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Pentir i Drawsfynydd

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Pentir to Trawsfynydd Reinforcement Project

Environmental Statement Volume 5: Trawsfynydd Works
September 2025

nationalgrid

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Introduction

i. This document (**Volume 5 - Trawsfynydd Works**) 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 5 focuses on the works at the existing Trawsfynydd substation. It provides an assessment of likely effects that could arise from the construction, operation and maintenance of this aspect of the Project.

Trawsfynydd Substation Location

ii. Trawsfynydd substation is an existing substation, in Eryri National Park, North West Wales. It is approximately 1.2 kilometres (km) south of Gellilydan, in the administrative boundary of Eryri National Park Authority. The Trawsfynydd works site is on relatively flat ground and is bound by mixed, semi-natural woodland. There is Grade 4 and 5 agricultural land in the wider area. The Trawsfynydd substation has two access points: the main entrance is at the southern extent of the compound with a secondary entrance along the western boundary. Farms and residential properties are sparse and the closest is approximately 315 metres (m) north of the Trawsfynydd works site. There are four Public Rights of Way within 500 m of the Trawsfynydd works site.

Trawsfynydd Works Site and the Proposed Works

iii. The Trawsfynydd works site covers an area approximately 3.05 hectares although the permanent development will be entirely within the existing substation footprint. The land within the Trawsfynydd works site comprises the existing Trawsfynydd substation, the access road, office and welfare facilities, material storage areas, laydown areas and car parking.

iv. Works would include the removal of existing electrical apparatus, the demolition of old concrete slabs and foundations and decommissioning and dismantling of old existing redundant 400 kilovolt (kV) oil filled cables. Part of the existing access road in the fenced substation will be widened to accommodate the delivery of the shunt reactor.

v. New infrastructure would include reinforced concrete foundations, an air insulated substation circuit bay, shunt reactor and landing gantry and 400 kilovolt cables. The downleads one on one side of Tower 4ZC005 will change to connect to a new gantry.

vi. Construction will take place over a three year period between Quarter 2 2026 – Quarter 2 2 2029. Works will take place from Monday to Friday with working hours between 7.30 am – 5.30 pm.

Alternatives

vii. Ensuring a low risk to the continued operation of the substation, the defined design layout as assessed in this Volume was the only technically feasible alternative for the works.

Key findings of the Environmental Impact Assessment

Landscape and Visual Amenity

viii. The Study Area for Landscape and Visual Amenity was the Trawsfynydd works site and a 1 km radius around it. The Trawsfynydd works site and Study Area is in the Eryri National Park. There is also a Registered Historic Park and Garden within the study area. The Dragon Square and Dame Sylvia Crowe Garden is 65 m west of the Trawsfynydd works site at its closest point. The landform of the Trawsfynydd works site is generally flat within an elevated plateau set amongst a mountainous area. Visual receptors are limited to a small number of scattered farm and individual properties.

ix. Effects on landscape character and visual amenity would be barely discernible as they would occur within the context of existing Trawsfynydd substation infrastructure that is screened by existing vegetation.

x. Further assessment of landscape and visual effects has been scoped out of this volume of the Environmental Statement due to the limited and temporary nature of potential change, with significant effects predicted not to occur.

Ecology and Nature Conservation

xi. 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 Trawsfynydd works site considering professional good practice and guidance.

xii. A desk study identified sites designated for nature conservation and records of protected and notable habitats and species, invasive non-native species and water bodies covered by the Water Framework Directive. Cofnod, the relevant local biological records centre, was contacted to gain information on pre-existing ecological data. An extended Phase 1 habitat survey was completed in 2024, covering habitats and notable species within 50 m of the Trawsfynydd works site. In November 2024 a badger survey was conducted on land up to 30 m from the Trawsfynydd works site and a ground level tree assessment for roosting bats was carried out on all trees up to 30 m from the works site.

xiii. Most of habitat in the Trawsfynydd works site is hardstanding, with two small parcels of broadleaved scattered trees, and one small parcel of semi-natural broadleaved woodland in the west of the existing Trawsfynydd substation. There are six international statutory sites for nature conservation (Special Areas of Conservation, Special Protection Areas and Ramsar sites) within 10 km of the Trawsfynydd works site, with two further Special Areas of Conservation designated for bats within 30 km. Fifteen other statutory designated sites (Site of Special Scientific Interest, National Nature Reserve and Local Nature Reserves) are present within 5 km of the Trawsfynydd works site. There are no non-statutory sites designated for nature conservation within 2 km of the Trawsfynydd works site. There are 45 Ancient Woodland sites within 2 km of the Trawsfynydd works site and the closest directly abuts it. Habitats of Principal Importance identified within 1 km of the Trawsfynydd works site include lowland dry acid grassland, purple moor grass and rush pastures, lowland heath, lowland heath and fens, traditional orchards upland flushes, upland heathland, raised and blanket bogs. The following protected and notable species were identified within 2 km of the Trawsfynydd works site: terrestrial invertebrates, breeding and non-breeding birds, bats, badger, otter, hedgehog, polecat, reptiles, flora and invasive non-native species.

xiv. The proposed works have the potential to affect ecology and nature conservation through habitat loss, disturbance (light, noise, vibration and human activity), habitat degradation, species mortality and spread of invasive non-native species during construction. During operation, the sources of potential effects include disturbance from noise.

xv. Mitigation measures have been embedded 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, trees, and watercourses. The Construction Environmental Management Plan will outline measures to address construction dust, pollution, water quality, light noise and vibration. Vegetation clearance will avoid the nesting bird period. To avoid killing or injuring animals potentially sheltering under vegetation, such as reptiles and amphibians, vegetation will be cut in two phases; first to approximately, but no less than, 15 cm above ground level, and left undisturbed until it can be cut to ground level during the typical reptile and amphibian active season (March to October, inclusive). Where vegetation clearance cannot avoid the nesting bird period, a check for the presence of any active nests would be carried out by a suitably experienced ornithologist, prior to vegetation removal. 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 invasive species are used to inform mitigation measures, including wildlife protection and reasonable avoidance measures for badgers and bats.

xvi. With the implementation of suitable embedded 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

xvii. Two Study Areas were used for the Historic Environment assessment, a Study Area of 3 km from the Trawsfynydd works site has been defined for designated historic assets and a 500 m Study Area for non-designated heritage assets.

xviii. All designated sites were scoped out the assessment due to the lack of potential impacts resulting from the proposed works.

xix. All assessment of historic environment effects has been scoped out of the Environmental Statement due to there being no intervisibility between either Scheduled Monuments and Listed Buildings and the proposed works, and a negligible potential to impact unknown archaeological remains, with significant effects unlikely to occur.

Geology, Hydrogeology, Land Use and Agriculture (Soils)

xx. The Study Area comprises the Trawsfynydd works site plus a 250 m buffer extending to 1 km for water abstractions.

xxi. The Study Area is underlain with Till Superficial deposits and Rhinog Formation and Hafotty Formation bedrock. The existing Trawsfynydd substation and access road in the Trawsfynydd works site comprises Made Ground. There are no faults or linear features within the Trawsfynydd works site and the closest is approximately 230 m west. Ground stability classifies most of the Trawsfynydd works site as stable. The Study Area sits on slowly permeable, seasonally wet, acid loamy and clayey soils and is in a Geological Landscape classed as outstanding. There are no sites designated for geodiversity interest in the Study Area. The majority of the Trawsfynydd works site is in an area of Category 2 sandstone although the south-western corner of the Trawsfynydd works site is in an area Category 1 for sandstone and igneous rock. Immediately adjacent to the west of the Trawsfynydd works site is an area of surface ground workings relating to sewage works. A

historical landfill site is indicated approximately 120 m west of the Trawsfynydd works site, it accepted inert, industrial, household and special liquid sludge waste. The historical landfill site is also a potential source of ground gas. There are no groundwater abstractions, private water supplies or source protection zones in the Study Area. There are no source protection zones, historic landfill sites or sources of ground gas in the Study Area.

xxii. The proposed works have the potential to cause geological and hydrogeological impacts, including potential damage to geology, hydrogeology and land contamination. The hydrogeological regime may be affected by foundation and trench work, potentially altering groundwater flow and quality. Contamination risks include accidental leaks, spills, disturbance of potentially contaminated soils, and exposure of construction workers to harmful substances. Mitigation measures during construction, such as remediation for contamination, will reduce these risks, leading to beneficial effects. No effects are anticipated for land use, agriculture and soils therefore they have been scoped out of the assessment.

xxiii. On completion of the proposed works the infrastructure would minimise exposure to residual contamination, with minimal ongoing risks for maintenance workers. Operational impacts are expected to be negligible, with no additional mitigation required.

xxiv. The residual effects of the Trawsfynydd works site on geological and hydrogeological receptors are minimal, with slight adverse effects from temporary dewatering and a low risk of ground instability. Land contamination risks from spills and disturbed soils are well-managed, and any potential contamination will be mitigated. The reuse of materials and spoil will be carefully managed to avoid adverse effects. Overall, the proposed works will have low impact to geology, hydrogeology, land use or agriculture (soils), with no significant impacts expected.

Water Quality, Resources and Flood Risk

xxv. The Study Area for effects of the proposed works consists of the existing Trawsfynydd substation and immediate surrounding environs. The closest watercourses are unnamed tributaries of the Afon Tatarn-helyg, immediately west of the Trawsfynydd works site. In addition, the Trawsfynydd works site is bounded to the north and the east by networks of unnamed small watercourses, which are assumed to drain into the Afon Tafarn-helyg. At its closest point, Llyn Trawsfynydd is 30 m south of the Trawsfynydd works site and retains a Moderate overall status under the Water Framework Directive. The closest recorded Water Framework Directive river waterbody is the Afon Prysor located approximately 1.8 km to the west of the Trawsfynydd works site. The Afon Prysor is recorded as two different reaches: downstream Llyn Trawsfynydd and upstream Llyn Trawsfynydd. The Afon Prysor (downstream Llyn Trawsfynydd) retains an overall Moderate waterbody status. The Afon Prysor (upstream Llyn Trawsfynydd) retains an overall Poor waterbody status.

xxvi. The Trawsfynydd works site lies above Made Ground and bordered by Till, Devensian – Diamicton superficial deposits, Rhinog Formation bedrock and the Llyn and Eyri Water Framework Directive groundwater body which retains a Poor overall status under the Water Framework Directive.

xxvii. All assessment of Water Quality, Resources and Flood Risk has been scoped out of this volume as the proposed works are not anticipated to have significant impacts in the immediate or local area. The embedded mitigation measures, will be set out in the Construction Environmental Management Plan, are expected to prevent any effects during construction, operation and maintenance.

Traffic and Transport

xxviii. The Study Area is the likely catchment area for construction traffic which includes likely routes to the Trawsfynydd works site from the strategic road network and from local and regional population centres between a 30 – 45-minute drive time of the Trawsfynydd works site. Automatic Traffic Counts have been carried out on all the roads identified in the Study Area.

xxix. The roads in the Study Area form part of the strategic road networks and local highway network. Access to the Trawsfynydd works site via Public Rights of Way, buses and rail is limited and it has been assumed that staff would gain access to the Trawsfynydd works site via private vehicles. Over the last seven years there have been 13 collisions in the Study Area, two fatal, five serious and six slight. The Automatic Traffic Counts (ATC) conducted between 26 September – 02 October 2024 concluded the 24-hour annual average daily traffic was 21,643 across the five ATC sites, 922 of which were heavy duty vehicles.

xxx. The potential construction impacts from the proposed works include severance of communities, driver delay, non-motorised user amenity, fear and intimidation, road safety and accidents, total traffic increase and heavy goods vehicle increase. During operation and maintenance there would be no change to the existing situation.

xxxi. Embedded mitigation measures include using existing accesses for vehicles movement, completing swept path analysis, using internal routes where possible, establishing designated routes, using traffic management where construction vehicles interact with the public road network, restricting arrivals and departures to avoid peak traffic flow, implementing a Delivery Management System to control deliveries, encouraging car sharing and employing specialised haulage services to the transport of abnormal indivisible loads. Following the implementation of embedded mitigation measures, impacts would not be significant at any of the assessed roads within the Study Area. Traffic would increase on some links during construction but none are predicted to experience substantial adverse effects.

Air Quality and Emissions

xxxii. An area of 10 km from the Trawsfynydd 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 within 250 m of the construction site and 50 m of the construction route, up to 250 m from the Trawsfynydd works site entrance; and ecological receptors within 50 m of the Trawsfynydd works site or construction route, up to 250 m from the Trawsfynydd works site entrance.

xxxiii. There are two areas of ancient woodland within 50 m of the Trawsfynydd works site which may be sensitive to the impacts of dust settling either directly or indirectly through increased stresses on the plants. There are no residential properties or other amenities within 250 m of the Trawsfynydd works site.

xxxiv. The source of potential Air Quality and 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 small magnitude. The area surrounding the Trawsfynydd works site has limited human health and nature conservation receptors. It is deemed to have low sensitivity to dust soiling, human health impacts, and nature conservation impacts. The small dust emissions magnitude and the low sensitivity of the area equates to a negligible impact to dust soiling, human health and nature conservation

receptors. The impact of operational and maintenance emissions has been scoped out of this assessment.

xxxv. 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 Trawsfynydd works site throughout the works and the residual effects are anticipated to be negligible and not significant.

