reduce the overall impact magnitude identified in **Section 11.8**, they are intended to control construction noise and vibration emissions. The residual effects during construction are the same as those presented in **Section 11.8**.

Communication Strategy

11.9.3 The effect of Noise and Vibration on nearby sensitive receptors can be minimised through a good communication strategy. Prior to works being undertaken, liaison will be undertaken with occupiers of sensitive receptors that may be adversely affected by construction noise and vibration. Providing information of construction works and notice of when high noise and/or vibration generating activities are taking place can reduce adverse effects. All communications will contain contact details to direct any questions or complaints to. The extent of communications will be agreed with the Local Authority through the Section 61 process.

Operation and Maintenance

11.9.4 The substation super grid transformer was modelled within an acoustic enclosure, which is assumed to provide at least 20 dB attenuation.

11.10 Summary

11.10.1 An assessment of construction noise and vibration emissions during works associated with the Bryncir Site has been undertaken. The assessment does not identify any significant residual noise and vibration effects. Measures covering BPM are secured in the CEMP and are sufficient for controlling construction noise and vibration emissions.

11.10.2 An assessment of operational substation noise emissions has been undertaken. The level of substation noise is predicted to be approximately equal to the measured night-time background sound level and of a level that would not cause disturbance. Operational noise effects are not significant.

12. Socio-Economics

12.1 Introduction

12.1.1 This chapter presents an assessment of the likely Socio-Economic effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Bryncir Works**.

12.1.2 This chapter describes the baseline conditions currently existing in the Study Area (as defined in **Section 12.3**), the scope of the assessment, the potential effects, the mitigation measures required to avoid, reduce or offset any significant negative effects, and the likely residual effects after these mitigation measures have been adopted.

12.1.3 This chapter is supported by figures and appendices as listed below:

- **Figure 3.12.1**: Socio-Economic Land Use Receptors.
- **Figure 3.12.2**: 60-minute Peak Hour Drive from the Bryncir Works Site.
- **Figure 3.12.3:** Public Rights of Way.
- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

12.1.4 Other chapters that are useful to review in association with this chapter are as follows:

- **Chapter 9: Traffic and Transport; and**
- **Chapter 16: Cumulative Effects.**

12.2 Legislation and Planning Policy

12.2.1 This section summarises the legislation and planning policy framework that is relevant to the Socio-Economic assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

12.2.2 The following legislation is relevant to Socio-Economics:

- Environment (Wales) Act 2016 (Ref 5.10).
- The Planning (Wales) Act 2015 (Ref 12.1).
- Well-being of Future Generations (Wales) Act 2015 (Ref 10.5).
- Health and Well-being Impact Assessment for the Planning (Wales) Bill 2015 (Ref 12.2).

National Policy

12.2.3 The following national policy is relevant to Socio-Economics:

- PPW – Edition 12 (Ref 4.4).

- The UK's Modern Industrial Strategy (Ref 12.3).
- Building Better Places (Ref 12.4).
- Ten Point Plan for a Green Industrial Revolution (Ref 12.5).
- Future Wales: The National Plan 2040 (Ref 4.3).
- Stronger, Fairer, Greener Wales - Net Zero Skills Action Plan (Ref 12.6).
- Net Zero Wales Carbon Budget 2 (2021-25) (Ref 12.7).
- Welcome to Wales - Priorities for the Visitor Economy 2020-25 (Ref 12.8).
- Welsh Government Economic Resilience and Reconstruction Mission (Ref 12.9).
- UK's Integrated National Energy and Climate Plan (Ref 12.10).

Regional Policy

12.2.4 The following regional policy is relevant to Socio-Economics:

- North Wales Regional Economic Framework (Ref 12.11).
- A Growth Vision for the Economy of North Wales (Ref 12.12).
- North Wales Energy Strategy (Ref 12.13).

Local Policy

12.2.5 The following local policy is relevant to Socio-Economics:

- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (2017) (Ref 4.9).
- Anglesey and Gwynedd Well-being Plan 2023-28 (2023) (Ref 12.14).
- Eryri Local Development Plan 2016 – 2031 (Ref 4.11).
- Eryri Local Development Plan Review Report 2023 (Ref 5.21).

Guidance

12.2.6 The following guidance is relevant to Socio-Economics:

- TAN 23: Economic Development (Ref 12.15).
- Additionality Guide (4th Edition) (Ref 12.16).
- The Green Book – Appraisal and Evaluation in Central Government (Ref 12.17).

12.3 Study Area

12.3.1 The impacts of the proposed works with respect to Socio-Economics are considered at varying spatial levels according to the likely extent of the effect under consideration. This approach is consistent with the Homes and Communities Agency (HCA), now known as Homes England, guidance entitled 'Additionality Guide, A Standard Approach to Assessing the Additional Impact of Projects, 4th Edition' (Ref 12.216). This guidance is applicable in Wales as well as England, as it follows principles outlined in His Majesty's Treasury's Green Book, which is used across the UK for project appraisal and evaluation. **Table 12-1** presents the different components of the Socio-Economics

assessment of effects, the geographical scale at which each component is assessed, and the rationale behind these geographical scales.

Table 12-1 – Assessment of effects Study Areas

Impact	Geographic Study Area	Rationale for Study Area
Employment generation during construction phase, and the operational and maintenance phase (direct, indirect and induced impacts). Skills and training. Gross Value Added.	60-minute drive area (Principal Economic Impact Area).	Research by Chartered Institute of Personnel and Development (CIPD) found that 90% of national employees commuted for 60 minutes or less each way. This was reported by CIPD in the 2018 Employee outlook 'Employee views on working life'. The 60-minute drive area represents the principal labour market catchment area for the proposed works.
Temporary accommodation services.	30-minute and 60-minute drive area.	Professional judgement and experience from other proposed developments in the UK.
PRoW.	Within, and up to 500 m radius from the Bryncir works site.	Professional judgement and experience from other proposed developments in the UK.
Agricultural land holdings (farms).	Within, and up to 500 m radius from the Bryncir works site.	Professional judgement and experience from other proposed developments in the UK.
Community facilities.	1 km radius from the Bryncir works site.	Professional judgement and location of sensitive receptors for impacts arising from the proposed works as informed by other assessments. Community facilities are likely to be accessed by residents from a wider catchment, especially in rural areas, owing to a tendency for provision to be sparse. A wider radius has been considered for this receptor in order to fully appreciate the effect of severance on access to these facilities.
Other private and community assets (residential properties, business premises, visitor attractions, development land).	500 m radius from the Bryncir works site.	Professional judgement and experience from other proposed developments in the UK.

12.4 Assumptions and Limitations

12.4.1 The assessment has been carried out against a benchmark of current Socio-Economic baseline conditions prevailing around the proposed works, as far as possible within the limitations of such a dataset. The most recently available data sources have been used in this chapter, although baseline data can be subject to a time lag between collection and publication.

12.5 Baseline

12.5.1 This section first describes the population and the economy local to the Bryncir works site. The baseline is described relative to three geographies. The Principal Economic Impact Area is defined as a 60-minute drive time from the Bryncir works site; this consists of 191 Lower Layer Super Output Areas (LSOAs) and as shown in **Figure 3.12.2** this takes in most of Gwynedd, the Isle of Anglesey and Conwy and small sections of Denbighshire and Powys. Data is also provided for Gwynedd local authority and for the National comparator, Wales.

12.5.2 The section goes on to identify Socio-Economic assets and resources local to the Bryncir works site (within a 500 m or 1 km radius as appropriate) which could be affected by the proposed works either directly (i.e. via land take) or indirectly (via severance associated with transport impacts). The land use receptors identified include PRoW, open spaces, community facilities, residential properties, visitor attractions, business premises, agricultural land holdings, and development land.

Population Demographics

12.5.3 The 2021 Census provides data on the population of the Principal Economic Impact Area and the comparator geographies (Ref 12.18). The Principal Economic Impact Area had a population of 315,251 in 2021, while Gwynedd's population was smaller (117,393). The Principal Economic Impact Area constituted approximately 10.1% of Wales' population (3,107,494) (Ref 12.19). In the Principal Economic Impact Area, 25.6% of the population were aged over 65, a higher proportion than that recorded in Gwynedd (23.1%) and Wales (21.3%). The Principal Economic Impact Area had a smaller proportion of working age residents (59.3%) compared to Gwynedd (61.4%) and Wales (62.1%). **Plate 12-1** displays the population age profile across the three

geographies.

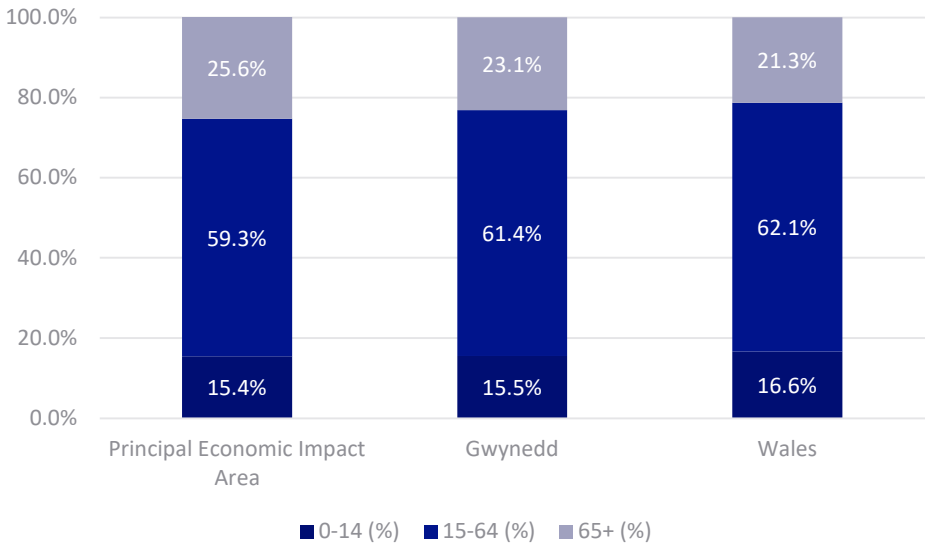


Plate 12-1 – Population Age Profile

Economic Activity

12.5.4 **Table 12-2** displays economic activity rates across the three geographies using Census 2021 data (Ref 12.20). The Principal Economic Impact Area has a smaller proportion of economically active individuals (54.9%) than both Gwynedd (56.1%) and Wales (56.6%). Of those who are economically active, the Principal Economic Impact Area has the lowest proportion of unemployed individuals (3.0%), compared to 3.2% in Gwynedd and 3.1% in Wales. In the Principal Economic Impact Area, 28.2% of the population worked full-time, compared to 28.0% in Gwynedd and 32.2% in Wales.

Table 12-2 – Economic activity

	Principal Economic Impact Area	Gwynedd	Wales
Economically Active (%)	54.9	56.1	56.6
Employee: Part-time (%)	13.2	13.5	13.0
Employee: Full-time (%)	28.2	28.0	32.2
Self-employed (%)	10.5	11.2	8.3
Unemployed (%)	3.0	3.2	3.1
Economically inactive (%)	45.1	43.9	43.5

*Source: Office for National Statistics, (2022); Census 2021. * Economic activity rate is the proportion of working aged people (i.e., people aged 16-64) who are active or potentially active members of the labour market (i.e., people who are employed or unemployed). Examples of people who may not count as economically active include students, early retirees, carers and people with a long-term sickness or disability. Note: some columns on the table may not sum due to rounding.*

Qualifications

12.5.5 **Table 12-3** categorises the over 16 population of the Principal Economic Impact Area and the comparator geographies according to the highest level of qualification they have achieved, using 2021 Census data (Ref 12.21). 33.4% of the Principal Economic Impact Area are qualified to level 4+, greater than the proportion recorded across Wales (31.5%) but less than that in Gwynedd (34.5%). Of the three geographies, the Principal Economic Impact Area had the highest proportion of individuals with apprenticeships (6.1%) and the largest proportion of people with 'other' qualifications alongside Wales (2.7%). The Principal Economic Impact Area had a lower proportion of individuals with no qualifications (17.5%) than Wales (19.9%), however Gwynedd had the lowest proportion of the three geographies (16.3%). Generally, the Principal Economic Impact Area is less qualified than Gwynedd, but more qualified than Wales as a whole.

Table 12-3 – Highest level of qualification

	Principal Economic Impact Area	Gwynedd	Wales
No qualifications (%)	17.5	16.3	19.9
Level 1 and entry level qualifications (%)	8.2	7.6	8.7
Level 2 qualifications (%)	14.5	14.6	14.4
Apprenticeship (%)	6.1	5.8	5.6
Level 3 qualifications (%)	17.5	18.8	17.2
Level 4 qualifications+ (%)	33.4	34.5	31.5
Other qualifications (%)	2.7	2.5	2.7

Note: Some columns on the table may not sum to 100% due to rounding.

Employment by Industry

12.5.6 The 2021 Census provides data on employment by industry, classifying industries by their Standard Industrial Classification (Ref 12.22). In the Principal Economic Impact Area, the largest industry is Q: human health and social work activities (17.8% of employment); this is also the largest industry in Gwynedd (16.6%) and Wales (17.0%). Industry G: Wholesale and retail trade; repair of motor vehicles and motor cycles is the second largest industry in all three geographies. Industry P: Education is the third largest industry in all three geographies. In general, the distribution of employment across industries is relatively similar between all three geographies. Industry I Accommodation and food service activities has a greater proportion of employment in Gwynedd (8.5%) compared to the Principal Economic Impact Area (7.9%); Wales has the lowest proportion of all three geographies (5.2%). **Table 12-4** provides further data on employment distribution by industry for all three geographies.

Table 12-4 – Employment by industry

	Principal Economic Impact Area	Gwynedd	Wales
A Agriculture, forestry and fishing (%)	3.5	3.9	1.8
B Mining and quarrying (%)	0.3	0.3	0.2
C Manufacturing (%)	5.2	5.2	8.7
D Electricity, gas, steam and air conditioning supply (%)	0.9	0.9	0.7
E Water supply; sewerage, waste management and remediation activities (%)	1.1	1.3	1.0
F Construction (%)	9.2	9.7	8.6
G Wholesale and retail trade; repair of motor vehicles and motor cycles (%)	14.0	13.3	14.5
H Transport and storage (%)	3.3	2.9	3.8
I Accommodation and food service activities (%)	7.9	8.5	5.2
J Information and communication (%)	2.2	2.3	2.7
K Financial and insurance activities (%)	1.1	0.8	2.9
L Real estate activities (%)	1.5	1.5	1.3
M Professional, scientific and technical activities (%)	3.9	3.6	4.4
N Administrative and support service activities (%)	4.3	4.3	4.2
O Public administration and defence; compulsory social security (%)	8.7	8.4	9.2
P Education (%)	10.2	11.4	9.6
Q Human health and social work activities (%)	17.8	16.6	17.0
R, S, T, U Other (%)	4.8	5.2	4.2

Note: Some columns may not add up due to rounding

Gross Value Added (GVA)

12.5.7 The Office for National Statistics published data on Gross Value Added (GVA) in 2024 for the year 2022 (Ref 12.23). Gwynedd's GVA per person (£22,206) was lower than the average across Wales (£23,804) (Ref 12.24). **Table 12-5** presents the composition of GVA by industry in Gwynedd and Wales (Ref 12.25). The largest industry by GVA in Gwynedd was Industry Q: Human health and social work activities (14.4%), followed by

Industry L: Real estate activities (marginally lower at 14.3%). Wales had a notably larger industry by GVA in Industry C: Manufacturing (15.4%) compared to Gwynedd (3.5%). Gwynedd however had a much larger Industry I: Accommodation and food services (8.4%) compared to Wales (3.7%).

Table 12-5 – GVA by Industry

	Gwynedd	Wales
A Agriculture, forestry and fishing (%)	4.3	1.6
B Mining and quarrying (%)	N/A	0.3
C Manufacturing (%)	7.5	15.4
D Electricity, gas, steam and air conditioning supply (%)	3.5	1.4
E Water supply; sewerage, waste management and remediation activities (%)	N/A	1.8
F Construction %)	7.7	6.4
G Wholesale and retail trade; repair of motor vehicles and motor cycles (%)	8.8	10.0
H Transport and storage (%)	1.2	2.9
I Accommodation and food service activities (%)	8.4	3.7
J Information and communication (%)	3.1	2.9
K Financial and insurance activities (%)	0.5	6.1
L Real estate activities (%)	14.3	11.2
M Professional, scientific and technical activities (%)	2.0	4.1
N Administrative and support service activities (%)	1.4	3.2
O Public administration and defence; compulsory social security (%)	10.1	8.7
P Education (%)	9.0	6.3
Q Human health and social work activities (%)	14.4	11.1
R Arts, entertainment and recreation (%)	2.2	1.2
S Other service activities (%)	1.7	1.6
T Activities of Households (%)	0.1	0.1

Note: Columns may not add up to 100% due to rounding. Data for Gwynedd is published with industries A and B combined, as well as industries D and E combined. Therefore, the proportions of these industries are represented together under industry A and industry D.

Deprivation

12.5.8 The 2019 Welsh Index of Multiple Deprivation presents deprivation data at LSOA level (Ref 12.26). There are 1,909 LSOAs across Wales; the average rank of the LSOAs comprising Gwynedd was 1,080 (with 1 being the most deprived). Scores are also given for each LSOA, with 0 being the least deprived and 100 the most deprived. The average

score across the Gwynedd LSOAs was 16.8. Furthermore, the median deprivation decile for Gwynedd's LSOAs was 6; this indicates that the average LSOA in Gwynedd is less deprived than 60% of LSOAs in Wales. Overall therefore, Gwynedd is relatively less deprived on average.

Local Accommodation Capacity

12.5.9 Analysis of the hotel, bed and breakfast and inns accommodation sector has been undertaken to consider the likely capacity in the context of potential demand from the construction workforce. Data on the number of rooms available within a 30 and 60-minute drive area in the hotel, bed and breakfast and inns accommodation sector has been sourced from CoStar, a property resource website (Ref 12.27). Typical room occupancy is sourced from the Welsh Government's accommodation occupancy survey for 2023 (Ref 12.28). As of 2024, there are approximately 1,083 rooms in local hotel, bed and breakfast and inns accommodation within a 30-minute drive of the Bryncir works site, as well as 3,218 rooms within a 60-minute drive of the Bryncir works site. This number has been adjusted in **Table 12-6** and

12.5.11 Table **12-7** to reflect the typical availability based on seasonal occupancy rates.

Table 12-6 – Accommodation capacity within a 30-Minute drive time

Month	Typical room occupancy (%)	Inventory rooms	Rooms available after existing demand
January	47	1,083	574
February	56	1,083	477
March	59	1,083	444
April	63	1,083	401
May	69	1,083	336
June	71	1,083	314
July	76	1,083	260
August	80	1,083	217
September	75	1,083	271
October	66	1,083	368
November	56	1,083	477
December	60	1,083	433

Table 12-7 – Accommodation capacity within a 60-Minute drive time

Month	Typical room occupancy (%)	Inventory rooms	Rooms available after existing demand
January	47	3,218	1,678
February	56	3,218	1,388
March	59	3,218	1,291
April	63	3,218	1,163
May	69	3,218	970
June	71	3,218	905
July	76	3,218	744
August	80	3,218	616
September	75	3,218	777
October	66	3,218	1,066
November	56	3,218	1,388
December	60	3,218	1,259

PRoW

12.5.12 There are two PRoW in the Bryncir works site:

- Public Right of Way Dolbenmaen No 18 crosses the Bryncir works site.
- Public Right of Way Dolbenmaen No 17 falls marginally in the Bryncir works site.

12.5.13 Within 500 m of the Bryncir works site, there are 12 PRoW:

- Public Right of Way Dolbenmaen No 19.
- Public Right of Way Llanystumdwy No 96.
- Public Right of Way Dolbenmaen No18a.
- Public Right of Way Llanystumdwy No 62.
- Public Right of Way Dolbenmaen No 86.
- Public Right of Way Dolbenmaen No 92.
- Public Right of Way Dolbenmaen No 73.
- Public Right of Way Dolbenmaen No 74.
- Public Right of Way Dolbenmaen No 91.
- Public Right of Way Dolbenmaen No 1.
- Public Right of Way Dolbenmaen No 4.
- Public Right of Way Dolbenmaen No 17b.

12.5.14 The NCR 8 also runs within 100 m north-west of the Bryncir works site.

Open Space

12.5.15 There are no dedicated open space sites in the Bryncir works site or within 500 m of the Bryncir works site.

Community Facilities

12.5.16 There is one community facility within 1 km of the Bryncir works site, the Ysgol Garndolbenmaen primary school, approximately 840 m east from the Bryncir works site. The nearest hospital is Porthmadog Ysbyty Alltwen National Health Service Wales, approximately 8 km south-east in the village of Tremadog.

Residential Properties

12.5.17 There are no residential properties in the Bryncir works site. Within 500 m, residential properties are relatively sparsely located with small clusters on the B4411 and Station Road. There is a large cluster of residential properties approximately 1 km north-east in the village of Garndolbenmaen. These can be seen in **Figure 3.12.1: Socio-Economic Land Use Receptors.**

Visitor Attractions

12.5.18 There are two visitor accommodation sites within 500 m of the Bryncir works site, the Eiddior cottage holiday rental and the Hafod Llecheiddior holiday home. They are both 500 m north-west of the works site and are visible in **Figure 3.12.1: Socio-Economic Land Use Receptors.**

12.5.19 The closest part of Eryri (Snowdonia) National Park is 1.1 km east of the Bryncir works site; visitors may use accommodation near the Bryncir works site as a base location to visit the national park.

Business Premises

12.5.20 There are no business premises in the Bryncir works site. Within 500 m of the Bryncir works site, there are four business premises:

- The Goat Inn.
- Bryncir Garden Centre.
- Caffi at Bryncir Garden Centre.
- Evans W H warehouse/agricultural services.

Agricultural Land Holdings

12.5.21 There are four landowners and one tenant in the Bryncir works site. Agricultural land in the area is predominantly used for cattle and sheep grazing; crops of silage are also taken from the land in some months.

Development Land

12.5.22 Development land refers to sites on which there are planning applications and planning permissions. The assessment considers the potential for the proposed works to conflict with, hinder or otherwise adversely affect development land within or nearby to the Bryncir works site.

12.5.23 There are no development applications in progress within 500 m of the Bryncir works site. There is one development application 880 m north-west of the Bryncir works site, an application for a vertical extension of an existing sand and gravel pit, partial backfilling and site restoration to agriculture.

12.5.24 There are no housing allocations or employment allocations within 500 m of the Bryncir works site.

12.5.25 One MSA for sand and gravel falls in the Bryncir works site to the west. The area of the MSA in the Bryncir works site is very small and may only be impacted temporarily for construction access or as a laydown area.

Future Baseline

12.5.26 2030 is considered as the baseline year, as it represents a practical timeframe for planning and decision-making while maintaining reasonable degree of accuracy and reliability. The future baseline is anticipated to be largely the same as the existing baseline for Socio-Economics and land use. However, it would be reasonable to expect that the population will increase. According to the Office for National Statistics (ONS) population projections (Ref 12.29), the population of Gwynedd is forecasted to increase from 124,936 in 2021 to 128,250 in 2030, representing a 2.7% increase. The overall population of Wales is forecasted to grow at a higher rate of 3.9%, from 3,107,494 in 2021 to 3,229,297 in 2030. These projections were last updated in 2021 and are based on 2018 data which use assumed levels of future fertility, mortality and migration. The projections did not consider the findings of the Census 2021.

12.6 Scope of Assessment

12.6.1 This section describes the scope of the assessment of effects on Socio-Economics.

12.6.2 Table **12-8** summarises the potential Socio-Economic receptors that have been reviewed and states whether they have been included or excluded from the Socio-Economic assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

12.6.3 Operational effects have been scoped out of the assessment as the magnitude of the proposed works during operation is unlikely to cause significant effects. The justification for each receptor is also detailed below in Table **12-8**.

Table 12-8 – Scope of the Socio-Economic assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Employment generation during construction phase and operational and maintenance phase (direct, indirect and induced impacts)	In	Out	The proposed works will require a construction workforce which could be large relative to the Principle Economic Impact Area. Employment impacts during construction are likely to be beneficial with the potential to be significant. The proposed works are unlikely to generate operational phase jobs.

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Skills and training	In	Out	The proposed works are likely to generate a construction workforce which may benefit from training programmes provided by NGET.
Gross Value Added	In	Out	GVA generated is proportionate to the size of the construction workforce; therefore, as for employment impacts, any GVA effects during construction are anticipated to have the potential to be significant. However, for operation they are not likely to be significant and have been scoped out.
Local accommodation facilities	In	Out	The construction workforce is anticipated to be large enough that there could be pressure on the local temporary accommodation sector with the potential for significant effects.
PRoW and recreational routes	In	Out	The construction of the proposed works may result in closures and diversions of PRoWs in the Bryncir works site. Two PRoW were identified in the Bryncir works site and there is potential for effects. The operation of the proposed works is not likely to cause significant impacts on access to PRoW as permanent land take is minimal and won't affect PRoW.
Other private and community assets (residential properties, business premises, community facilities, open space, agricultural land holdings, development land)	In	Out	There is the potential for significant direct effects on other private and community assets due to land take in construction. There is also potential for significant adverse indirect effects on access to private and community assets due to traffic related impacts. Due to the nature of the operational works, direct and indirect effects on private and community assets are unlikely to be significant.

12.7 Methodology

12.7.1 There is currently no statutory guidance on the methodology for undertaking assessments of Socio-Economic effects. There is no accepted definition of what constitutes a likely significant (or not significant) Socio-Economic effect. It is recognised that 'significance' reflects the relationship between the scale of impact (magnitude) and the sensitivity (or value) of the affected resource or receptor. The significance criteria for

Socio-Economic effects have been assessed using the expert judgement of authors with professional experience in Socio-Economics

12.7.2 Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the socio-economics assessment are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

12.8 Potential Effects

12.8.1 The potential impacts and effects of the Proposed Works have been assessed using the methodology as detailed in **Section 12.7** of this chapter and **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. Only construction impacts are assessed as operational impacts were scoped out in **Section 12.6** of this chapter.

Employment Generation (Indirect, Direct and Induced Impacts)

12.8.2 The estimated construction period is expected to last 18 – 20 months from Q1 2026 to Q3 2027. The likely effects will be of a medium-term temporary nature. Although these jobs are temporary, they represent a positive economic effect for a substantial period that can be estimated from the function of the scale of the type of construction.

12.8.3 The proposed works will require an estimated average of 16 gross direct FTE construction jobs on-site per day during this construction period, with a peak workforce of 32 in 2027. This is based on activities required and will fluctuate during the period being both higher and lower than average at times.

Leakage

12.8.4 Leakage effects are the benefits to those outside the Principal Economic Impact Area, defined as a 60-minute drive time area.

12.8.5 It is estimated that 25% of construction staff could be sourced from within a 60-minute drive time area (Principal Economic Impact Area). This will be subject to labour availability and take-up at the time of construction; however, it is a reasonable assumption on which to base this assessment and 75% of construction staff would be likely to reside outside of this Study Area. This indicates that a large proportion of employment opportunities will be taken up outside the Principal Economic Impact Area. This high level of leakage has been identified due to the specified nature of the construction roles and the limited population in the Principal Economic Impact Area.

12.8.6 An adjustment of 25% has been applied to the estimated 16 gross direct construction jobs on-site on average during the construction period to estimate the jobs created within the 60-minute drive time area. On this basis it is estimated that the proposed works will create 4 jobs for residents in the Study Area during construction.

Displacement

12.8.7 Displacement measures the extent to which the benefits of a development are offset by reductions in output or employment elsewhere. Any additional demand for labour cannot simply be treated as a net benefit since it has the potential to displace workers from other positions and the net benefit is reduced to the extent that this occurs.

12.8.8 Construction workers typically move between construction projects when delays occur or to help the workforce meet construction deadlines. Due to the flexibility of the labour market, construction labour force displacement has been assumed to be low.

12.8.9 The HCA Additionality Guide (Ref 12.16) provides standards (or 'ready reckoners') for displacement. Within the context of a construction project in the Study Area, a low displacement factor for 25% is considered appropriate according to the HCA Additionality Guide. Applying this level of displacement to the total 4 gross direct jobs results in a total net direct employment figure of 3 FTE jobs per annum in the Principal Economic Impact Area during the construction period.

Multiplier Effect

12.8.10 In addition to the direct employment generated by the construction associated with proposed works, there will be an increase in local employment arising from indirect and induced effects of the construction activity. Employment growth will arise locally through manufacturing services and suppliers to the construction process (indirect or supply linkage multipliers). Additionally, it is assumed that part of the income of the construction workers and suppliers will be spent in the Gwynedd area, generating further employment (in terms of induced or income multipliers).

12.8.11 The effect of the multiplier depends on the size of the geographical area that is being considered, the local supply linkages and income leakage from the area. The HCA Additionality Guide (Ref 12.16) provides 'ready reckoner' composite multipliers (the combined effect of indirect and induced multipliers) to account for this. For the Principal Economic Impact Area, a multiplier effect of 1.3 has been considered appropriate which equates to 0.9 FTE indirect and induced jobs per annum in the Study Area.

Net Construction Employment

12.8.12 **Table 12-9** presents the temporary annual employment generated by the proposed works accounting for leakage, displacement and multiplier effects. The proposed works will support, on average, 16 total net jobs per day during the construction period. Of these, four jobs will be expected to be taken-up by residents in the Study Area.

Table 12-9 – Net additional construction employment per annum from the proposed works

	Principal Economic Impact Area (60-minute drive time area)	Outside the Principal Economic Impact Area	Total
Gross Direct Employment	4	12	16
Displacement	1	3	4
Net Direct Employment	3	9	12
Indirect and Induced Employment	0.9	2.7	3.6
Total Net Employment	4	12	16

Note: Calculations may not sum up correctly due to rounding.

12.8.13 The sensitivity of the local workforce to employment changes has been assessed as medium, as whilst the unemployment rate in the Principal Economic Impact Area is slightly lower than the national average, economic activity is also lower, as detailed in **Section 12.5**. The direct, indirect and induced employment, expenditure and upskilling

created from the construction of the proposed works must be judged in the context of the labour pool of construction workers in Gwynedd (approximately 2,500 workers) (Ref 12.22). Taking this into account, the impact of construction employment generation in the Study Area has been assessed as having a magnitude of low, which results in a minor beneficial effect. This is considered significant.

Skills and Training

12.8.14 The Great Grid Partnership (GGP) partners are committed to creating opportunities for training, education, and apprenticeships that support the current and future skills demand across the UK energy sector. This work is done through creating direct opportunities for the local communities in which projects are based as well as through engagement with supply chain partners to develop both new and existing employees. This commitment is backed up by investments in specialist facilities, such as the Morgan Sindall Overhead Line Training Centre in Staffordshire which has provided more than 20,000 training hours to over 200 people who work across the UK. As part of the proposed works, the GGP partners will work together on the creation of a joint strategy which maximises on the economic and social opportunities afforded to the communities in North West Wales by the involved parties. A crucial part of this will involve matching the skills need for this project and the future pipeline in the region, to the initiatives that will be delivered in partnership with local service providers. This approach will ensure the long-term sustainability of those careers in the local area.

12.8.15 On this basis, it is likely that there will be a beneficial impact on the local workforce relating to training and skills uplift. However, as specific interventions and commitments have yet to be identified, the magnitude of impact is assessed to be low. As described in **Section 12.5,** the qualification levels of the population in the Principal Economic Impact Area are better on average than across Wales, but somewhat worse than across Gwynedd. Therefore, the sensitivity of the workforce within the Principal Economic Impact Area to potential skills and training benefits is assessed to be medium. This results in a Minor beneficial effect, which is not significant.

Gross Value Added

12.8.16 Applying the average gross direct value added per construction worker in the Study Area to the total number of construction workers generated from the proposed works gives the total GVA arising from the construction period. Note that this has been calculated based on the compound average GVA per worker in the construction sector in Gwynedd as the appropriate benchmark as data is published at this level rather than the more granular, LSOA-derived, Study Area.

12.8.17 In Gwynedd, the average GVA per worker in the construction sector was approximately £80,000 in 2022, calculated by dividing the GVA in the Gwynedd construction industry (£200 million in 2022) (Ref 12.25) by the number of construction workers stated in the Business Register and Employment Survey (2,500 in 2022) (Ref 12.29). By applying this figure to the total gross construction workers generated by the proposed works[7] (16 workers) it is estimated that construction activity will contribute approximately £1,280,000 to the national economy, of which approximately £320,000 would likely be in the Study Area, as shown in **Table 12-10**.

[7] Indirect and induced employment are not considered as these jobs are in non-construction industries with much lower GVAs e.g. retail.

Table 12-10 – Gross direct value added per annum from the proposed works during the construction phase

	Study Area (60-minute drive time area)	Outside Study Area	Total
GVA during the construction phase (£)	320,000	960,000	1,280,000

12.8.18 The sensitivity of the Study Area workforce to direct GVA generation from the construction phase of the proposed works has been assessed as high, reflecting that Gwynedd's GVA per person in 2022 (£22,206) was lower than the average across Wales (£23,804). The magnitude of impact has been assessed to be very low, given the relatively small scale of the GVA generated compared to total Gwynedd GVA. Based on this, the impact of GVA generation during construction on the Study Area is assessed to be Minor Beneficial (Not Significant).

Local Accommodation Facilities

12.8.19 Analysis of the hotel, bed and breakfast and inns accommodation sector has been undertaken to assess the likely capacity against the demand from the potential peak construction workforce of 32.

12.8.20 The analysis indicates, considering existing seasonal demand and typical occupancy levels, that capacity is sufficient and that the workforce can be accommodated within existing provision in a 60-minute drive time radius of the proposed works. This is shown in

12.8.21 **Table 12-11**. Analysis indicates that during peak seasonal occupancy (August), there would be 584 rooms (18% of the 3,218 total rooms) available after accounting for the peak construction workforce of 32. This is a worst-case scenario, given that approximately 25% of the workforce would likely be living within a 60-minute drive time of the Bryncir works site and therefore be home-based (i.e. would live sufficiently close-by to return home in the evenings rather than needing overnight accommodation).

12.8.22 Further analysis to identify accommodation within a 30-minute drive time radius indicates that at peak seasonal occupancy in August, there would be sufficient capacity to house the peak workforce of 32 FTE workers. This is shown in **Table 12-12**. There would be 185 rooms (17% of the total 1083 rooms) available after accounting for the peak workforce.

12.8.23 In summary, this analysis demonstrates that at peak workforce employment and typical seasonal occupancy levels, 100% of the proposed works' construction workers could be accommodated within a 60-minute drive time and a 30-minute drive time of the Bryncir works site. Overall, given that there is sufficient capacity to accommodate the full peak workforce, there is assessed to be **no effect** on local accommodation facilities.

Table 12-11 – Accommodation capacity within 60-minute drive time radius

Month	Typical room occupancy (%)	Rooms available after existing demand	Peak construction workers	Remaining rooms available	Remaining rooms available (%)
January	47	1,678	32	1,646	51
February	56	1,388	32	1,356	42
March	59	1,291	32	1,259	39
April	63	1,163	32	1,131	35
May	69	970	32	938	29
June	71	905	32	873	27
July	76	744	32	712	22
August	80	616	32	584	18
September	75	777	32	745	23
October	66	1,066	32	1,034	32
November	56	1,388	32	1,356	42
December	60	1,259	32	1,227	38

Table 12-12 – Accommodation capacity within 30-minute drive time radius

Month	Typical room occupancy (%)	Rooms available after existing demand	Peak construction workers	Remaining rooms available	Remaining rooms available (%)
January	47	574	32	542	50
February	56	477	32	445	41
March	59	444	32	412	38
April	63	401	32	369	34
May	69	336	32	304	28
June	71	314	32	282	26
July	76	260	32	228	21
August	80	217	32	185	17
September	75	271	32	239	22
October	66	368	32	336	31

November	56	477	32	445	41
December	60	433	32	401	37

PRoW

12.8.24 During the construction phase, the section of the PRoW Dolbenmaen No 18 footpath running through the Bryncir works site will be temporarily closed.

12.8.25 As shown on **Figure 3.12.3**, there are two entrances to Footpath 18 Dolbenmaen from the B4411, 250 m apart. These two entrance paths connect at a farmhouse 100 m from the B4411. From there, the PRoW runs east over the centre of the Bryncir works site, before heading north-east, on the same path as the proposed access road connecting the proposed Bryncir substation to the A487.

12.8.26 No diversion will be provided to mitigate the impact of the temporary closure of the PRoW Dolbenmaen No 18 footpath. It is assumed as a worst case scenario that this section of the footpath would be closed for the duration of the construction works (18 – 20 months). During this time, walkers would need to use the roads (B4411 and A487) as an alternative route, which would be 250 m longer than following the PRoW.

12.8.27 After construction, the PRoW will be permanently diverted. The footpath will be diverted along the proposed substation access track, then across a field to cross a field boundary via new kissing gates. The diversion would then follow the proposed Bryncir Substation boundary fence before re-joining the existing alignment of the footpath south-west of the proposed Bryncir Substation. The footpath would not be surfaced. The diverted footpath will be 90 m longer than the current route.

12.8.28 This section of Footpath 18 Dolbenmaen is likely to be used for recreation; it does not connect users to community facilities or employment opportunities. There is a large network of PRoWs in the Study Area that could be used as substitutes for recreational activity. Therefore, the sensitivity of PRoW users is assessed to be low. Given the length and nature of the diversions as detailed above, the magnitude of impact would be medium. This results in a Minor adverse (not significant) effect.

Private and Community Assets (Residential Properties, Business Premises, Community Facilities, Open Space, Visitor Attractions and Agricultural Land Holdings)

Permanent Land Take

12.8.29 There are no residential properties, business premises, community facilities, open spaces or visitor attractions within the Bryncir works site which would need to be demolished or which would be permanently displaced in whole or in part by the proposed works.

12.8.30 Sensitivity of private and community assets is assessed to be medium due to their relative importance. Magnitude is assessed to be very low as there are no receptors that will be demolished or permanently displaced in whole or in part by the proposed works. Impacts on private and community assets from permanent land take are therefore assessed to be Negligible (Not Significant).

12.8.31 One landowner will be affected by permanent land take as acquisition of land is required for the proposed Bryncir Substation. Magnitude is assessed to be low, as it is assumed that compensation will be provided as part of the easement to reflect adverse impacts

on agricultural land. Sensitivity is assessed to be medium due to the importance of farms to the local economy and the number of farms surrounding the Bryncir works site. The effect is assessed to be Minor adverse (Not Significant).

Temporary Land Take

12.8.32 Temporary land take would be required from the four landowners and the tenant farming the landholdings within the Bryncir works site. For the proposed Bryncir Substation, a new site access, laydown area, and site welfare and office facilities will be required. The new DB connection route will be part underground cables and part overhead line; the cables would be laid via an open cut trench. Installation of the overhead line would involve taking materials to each support site and excavating a trench to accommodate the support structure; access would be required along the route e.g. via a temporary haul road or steel trackway running alongside.

12.8.33 These works will be temporary. Alternative access tracks will be constructed to minimise disruption to landowners; impacts on landowners will also be mitigated via financial compensation where appropriate. The Bryncir works site will be reinstated after construction, including landscape works. The magnitude of impact is low. Sensitivity is assessed to be medium due to the importance of farms to the local economy and the number of farms surrounding the Bryncir works site. The effect is assessed to be Minor adverse (Not Significant).

Severance

12.8.34 There is potential for severance impacts arising from construction of the proposed works to impact on the use of residential properties, business premises, community facilities, open spaces, visitor attractions and agricultural land holdings. **Chapter 9: Traffic and Transport** assesses community severance impacts at road links due to increased traffic volume from the proposed works during construction. The assessment finds that impacts on links range from Negligible, with all effects related to severance being not significant.

12.8.35 Sensitivity of private and community assets is assessed to be medium due to their relative importance and moderate potential for proposed substitution. Magnitude is assessed to be low as no significant severance impacts are found in **Chapter 9: Traffic and Transport**. Impacts on private and community assets from severance associated with the construction phase of the proposed works are assessed to be Minor adverse (Not Significant).

Development Land

12.8.36 There are no planning applications, permissions or allocations affected either directly (due to land take) or indirectly (due to severance) during the construction of the proposed works and thus no effects are expected to arise.

12.8.37 There is one MSA in the Bryncir works site to the west, however, there are no planned permanent works overlapping the MSA in the Bryncir works site.

12.9 Mitigation and Residual Effects

12.9.1 No additional mitigation or enhancement measures are required, due to no significant adverse effects associated with Socio-Economics being identified.

12.9.2 No likely significant residual effects of the proposed works on Socio-Economics receptors are found.

12.10 Summary

12.10.1 The baseline analysis in **Section 12.5** shows that the economic characteristics of the Principal Economic Impact Area are broadly in line with Gwynedd and Wales. The Bryncir works site has some receptors relevant to Socio-Economics nearby including residential, business, agriculture and tourist uses.

12.10.2 On the basis of the rationale noted in **Section 12.6**, all potential Socio-Economic impacts associated with operation have been scoped out. Construction phase impacts range from minor beneficial for skills uplift to minor adverse in relation to temporary and permanent land take of open spaces.

13. Climate Change

13.1 Introduction

13.1.1 This chapter assesses the potential effects of climate change and the vulnerability of the proposed works at Bryncir to climate-related impacts during construction, operation, and maintenance, as described in Chapter 2: Bryncir Works.

13.1.2 This chapter describes the baseline conditions in the Study Area (as defined in **Section 13.3**), the scope of the assessment, the potential effects, the mitigation measures required to avoid, reduce or offset any significant negative effects, and the likely residual effects after these mitigation measures have been adopted.

13.1.3 The assessment is consistent with the ruling by the Supreme Court in the Finch Case (Ref 13.1), in that it addresses all relevant direct and indirect environmental impacts, whether these are upstream or downstream of the proposed works.