Noise and Vibration

xxxvi. The Study Area has been defined as 300 m from the Trawsfynydd works site for construction noise and 100 m for construction vibration. There are four Public Rights of Way within the Study Area but no receptors that are sensitive to noise or vibration are identified within 300 m of the Trawsfynydd works site.

xxxvii. All works would be contained within the existing Trawsfynydd substation and there are no noise sensitive receptors (except Public Rights of Way) in the Study Area. Construction noise would only affect Public Rights of Way users for limited periods of time when they are close to a noise source. Noise emissions from the new shunt reactor would be sufficiently quieter than from existing transformers, so any changes in operational noise would not be perceptible.

xxxviii. All assessment of noise and vibration is proposed to be scoped out of the Environmental Statement as no significant impacts are anticipated in the immediate or local area.

Socio-Economics

xxxix. 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 Trawsfynydd works site for Public Rights of Way and recreational services, residential properties, business premises, visitor attractions and development land; and a 1 km radius from the Trawsfynydd works site for community facilities.

xl. The baseline outlines the population, economy and local resources within the various Study Areas. The Principal Economic Impact Area had a population of 245,949 in 2021, with 24.9% of the population aged over 65. Employment rates and 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.

xli. Accommodation capacity within a 30-minute and 60-minute drive of the Trawsfynydd works site is sufficient, although it varies seasonally. There are four Public Rights of Way, sparsely distributed residential properties, two business premises and visitor attractions (Llyn Trawsfynydd) within 500 m of the Trawsfynydd works site and one community facility within 1 km. There are no recreational routes, open space or development land within 500 m of the Trawsfynydd works site.

xlii. It has been demonstrated that the proposed works are not anticipated to have significant impacts on Socio-Economics in the immediate or local area, as such, Socio-Economics has been scoped out of this volume of the Environmental Statement.

Climate Change

xliii. The Study Area for the greenhouse gas assessment includes direct greenhouse gas emissions (arising through works on the Trawsfynydd works site) and indirect greenhouse gas emissions (occurring outside the Trawsfynydd 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.

xliv. The greenhouse gas assessment uses the current condition of the Trawsfynydd 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 effect of greenhouse gas emissions associated with the proposed works are minor adverse and not significant. No mitigation is required.

xlv. The Greenhouse gas 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 Greenhouse gas assessment for the Trawsfynydd substation includes all relevant direct and indirect environmental impacts.

xlvi. 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.

xlvii. It is not anticipated there will be any In-combination Climate Change Impact Assessment on the receptors in the surrounding environment and it has been scoped out of the climate assessment.

Materials and Waste

xlviii. 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

xlix. 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 undertaken at a Project level and is discussed in **Volume 7: The Project and Cumulative Assessment**.

Cumulative Effects

l. 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 Trawsfynydd works site has been implemented to assess the cumulative effects.

li. No additional developments were identified on the Gwynedd Council planning portal and Eryri National Park planning portal the 2 km Study Area.

lii. However, it should be noted that the consented Eryri Visual Impact Provision (EVIP) project will require the installation of a new shunt reactor at the Trawsfynydd substation. The cumulative effects are assessed in **Volume 7: The Project and Cumulative Assessment**.

1. Introduction

1.1 Introduction

1.1.1 **Volume 5** (this document) forms part of the Environmental Statement (ES) that accompanies applications by National Grid Electricity Transmission plc (NGET) to construct and operate developments that comprise parts of the Pentir to Trawsfynydd Reinforcement Project (the 'Project').

1.1.2 This volume focuses on works at the existing Trawsfynydd substation. 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 works at Trawsfynydd substation is provided in **Chapter 2: Trawsfynydd Substation Works**.

1.2 Structure of the Volume

1.2.1 This volume is structured as follows:

- **Chapter 1: Introduction.**
- **Chapter 2: Trawsfynydd Substation 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.**

1.3 Figures and Appendices

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

1.3.2 The figure numbering system is as follows: Volume number, chapter number then 1, 2, 3 etc. For example, **Figure 5.1.1**.

1.3.3 The appendix numbering system is as follows: Volume number, chapter number, then A, B, C etc. For example, **Appendix 5.1.A**. All figures associated with a given appendix will follow the same system, followed by the figure number, for example, a figure to Appendix 5.1.A would be Figure 5.1.A.1, 2, 3 etc.

2. Trawsfynydd Substation Works

2.1 Introduction

2.1.1 This chapter provides a description of the proposed works at Trawsfynydd substation (the 'proposed works'), their location ('the proposed works site'), the infrastructure proposed, and construction and operation details.

2.2 Trawsfynydd Location

2.2.1 The National Grid Trawsfynydd 400 kilo Volt (kV) Substation is an existing substation in Eryri (previously Snowdonia) National Park (ENP), North West Wales. It is approximately 3.2 kilometres (km) north of Trawsfynydd Village, in the administrative boundary of Eryri National Park Authority (see **Figure 5.2.1**). The works will be centred on Grid Reference SH 691384 within the existing Trawsfynydd substation compound (the 'Trawsfynydd works site').

2.2.2 The proposed works lie at approximately 180 metres (m) Above Ordnance Datum (AOD) on relatively flat topography. There are two entrances into the existing Trawsfynydd substation, the main entrance is at the southern extent of the compound with a secondary entrance along needing to be accessed via Nuclear Restoration Services (NRS) land along the western boundary. The remainder of the compound is bound by mixed, semi-natural woodland. The former Trawsfynydd Nuclear Power Station (which is currently being decommissioned) is approximately 50 m south-west of the existing Trawsfynydd 400 kV Substation. Llyn Trawsfynydd is 155 m south of the existing Trawsfynydd 400 kV Substation and is a popular tourist attraction for walking, cycling, fishing, canoeing and kayaking. Agricultural land in the wider area, particularly to the north-west and north-east of the Trawsfynydd works site, has an Agricultural Land Classification (ALC) of predominantly Grade 4 (poor quality) with pockets of Grade 5 (very poor quality) (Ref 2.1).

2.2.3 The existing 4ZC overhead line exits the Trawsfynydd 400 kV Substation to the north-west; the ZO runs north to Ffestiniog and the ZK runs to the east. The pylons are visible from many views in the vicinity of the Trawsfynydd works site due to the flat topography, with the pylons become increasingly visible to the east of the Trawsfynydd substation as the elevation rises.

2.2.4 The existing Trawsfynydd substation is accessed from the east via the A470, which runs in a north-west to south-east direction approximately 560 m east of the Trawsfynydd works site.

2.2.5 Farms and residential properties are sparse, the closest being approximately 315 m north of the Trawsfynydd works site. There are four Public Rights of Way (PRoW) within 500 m of the Trawsfynydd works site: Maentwrog No 18 footpath, 50 m north (of the access road entrance); Maentwrog No 5 footpath, 210 m west; Maentwrog No 21 footpath, 350 m north and Maentwrog No 21 bridleway, 290 m north-west (Ref 2.2). In addition, the Trawsfynydd to Gellilydan cycle route is under development and will

connect into National Cycle Network (NCN) Route 82 Bangor to Fishguard when complete. The proposed NCN Route 82 is approximately 300 m west of the Trawsfynydd works site (Ref 2.3).

2.3 Proposed Trawsfynydd Works

2.3.1 The Trawsfynydd works site boundary is shown on **Figure 5.2.2** covers an area approximately 3.05 hectares (ha); however, the permanent development will be entirely contained within the existing substation footprint. The land within the Trawsfynydd works site comprises the access roads, a compound (comprising office and welfare facilities), laydown storage and car parking.

2.3.2 The proposed works are summarised below:

- Removal of redundant cables.
- New 400 kV cables and cable sealing ends, shunt reactor and gantry.
- Replacement downleads from Tower 4ZC005.
- Alterations to the fence alignment.

2.3.3 The proposed works are described in more detail in the following sections.

Site Clearance

2.3.4 A small area of semi-natural broadleaved woodland, covering approximately 180 m^2, has self seeded at the north-western extent of the existing Trawsfynydd substation and will need to be cleared. There are two additional areas of scattered young trees covering approximately 225 m^2, these are located at the north-western extent of the existing Trawsfynydd substation and would also be removed.

Removal of Existing Equipment

2.3.5 The removal of existing electrical apparatus and the demolition of old concrete slabs and foundations.

2.3.6 A specialist subcontractor would be appointed to undertake the draining, de-commissioning and dismantling of old existing redundant 400 kV oil-filled high voltage cables (Pentir – Bryncir circuit) and associated plant i.e. three 300 litre tanks (one per phase). All scrap waste material will be disposed of off-site to a designated licenced waste or recycling site.

2.3.7 Redundant concrete foundations would be broken out using a combination of mini excavator and breaker. The resultant arisings would be disposed to a designated waste skip within the Trawsfynydd works site. General ground arisings would be stockpiled locally for re-use.

New Equipment

New Structures

2.3.8 Delivery of the new shunt reactor (abnormal indivisible load (AIL)) to the Trawsfynydd works site would be planned and co-ordinated. The Trawsfynydd 400kV substation and

the former Trawsfynydd Nuclear Power Station site have received and generated AIL journeys throughout their operational lives.

2.3.9 One set of downleads from existing Tower 4ZC005 will be amended to connect to a new gantry and the substation compound fence line will be adjusted to accommodate the amended downleads.

2.3.10 The new electrical apparatus to be installed is new cable sealing ends and associated steel structures.

2.3.11 Two portable relay rooms are also required which contain protection and controls equipment. These will be 7.5 m long, 3.8 m wide, 3.7 m tall, goosewing grey structures with a shed / duo pitch roof.

2.3.12 Drainage and manholes would also be constructed.

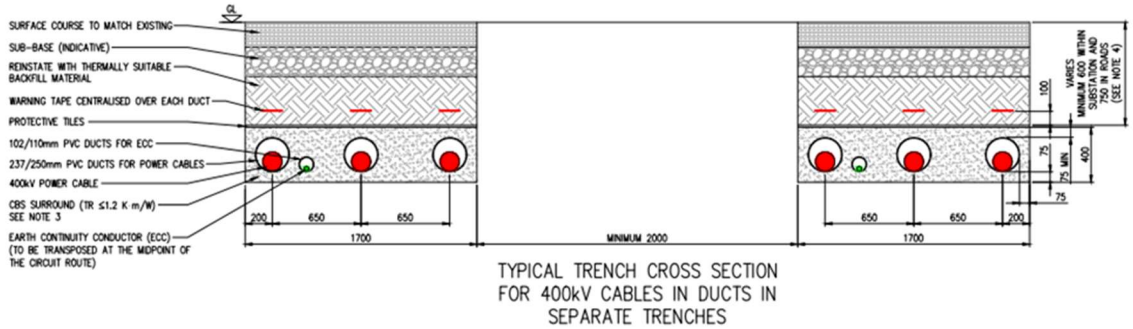
Cables

2.3.13 The 400 kV cable would be a 2500 millimetres squared (mm^2) single core cable comprising a segmented copper conductor, semi-conducting polymer conductor screen, extruded cross-linked polyethylene insulation, extruded semi-conducting polymer insulated screen, smooth welded aluminium sheath and high-density polyethylene outer sheath. The complete cable outer diameter is approximately 145 millimetres (mm).

2.3.14 The proposed works would include the re-use of infrastructure (where suitable) for an existing circuit, the 400 kV cables which runs along the western boundary of the substation compound would be replaced.

2.3.15 A new 400 kV cable would be routed along the existing Trawsfynydd substation access road, in parallel to the existing 400 kV cables approximately 40 m east. The cables would be contained within ducts in separate tranches or concrete troughs approximately 1 m deep, as illustrated in **Plate 2-1**.

2.3.16 Circuit 1 is new and will use existing troughs running through the centre of the existing Trawsfynydd substation. Circuit 2 would branch off into the existing Trawsfynydd substation access road in ducting. There would be three cables per circuit, and it will be 2500 mm^2 single core cable as described in paragraph 2.3.14.



TYPICAL TRENCH CROSS SECTION FOR 400kV CABLES IN DUCTS IN SEPARATE TRENCHES

Plate 2-1 Typical cable trench cross section

Reinstatement

2.3.17 Within the Trawsfynydd substation compound, all working areas would be reinstated with 300 mm of type 1 and 75 mm of 10 mm limestone chippings.

2.4 Construction

General Construction Information

2.4.1 Before the proposed works commence, the necessary safety permits and authorisations would be issued by National Grid and the electrical equipment would be made safe. Power outages would also be agreed with National Grid in advance.

2.4.2 Designated access routes through the substation and working areas would be established before any of the proposed works take place and safety briefings communicated to the workforce.

2.4.3 Prior to the new underground cables being brought into service, commissioning tests would be required, starting with testing the individual items of plant and culminating with testing the installed system as a whole, before being brought into operation.

2.4.4 During installation, the appointed Contractor would be required to operate under a detailed site-specific Construction Environmental Management Plan (CEMP) (**Volume 8, Appendix 5.2.A: Outline Construction Environmental Management Plan**). It would, as a minimum, implement the mitigation measures identified in this ES. 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.

Lighting

2.4.5 During darker evenings there would be task lighting and low-level lighting to access walkways to ensure safe pedestrian passage from the site welfare facilities to the site of the works. It would adhere to required guidance such as Institute of Lighting Professionals Guidance Note 08/23 Bats and Artificial Lighting at Night (Ref 2.4) and Institute of Lighting Professionals. Guidance Note 1 for the Reduction of Obtrusive Light (Ref 2.5).

Installation Activities

2.4.6 Foundations for the new structures, including an Air Insulated Substation (AIS) bay, shunt reactor and landing gantry, would be constructed from reinforced concrete. The concrete would be delivered to the Trawsfynydd works site by truck mixer, ready mixed from the nearest supplier.

2.4.7 Steel structures and associated electrical equipment would be erected using a combination of mobile cranes, mobile elevation working platforms and telehandlers.