13.1.4 This chapter is supported by appendices as listed below:

- **Volume 8, Appendix 1.1.A: Legislation, Guidance and Policy.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 3.13.A: Climate Change Risk Assessment.**

13.1.5 Other chapters that are useful to review in association with this chapter are as follows:

- **Chapter 5: Ecology and Nature Conservation.**
- **Chapter 7: Geology, Hydrogeology, Land Use and Agriculture (Soils).**
- **Chapter 8: Water Quality, Resources and Flood Risk.**
- **Chapter 9: Traffic and Transport.**
- **Chapter 10: Air Quality and Emissions.**

13.2 Legislation and Planning Policy

13.2.1 This section summarises the legislation and planning policy framework that is relevant to the Climate Change assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance**.

Legislation

13.2.2 The following legislation is relevant to Climate Change:

- United Nations Framework Convention on Climate Change Paris Agreement (Ref 13.2).
- UK Nationally Determined Contribution (Ref 13.3).
- Climate Change Act 2008 (as amended) (Ref 13.4).

- The Climate Change (Interim Emissions Targets) (Wales) (Amendment) Regulations 2021 (Ref 13.5).
- Environment (Wales) Act 2016 (Ref 5.10).
- Well-being of Future Generations (Wales) Act 2015 (Ref 10.5).

13.2.3 To align with the requirements of 2017 TCP EIA Regulations (Ref 3.1) and The Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2017 (Ref 3.2) the climate assessment is required to consider the following aspects:

- Greenhouse Gas (GHG) Assessment – considers the impact on the climate of GHG emissions arising from the proposed works during its lifetime. This considers the proposed works in the context of the UK and Welsh carbon budgets and how it would affect the ability of the Government to meet its carbon reduction targets.
- Climate Change Risk Assessment (CCRA) – considers the resilience of the proposed works to climate change impacts, including how the proposed works is designed to reduce its vulnerability to the projected impacts of climate change.
- In-combination Climate Change Impact (ICCI) Assessment – the combined impact of the proposed works and future climate change on receptors in the surrounding environment.

National Policy

13.2.4 The following national policy is relevant to Climate Change:

- Working Together to Reach Net Zero: All-Wales Plan April 2022 Update (Ref 13.11).
- PPW – Edition 12 (February 2024) (Ref 4.4).
- Future Wales: The National Plan 2040 (Ref 4.3).

Guidance

13.2.5 The following guidance is relevant to Climate Change:

- IEMA – Environmental Impact Assessment Guide to: Climate Change Resilience and Adaption (Ref 13.7).
- IEMA – Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition (Ref 13.8).

13.3 Study Area

GHG Assessment

13.3.1 The Study Area for the GHG assessment includes:

- Direct GHG emissions arising through works on the Bryncir works site as a result of the site clearance and remediation, construction, operation and maintenance activities.
- Indirect GHG emissions occurring outside the Bryncir works site include emissions from embodied carbon in materials, transportation, and both upstream and

downstream activities (such as well-to-tank processes, transmission and distribution losses, and the processing and disposal of waste).

CCRA

13.3.2 The CCRA Study Area encompasses the temporary and completed works that make up the proposed works.

ICCI

13.3.3 The Study Area for the ICCI assessment is determined by the EIA topic assessments, as described in other chapters of this ES. Relevant topic chapters may include:

- **Chapter 4: Landscape and Visual Amenity.**
- **Chapter 5: Ecology and Nature Conservation.**
- **Chapter 6: Historic Environment.**
- **Chapter 7: Geology, Hydrogeology, Land Use and Agriculture (Soils).**
- **Chapter 8: Water Quality, Resources and Flood Risk.**
- **Chapter 9: Traffic and Transport.**
- **Chapter 10: Air Quality and Emissions.**
- **Chapter 11: Noise and Vibration.**
- **Chapter 12: Socio-Economics.**
- **Chapter 14: Materials and Waste.**

13.4 Assumptions and Limitations

GHG Assessment

13.4.1 Granular activity data required for a quantitative GHG assessment was not available to inform the assessment. Consequently, a qualitative approach was adopted to identify GHG emission sources. Further details on the approach taken for the qualitative GHG Assessment are provided in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

13.4.2 While upstream and downstream emissions, such as those from raw material extraction, transport, maintenance, and end-of-life disposal, are considered in the qualitative assessment, they have not been quantified due to data limitations.

CCRA

13.4.3 The start date of the CCRA will be the start of the construction period. In line with the construction programme, the construction phase of the proposed works is assumed to be from Q1 2026 to Q3 2027.

13.4.4 For the purposes of the CCRA a reference operational period of 40 years was assumed, in accordance with asset lifespans.

13.4.5 The CCRA has been carried out using the most up to date, reliable and publicly available climate data. Information has also been taken from NGET internal documents and wider ES chapters.

13.4.6 Climate change projections, by their very nature, are associated with a range of assumptions and limitations. There are inherent uncertainties associated with climate projections. Climate projections are not predictions of the future but are rather a projection based on the best available data and science.

13.4.7 For climate projections, UK Climate Projection 2018 (UKCP18) (Ref 13.9) data was collected for periods between 2020 – 2049, 2040 – 2069, and 2070 – 2099 to adequately account for both short-term construction phase and long-term operational period.

13.4.8 A 'high' emissions scenario, Representative Concentration Pathway 8.5 has been used in the assessment. This is to reflect a high level of GHG emissions at the 10%, 50%, 90% probability levels to assess the impact of climate change during the construction and operation of the proposed works.

13.5 Baseline

Existing Baseline

GHG Impact Assessment

13.5.1 For the GHG assessment, the existing baseline is the current conditions at the Bryncir works site. The existing baseline consists of the carbon stock and sources of GHG emissions within the boundary of existing on-site activities.

13.5.2 The current land use in the Bryncir works site consists predominantly of pastoral fields and managed hedgerows and trees, with an area of marshy grassland. The abundance of vegetation in the Bryncir works site suggests a relatively high carbon sink potential.

CCRA and ICCI Assessment

13.5.3 The CCRA and ICCI assessments consider how resilient the proposed works and surrounding environment are to current and projected future climate hazards. The receptor for the CCRA is the construction, maintenance, and operation of the proposed works, including its assets and associated users. For the ICCI assessment, receptors are as defined in the applicable technical chapters of this ES.

13.5.4 The current baseline for the CCRA and ICCI assessments is based on historic climate data obtained from the Met Office website recorded at the closest meteorological station to the Bryncir works site (Cwmystradllyn) (Ref 13.10). This is located approximately 22 km east from the Bryncir works site. The climate data covers the 30-year period 1981 to 2010 as detailed in **Table 13-1.**

Table 13-1 – Historical climate data for the Bryncir works site

Climatic variable	Baseline data 1981-2010
Mean Annual Max Temp (°C)	12.4
Mean Annual Min Temp (°C)	6.3
Mean summer maximum daily temp (°C)	18.0
Mean winter minimum daily temp (°C)	2.2
Warmest Month on Average (°C)	18.7

Climatic variable	Baseline data 1981-2010
Warmest Month on Average (Month)	August
Coldest Month on Average (°C)	1.8
Coldest Month on Average (Month)	February
Frost days per annum	No data recorded
Mean annual rainfall levels (mm)	1944.5
Mean summer rainfall (mm)	143.5
Mean winter rainfall (mm)	176.4
Wettest Month on Average (mm)	220.0
Wettest Month on Average (Month)	October
Driest Month on Average (mm)	104.7
Driest Month on Average (Month)	May

Future Baseline

GHG Assessment

13.5.5 The future baseline for assessing the impact of the proposed works on climate change is based on a 'business as usual' scenario, where no development occurs in the Bryncir works site and the current land use remains unchanged.

CCRA and ICCI assessment

13.5.6 The future baseline for the CCR and ICCI assessments is based on UKCP18 data from the Met Office (Ref 13.9) for the 25 km grid squares in which the Bryncir works site is located.

13.5.7 This projection data provides probabilistic indications of how global climate change is likely to affect areas of the UK using pre-defined climate variables and time periods. Projected climate data is presented in Table **13-2**. Climate parameters considered in the CCRA include the following:

- Mean annual temperature.
- Mean summer temperature.
- Mean winter temperature.
- Number of frost days per annum.
- Maximum summer temperature.
- Minimum winter temperature.
- Mean annual precipitation.
- Mean summer precipitation.
- Mean winter precipitation.

- Extreme weather events (e.g. storms).

13.5.8 The historic and future baseline for the site location is presented within Table **13-2** below.

Table 13-2 – Climate change baseline and projection

Climatic variable	Baseline data	Projection (change)				Projected trend	Source
	1981 - 2010	2020 - 2049	2040 - 2069	2070 - 2099	Beyond 2100		
Temperature							
Mean annual maximum daily temperature (°C)	12.4	+0.9 (+0.4 to +1.5)	+1.6 (+0.8 to +2.5)	+3.4 (+1.8 to +4.9)	No projection data is available beyond 2100, trend towards increasing temperatures is expected to continue.	↑	UKCP18
Mean summer maximum daily temperature (°C)	17.9	+0.9 (+0.1 to +1.8)	+1.8 (+0.5 to +3.2)	+3.9 (+1.6 to +6.5)		↑	UKCP18
Mean winter minimum daily temperature (°C)	2.2	+0.8 (+0.1 to +1.6)	+1.5 (+0.4 to +2.6)	+2.7 (+1.0 to +4.6)		↑	UKCP18
Number of days of air frost per annum	No data recorded.	Reports have shown that the number of frost air and ground frost days has decreased since the 1960s. Combined with detailed studies, these long-term trends point to a long-term warming trend of the UK's climate and a reduction in cold events.				↓	Met Office
Highest temperature for baseline period (°C)	18.7 (August)	+1.1 (+0.1 to +2.2)	+1.9 (+0.2 to +3.8)	+4.4 (+1.3 to +7.5)	No projection data is available beyond 2100, trend towards increasing temperatures is expected to continue.	↑	UKCP18
Lowest temperature for baseline period (°C)	1.8 (February)	+0.8 (-0.1 to +1.8)	+1.5 (+0.2 to +2.7)	+2.7 (+0.7 to +4.8)		↑	UKCP18

Climatic variable	Baseline data	Projection (change)				Projected trend	Source
	1981 - 2010	2020 - 2049	2040 - 2069	2070 - 2099	Beyond 2100		
Precipitation							
Mean annual rainfall (mm)	1944.5	+0.7% (-4.5% to +6.4%)	+1.5% (-5.1% to +8.5%)	+3.2% (-7.0% to +13.8%)	No projection data is available beyond 2100. However, there is potential for a continued slight increase in rainfall overall.	↑	UKCP18
Mean summer rainfall (mm)	143.3	-6.8% (-22.1% to +8.6%)	-15.5% (-35.5% to +4.3%)	-30.8% (-53.9% to -4.6%)	No projection data is available beyond 2100, but the decreasing trend in summer rainfall could potentially continue beyond this period.	↓	UKCP18
Mean winter rainfall (mm)	176.4	+2.4% (-7.3% to +13.5%)	+9.1% (-3.4% to +24.1%)	+18.7% (-2.1% to +43.2%)	No projection data is available beyond 2100, but it is possible that the trend of increasing winter rainfall could persist beyond this period.	↑	UKCP18
Wettest month on average (mm)	220 (October)	+7.8% (-12.6% to +30.4%)	+13.8% (-9.1% to +39.4%)	+17.7% (-14.6% to +58.3%)	No projection data is available beyond 2100. An increase in rainfall during the month of November is possible.	↑	UKCP18
Driest month on average (mm)	104.7 (May)	+2.8% (-18.0% to +22.6%)	-1.1% (-26.7% to +23.5%)	-9.1% (-41.1% to +24.4%)	No projection data is available beyond 2100. A decrease in rainfall during the month of May is possible.	↓	UKCP18
Other							
Droughts	The Met Office has projected a trend towards drier summers on average, with the trend being stronger under a high GHG emission scenario compared to a low one. However, it is the distribution of rainfall throughout the seasons that will determine UK drought risk (Ref 13.11).					↑	Met Office

Climatic variable	Baseline data	Projection (change)				Projected trend	Source
	1981 - 2010	2020 - 2049	2040 - 2069	2070 - 2099	Beyond 2100		
Storms	The Met Office projects that climate change will likely lead to more frequent and intense winter storms in the UK, driven by factors such as rising sea surface temperatures and changes in the jet stream. While past data shows no clear trend in storm frequency or intensity, future projections indicate an increase in severe storms, particularly during winter, with stronger winds and heavier rainfall, which could also worsen coastal flooding due to rising sea levels (Ref 13.12).					↑	Met Office
Wildfires	The wildfire hazard is classified as high according to the information that is currently available to the Think Hazard tool (Ref 13.13). This means that there is greater than 50% chance of experiencing weather that could support a hazardous wildfire that may pose some risk of life and property loss in any given year.					↑	Think Hazard

13.6 Scope of Assessment

13.6.1 This section describes the scope of the assessment of effects on Climate Change.

13.6.2 **Table 13-3** below summarises the potential climate receptors that have been reviewed and states whether they have been included or excluded from the Climate assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 13-3 – Scope of Climate Change assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Global atmosphere (GHG Assessment)	In	In	A GHG Assessment has been scoped into the climate change assessment to evaluate the potential GHG emissions associated with the proposed works.
The proposed works (CCRA)	In	In	A CCRA has been scoped in to assess the potential climate risks associated with the proposed works.
Various identified by each discipline in their assessment (ICCI Assessment).	Out	Out	It is not anticipated there will be any ICCIs on the receptors in the surrounding environment. An ICCI Assessment has been scoped out of the climate change assessment.

13.7 Methodology

13.7.1 The purpose of the Climate assessments is to assess the potential effects of the proposed works on Climate Change.

13.7.2 Full details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the CCRA are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

13.8 Potential Effects

GHG Impact Assessment

13.8.1 The GHG emissions are reported in line with the lifecycle stages of the civil engineering works assessment, as outlined in the Publicly Available Guidance 2080:2023 Guidance (Ref 13.14). Additionally, the Royal Institution of Chartered Surveyors Guidance for whole life GHG assessments (Ref 13.15) have been integrated to inform the scope and reporting framework of the GHG assessment.

13.8.2 **Table 13-4** below qualitatively summarises the GHG emissions associated with the construction and operation of the proposed works.

Table 13-4 – Qualitative life cycle GHG assessment of the proposed works

Lifecycle stage	Qualitative assessment	Estimated GHG % contribution to the proposed works
Pre-construction stage (A0)	The pre-construction stage (A0) includes planning, design, and site investigations. GHG emissions during this stage primarily arise from office energy consumption and occasional employee travel. As these activities involve minimal energy use, the resulting emissions are expected to constitute only a minor share of the total emissions associated with the proposed works.	<1%
Product stage (A1 – A3)	Based on previous life cycle GHG assessments, embodied GHG emissions from the product stage are anticipated to be the largest source of GHG emissions over the life of the proposed works. This stage focuses on the extraction, transport, and manufacturing of raw materials. Due to the scale of the proposed works, the magnitude of emissions from Stage A1 to A3 are not substantial in the context of Wales and UK carbon budgets. Furthermore, GHG emissions relating to the product stage of the proposed works are likely to be controlled and reduced through various control mechanisms through the NGET's internal climate policies and national policy, as discussed below.	~70%
Construction process stage (A4 – A5)	Based on similar-scale projects, GHG emissions from the construction phase are expected to be the second largest contributor of GHG emissions. A CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will be prepared before construction, including measures like sourcing local materials to reduce GHG emissions.	~20%
Operation stage (B1 – B7)	The operation stage of the proposed works is likely to be the third largest contributor of GHG emissions. GHG emission sources are anticipated to include periodic maintenance activities, such as inspections, servicing, and minor repairs. Additional sources include the replacement of on-site equipment, transmission losses, and other operational activities, such as worker transport to and from the Bryncir works site. While these direct GHG emissions are unlikely to impact the UK's and Wales's net-zero targets, the proposed works will also have wider, indirect effects on emissions through the enabling of a greater expansion of on- and offshore renewables that will increase the generation of low-carbon electricity and support the ongoing decarbonisation of the UK power grid. Operational efficiencies will be managed through regular equipment inspections to identify deterioration of components, which will be replaced where necessary.	~10%

13.8.3 As detailed in **Table 13-4**, it is estimated that the bulk of emissions (estimated around 90%) from the proposed works will come from the A0 – A5 life cycle stages.

13.8.4 NGET is committed to achieving carbon neutrality across all its construction projects by 2025/26 (Ref 13.16), focusing on reducing the carbon intensity of construction materials and the phasing out of diesel-powered construction plant. The Transport Decarbonisation Plan (TDP) (Ref 13.17) aligns with the UK's carbon targets by placing a commitment to reduce transport GHG emissions in line with the 2050 net-zero target. In line with commitments in the TDP, GHG emissions associated with the transportation of workers are expected to decrease due to the continued rollout of electric vehicles. These commitments will help manage the proposed works construction GHG emissions in line with UK and Welsh net-zero targets.

13.8.5 The UK Government has published a Net Zero Strategy (Ref 13.18), which outlines plans to reduce GHG emissions across all sectors of the economy to meet the net zero targets. The TDP outlines measures to support a shift towards low-carbon transportation, such as increasing the use of electric vehicles. GHG emissions from worker and materials transportation are anticipated to decrease in line with government policy in the TDP.

13.8.6 The proposed works will support the ongoing expansion of renewable energy generation within the UK energy system by providing the necessary infrastructure to support the increased transmission of low-carbon electricity. This will contribute to the decarbonisation of the power sector as renewables increasingly replace higher-carbon energy sources. This aligns with the UK Government's goal of achieving a fossil fuel-independent electricity system by 2035.

13.8.7 IEMA GHG Assessment guidance (Ref 13.19), states that assessing the significance of a project's impact on the climate should not just be based on the magnitude of emissions arising but on how these emissions align with national policies and the path towards net zero. The assessment must therefore determine whether the proposed works could negatively affect Wales and the UK's ability to meet legislated carbon budgets and net-zero targets.

13.8.8 Based on a qualitative assessment, the magnitude of GHG emissions is low in the context of the UK and Welsh carbon budgets. The proposed works are consistent with applicable UK and Welsh Government climate change policy and legislation. In accordance with the IEMA GHG Guidance (see **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**), the effect of GHG emissions associated with the proposed works is deemed Minor Adverse and Not Significant.

13.8.9 While not legally binding, NGET has also demonstrated a commitment to reduce GHG emissions through the setting of validated Science-Based Targets (Ref 13.20), aligning NGET with the Paris Climate Commitment (Ref 13.2). There targets are as follows:

- Scope 1[8] and 2[9] GHG emissions: Reduce absolute scope 1 and 2 emissions by 60% by 2030 from a 2018 base year.
  - Scope 1 emissions from power generation: Reduce scope 1 GHG emissions by 90% per Megawatt hour (MWh) by 2030 and 92% per MWh by 2033, both from a 2018 base year.

[8] Scope 1: Direct emissions from sources that are owned or controlled by the organisation.

[9] Scope 2: Indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting organisation.

- Other Scope 1 and 2 emissions: Reduce all other absolute Scope 1 and 2 GHG emissions by 50% by 2030 from the 2018 base year.

- Scope 3[10] emissions: Reduce Scope 3 category 3 GHG emissions from all generated and sold electricity by 86% per MWh by 2033 from a 2018 base year and reduce all absolute scope 3 GHG emissions by 37.5% by 2033 from a 2018 base year.

CCRA

13.8.10 This section summarises the climate risks identified for the proposed works. **Volume 8, Appendix 3.13.A: Climate Change Risk Assessment** contains further details on each climate risk identified in the CCRA.

13.8.11 The proposed works will be designed and operated in accordance with the risks and mitigation measures outlined in NGETs Climate Resilience Strategy (Ref 13.21). This approach enables the proposed works to withstand the climatic conditions projected for the end of its design life. Additionally, a CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will be developed to incorporate measures aimed at reducing the impact of climate-related risks during the construction phase.

13.8.12 In accordance with IEMA CCRA Guidance (Ref 13.7) (see **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**), the climate risks were assessed as moderate, unlikely, or rare. While climate-driven disruption is possible, its occurrence is infrequent, with some evidence suggesting a potential shift away from business as usual. The likelihood of the event is estimated to be between 0% and 50%. The consequence of climate change impacts has been identified as insignificant and minor in terms of their impact on the proposed works. As a result, risks identified during the construction and operation phases are Not Significant. Further details on the selected likelihood and consequence ratings are provided in **Volume 8, Appendix 3.13.A: Climate Change Risk Assessment.**

13.9 Mitigation and Residual Effects

13.9.1 As no significant impacts have been identified in the GHG Assessment, no additional mitigation is required. A CEMP (**Volume 8, Appendix 3.2.A: Outline Construction Environmental Management Plan**) will be produced before construction and include mitigation measures to reduce GHG emissions during construction. The standard measures typically implemented by NGET to reduce GHG emissions during the construction and operation phases of the proposed works are considered sufficient.

13.9.2 As no significant climate risks have been identified in the CCRA, no specific mitigation measures are required.

13.9.3 The GHG Assessment and CCRA have identified no residual effects across the construction and operation phases.

[10] Scope 3: All other indirect emissions that occur in the value chain of the reporting company, both upstream and downstream. Scope 3 Category 3 covers the upstream extraction, production, transport, and transmission losses associated with the fuels and energy purchased by the company.

13.10 Summary

13.10.1 Overall, the GHG impact of the proposed works will be Minor Adverse and Not Significant. The proposed works will bring long-term benefits to the UK and Wales by upgrading energy-related infrastructure. This is essential for integrating new sources of renewable power and upgrading NGETs capacity to facilitate the electrification of the broader economy. This, in turn, will support the transition away from fossil fuels and help achieve net-zero emissions across Wales and the UK.

13.10.2 The CCRA did not identify any significant climate risks. The risk posed to Climate Change by the proposed works is **Not Significant**.

14. Materials and Waste

14.1 Introduction

14.1.1 This chapter presents an assessment of the likely Materials and Waste effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Bryncir Works.**

14.1.2 The assessment has been undertaken in accordance with current best practice guidance and is based on the methodology set out in the IEMA Guide to Materials and Waste in Environmental Impact Assessment, Guidance for a Proportionate Approach (referred to herein as the 'IEMA Guidance') (Ref 14.1).

14.1.3 This chapter is supported by the following appendix listed below:

- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

14.2 Legislation and Planning Policy

14.2.1 This section summarises the legislation and planning policy framework that is relevant to the Materials and Waste assessment. Details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

14.2.2 The following legislation is relevant to Materials and Waste:

- Environmental Protection Act 1990 (Ref 5.7).
- The Hazardous Waste (England and Wales) Regulations 2005 (Ref 14.2).
- The Waste (England and Wales) Regulations 2011 (Ref 14.3).
- The Environmental Permitting (England and Wales) Regulations 2016 (Ref 7.8).
- Environment Act 2021 (Ref 4.2).
- Environment (Wales) Act 2016 (Ref 5.10).
- The Waste Separation Requirements (Wales) Regulations 2023 (Ref 14.4).

National Policy

14.2.3 The following national policy is relevant to Materials and Waste:

- PPW – Edition 12 (Ref 4.4).
- Beyond Recycling: A Strategy to Make the Circular Economy in Wales a Reality (Ref 14.5).
- Towards Zero Waste, One Wales: One Planet – The Overarching Waste Strategy Document for Wales (Ref 14.6).
- Towards Zero Waste, One Wales: One Planet – The Waste Prevention Programme for Wales (Ref 14.7).

- Future Wales: The National Plan 2040 (Ref 4.3).

Local Policy

14.2.4 The following local policy is relevant to Materials and Waste:

- Joint Anglesey and Gwynedd Local Development Plan 2011 – 2026 (Ref 4.9).

Guidance

14.2.5 The following guidance is relevant to Materials and Waste:

- IEMA Guidance (Ref 14.1).
- CL:AIRE 'Definition of Waste: Development Industry Code of Practice' (2011) (Ref 7.29).
- Separate Collection of Waste Materials for Recycling – A Code of Practice for Wales (Ref 14.8).

14.3 Study Area

14.3.1 The Study Areas for the assessment of impacts related to Waste have been defined in line with the IEMA Guidance (Ref 14.1). Two Study Areas are defined in the following sections:

- A Bryncir works site Study Area: within which waste associated with the proposed works is generated.
- An expansive Study Area: within which landfills and other waste facilities that manage waste generated by the proposed works are likely to be located.

14.3.2 Together, the Bryncir works site Study Area and expansive Study Area are referred to in this chapter as 'the Study Areas'.

Bryncir Works Site Study Area

14.3.3 The Bryncir works site Study Area for construction and operational waste generation comprises the Bryncir works site (**Figure 3.2.2**).

Expansive Study Area

14.3.4 The expansive Study Area for non-hazardous and inert waste management comprises the whole of Wales, within which waste management infrastructure (specifically landfill void capacity) is located. The expansive Study Area for non-hazardous and inert waste management is defined based on professional judgement and informed by consideration of the proximity principle (waste should generally be managed as near as practicable to its place of production) and value for money.

14.3.5 The proximity principle "*must be applied in Wales when decisions are taken on the siting of appropriate waste facilities*", as outlined in the Towards Zero Waste, One Wales: One Planet – The Overarching Waste Strategy Document for Wales (Ref 14.6).

14.4 Assumptions and Limitations

14.4.1 The assessment is based on information available at the time of writing. Detailed data on waste generated by the proposed works was not available and hence professional experience has been used to estimate the likely order of magnitude of waste generated.

14.4.2 It is not possible to reliably forecast any potential changes to landfill void capacity by the time of the proposed works' construction and operation. Landfill void capacity is assumed to remain the same as the current baseline.

14.5 Baseline

Existing Baseline

14.5.1 Baseline information for Waste has been reviewed and consists of the non-hazardous and inert landfill void capacity for Wales (8.3 million cubic metres (m^3) and 1.8 million m^3 respectively).:

Future Baseline

14.5.2 Considering the decline of landfill void capacity, forecasting into the future would lead to the inevitable conclusion that there would be no void space remaining. However, this is not a credible scenario as if there is still a need for landfill, then the Waste Planning Authority will need to consent new landfill void capacity to replace that which has been used up. Landfill void capacity is assumed to remain the same as the current baseline. However, although the current baseline is used in the assessment, a 'very high' sensitivity is applied to landfill void capacity recognising the potential for landfill void capacity to decline in future.

14.6 Scope of Assessment

14.6.1 This section describes the scope of the assessment of effects on Materials and Waste.

14.6.2 For the purposes of this assessment, Materials and Waste comprise:

- The consumption of materials (key construction materials only).
- The generation and management of waste during construction and operation.

14.6.3 Materials are defined in the IEMA Guidance (Ref 14.1) as:

"*physical resources that are used across the lifecycle of a development. Examples include key construction materials such as concrete, aggregate, asphalt, and steel".*

14.6.4 Other material assets considered include built assets such as landfill void capacity and allocated/safeguarded mineral sites (e.g. quarries, wharves, rail depots, concrete plants) and waste sites.

14.6.5 Waste is defined, as per the Waste Framework Directive (2008/98/EC) (Ref 14.9), as:

"any substance or object which the holder discards or intends or is required to discard".

14.6.6 Impacts upon MSAs are not assessed in this Materials and Waste assessment in accordance with the IEMA Guidance (Ref 14.1); they are assessed in **Section 7.8** of C**hapter 7: Geology, Hydrogeology, Land Use and Agriculture (Soils)**.

14.6.7 The assessment of Materials and Waste takes into account the following:

- Waste producers have a legal duty of care to manage their waste in accordance with regulations and to ensure that any waste leaving the site where it is generated is transferred to a suitably licensed facility for further treatment or disposal.
- Facilities transferring, treating or disposing of waste must be either licensed or apply for an exemption from a licence, and impacts arising from the operation of waste management facilities are considered as part of the planning and permitting process for these facilities themselves.
- As part of their planning function, Waste Planning Authorities (WPAs) are required to ensure that sufficient land is available to accommodate facilities for the treatment of all waste arising in the area, either within the WPA area, or through export to suitable facilities in other areas.

14.6.8 Mineral Planning Authorities are similarly required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs. **Table 14-1** summarises the potential Materials and Waste receptors that have been reviewed and states whether they have been included or excluded from the Materials and Waste assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 14-1 – Scope of the Materials and Waste assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Waste arising from extraction, processing and manufacture of construction components and products	Out	Out	This assumes that these products and materials are being developed in a manufacturing environment with their own waste management plans, facilities, and supply chain, which are potentially in different regions of the UK or the world and outside of the geographical scope of this study.
Other environmental impacts associated with the management of waste from the proposed works on-site (e.g. on water resources, air quality, noise) and off-site transport of materials and waste	Out	Out	Assessed in other relevant chapters (e.g. Water Quality, Resources and Flood Risk, Air Quality, Noise or Traffic)
Changes to MSAs	Out	Out	Impacts upon MSAs are not assessed in this Materials and Waste assessment in accordance with the IEMA Guidance (Ref 14.1); they are assessed in **Section 7.8** of C**hapter 7: Geology,**

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			Hydrogeology, Land Use and Agriculture (Soils).
Changes to allocated or safeguarded mineral site	Out	Out	Review of the Local Plan (Ref 4.9) indicates no allocated or safeguarded mineral or waste sites are in the Bryncir works site.
Changes in demand for materials	Out	Out	The scale of the proposed works (in terms of material demand) is very small when compared with the overall UK construction sector, and once constructed there will be minimal need for materials during operation. Using professional judgement, forecast effects are considered negligible.
Changes in available landfill void capacity (hazardous waste)	Out	Out	Hazardous waste is scoped out of the assessment. Although some hazardous waste will be generated from the project (such as cable insulating oil and waste from construction plant maintenance), there are not expected to be any large-scale hazardous waste generating activities. The quantities of hazardous waste generated by the proposed works are very small when compared to overall hazardous waste generation in England and Wales, and using professional judgement forecast effects are negligible.
Changes in available landfill void capacity (non-hazardous waste)	In	Out	The majority of the waste generated by the proposed works will comprise non-hazardous waste during the construction phase and hence the potential for this to give rise to significant impacts is assessed.

14.7 Methodology

14.7.1 Details of the technical methods used to determine the baseline conditions, sensitivity of the receptors, magnitude of effects and the significance criteria that have been used for the Materials and Waste assessment are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

14.8 Potential Effects

Waste Receptor Sensitivity

14.8.1 Waste receptor sensitivity for non-hazardous landfill void capacity (the only receptor which has been scoped in) is determined as 'very high'. Since there is no publicly available information on any potential changes to landfill void capacity at the time of the proposed works' construction and operation, a worst-case scenario is considered. Landfill capacity is assumed to remain the same for the baseline, however a very considerable reduction in capacity cannot be excluded (>10% for non-hazardous and inert landfill) for the purpose of selecting sensitivity.

Waste Generation

14.8.2 The following summarises the types of waste that would be generated during the proposed works construction phase:

- Redundant cables.
- Waste oil from cable insulation.
- Vegetation clearance.
- Steel from tower decommissioning
- Excess, offcuts and broken or damaged construction materials.
- Surplus excavated material
- Packaging from materials delivered to the works site.
- Construction worker wastes from offices and welfare areas and canteens.
- Waste oils from construction plant.
- Aggregates, geotextile, geomembrane and fencing following decommissioning of the temporary construction compound.
- Paints and coatings.

Impact and Significance

14.8.3 For non-hazardous waste, the threshold for a significant effect (based on a 'very high' sensitivity) is 1% of the inert and non-hazardous waste landfill void capacity in Wales which is equivalent to 101,000 m^3.

14.8.4 Based on experience of a wide range of other projects of various types and scales, it is estimated that the overall quantities of non-hazardous waste generated are likely to fall well below this threshold of significance. The largest waste stream is expected to be surplus excavated soil (15,500 m^3) which is well below the threshold for a significant effect. This estimate is informed by the facts that:

- There is no demolition of large-scale structures or buildings.
- Construction of site compounds, roads and other infrastructure is small in scale compared to (for example) major road schemes or power stations and hence the associated waste generation is also expected to be small in scale.

- Many of the waste streams are capable of being recycled and hence unlikely to be sent for landfill disposal.

14.8.5 The following approaches are expected to be followed for managing particular waste streams, where feasible, and will further reduce the quantity of waste requiring landfill disposal:

- Vegetation clearance waste will be sent for composting.
- Metallic waste (including cable conductors, electrical equipment and constructional steel) will be sent for recycling.
- Concrete and other inert waste will be used to produce recycled aggregate, either on-site or offsite.
- Surplus excavated materials will be used to backfill trenches and elsewhere in the works where possible.
- Waste oil will be sent either for recovery or high-temperature incineration.

14.9 Mitigation and Residual Effects

Embedded Measures

14.9.1 The proposed works has been designed, as far as possible, to avoid and minimise the impacts and effects on Materials and Waste. This has been achieved through the process of design development, and by embedding mitigation measures into the design of the proposed works.

Design

14.9.2 The following embedded mitigation measures have been incorporated into the proposed works' design principles:

- Design for reuse and recovery: identifying, securing and using materials that already exist on-site, or can be sourced from other projects (e.g. reuse of excavated soil for landscaping).
- Design for materials optimisation: simplifying layout and form to minimise material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content.
- Design for off-site construction: maximising the use of prefabricated structure and components, encouraging a process of assembly rather than construction where practicable.
- Design for the future (deconstruction and flexibility): identify how materials can be designed to be more easily adapted over an asset lifetime and how de-constructability and de-mountability of elements can be maximised at end of first life.
- Design for Waste and Material asset efficient procurement.

Construction

14.9.3 The proposed works would aim to prioritise waste prevention, followed by preparing for reuse, recycling and other recovery and lastly disposal to landfill as per the waste hierarchy illustrated in **Plate 14-1**.

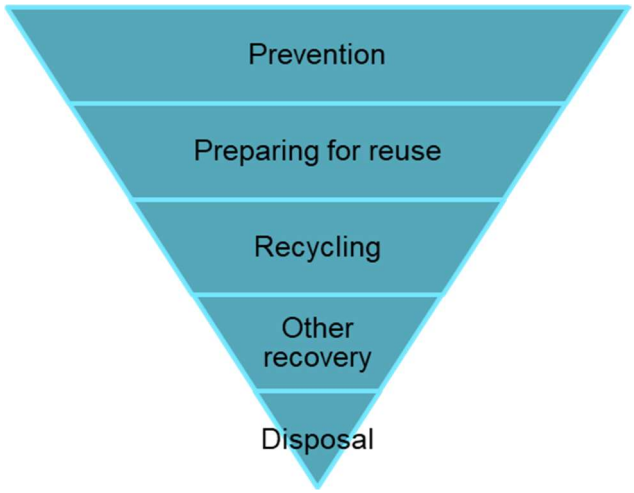


Plate 14-1 – The Waste Hierarchy (Ref 14.10)

14.9.4 The following standard construction practices are relevant to this assessment:

- Implementation of a 'just-in-time' material delivery system to avoid materials being stockpiled where possible, which increases the risk of their damage and disposal as waste.
- Attention to material quantity requirements to avoid over-ordering and generation of waste materials.
- Segregation of waste at source where practical.

Additional Mitigation and Enhancement Measures

14.9.5 No significant effects have been identified, and no additional mitigation or monitoring is proposed.

14.9.6 No enhancement measures related to Materials and Waste are proposed at this stage.

14.10 Summary

14.10.1 Table **14-2** summarises the residual effects of the proposed works in relation to Waste.

14.10.2 In summary, there are no significant residual effects associated with construction of the proposed works and an assessment of the operation (including maintenance) is scoped out of the assessment on the basis the effects would be of a similar or lower magnitude to those identified for construction.

Table 14-2 – Summary of residual effects (construction)

Receptor	Sensitivity (value)	Description of impact	Classification of effect (prior to additional mitigation)	Additional mitigation/ enhancement measure	Magnitude of impact after additional mitigation	Residual effect
Changes in available non-hazardous and inert waste landfill void capacity	Very High	Negligible	Slight adverse (not significant)	N/A	Negligible	Slight adverse (not significant)

15. In-Combination Effects

15.1 Introduction

15.1.1 This chapter introduces the likely In-Combination Effects that could arise from the construction and operation of the works at Bryncir as described in Chapter 2: Bryncir Works and how it is assessed within this ES.

15.1.2 In-combination effects occur where a single receptor is affected by more than one type of effect arising from different aspects of a project. An example of an in-combination effect would be where a local resident is affected by temporary visual effects of construction works, noise and traffic disruption during the construction of a scheme, with the resulting effect being greater than each individual effect alone.

15.2 Legislation and Planning Policy

15.2.1 This section summarises the legislation and planning policy framework that is relevant to the In-combination Effects assessment. Full details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

15.2.2 The following legislation is relevant to In-Combination Effects:

- 2017 TCP EIA Regulations (Ref 3.1).
- The Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations (2017) (Ref 3.2).

National Policy

15.2.3 The national policy is relevant to In-Combination Effects:

- PPW – Edition 12 (Ref 4.4).
- Future Wales: The National Plan 2040 (Ref 4.3).

15.3 Methodology

15.3.1 There is no established EIA methodology for assessing and quantifying the effects of a number of individual impacts on the same sensitive receptors. The methodology used to undertake the in-combination effects assessment is based on previous experience and professional judgement. A full description of the methodology used for in-combination effects is outlined in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

15.4 Assessment

15.4.1 An assessment of the potential in-combination effects has been undertaken at a Project level and is discussed in **Volume 7: The Project and Cumulative Effects.**

16. Cumulative Effects

16.1 Introduction

16.1.1 This chapter introduces the likely Cumulative Effects that could arise from the construction and operation of the works at Bryncir as described in Chapter 2: Bryncir Works and how it is assessed within this ES.

16.1.2 Cumulative effects occur when two or more planned developments have an effect on the same receptor leading to an increase in the effect, and possibly an effect of greater significance. It is possible that individually the developments might not result in significant effects, but when considered together they could create significant effects on a shared receptor; this would typically result from an overall increase in the magnitude (scale, duration, etc.) of effects.

16.2 Legislation and Planning Policy

16.2.1 This section summarises the legislation and planning policy framework that is relevant to the Cumulative Effects assessment. Full details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

16.2.2 The following legislation is relevant to Cumulative Effects:

- 2017 TCP EIA Regulations (Ref 3.1).
- The Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations (2017) (Ref 3.2).

National Policy

16.2.3 The national policy is relevant to Cumulative Effects:

- PPW – Edition 12 (Ref 4.4).
- Future Wales: The National Plan 2040 (Ref 4.3).

16.3 Study Area

16.3.1 A 2 km Study Area from the Bryncir works site has been implemented to assess the cumulative effects. A 2 km Study Area was deemed appropriate given the nature of the proposed works and its predominantly rural setting.

16.4 Methodology

16.4.1 A range of public sector and industry-led guidance is available on the approach to assessing cumulative effects but at present there is no single, agreed industry standard method. Whilst the proposed works or the wider Project as a whole are not classed as a Nationally Significant Infrastructure Project, the approach to the assessment of

cumulative effects broadly follows the Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment guidance (Ref 16.1). A description of the methodology used for cumulative effects is outlined in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

16.5 Potential Effects

16.5.1 There are no other developments within 2 km of the Bryncir works site.

16.6 Summary

16.6.1 There are no other developments within 2 km of the Bryncir works site, however, a full assessment of the potential cumulative effects is carried out at a Project level and is discussed in **Volume 7: The Project and Cumulative Effects.**

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Figures

Figure 3.2.1: Location of the Proposed Works.

Figure 3.2.2: Bryncir Works Site.

Figure 3.4.1: Landscape and Visual Impact Assessment Study Area.

Figure 3.4.2: National Landscape Character Areas.

Figure 3.4.3: Gwynedd Local Landscape Character Areas.

Figure 3.4.4: Eryri National Park Local Landscape and Seascape Character Areas.

Figure 3.4.5: LANDMAP Visual Sensory Landscape Character Areas.

Figure 3.4.6: Landscape Relevant Statutory Designations and Recreational Routes.

Figure 3.4.7: Zone of Theoretical Visibility.

Figure 3.4.8: Representative Viewpoint and Visual Receptor Locations.

Figure 3.4.9: Baseline Photography.

Figure 3.5.1: Statutory Designated Sites for Nature Conservation in the Wider Area (up to 30 km).

Figure 3.5.2: Statutory Designated Sites for Nature Conservation within 5 km.

Figure 3.5.3: Non-Statutory Sites Designated for Nature Conservation within 2 km.

Figure 3.5.4: Habitats of Principal Importance and Ancient Woodland within 2 km.

Figure 3.7.1: Made Ground and Superficial Geology.

Figure 3.7.2: Bedrock Geology.

Figure 3.7.3: Hydrogeology.

Figure 3.7.4: Groundwater Vulnerability.

Figure 3.7.5: Potential Sources of Contamination.

Figure 3.7.6: Historical Potential Sources of Contamination.

Figure 3.7.7: Mining, Quarrying and Mineral Resources.

Figure 3.7.8: Surface Ground Works.

Figure 3.8.1: Study Area and Hydrology.

Figure 3.8.2: Water Resources.

Figure 3.8.3: Fluvial Flood Risk.

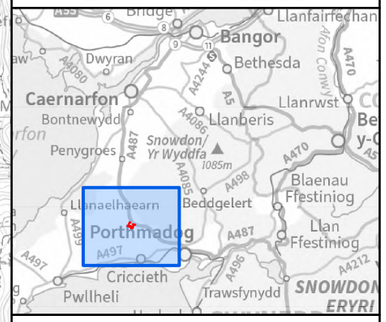
Figure 3.8.4: Surface Water Flood Risk.

Figure 3.8.5: WFD River Waterbodies.

Figure 3.9.1: Traffic and Transport Study Area and Traffic Survey Locations.