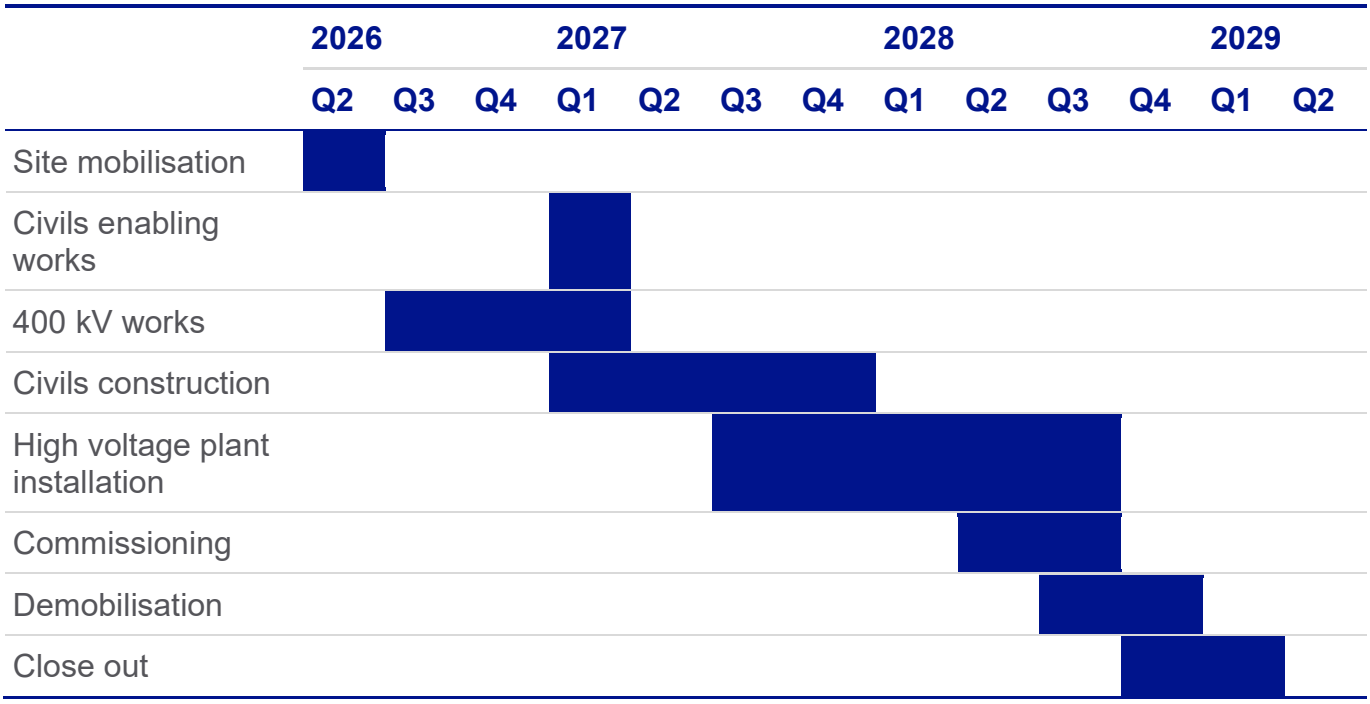
2.4.8 Stone and aggregates would be delivered to the Trawsfynydd works site as and when required, from nearby quarries.

2.4.9 The ducts and cable drums would be securely stored within the compound area. A combination of hydraulic winches and a crane would be used to install the ducts and troughs.

2.4.10 Sheet scaffolding would be placed around the cable sealing end structure to provide suitable access for cable termination and mounting structures, the scaffolding would be removed on completion.

Construction Programme

2.4.11 The proposed works are planned to be undertaken over a period of approximately three years from Q2 2026 – Q2 2029 to coordinate with the wider Project. Construction will occur in phases which will include activities summarised below.



2.4.12 Within the phases outlined above a number of activities will be undertaken including:

- Site mobilisation – site set up for cabins and civils.
- Civils enabling works – access, main site office establishment, earthworks, drainage and platform.
- 400 kV works – de-oiling and purging of the existing cables; removing lids, breaking concrete bound sand and exposing cables; cutting at capping at joint bays, removal of cables; and clean throughs and removal of steelwork.
- Civils construction – shunt reactor base, cable sealing end bases and structures and portable relay room etc.
- High voltage plant installation.
- Commissioning – commissioning test, starting with testing the individual items of plant and culminating with testing the installed system as a whole.
- Demobilisation – removal of all temporary infrastructure i.e. cabins and offices.
- Close out – handover assets and final as built drawings.

Construction Access

2.4.13 Access to the Trawsfynydd works site would be gained via the existing Trawsfynydd substation access road off the A470. No works are required to the access road between the A470 and Trawsfynydd substation compound, however widening works to the south-eastern corner of the 275 kV section of the Trawsfynydd substation will be required to allow the shunt reactor to be transported around the bend as well as accommodate the weight.

2.4.14 The shunt reactor would require transportation by special order due to being over 150 tonnes. The shunt reactor would arrive via beach landing site at Black Rock Sands, approximately 16.3 km west of the Trawsfynydd works site. The shunt reactor would be delivered via an abnormal indivisible load (AIL) to the Trawsfynydd works site.

Construction Site Layout

2.4.15 A construction compound comprising office and welfare facilities within the existing Trawsfynydd substation is proposed and would be positioned in the substation close to the secondary entrance (**Figure 5.2.2**). Car parking is proposed just outside the existing substation fence as shown on the Figure.

2.4.16 Existing hardstanding areas for material storage and laydown would be provided at two separate locations: the first halfway along the main access road and a second close to the area allocated to the new proposed AIS circuit bay.

Staffing and Employment

2.4.17 The number of staff on the Trawsfynydd 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 works:

- Removing and decommissioning old equipment, concrete break out of slabs and foundations – 10 operatives.
- Civil construction of new AIS bay and shunt reactor bund –16 operatives.
- High voltage mechanical and electrical services installation – eight operatives.
- Constructing the new duct routes for the two circuits – 12 operatives.
- Installing, terminating and testing the new cable – eight operatives.
- Installing shunt reactor (by others) – six operatives.

2.4.18 Site staff would oversee the works.

2.4.19 A policy of using local labour would be implemented as a priority, however, given the isolated location of the Trawsfynydd substation, this may not be achievable.

Hours of Working

2.4.20 Generally, construction activities would be undertaken during daytime periods only, from Monday to Friday 7.30 am – 5.30 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 (Eryri National Park Authority).

2.4.21 There may be some periods of extended or 24 hour working, however this would be by agreement with the Local Planning Authority (Eryri National Park Authority).

2.5 Operation

2.5.1 The Trawsfynydd substation is manned and there would be no change in the current frequency of attendance, inspections and maintenance regimes during operation due to the proposed works. The Trawsfynydd substation works includes the installation of an additional shunt reactor which would generate additional noise and vibration during operation.

2.5.2 Maintenance of the substation is triggered by issues arising from monthly inspection. If the substation required refurbishment or replacement works, these are accessed via the existing access road A470.

Electric and Magnetic Fields

2.5.3 All equipment that generates, distributes or uses electricity produces electric and magnetic fields (EMFs). A separate EMF report has been produced which sets out the technical specifications of the proposed Trawsfynydd substation and how the proposed works complies 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) and paragraph 4 of The Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2017 (Ref 3.2) 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."

3.2.2 To accord with the 2017 TCP EIA Regulations, design alternatives have been considered for the proposed works.

3.2.3 The proposed works are required at the existing Trawsfynydd substation, owned and operated by NGET, to meet the project need of reinforcing the connection between Pentir and Trawsfynydd (see **Volume 1, Chapter 1, Section 1.5: Project Background and Need** for more details). NGET has not studied alternative locations for the proposed works.

3.3 Design Alternatives

3.3.1 As the works are to be carried out in the existing substation such that they present a low risks to the continued operation of the substation, design alternatives were constrained to the design as assessed in this Volume.

4. Landscape and Visual Amenity

4.1 Introduction

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

4.1.2 This chapter describes the baseline conditions currently existing within the Study Area (as defined in **Section 4.3**) and the scope of the assessment.

4.1.3 This chapter is supported by the appendix listed below:

- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

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 summarises the legislation and planning policy framework that is relevant to the Landscape and Visual Amenity assessment. Full details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

4.2.2 The European Landscape Convention (Ref 4.1) is relevant to Landscape and Visual Amenity:

National Policy

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

- Future Wales: The National Plan 2040 (Ref 4.2).
- Planning Policy Wales (PPW) – Edition 12 (Ref 4.3).
- Technical Advice Notes (TAN):
  - TAN 5: Nature conservation and planning (Ref 4.4).
  - TAN 6: Planning for sustainable rural and communities (Ref 4.5).
  - TAN 12: Design (Ref 4.6).
- Environment Act 2021 (Ref 4.7).

Regional Policy

4.2.4 The following regional policy is relevant to Landscape and Visual Amenity:

- Strategic Development – North Wales (in progress).

Local Policy

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

- Eryri Local Development Plan 2016 – 2031 (Ref 4.8).
- Eryri National Park Authority Supplementary Planning Guidance - Landscapes and Seascapes of Eryri (Ref 4.9).
- Eryri National Park Authority Supplementary Planning Guidance – Landscape Sensitivity and Capacity Assessment (Ref 4.10).
- The Eryri National Park Partnership Plan 2020 (Ref 4.11).

4.3 Study Area

4.3.1 Guidelines for Landscape and Visual Impact Assessment Third Edition (Ref 4.12) suggest that the Study Area should be proportionate to the proposed works and may include refinement by professional judgement. In the case of the proposed works at Trawsfynydd, the Study Area has been defined through professional judgement and extents to 1 km radius from the Trawsfynydd works site.

4.4 Assumptions and Limitations

4.4.1 The assessment is based on the known construction methods to be utilised during the construction and the proposed permanent structures present during the operational phases.

4.5 Baseline

Designations

4.5.1 The Trawsfynydd works site and Study Area lie within the ENP. The ENP is Wales's largest National Park and covers 823 square miles with 1,497 miles of routes to explore.

4.5.2 ENP has a *"diverse mix of landscapes many of which are highly valued for their natural beauty and tranquillity"*. These have, and continue to *"inspire artists, scientists, residents and visitors*" (Ref 4.11).

4.5.3 One of the special perceptual qualities is the *"silence, tranquillity and solitude"* afforded by the landscape that promote *"vital aspects of health, well-being and personal reflection"* (Ref 4.11).

4.5.4 The Eryri National Park also offers *"Extensive opportunities for recreation, leisure and learning for people of all ages and abilities"* (Ref 4.11).

4.5.5 As a historic landscape of Wales, the ENP 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.

4.5.6 There is a Registered Historic Park and Garden in the Study Area. The *Dragon Square and Dame Sylvia Crowe Garden* at the former Trawsfynydd Nuclear Power Station at Trawsfynydd is Grade II* listed. Cadw describes the history of the landscape as part of

the Summary Description and Reason for Designation (Ref 4.13), and this provides context for the landscape character described in the section below:

"Much thought went into the landscaping, layout and design of the power station so as to fit it as sympathetically as possible into the landscape…The scale of the buildings was such that the only way to marry the landscape to them was to expand the scale of the surrounding landscape to fit the scale of the buildings. To this end Sylvia Crowe persuaded the Central Electricity Generating Board to buy up large areas of land around the site which she proceeded to afforest with spruce, beech, birch, rowan, sycamore and Pinus contorta. This gave the landscape greater scale and eased the transition between the wider landscape and the power station."

4.5.7 There are a number of ecological and cultural heritage designations in the Study Area, and these can inform landscape value and are of importance in terms of visitor destinations and visual amenity for the area. These are defined in **Chapter 5: Ecology and Nature Conservation**, and **Chapter 6: Historic Environment**.

Landscape Character

4.5.8 The landform of the Trawsfynydd works site is at approximately 180 m AOD within a generally flat elevated plateau set amongst a mountainous area. The landform of the Study Area is mountainous with several summits in the vicinity including Craig Gyfynys (approximately 270 m AOD) to the west of the Trawsfynydd works site, Gellilydan (approximately 190 m AOD) to the north of the Trawsfynydd works site, and at Wern-ieirch (approximately 275 m AOD) to the north-east of the Trawsfynydd works site.

4.5.9 Land use is a mixture of agricultural open fields and woodland blocks (some of which is ancient woodland) surrounding the former Trawsfynydd Nuclear Power Station. These provide a local sense of enclosure within an otherwise open landscape. There is an open, expanse of water at Llyn Trawsfynydd approximately 155 m south of the Trawsfynydd works site.

National Landscape Character

4.5.10 The Trawsfynydd works site and the Study Area lies within the National Landscape Character Area (NLCA) 06 Snowdonia (Ref 4.14) and exhibits some of the key characteristics of the NLCA:

- *"A mountainous topography;*
- *An upland character to principle* (sic) *land cover elements - including hill sheep grazing, forestry, heather dominated moorland and upland grassland;*
- *Sparsely populated/few large settlements;*
- *Rivers, lakes, waterfalls;* and
- *Sublime, picturesque, iconic visual and sensory landscape of great drama".*

The Registered Landscapes of Outstanding and of Special Interest in Wales

4.5.11 The Trawsfynydd works site is in the Trawsfynydd Basin and Cwm Prysor Registered Historic Landscape (Ref 4.15). The landscape is described as a *"characteristically upland and remote area of Wales".*

Local Landscape Character

4.5.12 LANDMAP is a tool produced by Natural Resources Wales (NRW) to inform sustainable decision making and planning, from national to local levels (Ref 4.16). LANDMAP

describes the key characteristics, qualities, and components of the datasets relating to geological, visual, historic, sensory and cultural elements. These are often used to understand and inform landscape character at the local level.