Figure 3.9.2: Study Area Road Network.
Figure 3.9.3: Traffic Accident Locations.
Figure 3.9.4: Indicative HGV Routing.
Figure 3.10.1: Construction Dust Assessment.
Figure 3.11.1: Noise Monitoring and Sensitive Receptor Locations.
Figure 3.12.1: Socio-Economic Land Use Receptors.
Figure 3.12.2: 60-minute Peak Hour Drive from the Bryncir Works Site.
Figure 3.12.3: Public Rights of Way.

BRYNCIR WORKS ROUTE LEGEND



Legend

Bryncir Works Site Boundary

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.2.1 LOCATION OF THE PROPOSED WORKS

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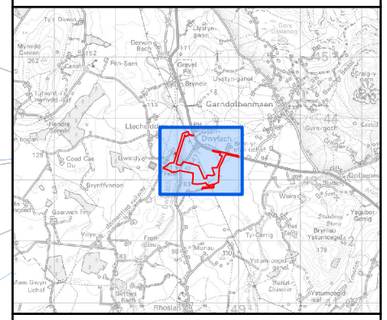
DB Connection Point

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- Existing OHL

Proposed Works

- Location of New 4ZC067 Tower
- Location of New 132 kV Support
- New Substation Infrastructure
- Preliminary Drainage Design
- Ditch to be Diverted
- Location of Permanent Substation Compound
- 132kV Cable Route Layout Area
- Temporary Access Road
- Main Compound
- Secondary Compound
- Existing PRoW (Public Right of Way)
- Route of Public Footpath Diversion

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Document Title: FIGURE 3.2.2 BRYNCIR WORKS SITE

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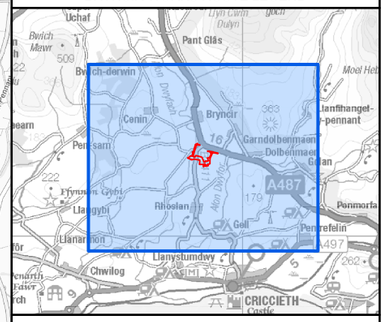
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- Landscape and Visual Impact Assessment (LVIA) Study Area (3km Buffer of Bryncir Works Site Boundary)

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LANDSCAPE AND VISUAL IMPACT ASSESSMENT STUDY AREA

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04 Llŷn

03 Arfon

06 Eryri
(Snowdonia)

05 Tremadog
Bay

06 Eryri
(Snowdonia)

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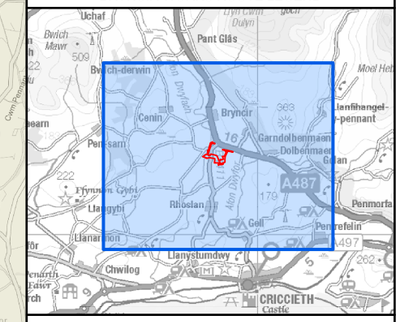
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- LVIA Study Area (3km Buffer of Bryncir Works Site Boundary)

National Landscape Character Area

- 03 Arfon
- 04 Llŷn
- 05 Tremadog Bay
- 06 Eryri (Snowdonia)

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Document Title: FIGURE 3.4.2
NATIONAL LANDSCAPE CHARACTER AREAS

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N

LCA 6 - Llyn North Coast

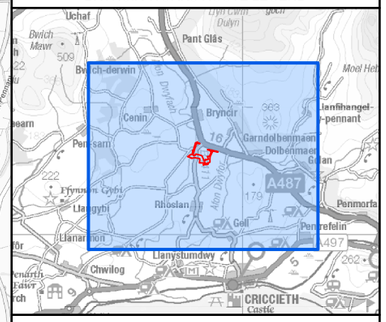
LCA 5 - Snowdon Massif

LCA 10 - Central Llyn

LCA 8 - Pwllheli-criccieth Coast

LCA 9 - Porthmadog

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- LVIA Study Area (3km Buffer of Bryncir Works Site Boundary)

Gwynedd Local Landscape Character Area (LCA)

- LCA 5 - Snowdon Massif
- LCA 6 - Llyn North Coast
- LCA 8 - Pwllheli-criccieth Coast
- LCA 9 - Porthmadog
- LCA 10 - Central Llyn

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Local landscape character areas have been re-created by AECOM based on the Gwynedd landscape strategy updated 2012.
The boundaries should be considered indicative and not for use at large scales

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Document Title: FIGURE 3.4.3 GWYNEDD LOCAL LANDSCAPE CHARACTER AREAS

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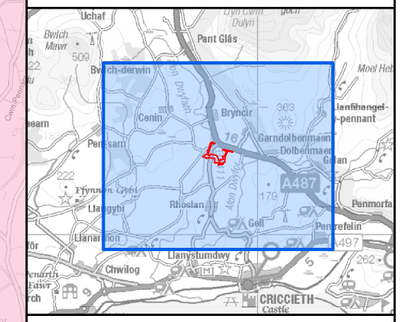
LCA 04

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- LVIA Study Area (3km Buffer of Bryncir Works Site Boundary)

Eryri National Park Local Landscape Character Area (LCA)

- LCA 04 - Moel Hebog Uplands

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Document Title: FIGURE 3.4.4
ERYRI NATIONAL PARK LOCAL LANDSCAPE CHARACTER AREAS

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N

GWNDDVS036 (Upland Moorland)

GWNDDVS043 (Hillside & Scarp Slopes Grazing)

SNPVS055 (Upland Moorland)

GWNDDVS011 (Hillside & Scarp Slopes Grazing)

SNPVS053 (Hillside & Scarp Slopes Mosaic)

SNPVS054 (Open Lowland Valleys)

GWNDDVS038 (Open Lowland Valleys)

GWNDDVS067 (Open Lowland Valleys)

SNPVS053 (Hillside & Scarp Slopes Mosaic)

GWNDDVS044 (Mosaic Rolling Lowland)

GWNDDVS039 (Mosaic Lowland Valleys)

GWNDDVS066 (Open Rolling Lowland)

GWNDDVS065 (Hillside & Scarp Slopes Grazing)

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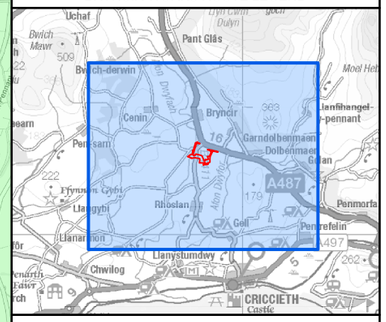
GWNDDVS068 (Mosaic Lowland Valleys)

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- LVIA Study Area (3km Buffer of Bryncir Works Site Boundary)

LANDMAP Visual and Sensory Landscape Character Area

- Hillside & Scarp Slopes Grazing
- Hillside & Scarp Slopes Mosaic
- Mosaic Lowland Valleys
- Mosaic Rolling Lowland
- Open Lowland Valleys
- Open Rolling Lowland
- Upland Moorland

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0 0.5 1 1.5 2 2.5
Kilometres

Rev	Date	Description	GIS	Chk	App
A	31/07/2025	Environmental Statement	ID	RC	RC

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.4.5 LANDMAP VISUAL SENSORY LANDSCAPE CHARACTER AREAS

Creator:	Date:	Checker:	Date:	Approver:	Date:
ID	31/07/2025	RC	31/07/2025	RC	31/07/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:28,000	A3	1 OF 1	A

Document Path: \na.aecomnet.com\lfs\EMEA\Manchester-UKMCR5\DCS\Projects\EGE\60686216_NWWC_GIS2\900_CAD_GIS\920_GIS\02_Maps\PTR - Environmental Statement\PTR_ES_Chp4_Fig5_LAN_LANDMAPVisualSensoryLandscape.aprx

N

Eryri / Snowdonia National Park

Dolbenmaen No 17

Dolbenmaen No 18

Link 8

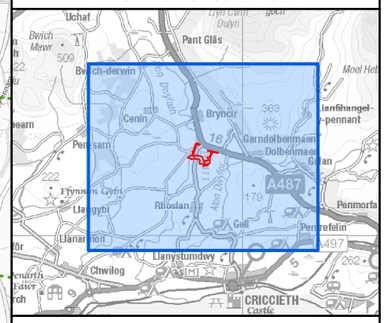
NCN Route 8

NCN Route 8

0 0.5 1 1.5 2 2.5

Kilometres

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- LVIA Study Area (3km Buffer of Bryncir Works Site Boundary)
- Eyri National Park
- Indicative Route of Public Footpath Diversion

Public Right of Way (PRoW)

- Footpath
- Bridleway
- Restricted Byway

Cycle Network

- National Cycle Network (NCN) Route
- Link

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Rev	Date	Description	GIS	Chk	App
A	09/09/2025	Environmental Statement	ID	RC	RC

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

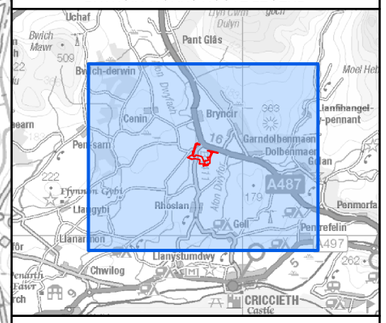
Document Title: FIGURE 3.4.6
LANDSCAPE RELEVANT STATUTORY DESIGNATIONS AND RECREATIONAL ROUTES

Creator:	Date:	Checker:	Date:	Approver:	Date:
ID	09/09/2025	RC	09/09/2025	RC	09/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:28,000	A3	1 OF 1	A

Document Path: \na.aecomnet.com\lfs\EMEA\Manchester-UKMCR5\DCS\Projects\EGE\60686216_NWWC_GIS2\900_CAD_GIS\920_GIS\02_Maps\PTR - Environmental Statement\PTR_ES_Chp4_Fig6_LAN_LandscapeRelevantStatDesignations.aprx

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- LVIA Study Area (3km Buffer of Bryncir Works Site Boundary)
- New 4ZC067 Tower - 50m Height
- New 132 kV Support - 15m Height
- New Substation Fence Boundary - 10.5m Height
- National Forest Inventory - 10m Height
- Existing Building using Height from OS MasterMap
- Existing Building - 7.5m Height
- Zone of Theoretical Visibility[1]

NOTES

1: Zone of Theoretical Visibility (ZTV) has been generated using OS Terrain 5 digital terrain model (DTM) which does not take into account the screening effects of vegetation, buildings or other structures.
Existing Buildings have been incorporated into the DTM from OS MasterMap with assigned individual heights and OS Open Map Local (where OS MasterMap data was not available) with an assumed height of 7.5m.
Woodland from National Forest Inventory has been incorporated into the DTM with an assumed height of 10m.
ZTV is based upon a 20m grid of points within the New Substation Fence Boundary at a height of 10.5m above a platform of 92.75m AOD, a New 4ZC067 Tower at a height of 50m above a platform of 93.252m AOD, and three New SPEN Towers at a height of 15m above ground level (AGL) with an observer eye height of 1.6m.
All heights mentioned above are above ground level unless otherwise specified.

Rev	Date	Description	GIS	Chk	App
A	04/09/2025	Environmental Statement	AB	LC	RC

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.4.7 ZONE OF THEORETICAL VISIBILITY

Creator:	Date:	Checker:	Date:	Approver:	Date:
AB	04/09/2025	LC	04/09/2025	RC	04/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:28,000	A3	1 OF 1	A

0 0.5 1 1.5 2 2.5 Kilometres

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N

3.1

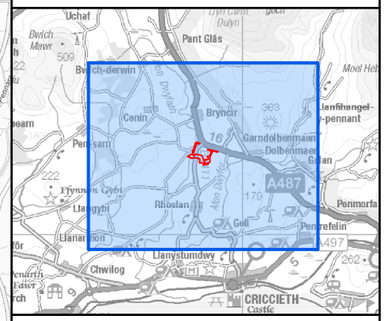
3.2

3.3

3.4

3.5

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- LVIA Study Area (3km Buffer of Bryncir Works Site Boundary)
- Proposed Viewpoint

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0 0.5 1 1.5 2 2.5
Kilometers

Rev	Date	Description	GIS	Chk	App
A	09/09/2025	Environmental Statement	LP	RC	RC

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.4.8 REPRESENTATIVE VIEWPOINT AND VISUAL RECEPTOR LOCATIONS

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	09/09/2025	RC	09/09/2025	RC	09/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:28,000	A3	1 OF 1	A

Document Path: \\na.aecomnet.com\lfs\EMEA\Manchester-UKMCR5\DCS\Projects\EGE\60686216_NWWC_GIS2\900_CAD_GIS\920_GIS\02_Maps\PTR - Environmental Statement\PTR_ES_Chp4_Fig9_LAN_RepresentativeViewpoints.aprx

200% enlargement

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30°



EXISTING (SUMMER)

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

45° 40° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 40° 45°

AECOM Delivering a better world

Visualisation Type:	1	Camera:	Canon EOS 6D	Height (m AOD):	87 m	**Note**:	
Projection:	Cylindrical	Lens:	Canon EF50mm f/1.8 STM	Camera Height (m AGL):	1.6m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	96%	Horizontal Field of View:	90°	Grid reference:	247754 343128		
Paper Size:	A1	Direction of View:	East				
Date / Time:	08/10/2024 10:56	Location:	Garndolbenmaen local road				

Figure X.XX Representative Viewpoint 1

Pentir to Trawsfynydd Project
Environmental Statement Volume 3: Bryncir

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200% enlargement

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30°



EXISTING (SUMMER)

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

45° 40° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 40° 45°

AECOM Delivering a better world

Visualisation Type:	1	Camera:	Canon EOS 6D	Height (m AOD):	104 m	**Note**:	Figure X.XX Representative Viewpoint 2
Projection:	Cylindrical	Lens:	Canon EF50mm f/1.8 STM	Camera Height (m AGL):	1.6m	Images to be viewed at a comfortable arm's length.	**Pentir to Trawsfynydd Project**
Enlargement Factor:	96%	Horizontal Field of View:	90°	Grid reference:	248796		**Environmental Statement Volume 3: Bryncir**
Paper Size:	A1	Direction of View:	South-southwest		343412		
Date / Time:	08/10/2024 11:05	Location:	A487 settlement edge in near Glan-Dwyfach				

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200% enlargement

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30°



EXISTING (SUMMER)

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

45° 40° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 40° 45°

AECOM Delivering a better world

Visualisation Type:	1	Camera:	Canon EOS 6D	Height (m AOD):	106 m	**Note**: Images to be viewed at a comfortable arm's length.	Figure X.XX Representative Viewpoint 3
Projection:	Cylindrical	Lens:	Canon EF50mm f/1.8 STM	Camera Height (m AGL):	1.6m		**Pentir to Trawsfynydd Project**
Enlargement Factor:	96%	Horizontal Field of View:	90°	Grid reference:	248835 342070		**Environmental Statement Volume 3: Bryncir**
Paper Size:	A1	Direction of View:	North-northwest				
Date / Time:	08/10/2024 09:47	Location:	PRoW Llanystumdwy No 62				

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200% enlargement

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

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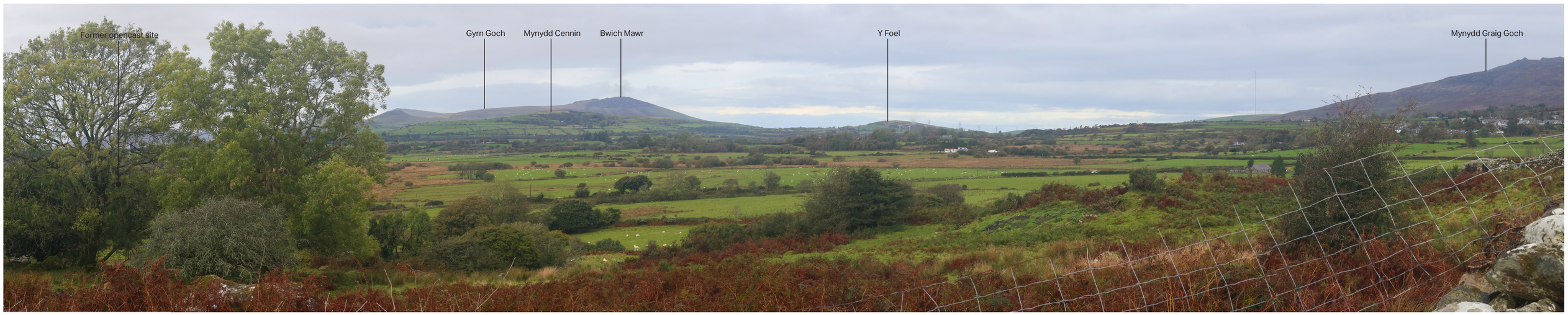

EXISTING (SUMMER)

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

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AECOM Delivering a better world

Visualisation Type:	1	Camera:	Canon EOS 6D	Height (m AOD):	108 m	**Note**:	
Projection:	Cylindrical	Lens:	Canon EF50mm f/1.8 STM	Camera Height (m AGL):	1.6m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	96%	Horizontal Field of View:	90°	Grid reference:	249769 342435		
Paper Size:	A1	Direction of View:	Northwest				
Date / Time:	08/10/2024 10:17	Location:	PRoW Dolbenmaen No 16				

Figure X.XX Representative Viewpoint 4

Pentir to Trawsfynydd Project
Environmental Statement Volume 3: Bryncir

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200% enlargement

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30°



EXISTING (SUMMER)

Extent of 50mm single frame image (27° field of view in portrait)

FOR CONTEXT ONLY

45° 40° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 40° 45°

AECOM Delivering a better world

Visualisation Type:	1	Camera:	Canon EOS 6D	Height (m AOD):	178 m	**Note**:	
Projection:	Cylindrical	Lens:	Canon EF50mm f/1.8 STM	Camera Height (m AGL):	1.6m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	96%	Horizontal Field of View:	90°	Grid reference:	250184		
Paper Size:	A1	Direction of View:	South		344288		
Date / Time:	08/10/2024 10:40	Location:	Road from T^y Eiddew Southeastwards to Tyn y Ffridd				

Figure X.XX Representative Viewpoint 5

Pentir to Trawsfynydd Project
Environmental Statement Volume 3: Bryncir

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N

CAERNARFON BAY / BAE CAERNARFON

Glynllifon SAC

Glynllifon SAC

Corsydd Eifionydd / Eifionydd Fens SAC

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

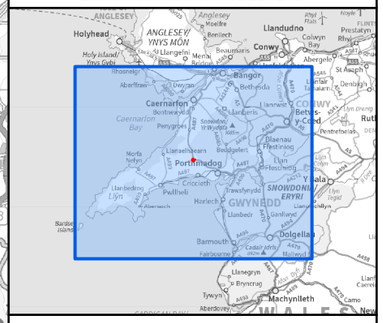
Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Pen Llŷn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC

Northern Cardigan Bay / Gogledd Bae Ceredigion SPA

SNOWDONIA NATIONAL PARK / PARC CENEDLAETHOL ERYRI

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 5km Buffer of Bryncir Works Site Boundary
- 10km Buffer of Bryncir Works Site Boundary
- 30km Buffer of Bryncir Works Site Boundary

Statutory Designated Sites for Nature Conservation[1]

- Ramsar
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)

NOTES

1: Only Statutory Designated Sites within 10km of the Bryncir works site boundary and relevant sites within 30km have been labelled. Those which are outside 10km and are not relevant are still displayed on the figure, but have a transparency applied to the layer.

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	MH	RR	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.5.1 STATUTORY DESIGNATED SITES FOR NATURE CONSERVATION IN THE WIDER AREA

Creator:	Date:	Checker:	Date:	Approver:	Date:
MH	18/08/2025	RR	18/08/2025	NL	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:230,000	A3	1 OF 1	A

0 4 8 12 16 20 Kilometres

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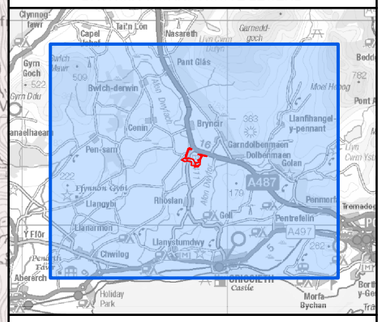
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 2km Buffer of Bryncir Works Site Boundary
- 5km Buffer of Bryncir Works Site Boundary

Statutory Designated Sites for Nature Conservation

- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- National Nature Reserve (NNR)

Corsydd Eifionydd / Eifionydd Fens SAC

Cors y Wlad SSSI

Cors Gyfelog SSSI

Cors Gyfelog NNR

Corsydd Eifionydd / Eifionydd Fens SAC

Cors Graianog SSSI

Corsydd Eifionydd / Eifionydd Fens SAC

Ffriddoedd Garndolbenmaen SSSI

Llystyn Isaf SSSI

Afon Ddu SSSI

Rhosgyll Fawr SSSI

Talhenbont SSSI

Northern Cardigan Bay / Gogledd Bae Ceredigion SPA

Pen Llyn a'r Sarnau

0 0.5 1 1.5 2 2.5 Kilometres

Rev	Date	Description	GIS	Chk	App
A	19/08/2025	Environmental Statement	MH	RR	NL

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.5.2 STATUTORY DESIGNATED SITES FOR NATURE CONSERVATION

Creator:	Date:	Checker:	Date:	Approver:	Date:
MH	19/08/2025	RR	19/08/2025	NL	19/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:42,000	A3	1 OF 1	A

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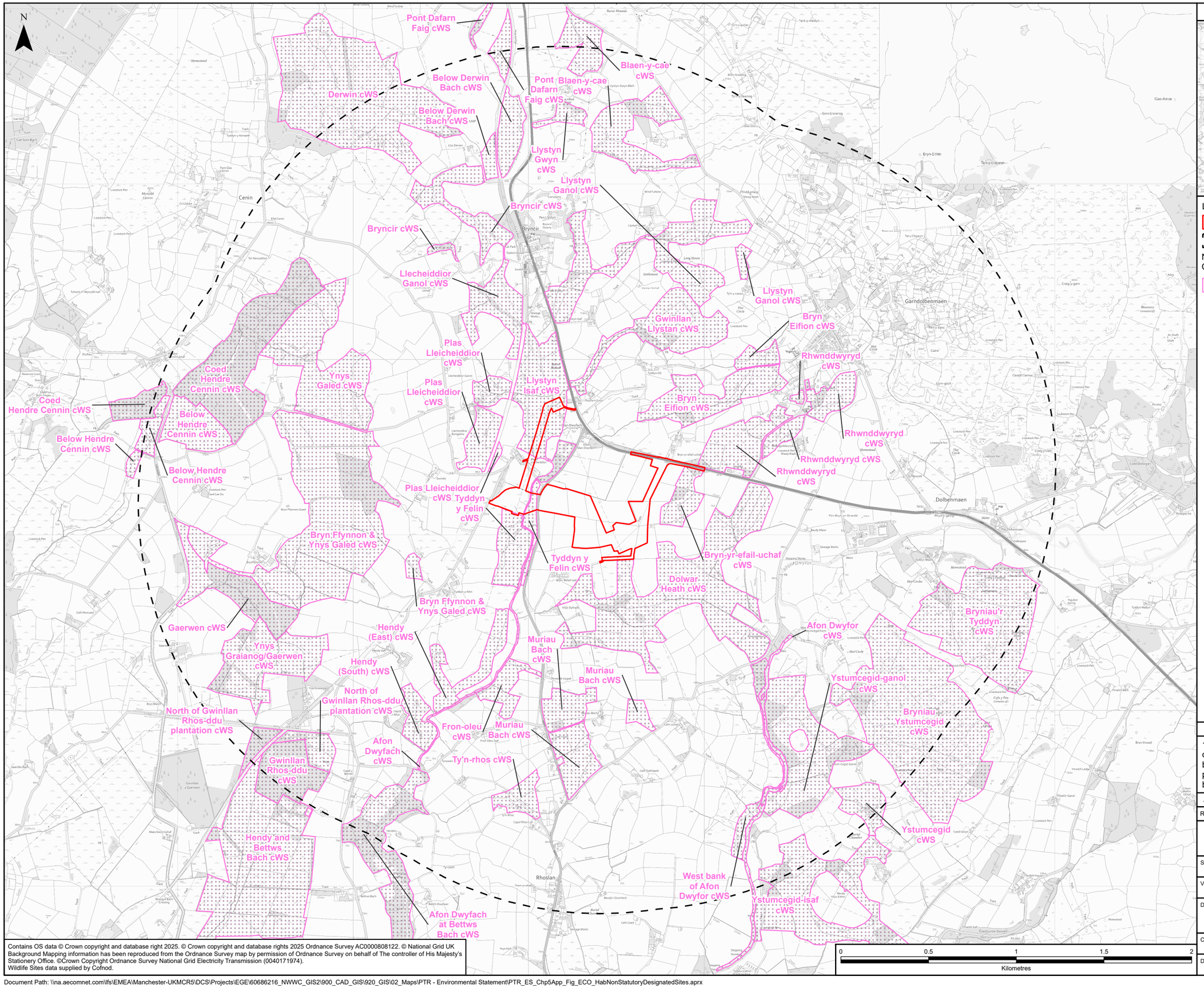
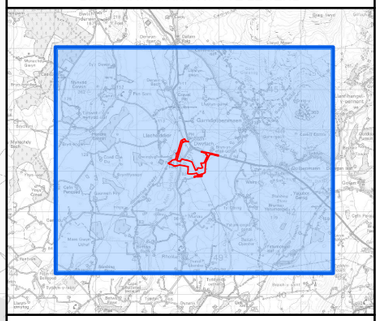


BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 2km Buffer of Bryncir Works Site Boundary

Non-Statutory Designated Sites for Nature Conservation

- Wildlife Site - Candidate (cWS)[1]

NOTES

1. Wildlife Sites data supplied by Cofnod, and are only shown within 2km of the Bryncir works site boundary, however composite wildlife sites, where part of the site intersects the buffer, may extend beyond 2km.

Rev	Date	Description	GIS	Chk	App
A	19/08/2025	Environmental Statement	CA	RR	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.5.3 NON STATUTORY DESIGNATED SITES FOR NATURE CONSERVATION

Creator:	Date:	Checker:	Date:	Approver:	Date:
CA	03/09/2025	RR	03/09/2025	NL	03/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	1 OF 1	A

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Wildlife Sites data supplied by Cofnod.

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N

Cenin

Bryncir

Garndolbenmaen

Dolbenmaen

Rhoslan

ROMAN CAMP

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 2km Buffer of Bryncir Works Site Boundary

Arboricultural Survey December 2024 / February 2025

- Ancient Tree
- Veteran Tree

Habitats of Principal Importance (HoPI)[1]

- Ancient woodland
- Blanket bog
- Lowland dry acid grassland
- Lowland fens and reedbeds
- Lowland heathland
- Lowland meadows
- Open mosaic habitats of previously developed land
- Purple moor grass and rush pastures
- Raised bog
- Upland flushes, fens and swamps
- Upland heathland
- Traditional orchard

NOTES

1. Due to availability of Habitat of Principal Importance (HoPI) data from Data Map Wales, not all HoPI types are shown on the figure.

Rev	Date	Description	GIS	Chk	App
A	11/09/2025	Environmental Statement	MH	RR	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.5.4
HABITATS OF PRINCIPAL IMPORTANCE & ANCIENT WOODLAND

Creator:	Date:	Checker:	Date:	Approver:	Date:
MH	11/09/2025	RR	11/09/2025	NL	11/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	1 OF 1	A

0 0.4 0.8 1.2 1.6 2
Kilometres

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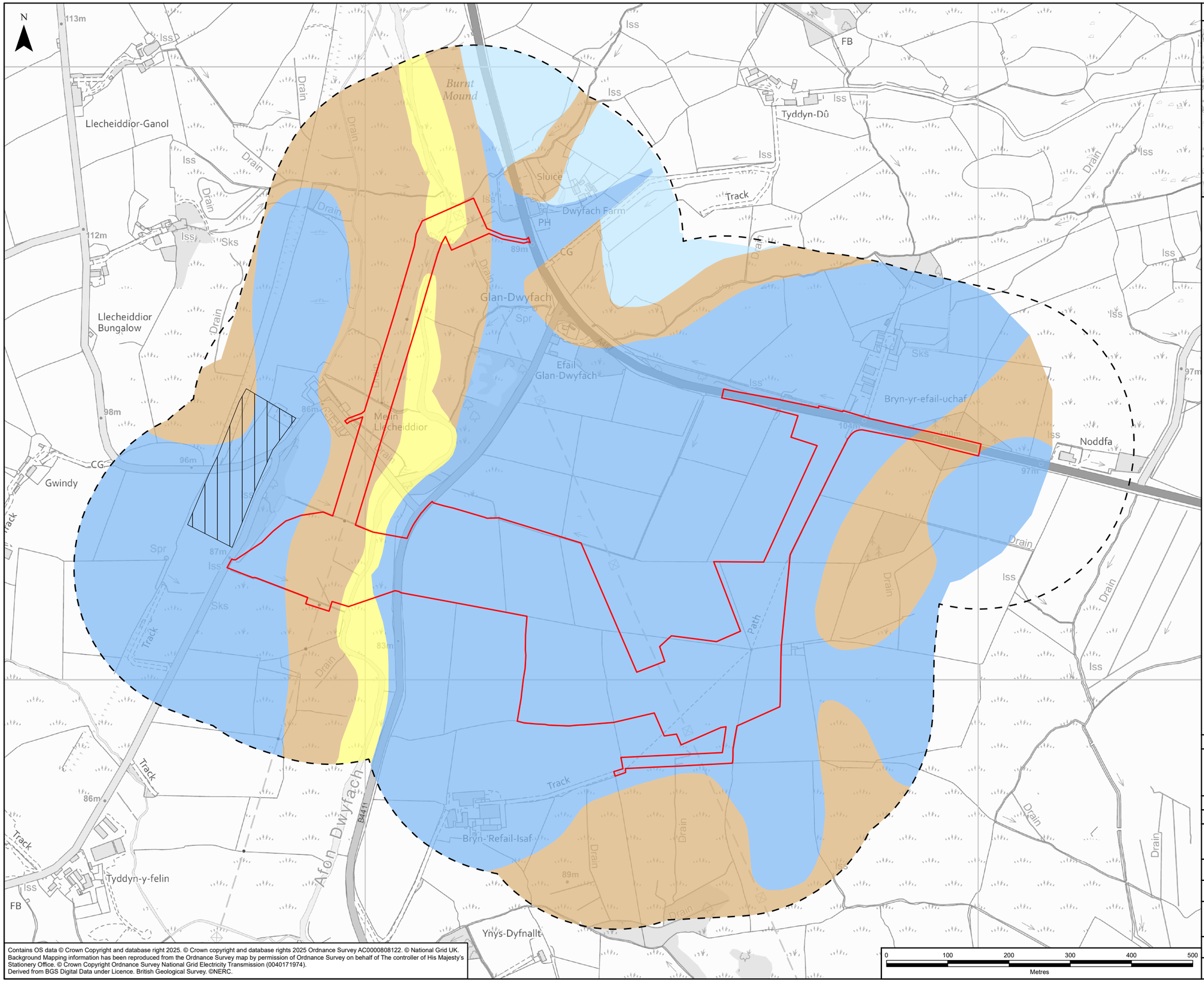

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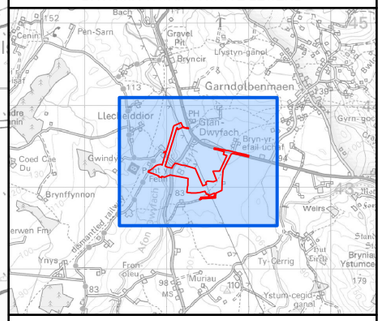
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 250m Buffer of Bryncir Works Site Boundary

BGS Artificial and Made Ground 50k

- Infilled Ground

BGS Superficial Geology 50k

- Alluvium - Gravel, Sand, Silt And Clay
- Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel
- Peat - Peat
- Till, Devensian - Diamicton

NOTES

1. Artificial, made ground and superficial geology data supplied as part of the Groundsure data search request. The search area was 250m from the Works site boundary at the time of the search request.

Rev	Date	Description	GIS	Chk	App
A	27/08/2025	Environmental Statement	LP	SB	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.7.1 MADE GROUND AND SUPERFICIAL GEOLOGY

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	27/08/2025	SB	27/08/2025	NL	27/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:5,750	A3	1 OF 1	A

Document Path: \\na.aecomnet.com\lfs\EMEA\Manchester-UKMCR5\DCS\Projects\EGE\60686216_NWWC_GIS2\900_CAD_GIS\920_GIS\02_Maps\PTR - Environmental Statement\PTR_ES_Chp7_Fig1_GEO_MadeGroundSuperficialGeology.aprx

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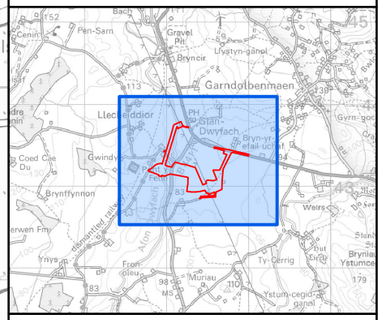
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 250m Buffer of Bryncir Works Site Boundary

BGS Bedrock Geology 50k

- Cwm Eigiau Formation - Siltstone
- Dwyfach Formation - Mudstone, Siltstone And Sandstone
- Dwyfach Formation - Sandstone
- Llanbedrog Volcanic Group - Tuff And Sandstone

NOTES

1. Bedrock geology data supplied as part of the Groundsure data search request. The search area was 250m from the Works site boundary at the time of the search request.

Rev	Date	Description	GIS	Chk	App
A	11/08/2025	Environmental Statement	LP	SB	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.7.2 BEDROCK GEOLOGY

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	11/08/2025	SB	11/08/2025	NL	11/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:5,750	A3	1 OF 1	A

0 100 200 300 400 500

Metres

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Document Path: \\na.aecomnet.com\lfs\EMEA\Manchester-UKMCR5\DCS\Projects\EGE\60686216_NWWC_GIS2\900_CAD_GIS\920_GIS\02_Maps\PTR - Environmental Statement\PTR_ES_Chp7_Fig2_GEO_BedrockGeology.aprx

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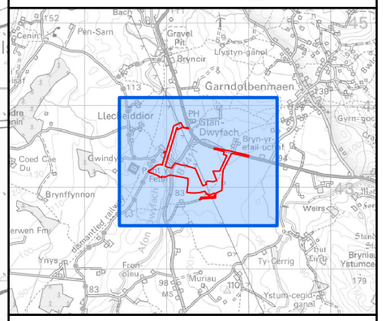
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 250m Buffer of Bryncir Works Site Boundary

BGS Hydrogeology

- Bedrock Secondary B Aquifer

Llecheiddior-Ganol
Llecheiddior Bungalow
Gwindy
Burnt Mound
Sluice
Dwyfach Farm
PH
CG
Glan-Dwyfach
Spr
Efail Glan-Dwyfach
Mein Llecheiddior
Tyddyn-Dû
Track
FB
Bryn-yr-efail-uchaf
Noddfa
Tyddyn-y-felin
Afon Dwyfach
B4411
Bryn-Refail-Isaf
Ynys-Dyfnallt
Path
Drain
Iss
Sks
A487
113m
112m
98m
96m
87m
86m
83m
89m
104m
100m
97m

NOTES

1. Hydrogeology data supplied as part of the Groundsure data search request. The search area was 250m from the Works site boundary at the time of the search request.

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	LP	SB	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.7.3 HYDROGEOLOGY

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	18/08/2025	SB	18/08/2025	NL	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:5,750	A3	1 OF 1	A

0 100 200 300 400 500
Metres

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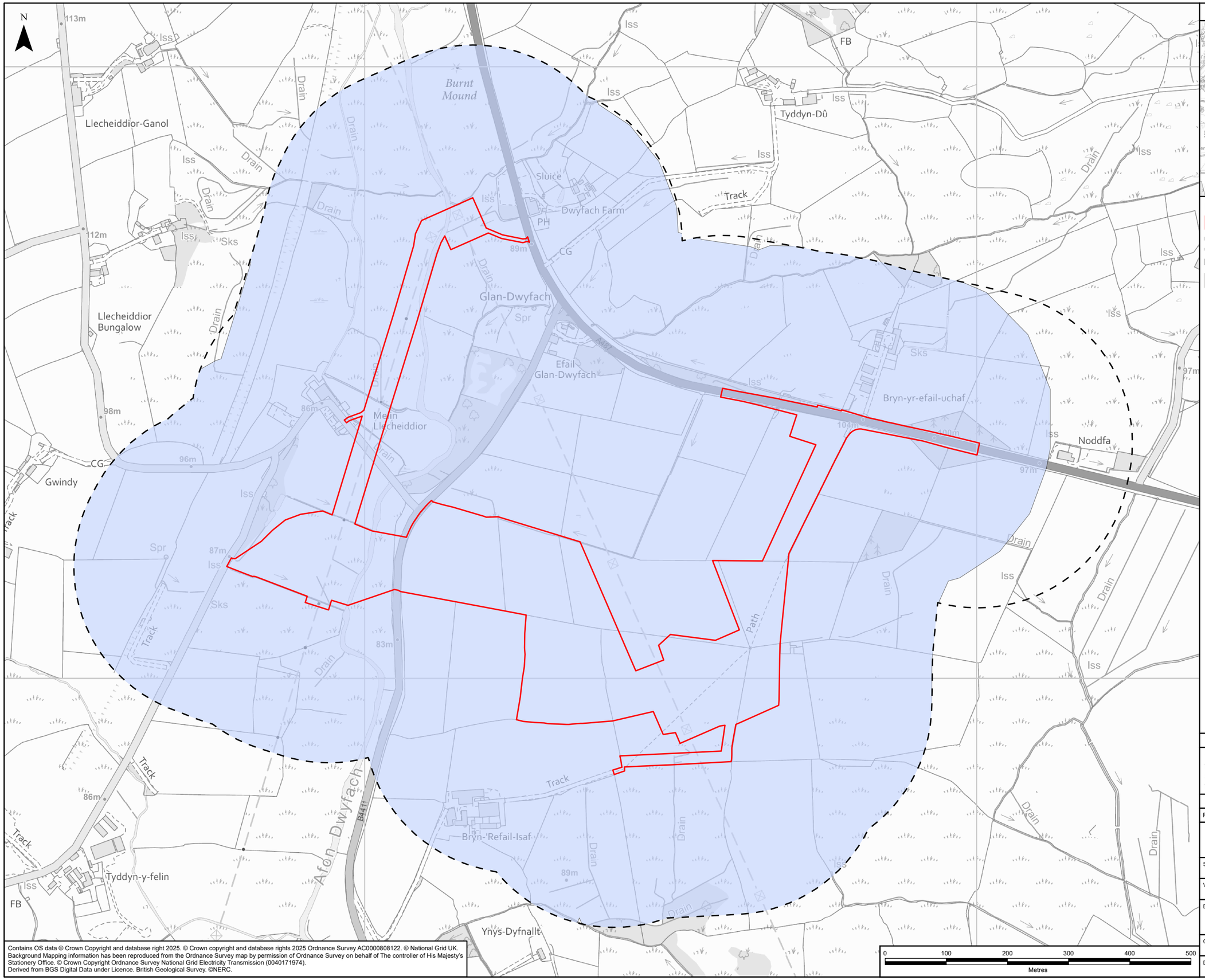
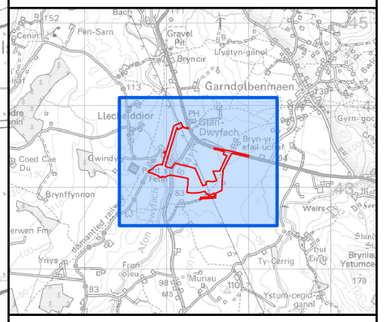


BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 250m Buffer of Bryncir Works Site Boundary

BGS Groundwater Vulnerability

- Secondary Bedrock Aquifer - Low Vulnerability

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NOTES

1. Groundwater vulnerability data supplied as part of the Groundsure data search request. The search area was 250m from the Works site boundary at the time of the search request.

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	LP	SB	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

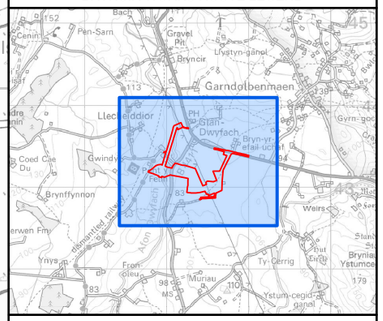
Document Title: FIGURE 3.7.4 GROUNDWATER VULNERABILITY

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	18/08/2025	SB	18/08/2025	NL	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:5,750	A3	1 OF 1	A

Document Path: \\na.aecomnet.com\lfs\EMEA\Manchester-UKMCR5\DCS\Projects\EGE\60686216_NWWC_GIS2\900_CAD_GIS\920_GIS\02_Maps\PTR - Environmental Statement\PTR_ES_Chp7_Fig5_GEO_GroundwaterVulnerability.aprx

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 250m Buffer of Bryncir Works Site Boundary
- Licensed Discharge to Controlled Waters

Current Industrial Land Use

- Industrial Products
- Infrastructure and Facilities

Radon

- Less than 1%
- Between 1% and 3%

NOTES

1: All datasets shown in this figure were supplied as part of the Groundsure data search request. The search area was 250m from the Works site boundary at the time of the search request.