4.5.13 The Trawsfynydd works site and Study Area are at the boundary of three Landscape Character Areas (LCA) as defined in the Eryri National Park Authority Supplementary Planning Guidance - Landscapes and Seascapes of Eryri (Ref 4.9). These are LCA 13 Y Rhinogau that covers the majority of the Trawsfynydd works site and the southern part of the Study Area, and LCA 08 Vale of Ffestiniog that covers a small part of the Trawsfynydd works site and the north-west of the Study Area. Part of the Study Area to the west also lies within LCA 09 Mignient Uplands.

4.5.14 LCA 13 Y Rhinogau is characterised by:

- *"Open mountainous area;*
- *Semi-natural oak-dominated woodlands;*
- *Landscape dominated in the north by the Llyn Trawsfynydd reservoir and former nuclear power station;* and
- *Strong feeling of wildness and remoteness associated with the mountains."*

4.5.15 LCA 08 Vale of Ffestiniog is characterised by:

- *"Nationally important extensive tracts of oak and ash-dominated woodland on hill and gorge slopes;*
- *Sparsely settled elsewhere, with scattered farmsteads and hamlets linked by winding rural roads.;* and
- *A strongly rural landscape framed by scenic views of the surrounding mountains."*

4.5.16 LCA 09 Mignient Uplands is characterised by:

- *"Uplands under rough grazing (predominantly by sheep); with pastoral farmland on lower valley sides and slopes;* and
- *Landscape with a greater sense of tranquillity and solitude than the more popular areas of Snowdonia* [Eryri]*."*

Visual Amenity

4.5.17 Visual receptors are the people who would potentially be affected by changes to views or visual amenity as a result of the proposed works. Visual receptors can be static or dynamic and can be largely placed in the following groups:

- Residents in settlements and rural properties.
- People using recreational routes such as footpaths and cycleways.
- People at work, including those working in the landscape.
- People in vehicles and others using public roads.

4.5.18 Residential settlement is limited to a small number of scattered farms and individual properties in the vicinity of the Trawsfynydd works site, the closest being approximately 315 m north.

4.5.19 The principal transport route in the vicinity of the works at Trawsfynydd is the A470 from which the existing Trawsfynydd substation is accessed. There are also a series of local and minor roads connecting between scattered farms and individual properties.

4.5.20 There are no long-distance walking routes in the Study Area. The closest is the Cambian Way just beyond the western extent of the Study Area running from north-west to south-west. There are four PRoW within 500 m of the Trawsfynydd works site: Maentwrog No 18 footpath, 50 m north (of the access road entrance); Maentwrog No 5 footpath, 210 m west; Maentwrog No 21 footpath, 350 m north and Maentwrog No 21 bridleway, 290 m north-west.

4.5.21 The Trawsfynydd to Gellilydan cycle route is under development and will connect into NCN Route 82 Bangor to Fishguard when complete. The proposed route runs approximately 300 m west of the Trawsfynydd works site from the north-west to the south-east.

4.5.22 The Trawsfynydd work site is in the Eryri (Snowdonia) Dark Skies Reserve.

Future Baseline

4.5.23 Landscape change is an ongoing and inevitable process and will continue across the Landscape and Visal Amenity 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.

4.5.24 The future baseline which assumes that there will be minor changes to the receiving landscape.

4.6 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 2: Background**.

4.6.2 **Table 4-1** summarises the potential Landscape and Visual receptors that have been reviewed and states whether they have been included or excluded from the Landscape and Visual Amenity assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 4-1 – Scope of the Landscape and Visual Amenity assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Landscape character	Out	Out	The proposed works would occur in the existing Trawsfynydd substation. Effects on landscape character would be barely discernible as they would occur in the context of the existing Trawsfynydd substation infrastructure.
Visual amenity receptors -	Out	Out	Substantial existing woodland planting around the Trawsfynydd substation and former Trawsfynydd Nuclear Power Station is an important aspect of landscape integration and

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			screens the Trawsfynydd works site from surrounding views.
Recreational routes and places of interest	Out	Out	There are no promoted routes near the proposed works and the nearest PRoW is approximately 50 m north of the access road entrance at its closest point, however the Trawsfynydd works site would be screened by intervening vegetation.

4.7 Summary

4.7.1 The majority of potential impacts on landscape character and visual amenity would relate to construction operations. Construction compounds, access tracks, storage areas and construction activities including the construction of proposed downleads, gantry and changes to boundary fencing would introduce new features and increased movement into parts of the landscape and views. However, these elements would be temporary and potential impacts limited and localised. Construction compounds would be carefully sited within the Trawsfynydd works site. All areas disturbed by construction would be reinstated and there would be very little or no discernible change upon completion of the works.

4.7.2 During operation the Trawsfynydd substation would appear visually very similar to the existing Trawsfynydd substation, with the main change being replacement and installation of cross-site underground cables, a single 400 kV shunt reactor new downleads, new gantry and changes to boundary fencing. Within the context of the Trawsfynydd substation, this change is unlikely to result in any discernible impact to landscape character or views. There is a potential requirement for localised ground reprofiling although due to the existing infrastructure this is unlikely to result in longer term or permanent change to land that is not already within the Trawsfynydd substation. Any ground reprofiling would be limited and very localised and would have little or no influence on the character of the landscape or nature of views.

4.7.3 Overall, although there is potential for localised landscape and visual effects during construction, the limited and temporary nature and short duration of these elements are unlikely to result in any significant effects on the identified landscape designations, landscape character and visual receptors. During operation, following completion of construction and reinstatement, little or no discernible change and therefore no significant effects are anticipated on any of the identified receptors.

4.7.4 The proposed works would occur in the existing Trawsfynydd substation and designated parking area, therefore effects on landscape character and visual amenity would be barely discernible as they would occur within the context of existing Trawsfynydd substation infrastructure.

4.7.5 All assessment of landscape and visual effects is proposed to be scoped out of this volume of the ES due to the limited and temporary nature of potential change, with no significant effects on landscape character or on visual amenity likely to occur.

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 works at Trawsfynydd as described in **Chapter 2: Trawsfynydd Substation Works**.

5.1.2 This chapter describes the baseline ecological conditions in the Trawsfynydd 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, mitigation measures required to prevent, 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 and species and can be temporary or permanent. Indirect effects can occur through the pollution of air and water and via changes in lighting, noise or hydrology. This chapter is supported by figures and appendices as listed below:

- **Figure 5.5.1:** Statutory Designated Sites for Nature Conservation in the Wider Area (up to 30 km).
- **Figure 5.5.2:** Statutory Designated Sites for Nature Conservation within 5 km.
- **Figure 5.5.3:** Non-Statutory Designated Sites for Nature Conservation within 2 km.
- **Figure 5.5.4:** Ancient Woodland and Habitats of Principal Importance within 2 km.
- **Figure 5.5.5:** Species Desk Study Records within 2 km.
- **Figure 5.5.6:** Phase 1 Habitat Survey.
- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 5.5.A Aquatic Ecology Report.**
- **Volume 8, Appendix 5.5.B Statutory Designated Sites Citations.**
- **Volume 8, Appendix 5.5.C: Arboriculture Impact Assessment.**
- **Volume 8, Appendix 5.5.D: Net Benefit for Biodiversity and Green Infrastructure Statement.**
- **Volume 8, Appendix 5.2.A: Outline Construction Environmental Management Plan (CEMP).**
- **Volume 8, Appendix 7.1.B: Report to Inform Habitats Regulation Assessment.**

5.1.4 Other chapters that are useful to review in association with this chapter are:

- **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 summarises the legislation and planning policy framework that is relevant to the ecology and nature conservation assessment. More information is in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

5.2.2 The following legislation is 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 1981 (as amended) (Ref 5.4).
- The Environment Act 2021 (Ref 4.5)
- The Environment (Wales) Act 2016 (Ref 5.6).
- The Countryside and Rights of Way Act 2000 (Ref 5.7).
- The Protection of Badgers Act 1992 (Ref 5.8).
- The Hedgerows Regulations 1997 (Ref 5.9).
- The Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended) (Ref 5.10).
- Animal Welfare Act 2006 (Ref 5.111)
- Salmon and Freshwater Fisheries Act 1975 (Ref 5.12).
- Eels (England and Wales) Regulations 2009 (Ref 5.13).
- The Water Environment (Water Framework Directive) [WFD] (England and Wales) Regulations 2017 (Ref 5.14).

National Policy

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

- PPW – Edition 12 (2024) (Ref 4.3).
- The Nature Recovery Action Plan for Wales 2020-2021 (Ref 5.15).
- Future Wales: The National Plan 2040 (Ref 4.2).

Local Policy

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

- Eryri Local Development Plan 2016 – 2031 (Ref 4.8).
- Eryri Local Development Plan Review Report 2023 (Ref 5.16).

Guidance

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

- Environmental Improvement Plan 2023 (Ref 5.17).
- Cyfoeth Naturiol Cymru/NRW Protected Species Licensing (Ref 5.18).
- Birds of Conservation Concern (BoCC) (Ref 5.19).
- Birds of Conservation Concern Wales (BoCCW) (Ref 5.20).
- The International Union for Conservation of Nature Red List of Threatened Species 2022 (Ref 5.21).
- UK Biodiversity Framework (JNCC) on behalf of the Four Countries' Biodiversity Group (2024) (Ref 5.22).
- Nature Recovery Action Plan (Ref 5.23).
- Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Ref 5.24).
- Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Ref 5.25).
- Institute of Lighting Professionals Guidance Note 08/23 Bats and Artificial Lighting at Night (Ref 2.4).
- Institute of Lighting Professionals. Guidance Note 1 for the Reduction of Obtrusive Light (Ref 2.5).
- UKHab (2018-2022). The UK Habitat Classification System (Ref 5.26).
- Joint Nature Conservation Committee. Handbook for Phase 1 habitat survey – a technique for environmental audit (Ref 5.27).
- Mammal Society. Surveying for Badgers (Ref 5.28).
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust (Ref 5.29).

5.2.6 Guidance used for ecological surveys are detailed in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

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 5.24) defines a ZoI as: "*…the area over which ecological*

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 at the construction, operation and maintenance phases.
- Nature of the land use and habitats nearby, the number of watercourses and waterbodies, their connectivity in and outside of the Trawsfynydd works site 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 in the initial ecological ZoI of the proposed works have been considered in this assessment. The distances assessed for each receptor reflect standard, professional good practice and are those that statutory consultees would typically expect to be considered for identification of potentially affected features in and around the Trawsfynydd works site.

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

- 10 km from the Trawsfynydd works site for statutory designated sites of international nature conservation value (e.g., Special Areas of Conservation (SACs), Special Protection Areas (SPAs) 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 Trawsfynydd 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 Trawsfynydd works site for non-statutory sites for conservation (e.g., Wildlife Sites (WS), candidate WS (cWS) and Sites of Importance for Nature Conservation (SINC)).
- 2 km from the Trawsfynydd works site for ancient woodland.
- 2 km from the Trawsfynydd works site for Habitats of Principal Importance (HoPI), as listed under Section 7 of the Environment (Wales) Act 2016 (Ref 5.7).
- 2 km from the from the Trawsfynydd works site for records dated within the last 10 years (2014 onwards) of protected and notable species.
- 50 m from the Trawsfynydd works site for ancient and veteran trees not in areas of ancient woodland.
- 50 m from the Trawsfynydd works site for other habitats not covered above.

5.3.5 This assessment considers data collected during site visits carried out on 05 September 2023, and 06 and 21 November 2024. Additional ecology survey data has been collected for the Wider Works including a survey adjacent to the Trawsfynydd works site on 29 April 2024 (further details of methodology are provided in **Section 5.5**.

5.3.6 The avoidance of potential adverse effects through the implementation of good practice avoidance measures, such as those that would be contained in the CEMP (described in

Section 2.4) (e.g., control measures for dust suppression), has been considered during the determination of the ZoI for ecological features and biophysical changes.

5.3.7 The ZoI with regard to habitats (broadleaved scattered trees and semi-natural broadleaved woodland) lost to site clearance for construction are easiest to define as they are mainly restricted to the footprint of the proposed works, in the Trawsfynydd works site, with the potential exception of roots of adjacent trees (if present) beneath the Trawsfynydd works site. For biophysical changes that can extend beyond the Trawsfynydd works site, the ZoI has been determined by the sensitivity of an ecological receptor to such changes. For example, a badger may be subject to disturbance from light pollution, such as sudden increases in light, if directly adjacent to their sett or foraging areas; whereas bats may be subject to disturbance and certain species, but not all, may actively avoid habitats subject to light pollution over a wider area.

5.3.8 Taking account of this, the extent of the ZoI beyond the Trawsfynydd works site was determined based on good practice and 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).

5.3.9 The Study Areas described are representative of the ZoIs for those receptors identified as important ecological features (IEFs) 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 (March 2025), and has referenced published data, records and web-based information.

5.4.2 This assessment is based on a review of desk study data, aerial photography and the ecology surveys that have been undertaken in Trawsfynydd works site and appropriate survey area (as discussed in paragraph 5.3.5). The land within the existing Trawsfynydd substation was surveyed in 2023 and did not contain trees with the potential to support roosting bats. Due to the age and size of the trees in the Substation, they are unlikely to contain features suitable for roosting bats, and this is unlikely to have changed since the 2023 survey.

5.4.3 The avoidance of potential effects through implementation of good practice avoidance measures, such as those that would be contained in a site-specific CEMP (described in **Section 2.4**) (e.g., control measures for dust suppression), has been taken into account during the determination of the ZoI for ecological features and biophysical changes.