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	LP	SB	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.7.5 POTENTIAL SOURCES OF CONTAMINATION

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	18/08/2025	SB	18/08/2025	NL	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:5,750	A3	1 OF 1	A

0 100 200 300 400 500 Metres

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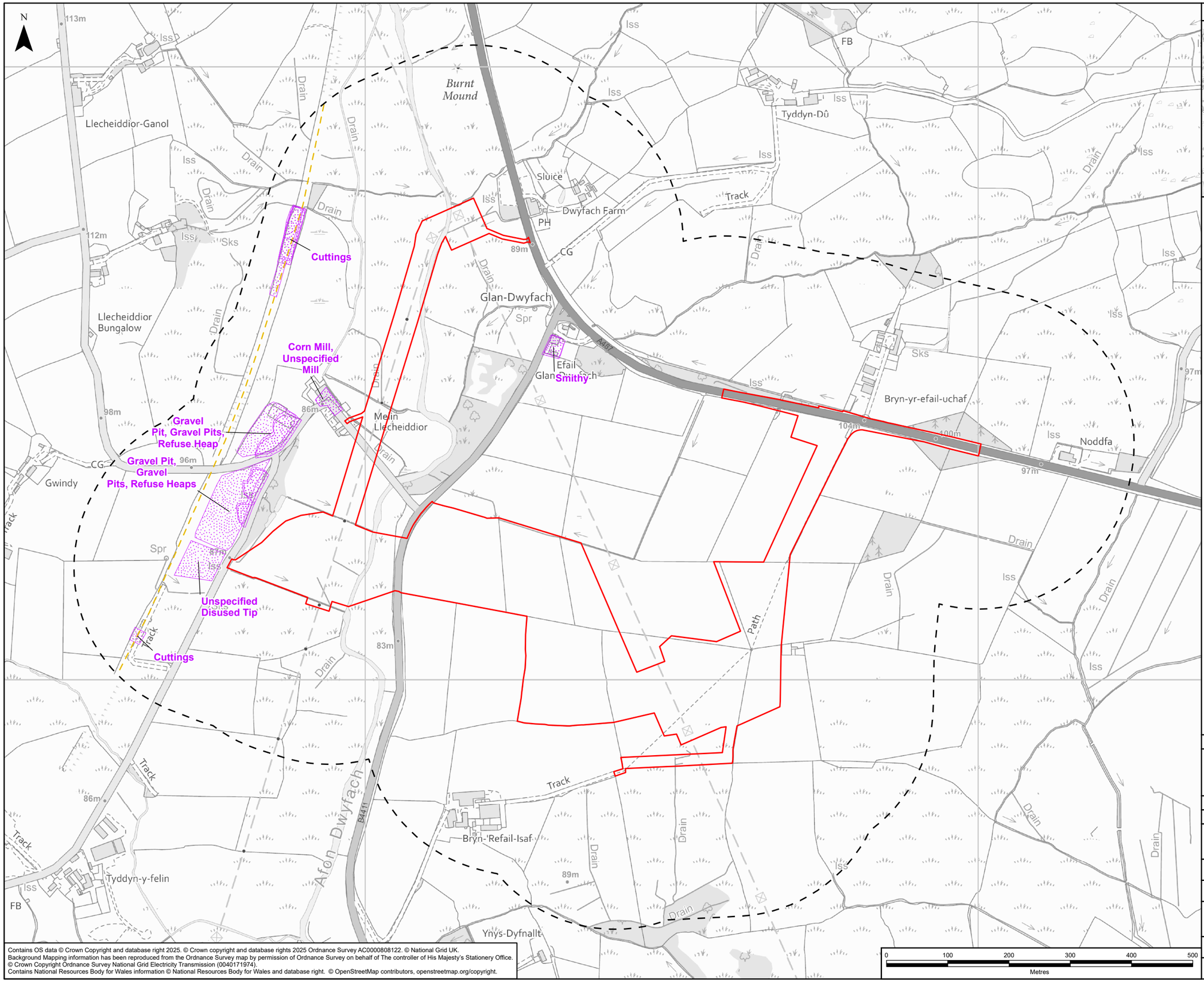

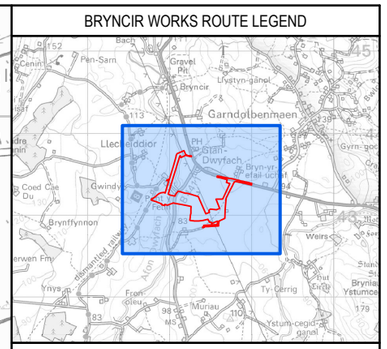

Legend

- Bryncir Works Site Boundary
- 250m Buffer of Bryncir Works Site Boundary
- Historical Railways
- Historical Industrial Land Use

NOTES

1: All datasets shown in this figure were supplied as part of the Groundsure data search request. The search area was 250m from the Works site boundary at the time of the search request.

Rev	Date	Description	GIS	Chk	App
A	08/09/2025	Environmental Statement	LP	SB	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.7.6 HISTORICAL POTENTIAL SOURCES OF CONTAMINATION

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	08/09/2025	SB	08/09/2025	NL	08/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:5,750	A3	1 OF 1	A

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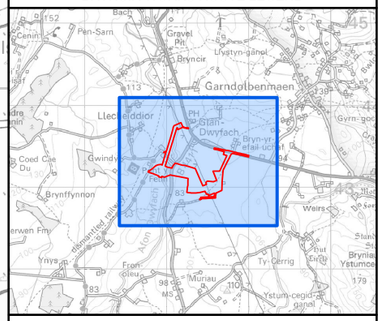
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 250m Buffer of Bryncir Works Site Boundary
- British Pit[1]
- Historical Mineral Planning Areas[1]
- Underground Workings[2]
- Non Coal Underground Mine Workings[1, 2]

Mineral Safeguarding

- Sand & Gravel

NOTES

1. British pit, historical mineral planning areas and non coal underground mine workings data supplied as part of the Groundsure data search request. The search area was 250m from the Indicative Works site boundary at the time of the search request.
2. Underground mine workings may have occurred in the past or current mines may be working at significant depth to modern engineering standards. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered

Rev	Date	Description	GIS	Chk	App
A	28/08/2025	Environmental Statement	LP	SB	NL

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.7.7
MINING, QUARRYING AND MINERAL RESOURCES

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	28/08/2025	SB	28/08/2025	NL	28/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:5,750	A3	1 OF 1	A

0 100 200 300 400 500
Metres

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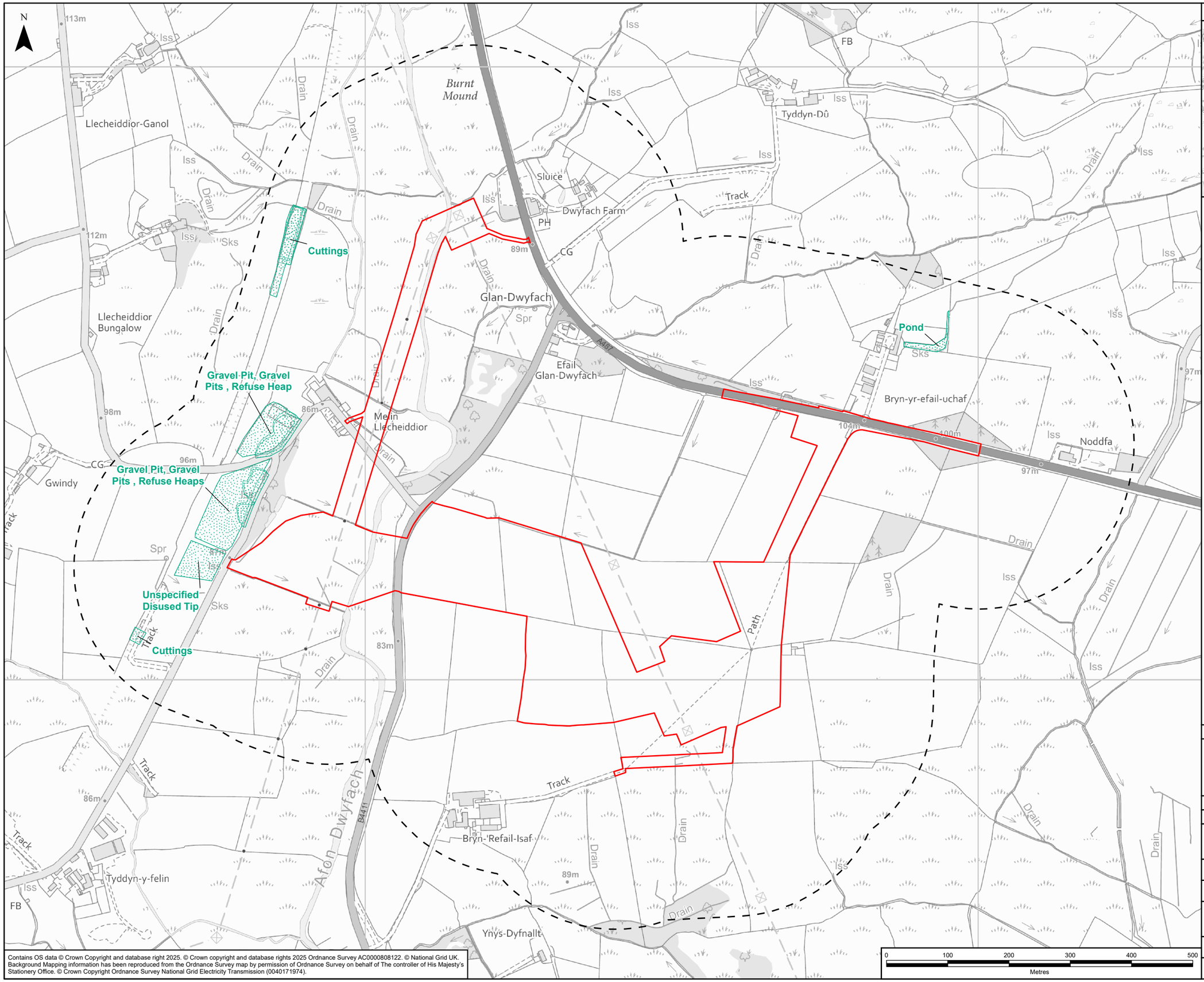

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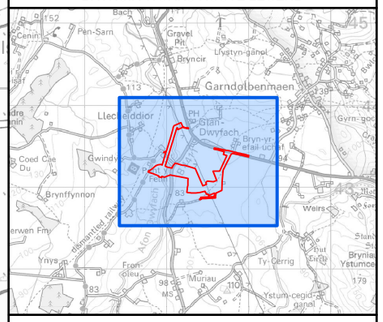
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 250m Buffer of Bryncir Works Site Boundary
- Surface Ground Workings[1]

NOTES

1. Surface ground workings and underground workings data was supplied by Groundsure as part of the Groundsure data search request. The search area was 250m from the Indicative Works site boundary at the time of the search request.

Rev	Date	Description	GIS	Chk	App
A	28/08/2025	Environmental Statement	LP	SB	NL

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

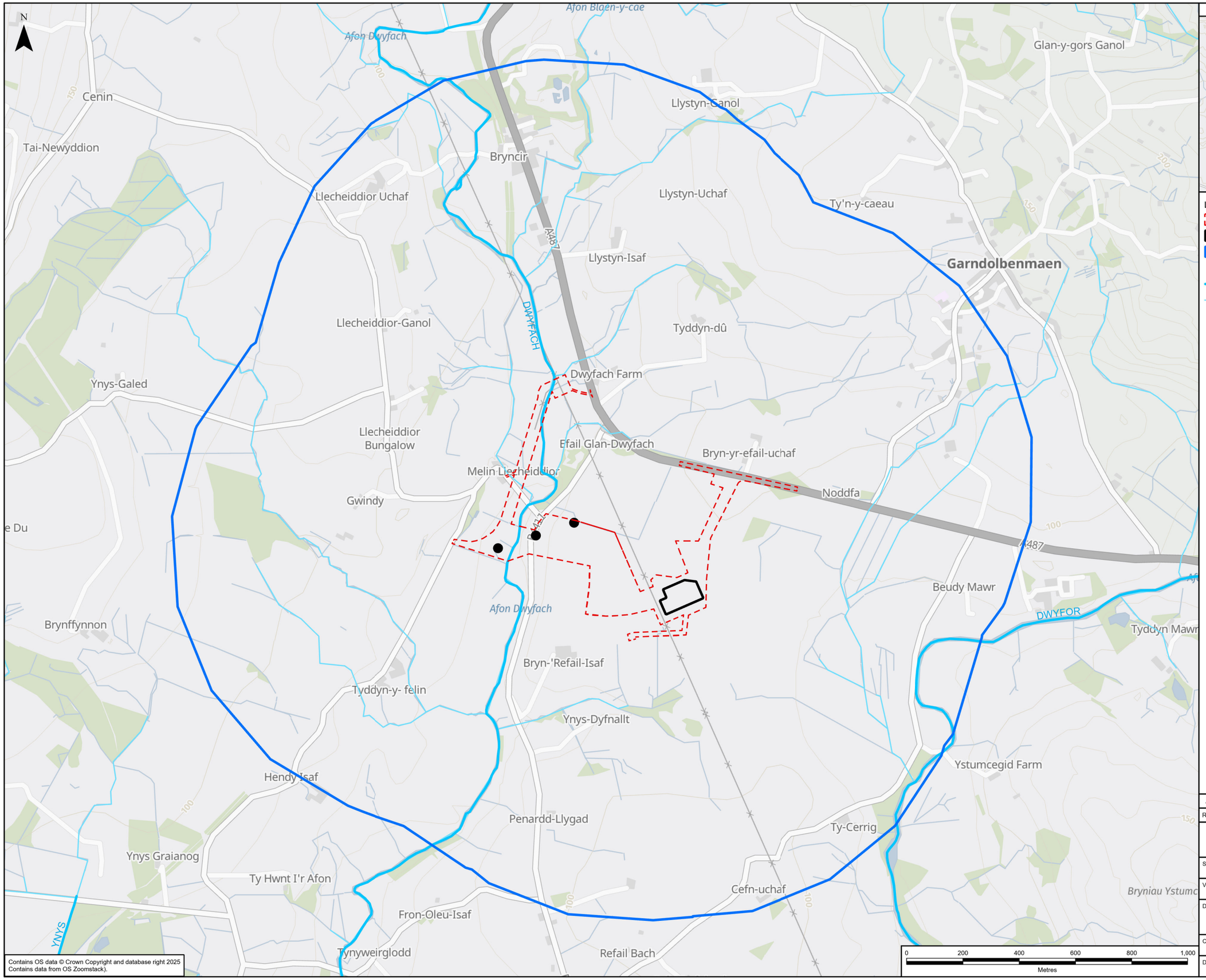
Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.7.8 SURFACE GROUND WORKINGS

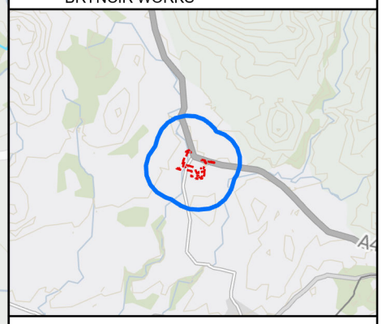
Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	28/08/2025	SB	28/08/2025	NL	28/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:5,750	A3	1 OF 1	A

Document Path: \\na.aecomnet.com\lfs\EMEA\Manchester-UKMCR5\DCS\Projects\EGE\60686216_NWWC_GIS2\900_CAD_GIS\920_GIS\02_Maps\PTR - Environmental Statement\PTR_ES_Chp7_Fig9_GEO_SurfaceGroundWorkings.aprx



BRYNCIR WORKS



Legend

- Bryncir works site
- Bryncir substation
- Study Area
- SPEN DB route connection trident poles
- NRW Main River
- Ordinary watercourse

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Rev	Date	Description	GIS	Chk	App
A	11/08/2025	Environmental Statement	JS	HS	RB

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Scheme:	BRYNCIR WORKS
Volume:	
Document Title:	FIGURE 3.8.1 STUDY AREA AND HYDROLOGY

Creator:	Date:	Checker:	Date:	Approver:	Date:
JS	14/08/2025	HS	14/08/2025	NL	14/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:12,500	A3		A

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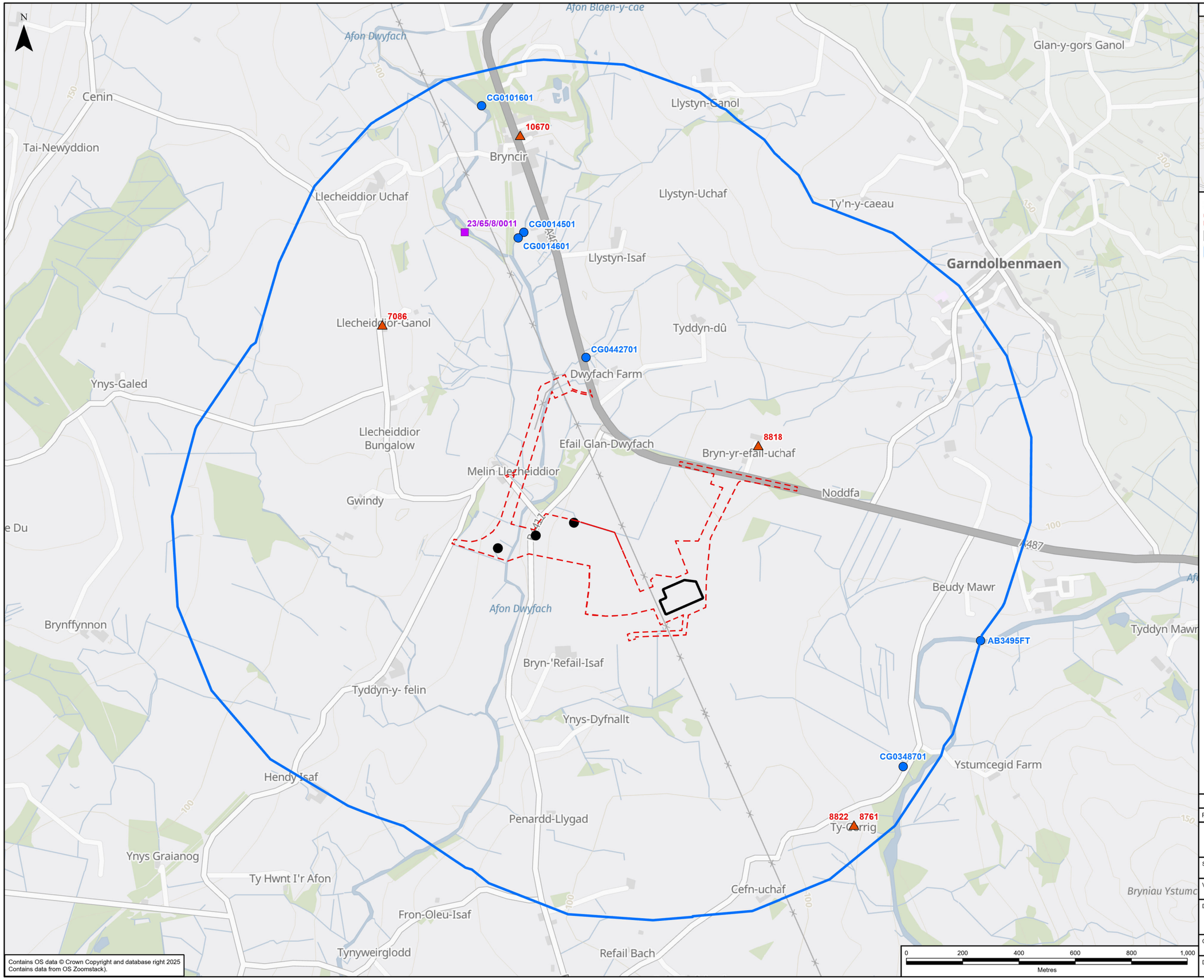

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Rev	Date	Description	GIS	Chk	App
A	11/08/2025	Environmental Statement	JS	HS	RB

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Scheme:	BRYNCIR WORKS
Volume:	
Document Title:	FIGURE 3.8.2 WATER RESOURCES

Creator:	Date:	Checker:	Date:	Approver:	Date:
JS	14/08/2025	HS	14/08/2025	NL	14/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:12,500	A3		A

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N

Cenin
Tai-Newyddion
Llecheiddior Uchaf
Bryncir
Llystyn-Ganol
Glan-y-gors Ganol
Llystyn-Uchaf
Ty'n-y-caeau
Llystyn-Isaf
Garndolbenmaen
Llecheiddior-Ganol
Tyddyn-dû
Dwyfach Farm
Ynys-Galed
Llecheiddior Bungalow
Bryn-yr-efail-uchaf
Melin Lle
Noddfa
A487
Gwindy
Beudy Mawr
Brynffynnon
Tyddyn Mawr
Bryn-'Refail-Isaf
Tyddyn-y- felin
Ynys-Dyfnallt
Ystumcegid Farm
Hendy Isaf
Penardd-Llygad
Ty-Cerrig
Ynys Graianog
Ty Hwnt I'r Afon
Cefn-uchaf
Fron-Oleu-Isaf
Refail Bach

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0 200 400 600 800 1,000
Metres

BRYNCIR WORKS

Legend
- Bryncir works site
- Bryncir substation
- Study Area
- SPEN DB route connection trident poles

NRW Flood Risk from Rivers
- Flood Zone 3
- Flood Zone 2

Rev	Date	Description	GIS	Chk	App
A	11/08/2025	Environmental Statement	JS	HS	RB

nationalgrid

Scheme: BRYNCIR WORKS

Volume:

Document Title: FIGURE 3.8.3 FLUVIAL FLOOD RISK

Creator:	Date:	Checker:	Date:	Approver:	Date:
JS	14/08/2025	HS	14/08/2025	NL	14/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:12,500	A3		A