5.5 Baseline

5.5.1 This section describes the baseline ecological characteristics of the Trawsfynydd works site and relevant Study Areas.

Data Sources

5.5.2 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

5.5.3 A desk study was undertaken to identify sites designated for nature conservation and records of protected and notable habitats and species (ecology features) and invasive non-native species (INNS) that are relevant to the Trawsfynydd works site. The desk study also identified the status of water bodies covered by the WFD to identify those likely to be impacted from an ecological perspective.

5.5.4 Cofnod, the relevant local biological records centre, was contacted in June 2023 to gain information on pre-existing ecological data (i.e. locally designated sites, HoPI, ancient woodland, existing records of protected and notable species, and INNS within 2 km of the Trawsfynydd works site). These data were refreshed on a six-monthly basis; the latest refresh was November 2024.

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

- Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref 5.30) and NRW website (Ref 5.31) for information on statutory designated sites of nature conservation interest and to confirm reasons for their designation and their condition.
- Joint Nature Conservation Committee (JNCC) website (Ref 5.32) for site information and designation details of SACs, SPAs and Ramsar Sites identified in the relevant study areas.
- Ordnance Survey (OS) Mastermap 1:1,250, OS mapping 1:25,000 mapping and aerial photography (Google.com/maps) (Ref 5.33).
- North Wales Environmental Information Service (Cofnod) (Ref 5.34) information on pre-existing ecological data (i.e., locations of locally designated sites, HoPI, ancient woodland and existing records of protected, notable and INNS within 2 km of the Trawsfynydd works site). This data was refreshed on a six monthly basis; the latest refresh was November 2024.
- DataMapWales (Ref 5.31) for information on the location and extent of HoPI.
- Woodland Trust Ancient Tree Inventory website (Ref 5.35) for records of veteran and ancient trees in and up to 50 m from the Trawsfynydd works site
- Eryri National Park Authority website (Ref 5.36).
- Welsh Government website (Ref 5.37).

Extended Phase 1 Habitat Survey

5.5.6 An extended Phase 1 habitat survey was completed on 05 September 2023, and 06 and 21 November 2024. Additional survey information relevant to the Trawsfynydd works site and associated survey areas has also been collected for the wider project (4ZC element) on 29 April 2024.

5.5.7 The Phase 1 habitat survey comprised a walkover of all safely accessible areas in and up to 50 m from the Trawsfynydd works site to observe and categorise all habitats present, in accordance with the methodology described in the Handbook for Phase 1 habitat survey – a technique for environmental audit (Ref 5.27). The survey was 'extended' so that observations relating to protected or notable fauna and flora encountered were recorded as 'Target Notes' (TN), such as direct sightings, potentially suitable habitat or field signs. This included a search for evidence of badger (including

setts), INNS, and features (such as trees) potentially suitable for roosting bats, as described in the following sections.

Badger

5.5.8 A badger survey was conducted on land in and up to 30 m from the Trawsfynydd works site, with the exception of land within the existing Trawsfynydd substation compound, on 21 November 2024. Land in the existing Trawsfynydd substation compound was not accessed as it is surrounded by a perimeter fence which does not permit access to badger. The Substation was also surveyed in 2023 and was found to contain no evidence of badger. The survey comprised a systematic search for evidence of badger and followed the methodology outlined in Surveying for Badgers (Ref 5.28). Evidence of badger searched for comprised:

- Sett entrances – holes characteristically at field edges, in hedgerows or on earth embankments marking the entrance to a sett which are frequently accompanied by other field signs and mounds of earth (spoil).
- Footprints – usually distinctive and easily recognisable for being broader than they are long which can be seen in recently dug earth or soft mud.
- Badger trails through vegetation – badgers will often use the same routes within their territory, so the paths are usually well worn and obvious, being at least 20 centimetres (cm) in width and often linking feeding grounds with the badger sett.
- Dung pits – can be found along territory boundaries and near to inhabited setts and on average are 15 cm across and 15 cm deep.
- Latrines – where dung pits are grouped together.
- Excavations – badgers often create shallow depressions to pass under fencing or push the fencing up to open up commuting routes.
- Badger hair – black and white and coarse hair which can become snagged when the badger slides under fencing or past thorny vegetation.
- Scratch marks – found on scratching poles close to the sett entrance, with shredded or scored bark to a height between approximately 60 – 90 cm, as well as sometimes seen on rocks in the spoil heap close to a sett entrance where they have been loosened by badgers.
- Snuffle holes – excavated depressions in areas of bare earth where the badger has been searching for worms or insects.
- Bedding and bedding trails – piles of old bedding (bracken, dead leaves and dry grass) in or near the entrance to a sett is a good sign that the sett is active or has been very recently and as badgers can gather bedding up to 100 m away from the sett bedding can sometimes be seen along well-used badger trails.
- Other signs – for example sightings of live badgers or the remains of dead badgers.

5.5.9 Where a badger sett is identified it can be classified as either active or disused, based on the presence or absence of field signs (such as prints and hairs) in and around the immediate vicinity of the sett. Active setts are those which display signs indicating current use by badger.

5.5.10 Setts can be further classed using sett classification criteria as a main, annex, subsidiary or outlying sett. Summary definitions for each of these categories are provided in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

Ground Level Tree Assessment – Roosting Bats

5.5.11 A ground-level tree assessment survey was carried out on all trees up to 30 m from the Trawsfynydd works site on 21 November 2024, with the exception of land within the existing Trawsfynydd substation compound, to ascertain the potential for roosting bats. Land within the existing Trawsfynydd substation compound was surveyed in 2023 and the trees were confirmed to be too small and thin to support features (such as hollows and crevices) potentially suitable for roosting bats. For completeness, the trees were observed again during the November 2024 survey, using binoculars, from outside the parameter fence to confirm that there had been little change due to the slow growth rate of the trees.

5.5.12 Trees outside the Trawsfynydd substation were examined from the ground using close focusing binoculars for Potential Roost Features (PRF) such as loose bark, cavities and ivy (*Hedera helix*) that could be used by bats, in accordance with the Bat Conservation Trust (BCT) guidance (Ref 5.29). Trees were also checked for any signs of bats such as droppings and scratch marks.

5.5.13 During the inspections, each tree was either classified as having no PRF (NONE), requiring further assessment (FAR) or one or more PRF visible (PRF) concordant with the BCT guidelines. Trees classified as FAR or PRF would require further survey to more definitively establish whether they are suitable for roosting bats, should they be at risk of impacts from the proposed works.

Existing Baseline

Site Context

5.5.14 The Trawsfynydd works site is mainly hardstanding, with two small parcels of broadleaved scattered trees, and one small parcel of semi-natural broadleaved woodland within the north-west of the existing Trawsfynydd substation (see **Figure 5.5.6**).

5.5.15 A review of surveys within the general area completed for a separate project (Ref 38) identifies that habitats and features within the Trawsfynydd substation comprise buildings (offices and welfare facilities) and hardstanding (including the Trawsfynydd substation and access road), electrical infrastructure (e.g. gantries and insulators), scattered scrub and scattered trees. The habitats were assessed as having limited suitability for nesting birds, and negligible suitability for roosting bats, great crested newt (*Triturus cristatus*), reptiles and terrestrial mammals (such as badger (*Meles meles*) and hedgehog (*Erinaceus europaeus*)).

5.5.16 Land in the wider area surrounding the Trawsfynydd works site is a mix of semi-natural habitats and development. The semi-natural habitats comprise broadleaved, and mixed woodlands (including ancient); priority habitat (as provided by Cofnod – refer to paragraph 5.6.13) including lowland dry acid grassland, lowland heathland, lowland fens and reedbeds, purple moor grass and rush pastures. Watercourses (Afon Tafarn-helyg and associated tributaries (ditches and streams)); and standing water (Llyn Trawsfynydd) is also present. Farmland (pasture) featuring scattered broadleaved trees and hedgerows are also present in the wider area.

5.5.17 Developed land outside the Trawsfynydd works site comprises other areas of the Trawsfynydd substation, private access and public roads, recreational areas for Llyn Trawsfynydd (reservoir), pylons and the former Trawsfynydd Nuclear Power Station.

Sites Statutorily Designated for Nature Conservation

5.5.18 There are six international statutory sites for nature conservation (i.e., SACs, SPAs and Ramsar sites) in the 10 km Study Area. There are a further two SACs designated for bats between 10 km and 30 km of the Trawsfynydd works site. The Study Area was not extended to 30 km for SPA or Ramsar sites as the habitats within and adjacent to the Trawsfynydd works site are not suitable for SPA or Ramsar birds, with the possible exception of peregrine, which is a qualifying feature of the Migneint-Arenig-Ddual lt SPA (and SSSI), and could utilise pylons for nesting, although unlikely in this location, as discussed in **Table 5-1**).

5.5.19 Fifteen other statutory designated sites for nature conservation are present within the 5 km Study Area.

5.5.20 The locations of these statutory sites are shown in **Figure 5.5.1** and **Figure 5.5.2**. Designation details of all statutorily designated sites are summarised in **Table 5-1.** The designated sites are listed in order of distance, starting with international designated sites, then national and local statutory designated sites. Designation details are summarised in **Volume 8, Appendix 5.5.B: Statutory Designated Sites Citations**.

Table 5-1 – Statutory sites designated for nature conservation within 10 km (international) and 5 km (national and local) of the Trawsfynydd works site (extended to 30 km for international sites designates for bats)

Site name and designation	Approximate distance (km) and direction from closest point to the Trawsfynydd works site	Importance/value
Migneint-Arenig-Dduallt SAC	1.08 km north-east	International (Very high)
Migneint-Arenig-Dduallt SPA	1.08 km north-east	International (Very high)
Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat Sites SAC	1.44 km south-west	International (Very high)
Pen Llyn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC	3.35 km north-west	International (Very high)
Afon Eden - Cors Goch Trawsfynydd SAC	3.36 km south	International (Very high)
Rhinog SAC	4.60 km south-west	International (Very high)
Mwyngloddiau Fforest Gwydir/Gwydyr Forest Mines SAC	19.87 km north	International (Very high)
Glynllifon SAC	21.08 km north-west	International (Very high)
Migneint-Arenig-Dduallt SSSI	1.08 km north-east	National (High)
Coed y Rhygen SSSI	1.44 km south-west	National (High)
Coedydd De Dyffryn Maentwrog SSSI	1.62 km north	National (High)
Ceunant Cynfal SSSI	2.65 km north	National (High)
Morfa Harlech SSSI	3.12 km north-west	National (High)
Coedydd Dyffryn Ffestiniog (Gogleddol) SSSI	3.22 km north	National (High)
Afon Eden - Cors Goch Trawsfynydd SSSI	3.36 km south	National (High)
Cwm Cynfal SSSI	4.57 km north-east	National (High)
Rhinog SSSI	4.60 km south-west	National (High)

Site name and designation	Approximate distance (km) and direction from closest point to the Trawsfynydd works site	Importance/value
Coed Y Rhygen NNR	1.43 km south-west	National (High)
Ceunant Llennyrch NNR	1.71 km west	National (High)
Coed Camlyn NNR	2.57 km north-west	National (High)
Ceunant Cynfal NNR	2.71 km north-east	National (High)
Coedydd Maentwrog NNR	3.30 km north	National (High)
Coed Cymerau NNR	3.74 km north	National (High)

Non-Statutory Sites Designated for Nature Conservation

5.5.21 There are no non-statutory sites designated for nature conservation identified within the Study Area.

Habitats

Ancient Woodland

5.5.22 There are 45 areas of ancient woodland in the Study Area, as shown in **Figure 5.5.4**. The nearest area of ancient semi-natural woodland directly abuts the Trawsfynydd works site. However, this section of the Trawsfynydd works site comprises the access road which will not be modified as part of the works and is over 400 m from the works area in the Trawsfynydd substation. The closest area of ancient woodland (plantation on ancient woodland) to the works area in the Trawsfynydd substation is approximately 180 m west.

Veteran Trees

5.5.23 A review of the Woodland Trust Ancient Tree Inventory (Ref 5.35) does not indicate the presence of any notable trees or veteran trees in the Study Area. However, a veteran willow was identified in an area of planted broadleaved woodland during the site visit in November 2024. The tree is approximately 23 m south-west of the existing access road for the Trawsfynydd works site.

Habitats of Principal Importance (HoPI)

5.5.24 Data supplied by Cofnod identified the following HoPI within the Study Area. The locations of these habitats are shown in **Figure 5.5.4** and the closest distances in relation to the Trawsfynydd works site are given below:

- Lowland dry acid grassland is adjacent (access road).
- Purple moor grass and rush pastures is approximately 30 m north (access road).
- Lowland heathland is approximately 60 m south (access road).
- Lowland fens and reedbeds is approximately 60 m north-east.
- Traditional orchard is approximately 1.1 km north-west.
- Upland flushes, fens and swamps is approximately 1.17 km east.
- Upland heathland is approximately 1.17 km east.
- Raised bog is approximately 1.51 km north.
- Blanket bog is approximately 1.51 km north.

5.5.25 Further HoPI likely to be present within the Study Area, but not currently identified by Cofnod or on the Datamap Wales website (Ref 5.31) are:

- Hedgerows.
- Rivers.
- Ponds.
- Deciduous woodland.

Broad Terrestrial Habitats

5.5.26 Based on the results of the Phase 1 habitat survey, and, where appropriate, third-party data, the Trawsfynydd works site primarily comprises hardstanding (with associated electrical infrastructure). Two small parcels of broadleaved scattered trees, and one small parcel of semi-natural broadleaved woodland are also present in the north-west of the existing Trawsfynydd substation (see **Figure 5.5.6**).

5.5.27 Habitats in the wider area surrounding the Trawsfynydd works site comprise a mix of semi-natural habitats and development. The semi-natural habitats likely to be present comprise broadleaved and mixed woodlands (including ancient); priority habitat (as provided by Cofnod – refer to paragraph 5.6.13) including lowland dry acid grassland, lowland heathland, lowland fens and reedbeds, purple moor grass and rush pastures; watercourses (Afon Tafarn-helyg and associated tributaries (ditches/streams)); and standing water (Llyn Trawsfynydd). Farmland (pasture) featuring scattered broadleaved trees and hedgerows are likely to be present within the wider area.

5.5.28 Developed land outside the Trawsfynydd works site comprises other areas of the Trawsfynydd substation, private access and public roads, pylons and the former Trawsfynydd Nuclear Power Station.

5.5.29 **Table 5-2** presents a summary of the broad terrestrial habitats that are present up to 50 m from the Trawsfynydd works site, alongside an evaluation of their ecological importance.

Table 5-2 – HoPI and non-HoPI present up to 50 m from the Trawsfynydd works site, and their ecological importance, ordered by habitat type

Habitat	Biodiversity importance	Rationale
A1.1.1 Semi-natural broadleaved woodland (including ancient woodland)	Up to National (High)	Lowland mixed deciduous woodland is a HoPI listed under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). In (not priority or ancient) and adjacent to the Trawsfynydd works site.
A1.1.2 Planted broadleaved woodland	Local (Low)	In and adjacent to the Trawsfynydd works site.
A1.3.1 Semi-natural mixed woodland (including ancient woodland)	Up to National (High)	Lowland mixed deciduous woodland is a HoPI listed under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). Adjacent to the Trawsfynydd works site.
A1.3.2 Planted mixed woodland	Local (Low)	In and adjacent to the Trawsfynydd works site.
A2.1 Dense scrub	Site (Very low)	Common and widespread. Not a HoPI. Adjacent to the Trawsfynydd works site.
A3.1 Scattered broadleaved trees	Site (Very low)	Common and widespread. Not a HoPI. In and adjacent to the Trawsfynydd works site.
B1.1 Lowland dry acid grassland	County (Medium)	Lowland acid grassland is a HoPI listed under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). Adjacent to the Trawsfynydd works site.
B4 Improved grassland	Site (Very low)	Common and widespread. Not a HoPI. In and adjacent to the Trawsfynydd works site.
B5 Purple moor grass rush pasture	County (Medium)	Purple moor grass and rush pasture is a HoPI listed under Section 7 of the Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). Approximately 30 m north of the Trawsfynydd works site.

Habitat	Biodiversity importance	Rationale
Poor semi-improved grassland	Site (Very low)	Common and widespread. Not a HoPI. Adjacent to the Trawsfynydd works site.
Standing water (Llyn Trawsfynydd)	Up to County	Common and widespread. Lakes are HoPI listed under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). Llyn Trawsfynydd is approximately 20 m south of the Trawsfynydd works site.
G2 Running water (field drains, streams and rivers)	Local (Low) for drains and streams Up to County (Medium) for rivers	Drains, smaller watercourses and streams are common and widespread. Rivers are HoPI listed under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). The Afon Tafarn-helyg is approximately 40 m from the Trawsfynydd works site. However, drains and streams connecting to this are located closer, with the closest approximately 12 m north of the Trawsfynydd works site where it is culverted and crosses beneath the access road. Another is approximately 20 m east of the Trawsfynydd works site.
J1.2 Amenity grassland	Site (Very low)	Common and widespread. Not a HoPI. In and adjacent to the Trawsfynydd works site.
J3.6 Buildings	Site (Very low)	Not a HoPI. In and adjacent to the Trawsfynydd works site.
J5 Other habitat	N/A	Containers of silt. No biodiversity importance. Adjacent to the Trawsfynydd works site.
Hardstanding	Site (very low)	Not a HoPI. In and adjacent to the Trawsfynydd works site (comprises the majority of the Trawsfynydd works site).

Protected and Notable Species and Invasive Non-native Species (INNS)

5.5.30 The desk study data search, obtained from Cofnod in November 2024, returned records of protected and notable species within the 2 km Study Area for the preceding 10 years.

5.5.31 **Table 5-3** presents a summary of protected or notable animal species that have been identified as present, or potentially present, within the Trawsfynydd works site and 2 km Study Area, alongside an evaluation including ecological importance, legal or conservation status and relationship to the Trawsfynydd works site.

Table 5-3 – Summary of baseline details for legally protected and notable species, alongside assessment of ecological importance

Species or species group	Baseline detail	Ecological importance	Rationale
Terrestrial invertebrates	The desk study returned records of seven notable terrestrial invertebrates within the 2 km Study Area, these are of grayling butterfly (*Hipparchia semele*), crescent moth (*Helotropha leucostigma*), oblique carpet moth (*Orthonama vittata*), neglected Rustic (*Xestia castanea*), wall butterfly (*Lasiommata megera*) small pearl-bordered fritillary butterfly (*Boloria selene*) and small heath butterfly (*Coenonympha pamphilus*). None of these records fall within the Trawsfynydd works site; the closest record is of small heath approximately 970 m north-east.	Local Importance (Low)	These species are included as Priority Species under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). They are associated with habitats including heathland, moorland, grassland, woodland clearings and coastal habitats. The Trawsfynydd works site is hardstanding, with a small number of young, small trees and is unsuitable for notable or rare invertebrate assemblages. However, notable invertebrate species could be present in habitats surrounding the Trawsfynydd works site such as woodland and grassland.
Aquatic macroinvertebrates and aquatic macrophytes	The desk study returned no records of aquatic macroinvertebrates or aquatic macrophytes within the 2 km Study Area. No notable aquatic macroinvertebrate were found during field surveys in the Study Area. No aquatic macrophyte surveys	N/A	The Trawsfynydd works site is dominated by hardstanding and unsuitable for aquatic macroinvertebrates or aquatic macrophytes. The closest named watercourse from the Trawsfynydd works site, the Afon Tafarn-helyg, is approximately 40 m east; however, smaller tributaries which appear to join this watercourse run approximately 12 m from the Trawsfynydd works site, where it is thought to pass beneath the existing access road and join Llyn Trawsfynydd. The Afon Tafarn-helyg joins Afon Dwyryd approximately 4.3 km north of the Trawsfynydd works site.

Species or species group	Baseline detail	Ecological importance	Rationale
	were carried out.		
Fish	The desk study returned of brown/sea trout (*Salmo trutta*) records within the 2 km Study Area. No fish surveys were conducted in the Study Area.	National (High) importance for brown trout.	Brown/sea trout and their habitats are protected under the Salmon and Freshwater Fisheries Act 1975 (Ref 5.12). They are included as Priority Species under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5) The proposed works area is hardstanding and unsuitable for fish. The closest major watercourse from the Trawsfynydd works site, Llyn Trawsfynydd, is 30 m south and is where the only desk records of fish have been identified. Other watercourses have been identified including Afon Tafarn-helyg, approximately 40 m east; however, smaller tributaries which appear to join this watercourse run approximately 12 m from the Trawsfynydd works site, where it is culverted beneath the access road.
Breeding and non-breeding birds	The desk study returned records of 79 bird species within the 2 km Study Area. There are records of 32 species in the Trawsfynydd works site; the most notable are wood warbler (*Phylloscopus sibilatrix*) spotted flycatcher (*Muscicapa striata*), pied flycatcher (*Ficedula hypoleuca*) and song thrush (*Turdus philomelos*). Thirteen of the species are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (Ref 5.4); 21 further species were listed as Priority Species in Wales (Ref 5.6); 23	Local (Low)	All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended) (Ref 5.4). The Trawsfynydd works site is hardstanding with minimal vegetation (including scattered trees) and offers limited opportunities for breeding birds and is therefore suboptimal for non-breeding birds. Habitats present adjacent to the Trawsfynydd works site, notably woodland and scrub habitats, are likely to support breeding and non-breeding birds. It is possible that some structures, such as pylons or the former Trawsfynydd Nuclear Power Station, could be used by nesting peregrine; this species is a qualifying feature of the Migneint-Arenig-Dduallt SPA (and SSSI) and is listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). However, this is unlikely, particularly for pylons and tall structures closer to the Trawsfynydd works site due to increased human activity and disturbance in comparison to those further away from the Trawsfynydd

Species or species group	Baseline detail	Ecological importance	Rationale
	species included on the BoCC Red List (Ref 5.20); 19 species on the BoCC Red Wales list (Ref 5.21), 36 species included on the BoCC Amber List (Ref 5.20) and 39 on the BoCC Amber Wales list (Ref 5.21).		works site.
Bats	The desk study returned 48 records of bats within the 2 km Study Area. This included records of the following species: soprano pipistrelle (*Pipistrellus pygmaeus*), lesser horseshoe (*Rhinolophus hipposideros*), common pipistrelle (*Pipistrellus pipistrellus*), noctule (*Nyctalus noctule*), whiskered (*Myotis mystacinus*), Daubenton's (Myotis daubentonii), *Myotis* sp. and brown long-eared (*Plecotus auritus*). The closest records are for soprano pipistrelle, common pipistrelle, whiskered and Daubenton's, approximately 230 m from the Trawsfynydd works site. The closest roost record is approximately 1.38 km from the site and is for soprano pipistrelle.	Up to County (Medium) Importance for *Myotis* sp. and lesser horseshoe bat and Local Importance for other species found to be present that are common and widespread.	All bat species and their roosts are legally protected in the UK under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (Ref 5.4) and the Habitats Regulations (Ref 5.1). Four bat species are also included as Priority Species under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). The Trawsfynydd works site is hardstanding with minimal vegetation, including scattered trees. The trees within the Trawsfynydd works site do not contain features suitable for roosting bats. Habitats present adjacent to the Trawsfynydd works site (woodland and scrub) offer suitable habitat for foraging, but trees in areas assessed within 50 m of the Trawsfynydd works site do not contain features suitable for roosting.

Species or species group	Baseline detail	Ecological importance	Rationale
Badger	The desk study returned two records of badger within the 2 km Study Area. The closest record is approximately 590 m north-east alongside the A470. No badger setts were found within 30 m of the Trawsfynydd works site when surveyed in November 2024.	Local (Low)	Badgers are protected under The Protection of Badgers Act 1992 (Ref 5.7). Badgers are relatively common in a local, regional and national context. The Trawsfynydd works site is hardstanding and unsuitable for the construction of badger setts; the perimeter fence also prevents access into the Trawsfynydd substation. Habitat present adjacent to the Trawsfynydd works site (woodland, scrub) is suitable habitat for foraging and potentially sett creation depending on underlying rock.
Great crested newt	The desk study returned no records of great crested newt within the 2 km Study Area. No ponds were identified within 250 m of the Trawsfynydd works site.	N/A	Great crested newt is protected in the UK under the Wildlife and Countryside Act 1981 (as amended) (Ref 5.4) and the Habitats Regulations (Ref 5.1), which implement the EC Directive 92/43/EEC (Ref 5.41). The Trawsfynydd works site is hardstanding with limited areas of terrestrial vegetation which are suboptimal terrestrial habitat for great crested newt. No ponds have been identified within 250 m of the Trawsfynydd works site. A safety briefing from May 2021 was circulated; this provided details of an instance where a palmate newt (*Lissotriton helveticus*) was found within the Trawsfynydd substation. Therefore, it may be possible that common amphibians are found within the Trawsfynydd works site in low numbers.
Red squirrel (*Sciurus vulgaris*)	The desk study returned no records of red squirrel within the 2 km Study Area. One record for the invasive non-native grey squirrel (*Sciurus carolinensis*) was returned, approximately 1.63 km from the	District (Medium)	Red squirrels are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (Ref 5.4) and are listed as a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). Red Squirrel are Endangered status in Wales under the International Union for the Conservation of Nature (IUCN) (Ref 5.23).

Species or species group	Baseline detail	Ecological importance	Rationale
	Trawsfynydd works site. The presence of grey squirrel typically indicates an absence of red squirrel.		The proposed works area is hardstanding with minimal areas of vegetation, notably young, small trees, and is unsuitable for red squirrel. The Trawsfynydd substation perimeter fence would likely deter red squirrel from attempting access. Red squirrels are potentially present in adjacent woodland habitats.
Otter	There are eight records of otter within the 2 km Study Area. The closest of these records is approximately 1.17 km north of the Trawsfynydd works site.	District (Medium)	Otter is protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (Ref 5.4) and the Habitats Regulations (Ref 5.1), which implement the EC Directive 92/43/EEC (Ref 5.41). Otter is also a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.6) and is listed as Vulnerable under the IUCN (Ref 5.21). The Trawsfynydd works site is hardstanding and unsuitable for otter, and the Trawsfynydd substation perimeter fence restricts access. The closest watercourse from the Trawsfynydd works site, Afon Tafarn-helyg, is approximately 40 m east; however, smaller tributaries which appear to join this watercourse run approximately 12 m from the Trawsfynydd works site, where it is culverted and passes beneath the access road, where it is thought to pass beneath the existing access road and join Llyn Trawsfynydd, which is likely suitable for otter, approximately 25 m south of the Trawsfynydd works site. The access road, however, will not be modified. The Afon Tafarn-helyg has recent records of otter presence.
Water vole (*Arvicola amphibius*)	The desk study returned no records of water vole within the 2 km Study Area. There are no watercourses within the Trawsfynydd works	Up to County (Medium)	Water vole is afforded legal protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (Ref 5.4). Water vole is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5).