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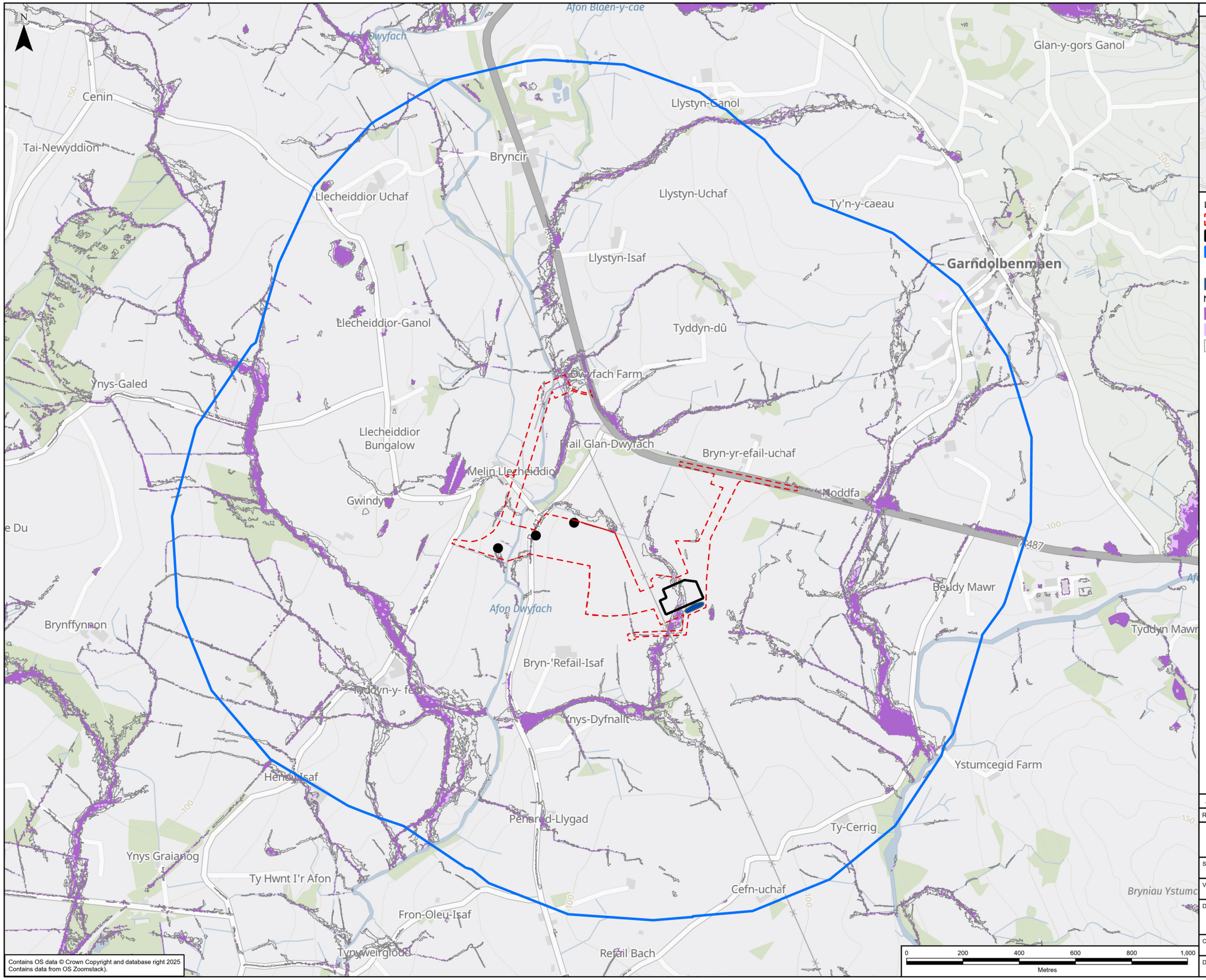

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Rev	Date	Description	GIS	Chk	App
A	11/08/2025	Environmental Statement	JS	HS	RB

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Scheme: BRYNCIR WORKS					
Volume:					
Document Title: FIGURE 3.8.4 SURFACE WATER FLOOD RISK					
Creator: JS	Date: 14/08/2025	Checker: HS	Date: 14/08/2025	Approver: NL	Date: 14/08/2025
Document Type: FIGURE	Scale: 1:12,500	Format: A3	Sheets:		Rev: A

Document Path: C:\Users\UKJPS775\WSP O365\62282643 - NG Glaslyn Hydrology - 62282643 NG Glaslyn\Delivery Stage\Design Technical\GIS\Figures\APRX\UK62282643-WSPE-FG-OW-00013_P01.1.aprx

N

Afon Bląen-y-cae
Afon Dwyfach
Glan-y-gors Ganol
Cenin
Llystyn-Ganol
Tai-Newyddion
Bryncir
Llecheiddior Uchaf
Llystyn-Uchaf
Ty'n-y-caeau
A487
Llystyn-Isaf
Garndolbenmaen
Wen
(Lleyn Peninsula)
Llecheiddior-Ganol
Tyddyn-dû
Dwyfach Farm
Ynys-Galed
Llecheiddior
Bungalow
Dwyfach
Efail Glan-Dwyfach
Bryn-yr-efail-uchaf
Melin Llecheiddior
Noddfa
Gwindy
Dwyfawr
- lower
Afon Dwyfach
Brynffynnon
Tyddyn Mawr
Bryn-'Refail-Isaf
Tyddyn-y- felin
Ynys-Dyfnallt
Ystumcegid Farm
Hendy Isaf
Penardd-Llygad
Ty-Cerrig
Ynys Graianog
Cwmystradllyn
Ty Hwnt I'r Afon
Cefn-uchaf
Fron-Oleu-Isaf
Tynyweirglodd
Refail Bach

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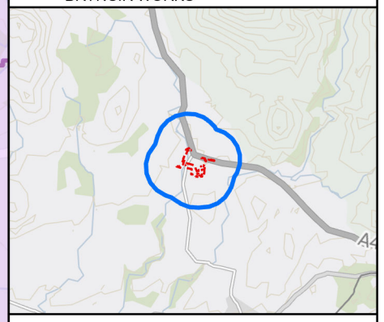
Metres

BRYNCIR WORKS



Legend
- Bryncir works site
- Bryncir substation
- Study Area
- WFD River Water Body
- WFD River Water Body

Rev	Date	Description	GIS	Chk	App
A	11/08/2025	Environmental Statement	JS	HS	RB

nationalgrid

Scheme: BRYNCIR WORKS

Volume:

Document Title:
FIGURE 3.8.5
WFD RIVER WATERBODIES

Creator:	Date:	Checker:	Date:	Approver:	Date:
JS	14/08/2025	HS	14/08/2025	NL	14/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:12,500	A3		A

Document Path: C:\Users\UKJPS775\WSP O365\62282643 - NG Glaslyn Hydrology - 62282643 NG Glaslyn\Delivery Stage\Design Technical\GIS\Figures\APRX\UK62282643-WSPE-FG-OW-00014_P01.1.aprx

N

ATC 3.1

ATC 3.2

ATC 3.3

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- Study Area
- Automatic Traffic Count (ATC) Location

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Kilometres

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	LP	AB	MR

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.9.1
TRAFFIC AND TRANSPORT STUDY AREA
AND TRAFFIC SURVEY LOCATIONS

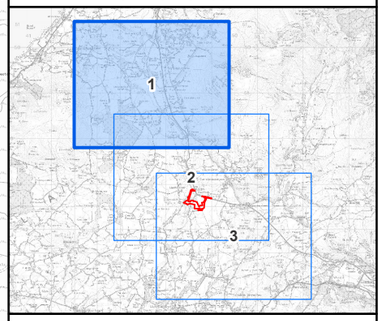
Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	18/08/2025	AB	18/08/2025	MR	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	1 OF 1	A

Document Path: \\na.aecomnet.com\lfs\EMEA\Manchester-UKMCR5\DCS\Projects\EGE\60686216_NWWC_GIS2\900_CAD_GIS\920_GIS\02_Maps\PTR - Environmental Statement\PTR_ES_Chp9_Fig9.1_TRA_StudyAreaAndTrafficSurveyLocations.aprx



BRYNCIR WORKS ROUTE LEGEND



Legend

Bryncir Works Site Boundary

Study Area

Road Network

Trunk

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	LP	AB	MR

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.9.2 STUDY AREA ROAD NETWORK

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	18/08/2025	AB	18/08/2025	MR	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	1 OF 3	A

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BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- Study Area

Road Network

- Trunk
- Secondary

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Kilometres

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	LP	AB	MR

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.9.2 STUDY AREA ROAD NETWORK

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	18/08/2025	AB	18/08/2025	MR	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	2 OF 3	A

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BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- Study Area

Road Network

- Trunk
- Primary
- Secondary
- Tertiary

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	LP	AB	MR

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.9.2 STUDY AREA ROAD NETWORK

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	18/08/2025	AB	18/08/2025	MR	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	3 OF 3	A

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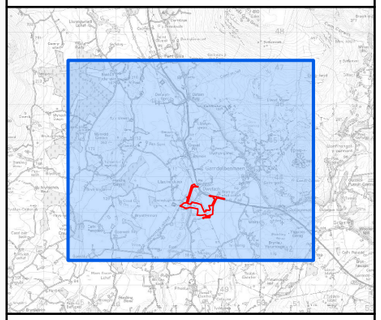
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- Study Area

Location of Recorded Accidents

Severity

- Fatal
- Serious
- Slight

Year

- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022

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A	18/08/2025	Environmental Statement	LP	AB	MR

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.9.3 TRAFFIC ACCIDENT LOCATIONS

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	18/08/2025	AB	18/08/2025	MR	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	1 OF 1	A

Document Path: \\na.aecomnet.com\lfs\EMEA\Manchester-UKMCR5\DCS\Projects\EGE\60686216_NWWC_GIS2\900_CAD_GIS\920_GIS\02_Maps\PTR - Environmental Statement\PTR_ES_Chp9_Fig9.3_TRA_TrafficAccidentLocations.aprx

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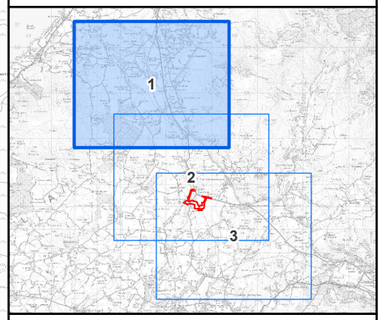
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- Study Area
- Indicative HGV Routeing

A487

Tai'n-lôn

Nebo

Pant Glâs

Bwlch-derwin

Cors-y-Wiad

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Kilometres

Rev	Date	Description	GIS	Chk	App
A	04/09/2025	Environmental Statement	LP	AB	MR

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.9.4 INDICATIVE HEAVY GOODS VEHICLE (HGV) ROUTEING

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	04/09/2025	AB	04/09/2025	MR	04/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	1 OF 3	A

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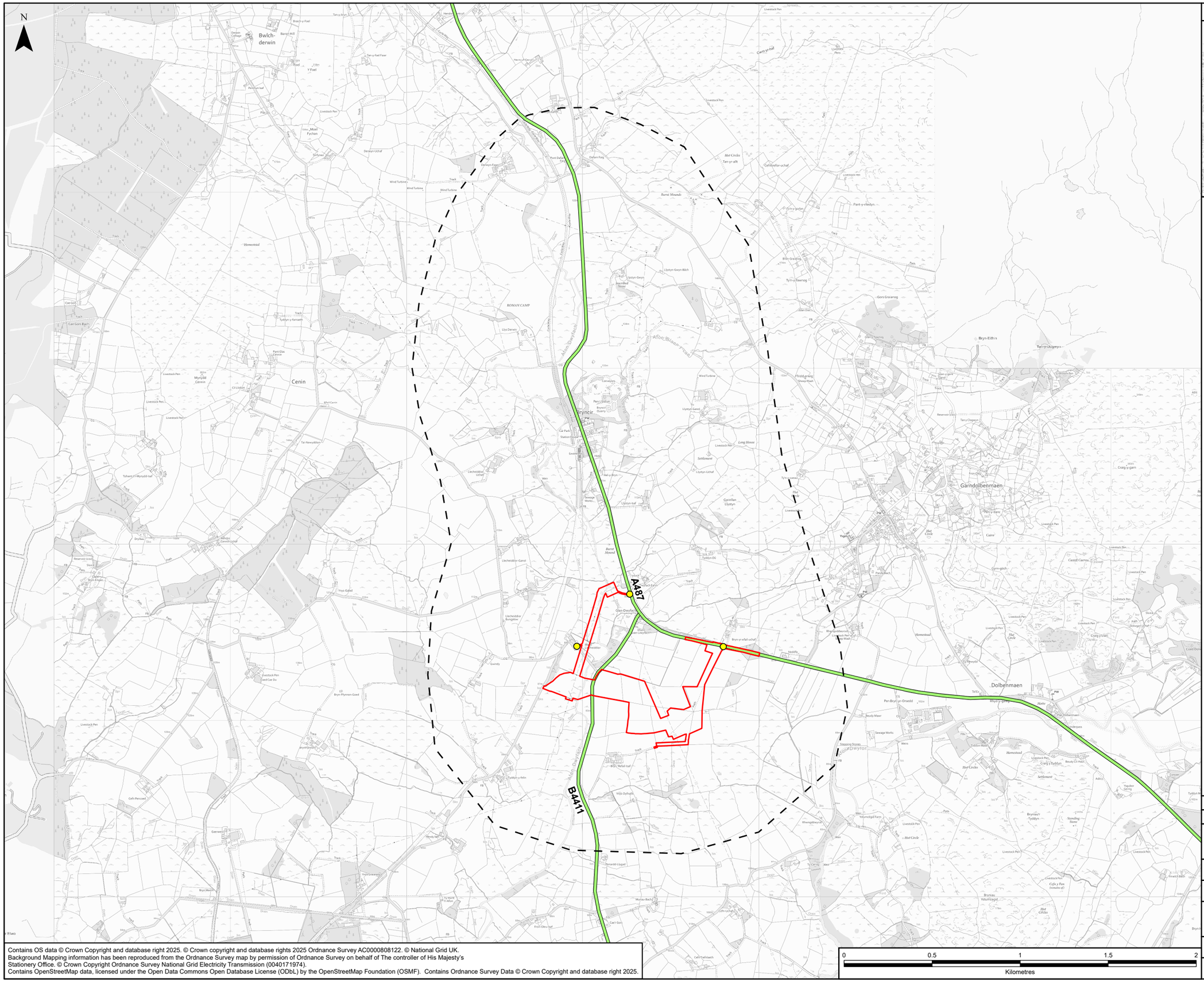

BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- Study Area
- Site Access Point
- Indicative HGV Routeing

Rev	Date	Description	GIS	Chk	App
A	04/09/2025	Environmental Statement	LP	AB	MR

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.9.4 INDICATIVE HEAVY GOODS VEHICLE (HGV) ROUTEING

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	04/09/2025	AB	04/09/2025	MR	04/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	2 OF 3	A

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BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- Study Area
- Site Access Point
- Indicative HGV Routeing

Rev	Date	Description	GIS	Chk	App
A	04/09/2025	Environmental Statement	LP	AB	MR

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.9.4 INDICATIVE HEAVY GOODS VEHICLE (HGV) ROUTEING

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	04/09/2025	AB	04/09/2025	MR	04/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	3 OF 3	A

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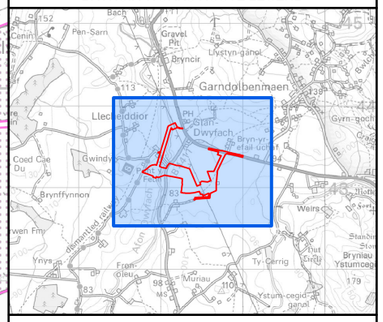
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 20m Buffer of Bryncir Works Site Boundary
- 50m Buffer of Bryncir Works Site Boundary
- 100m Buffer of Bryncir Works Site Boundary
- 250m Buffer of Bryncir Works Site Boundary

Statutory Designated Sites for Nature Conservation

- Site of Special Scientific Interest (SSSI)

Non-Statuatory Designated Sites for Nature Conservation

- Wildlife Site - Candidate (cWS)[1]

Receptor

- Residential Property
- Visitor Accomodation

NOTES

1. Wildlife Sites data supplied by Cofnod

Rev	Date	Description	ID	Chk	App
A	27/08/2025	Environmental Statement	GH	AS	

nationalgrid

Scheme:	PENTIR TO TRAWSFYNYDD REINFORCEMENT
Volume:	VOLUME 3: BRYNCIR WORKS
Document Title:	FIGURE 3.10.1 CONSTRUCTION DUST ASSESSMENT

Creator:	Date:	Checker:	Date:	Approver:	Date:
ID	27/08/2025	GH	27/08/2025	AS	27/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:5,750	A3	1 OF 1	A

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Metres

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N

BRYNCIR WORKS ROUTE LEGEND

Legend

Bryncir Works Site Boundary

300m Construction Noise Study Area

Noise Monitoring Location

Long Term (LT)

Sensitive Noise Receptor

Residential

LT3.1

LT3.2

LT3.3

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Rev	Date	Description	GIS	Chk	App
A	28/08/2025	Environmental Statement	ID	ER	NL

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.11.1 NOISE MONITORING AND SENSITIVE RECEPTOR LOCATIONS

Creator:	Date:	Checker:	Date:	Approver:	Date:
ID	28/08/2025	ER	28/08/2025	NL	28/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:7,750	A3	1 OF 1	A

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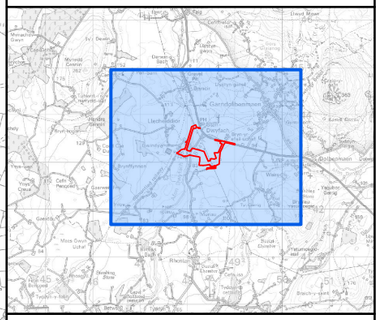
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 500m Buffer of Bryncir Works Site Boundary
- 1km Buffer of Bryncir Works Site Boundary
- Community Facility
- Residential Property
- Visitor Accomodation
- Business Premises
- Business Premises, Residential Property
- Residential Property, Visitor Accomodation

Greenspace

- Playing Field
- Religious Grounds

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Kilometres

Rev	Date	Description	GIS	Chk	App
A	05/09/2025	Environmental Statement	AG	AB	JH

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.12.1 SOCIO-ECONOMIC LAND USE RECEPTORS

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AG	05/09/2025	AB	05/09/2025	JH	05/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:12,000	A3	1 OF 1	A

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HOLYHEAD to Dublin 3 hrs

Dublin 2 hrs

ANGLESEY / YNYS MÔN

CAERNARFON BAY / BAE CAERNARFON

HOLYHEAD / CAERGYBI

LLANDUDNO

COLWYN BAY

PRESTATYN

RHYL

BANGOR

CAERNARFON

BEAUMARIS

PENMAENMAWR

LLANFAIRFECHAN

ST ASAPH

DENBIGH

RUTHIN

CRICCIETH

PWLLHELI

BARMOUTH

SNOWDONIA NATIONAL PARK / PARC CENEDLAETHOL ERYRI

LIVERPOOL BAY

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Kilometres

BRYNCIR WORKS ROUTE LEGEND

Legend

- Bryncir Works Site Boundary
- National Park
- Lower Super Output Area (LSOA)

Drive Time Analysis for an Average Wednesday Morning at 9.30am[1]

- 0 - 60 Minutes

NOTES

1: Figure shows 60 minute peak hour drive time from the Bryncir works site access points.

Rev	Date	Description	GIS	Chk	App
A	05/09/2025	Environmental Statement	AB	EH	JH

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.12.2
60 MINUTE PEAK HOUR DRIVE TIME
FROM BRYNCIR WORKS SITE

Creator:	Date:	Checker:	Date:	Approver:	Date:
AB	05/09/2025	EH	05/09/2025	JH	05/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:350,000	A3	1 OF 1	A

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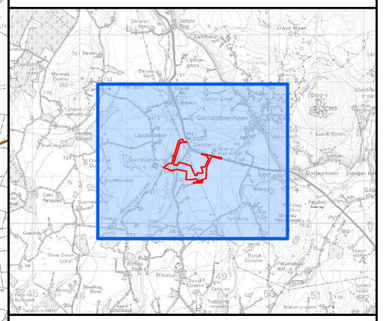
BRYNCIR WORKS ROUTE LEGEND



Legend

- Bryncir Works Site Boundary
- 500m Buffer of Bryncir Works Site Boundary
- 1km Buffer of Bryncir Works Site Boundary
- Indicative Route of Public Footpath Diversion

Public Right of Way (PRoW)

- Footpath
- Bridleway
- Restricted Byway

Cycle Network

- National Cycle Network (NCN) Route
- Link

Rev	Date	Description	GIS	Chk	App
A	08/09/2025	Environmental Statement	AG	AB	JH

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 3: BRYNCIR WORKS

Document Title: FIGURE 3.12.3 PUBLIC RIGHTS OF WAY

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National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com