Species or species group	Baseline detail	Ecological importance	Rationale
	site, however, there are several within the adjacent land.		Water vole is listed as Endangered status under the IUCN (Ref 5.21). The proposed works area is hardstanding and unsuitable for water vole. There are no watercourses within the Trawsfynydd works site. The closest watercourse from the Trawsfynydd works site, Afon Tafarn-helyg, is approximately 40 m east; however, smaller tributaries which appear to join this watercourse run approximately 12 m from the Trawsfynydd works site, where it is thought to pass beneath the existing access road and join Llyn Trawsfynydd. These may offer suitable habitat for water vole.
Hedgehog	The desk study returned five records of hedgehog within the 2 km Study Area. None of these records are from the Trawsfynydd works site; the closest record is approximately 1.05 km north.	Local (Low)	Hedgehog is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5) and of Vulnerable status in Wales under the IUCN (Ref 5.21). Hedgehog is widespread and abundant across the UK, but declining. The Trawsfynydd works site is hardstanding with minimal areas of vegetation, notably young, small trees, and suboptimal for hedgehog. The Trawsfynydd substation perimeter fence restricts access. Hedgehog are potentially present in adjacent woodland, scrub and grassland habitats.
Brown hare (*Lepus euroaeus*)	The desk study returned no records of brown hare within the 2 km Study Area.	Local (Low)	Brown hare is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). Brown hare is widespread and abundant across the UK. The Trawsfynydd works site is hardstanding with minimal areas of vegetation, notably young/small trees, and unsuitable for brown hare. The Trawsfynydd substation perimeter fence restricts access. Brown hare are potentially present in nearby scrub and grassland habitats.

Species or species group	Baseline detail	Ecological importance	Rationale
Polecat (*Mustela putorius*)	The desk study returned four records of polecat within the 2 km Study Area. None of these records are from the Trawsfynydd works site; the closest is approximately 1.3 km north of one found dead on the road.	Local (Low)	Polecat is a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). Polecat is of Least Concern status in Wales under the IUCN (Ref 5.21). Polecats are found throughout Wales where valleys and farms are favoured. The proposed works area is hardstanding with minimal areas of vegetation, notably young, small trees, and unsuitable for polecat. The Trawsfynydd substation perimeter fence would likely deter polecat from attempting access. Polecat are potentially present in adjacent woodland, scrub and grassland habitats.
Reptiles	The desk study returned eight records of reptiles within the 2 km Study Area. These include records of adder (*Vipera berus*), grass snake (*Natrix helvetica*), slow worm (*Anguis fragilis*) and common lizard (*Zootoca vivipara*). Adder, grass snake and slow worm have all been recorded approximately 60 m south-west of the Trawsfynydd works site between 2016 and 2019. The closest record of common lizard is approximately 970 m north-east.	Local (Low)	All reptiles are protected from intentional injuring or killing under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (Ref 5.6) and are Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016 (Ref 5.5). Adder, grass snake and slow worm have all been recorded within 60 m of the Trawsfynydd works site and could be impacted by the proposed works. The proposed works area is hardstanding with minimal areas of vegetation, notably young/small trees, and suboptimal for reptiles. However, small numbers of reptiles could be present within the Trawsfynydd works site. Furthermore, the adjacent habitats of woodland, scrub and grassland are likely to support reptiles.
Other (more commonly recorded	The desk study returned one record of common frog (*Rana temporaria*) and one record of	Local (Low)	Common toad is a Species of Principal Importance under Section 7 of the Environment (Wales) Act (Ref 5.5). The Trawsfynydd works site is hardstanding with minimal

Species or species group	Baseline detail	Ecological importance	Rationale
amphibians)	common toad (*Bufo bufo*) within 2 km. No records were identified from within the Trawsfynydd works site. Although there are several drains near the proposed works area, there are no ponds within 250 m.		areas of vegetation, notably young/small trees, suboptimal for amphibians. However, a safety briefing from May 2021 was circulated; this provided details of an instance where a palmate newt was found within the Trawsfynydd substation. Therefore, it may be possible that amphibians are found within the Trawsfynydd works site in low numbers. Common amphibians could inhabit nearby drains, scrub and woodland and habitats.
Flora	The desk study returned records of one protected plant species within the 2 km Study Area. This comprises seven records of bluebells (*Hyacinthoides non-scripta*), the closest being approximately 1.1 km north-west.	Local (Low)	No records of rare or notable plant species were returned as part of the desk study within 500 m of the Trawsfynydd works site, or were recorded during the site survey. The Trawsfynydd works site is hardstanding with minimal areas of vegetation, notably young/small trees, and suboptimal for notable and rare plants. Such plants could be present in nearby habitats.
INNS	The desk study returned 14 records of Himalayan balsam (*Impatiens glandulifera),* 82 records of Japanese knotweed (*Reynoutria japonica*), 16 records of New Zealand pigmyweed (*Crassula helmsii*), eight records of montbretia (*Crocosmia x crocosmiiflora*) and 20 records of rhododendron (*Rhododendron ponticum*). Historic records of the non-native rainbow trout (*Oncorhynchus mykiss*) and grass carp (*Ctenopharyngon*	N/A	Several INNS species are listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (Ref 5.4). No instances of INNS have been identified during the site visit conducted or are recorded in existing site reports. There are statutory constraints regarding the spread of Schedule 9 plants (as set out in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance**).

Species or species group	Baseline detail	Ecological importance	Rationale
	idella) were also recorded, albeit records of grass carp were within 2 km of the Study Area but older than 10 years and kept for assessment on a precautionary basis.		

Future Baseline

5.5.32 This section considers those changes to the baseline conditions that might occur in the absence of the proposed works and during the time period over which the proposed works would have been in place.

5.5.33 In the absence of the proposed works, the habitats present within the Trawsfynydd works site will continue to be an unsuitable or suboptimal habitat for species. Adjoining habitats will continue to provide habitats for a variety of species including breeding and non-breeding birds, bats, reptiles, and badger.

Construction

5.5.34 If the proposed works were not constructed, the hardstanding within the Trawsfynydd works site would continue to be maintained. The small areas of vegetation, including scattered trees, would be removed as part of general maintenance. The existing habitats present adjacent to the Trawsfynydd works site and in the wider local area are likely to continue to be present.

Operation (Including Maintenance)

5.5.35 In the absence of the proposed works being developed, there would not be any change in the hardstanding currently comprising the Trawsfynydd works site. Similarly, in the adjacent habitats no changes are anticipated. Changing climatic conditions resulting from climate change may influence the resilience of certain habitats and species adjacent to the Trawsfynydd works site. Habitats such as broadleaved trees and scrub would be more mature but are likely to support a broadly similar species assemblage.

5.6 Consultation and Scope of Assessment

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

Consultation

5.6.2 Consultation in relation to Ecology and Nature Consultation has been carried out with stakeholders. **Table 5-4** provides an overview of consultation and the actions taken to address any responses within the assessment.

Table 5-4 – Consultation and stakeholder engagement

Consultee	Date and nature of consultation	Summary of response	How and where addressed
NRW	12 September 2024 – Introduction to surveys	No specific comments for Pentir works	n/a
Eryri National Park	07 October 2024	Project introduction	n/a

5.6.3 Based on CIEEM guidelines (Ref 5.24) and using professional judgement, features of Site importance, i.e., less than Local (Low) importance, are not considered further in the assessment process. In addition, any receptors unlikely to be affected due to the absence of suitable habitats are not considered further in the assessment process. The following habitats and species are excluded from further consideration:

- Planted coniferous woodland, scattered scrub, scattered broadleaved trees, improved grassland, amenity grassland, buildings and hardstanding.

- Badger, Bat (loss of roosts), great crested newt and protected and notable flora, direct loss of aquatic habitats for otter, water vole, and aquatic species.

5.6.4 The Trawsfynydd works site (comprising existing hardstanding and infrastructure and a small number of immature trees) is unsuitable for roosting bats, and trees in areas assessed within 50 m of the Trawsfynydd works site do not contain features suitable for roosting. No existing buildings will be lost.

5.6.5 The proposed works avoid direct effects on watercourses. The Trawsfynydd works site contains no running water. Drains are present nearby: the closest approximately 12 m from the Trawsfynydd works site where it is culverted beneath the existing access road, which will remain unmodified. Loss or fragmentation of these watercourses will not be required.

5.6.6 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 5.42) sets out criteria to establish the need for an air quality assessment for construction of a development as being a change of more than 200 Heavy-Duty Vehicle (HDV) (also known as HGV) or more than 1,000 total vehicles (as two way annual daily average traffic flow). As detailed in Chapter: 10 Air Quality and Emissions, owing to the expected traffic levels from the proposed works being below IAQM guidance (Ref 5.42), a detailed dispersion modelling exercise was not conducted as the effect is not anticipated to be significant. Since no significant effects are anticipated, this chapter does not assess potential impacts on ecological features (e.g. habitats, sites, and species) from construction-phase traffic-related air quality changes. Similarly, as described in Chapter 2: Trawsfynydd substation Works, HGV movements are not anticipated during operation or maintenance of the proposed works. Any maintenance inspections would involve infrequent use of Light Goods Vehicles (LGV) or cars, resulting in no anticipated air quality impacts on ecological features. 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.

5.6.7 With regards construction dust, air quality assessments (detailed in Chapter 10: Air Quality and Emissions) have followed the IAQM construction dust guidance (Ref 5.42). This examines the risk of construction dust to ecological sites holding a National or European designation within 50 m of the Trawsfynydd works site. WSs and cWS have also been considered within this chapter.

5.6.8 There will be no change in use of the site as a result of the operation of the works, it will remain a working substation. Therefore no operational effects are anticipated beyond the maintenance effects discussed.

5.6.9 **Table 5-5** summarises the potential ecology and nature conservation receptors that have been reviewed and states whether they have been included or excluded from the ecology and nature conservation assessment with a justification of the decision.

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

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Statutory Designated Sites (within 10 km (international) and 5 km (national and local) of the Trawsfynydd works site (extended to 30 km for international sites designated for bats)	Out	Out	There are six international statutory designated sites within 10 km of the Trawsfynydd works site, and a further 15 statutory designated sites within 5 km. The closest site (Migneint-Arenig-Dduallt SPA and SAC) is 1.08 km north-east. No statutory designated sites will be directly impacted by the construction, operation or maintenance of the proposed works through habitat loss or disturbance. There are no watercourses within the Trawsfynydd works site with hydrological links to any statutory designated sites. No indirect impacts to statutory designated sites from potential water pollution are anticipated. At this distance, indirect disturbance impacts to species using designated sites through increased noise, lighting or visual disturbance will not lead to significant effects. The Trawsfynydd works site provides suboptimal foraging and commuting habitat for bats, and although there is suitable habitat in the wider area, the Trawsfynydd works site is already subject to a degree of disturbance and lighting being a working substation, and therefore impacts to bats affiliated with statutory sites within 30 km are not anticipated.
Non-Statutory Designated Sites (WS, cWS) (within 2 km of the Trawsfynydd works site)	Out	Out	There are no non-statutory designated sites within 2 km of the Trawsfynydd works site.
Habitats, watercourses, ancient woodland and habitats of biodiversity importance adjacent (up to 50 m or hydrologically connected) to the Trawsfynydd works site.	In Out for less than Low importance habitats	In	Indirect air quality impacts from construction dust and impacts to watercourses (water quality) ancient woodland, semi-natural woodlands, lowland acid grassland, purple moor grass rush pastures, standing water (Llyn Trawsfynydd), running water (rivers), lowland fen and reedbed and other notable habitats. Based on CIEEM guidelines (Ref 5.24) and using professional judgement, features of Site importance, i.e. less than Local (Low) importance, have been scoped out of further assessment.

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Protected and notable species	In	In	Incidental mortality, disturbance (noise or vibration, visual, lighting), temporary habitat degradation, modification and fragmentation for the following species: • Terrestrial invertebrates. • Breeding and non-breeding birds. • Bats. • Red squirrel. • Otter. • Hedgehog. • Brown hare. • Polecat. • Reptiles. • Common amphibians. • Fish. • Aquatic macroinvertebrates. • Aquatic macrophytes. Indirect effects, including pollution resulting in negative impacts for the following species: • Otter and water vole. • Fish. • Aquatic macroinvertebrates. • Aquatic macrophytes.

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Protected and notable species	In	Out	Direct loss of habitat potential for the following species; • Terrestrial invertebrates. • Breeding and non-breeding birds. • Bats (foraging and commuting only). • Reptiles. • Common amphibians (terrestrial only). Works are proposed with existing hardstanding or existing access roads with the exception of the loss of a small area of semi-natural woodland and scattered or parkland trees that have self seeded inside the substation. No other habitats are anticipated to be directly affected aside from potential small amount of removal of minor overhanging branches along the existing access road if not already done as part of existing maintenance; however woodland edges in some areas will be monitored. The proposed works avoid direct impacts to trees or buildings which have bat roost suitability. The proposed works avoid direct effects on watercourses.
Designated sites and notable habitats susceptible to air quality impacts within 250 m of the affected road network	Out	Out	Construction traffic flows do not show that vehicle trips exceed the IAQM criteria, an assessment of air quality impacts associated with construction road traffic will not be required for protected or otherwise notable habitats within 250 m of the affected road network. Therefore, air quality impacts on designated sites and notable habitats susceptible to air quality impacts within 250 m of the affected road network have been scoped out and not considered further.
Notable habitats, protected and notable species susceptible to INNS adjacent to the Trawsfynydd works site	In	In	Potential for introduction and spread of INNS during works and movement around the Trawsfynydd works site leading to degradation of existing habitat quality surrounding the Trawsfynydd works site, and reduction in native species due to being out-competed.

5.7 Methodology

5.7.1 Details of the technical methods used to determine the baseline conditions are provided in **Section 5.5**. Full details regarding assessment methods including 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.**

5.8 Potential Effects

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

Construction

5.8.2 The source of potential effects during the construction phase are:

- Habitat loss – 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., 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 ancient woodland from construction dust or impacts on tree root protection zones which lie within the Trawsfynydd works site.
- 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 introduction of INNS.

Operation and Maintenance

5.8.3 The sources of potential effects during the maintenance phases include:

- Disturbance – indirect impacts during 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.

Embedded Mitigation

5.8.4 Mitigation measures have been incorporated into the proposed works design and how it will be constructed. Likely impacts have been assessed on this basis and opportunities to mitigate them identified with the aim of preventing or reducing impacts as much as possible. This approach provides the opportunity to prevent or reduce potential adverse impacts from the outset. Embedded mitigation or mitigation by design approach has been considered when evaluating the significance of the potential effects on the relevant IEFs. The following mitigation will be secured within the CEMP and LEMP as appropriate.

Construction, Operation and Maintenance

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

Design

5.8.6 The proposed works will avoid direct and indirect impacts to statutorily designated sites for nature conservation; the closest of which is 1.11 km east at its closest point.

5.8.7 The proposed works will avoid direct and indirect impacts to non-statutory designated sites, as none are within 2 km of the Trawsfynydd works site.

Habitat Avoidance Measures

5.8.8 The proposed works have been designed to avoid key nature conservation and ecological features present in or adjacent to the Trawsfynydd works site as far as practicable. The following minimum buffers from key habitat features are applied where practicable for the Trawsfynydd works site excluding use of the unmodified existing access road which may fall in these buffers, and where new cable ducts are required adjacent to the perimeter fence:

- 15 m from woodlands.
- 15 m from individual trees.
- A minimum of 10 m from watercourses (bank top), including dry ditches, to protect riparian habitats and to mitigate for potential hazards such as chemical and soils spills into watercourses or waterbodies, with the exception of where the existing access road crosses watercourses, as no modification of the existing crossing and road is required.

Construction Environmental Management Plan (CEMP)

5.8.9 The CEMP (**Volume 8, Appendix 5.2.A: Outline Construction Environmental Management Plan**) will detail the measures required to mitigate construction related effects on ecology, including those associated with construction dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration. The implementation of the CEMP will manage the environmental effects of the proposed works and demonstrate compliance with environmental legislation.

Vegetation Management and Building Works

5.8.10 Vegetation clearance within the Trawsfynydd work site will avoid the nesting bird period (i.e., March to August inclusive). To avoid killing or injuring animals potentially sheltering under vegetation, such as reptiles and amphibians, vegetation will be cut in two phases; first to approximately, but no less than, 15 cm above ground level, and left undisturbed until it can be cut to ground level during the typical reptile and amphibian active season (March to October, inclusive). Where vegetation clearance cannot avoid the nesting bird period, a check for the presence of any active nests would be carried out by a suitably experienced ornithologist, prior to vegetation removal. If active nests are found, then appropriate buffer zones (species dependent) where no works take place would be put in place and the area monitored until the young birds have fledged. Vegetation at ground level (any vegetation beneath the trees within the Trawsfynydd works site), and areas potentially suitable for basking reptiles (including hardstanding) will be carefully checked prior to removal. Any habitat features within such areas which may conceal

sheltering reptiles and amphibians (e.g., rubble mound bunds, any other debris) will not be dismantled during their inactive season (i.e., November to February inclusive).

Lighting

5.8.11 It is anticipated that 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 practicable. However, task-specific and fixed 'general' lighting may be required in months with reduced daylight hours (early mornings and up to 5.30 pm for general workforce) to meet safety requirements. During operation, the Trawsfynydd works site will not require artificial lighting in addition to that of the existing Trawsfynydd substation (if any), other than during temporary periods of maintenance/repair. All routine maintenance activities will be scheduled for daylight hours as far as is practicable, and it is understood that focussed task specific lighting would be required only in the event of emergency works or equipment failure requiring night-time working.

5.8.12 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 (in particular GN08/23 Bats and Artificial Lighting at Night (Ref 2.4). This guidance was produced in collaboration with the Bat Conservation Trust, and GN-1: Reduction of Obtrusive Light (Ref 2.5) in so far as it is reasonably practicable. The following such measures will be taken:

- Lights installed will be of the minimum brightness and power rating capable of performing the desired function.
- Light fittings will be used that reduce the amount of light emitted above the horizontal (reduce upward lighting).
- Light fittings will be positioned correctly, inward facing and directed downwards, and away from watercourses or dry ditches.
- Direction of lights will seek to avoid spillage onto neighbouring properties, habitats, highway or waterway.

Wildlife Legislation Compliance

5.8.13 To comply with relevant wildlife legislation, pre-construction surveys, such as an updated badger survey, and bat roost assessments of any potentially managed or lost trees inside the Trawsfynydd works site, will be undertaken to support the baseline findings. Checks for nesting birds (including nesting peregrine on pylons or other adjacent structures potentially suitable) and reptiles 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 that may be identified as being necessary. 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.

5.8.14 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 in excavations, which will be secured through the CEMP.

Construction Effects

5.8.15 **Table 5-6** provides a summary of the magnitude of impacts and likely significance of environmental effects on IEFs during the construction of the proposed works, taking into account the embedded mitigation described in paragraphs 5.8.4 to 5.8.14.

5.8.16 Impacts related to air quality upon sensitive receptors, such as ancient woodland are detailed in **Chapter 10: Air Quality and Emissions**.

Table 5-6 – 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)
Ancient Woodland Semi-natural woodland (broad-leaved and mixed), lowland acid grassland, purple moor grass and rush pasture, lowland heathland, lowland fen and reedbed including HoPI	Up to **National (High)** Up to **National (High)**	Habitat loss (semi-natural woodland only). (Temporary and permanent).	Ancient woodland is present in two locations at the eastern end of the access road and will not be directly affected by the construction works at the substation (**Figure 5.5.4**). Suitably sized buffers from such habitats are embedded into the design of the proposed works, with no loss of habitats except for semi-natural woodland. A very small area (approximately 180 m^2) of semi-natural broadleaved woodland that has self seeded within the substation will require removal, and would likely have been removed for maintenance purposes should the proposed development not go ahead. Other areas of vegetation (total of approximately 225 m^2 scattered young trees) within the substation that require removal have been scoped out as are of site value only. No further loss is anticipated, such as along the edge of three sections of woodland outside of the perimeter fence on the south-west side of the substation, through incursion into root protection areas during cabling works. However an Arboricultural watching brief is required during excavation to	Very low	Negligible	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (Yes/No)
			monitor where the roots extend to beneath the hardstanding. Whilst the hard surface does not prevent root growth, it is a constraint to it, so it can reasonably be expected that there will be less root growth beneath than would be found in soft ground. Removal of minor overhanging branches along the existing access road may be required for the delivery of the shunt reactor; however, it is anticipated that these would already have been addressed through regular maintenance or transportation of other equipment of similar size, prior to the shunt reactor being transported to the site.			
		Habitat degradation due to dust and other pollutants. Temporary (short-term), reversible.	Standard environmental protection measures formalised through the CEMP includes dust suppression and pollution prevention measures. **Chapter 10: Air Quality and Emissions** concludes that the construction dust effects on these receptors would be not significant.	Very low	Negligible	No
		Habitat degradation – impacts to water quality through pollution and construction works run off.	Standard environmental protection measures formalised through the CEMP includes pollution prevention measures.	Very low	Negligible	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (Yes/No)
		Temporary (short-term), reversible.				
Running water, including wet ditches	Wet ditches/ drains (smaller watercourses) – **Local (Low)**	Habitat loss/ fragmentation. (Temporary and permanent).	The Trawsfynydd works site contains no running water. Drains are understood to be present nearby: the closest approximately 12 m from the Trawsfynydd works site where it is culverted beneath the existing access road, which will remain unmodified. Loss or fragmentation of these watercourses will not be required.	N/A – No impact	No effect	No
		Habitat degradation due to construction pollution/ siltation. Temporary (short term), reversible.	No works will be undertaken within 10 m of watercourses which is sufficient to mitigate for potential hazards such as chemical and soil spills to avoid potential direct impacts to watercourses. Standard pollution prevention measures will be implemented and adopted during construction, formalised through the CEMP.	Very low	Negligible	No
Protected and notable terrestrial invertebrates	Local (Low)	Direct loss and fragmentation of habitat, used by terrestrial invertebrates resulting in species mortality. (Temporary and permanent).	The proposed works avoid direct impacts to habitats of potential value to terrestrial invertebrates, including woodland, grassland, heathland and watercourse and ditch margins. The Trawsfynydd works site (comprising predominantly existing hardstanding) is suboptimal for protected and notable invertebrates. A very small area	Very low	Negligible	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (Yes/No)
			(c180m^2) of semi-natural broadleaved woodland and c225m^2 of scattered young trees that have self seeded within the substation will require removal, and would likely have been removed for maintenance purposes should the proposed development not go ahead.			
		Degradation of habitat for invertebrates due to dust and other pollutants. Temporary (short term), reversible.	Standard environmental protection measures formalised through the CEMP will include dust suppression and pollution prevention measures to prevent effects on habitats potentially utilised by protected and notable invertebrates.	Very low	Negligible	No
Breeding and non-breeding birds	**Local (Low)**	Direct loss and fragmentation of habitat used by breeding and non-breeding birds. (Temporary and permanent).	The Trawsfynydd works site offers limited opportunities for breeding birds and is suboptimal for non-breeding birds. A small number of scattered young trees and small area of semi-natural broadleaved woodland are present within the Trawsfynydd works site and will be lost, along with potential for minor branch removal along the access road if not already done as part of existing maintenance. The proposed works will not have direct impacts to habitats of greater value to breeding and non-breeding birds such as woodland areas. Connectivity of habitats will be maintained and, there will be no fragmentation of habitats	Very low	Negligible	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (Yes/No)
			used by breeding and non-breeding birds.			
		Direct loss of nests and young through tree removal, which could result in injuring or killing birds. (Permanent).	Any vegetation clearance will avoid the nesting bird period (i.e., March to August inclusive) for vegetation clearance. 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
		Disturbance due to noise or visual, including to nesting Wildlife and Countryside Act 1981 (as amended) Schedule 1 birds. Temporary (short term), reversible.	Some structures, such as pylons, could potentially be used by nesting peregrine (Wildlife and Countryside Act 1981 (as amended) Schedule 1, a qualifying feature of the Migneint-Arenig-Dduallt SPA (and SSSI)), however this is unlikely due to the presence of more suitable, less disturbed habitats/features within the wider area. A pre-construction survey will be completed to confirm there are none at the time of the works. Best practice construction methods as detailed in the CEMP includes implementation of measures to minimise noise, lighting and vibration disturbance to breeding and non-breeding birds.	Low	Negligible	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (Yes/No)
Bat	**Up to County (Medium)** Importance for *Myotis* sp. and lesser horseshoe bat and Local Importance for other species found to be present that are common and widespread.	Disturbance to roosting bats due to construction noise or lighting. Temporary (short term), reversible.	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, it will conform to best practice guidelines (Ref 2.4 and Ref 2.5) with respect to minimising light spill into adjacent habitats and preventing disturbance to bats and other species. These measures will be set out the CEMP.	Low	Minor adverse	No
		Loss and severance of foraging or commuting habitat (e.g., woodland watercourses, grasslands). (Temporary and permanent).	The proposed works will avoid direct loss of trees along the woodland edges, although management of overhanging limbs may be required. Connectivity will be retained around the Trawsfynydd works site for commuting and foraging bats. The Trawsfynydd works site (comprising predominantly existing hardstanding) is suboptimal for foraging and commuting bats.	Very low	Negligible	No
Reptiles and common amphibians Other mammals (hedgehog, brown hare, polecat)	**Local (Low)** **Otter - District (Medium)**	Loss and fragmentation of terrestrial and aquatic (used by reptiles and amphibians) habitats for	The proposed works avoid aquatic habitats of value to reptiles and amphibians as well as optimal terrestrial habitat to all listed. The Trawsfynydd works site (comprising predominantly existing hardstanding) is	Very low	Negligible	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (Yes/No)
Otter		foraging, breeding, or shelter. Temporary (short-term), reversible.	suboptimal for other mammals, and reptiles and amphibians, although reptiles could bask on hardstanding and common amphibians could potentially be present in gully pots and roots of vegetation in the Trawsfynydd works site.			
		Incidental killing, injury or disturbance through noise, visual or lighting, of reptiles and amphibians, otter and other mammals present in habitats within the Trawsfynydd works site. Temporary (short-term), reversible	The habitats affected by the proposed works (comprising predominantly hardstanding) is of low value to other mammals, and reptiles and amphibians. Any habitat features within such areas which may conceal sheltering reptiles and amphibians (e.g., rubble mound bunds, any other debris) will not be dismantled during their inactive season (i.e., November to February inclusive); these measures will be set out in the CEMP. In addition, inspections of the ground would be undertaken prior to working to ensure no reptiles were basking. The closest drain is approximately 12 m from the Trawsfynydd works site where it is culverted beneath the existing access road, which will remain unmodified. Otter could use this for commuting to and from Llyn Trawsfynydd. During construction, works will be restricted to daylight hours wherever practicable to remove the need for artificial lighting, with focussed	Very low	Negligible	No

Ecological feature	Importance (value)	Description of impact	Assessment	Magnitude of impact	Effect category	Significant effect (Yes/No)
			task specific lighting provided where this is not possible. Where lighting is required, specifications will be set out in the CEMP. Lighting it will conform to best practice guidelines (Ref 2.4 and Ref 2.5) with respect to minimising light spill into adjacent habitats and will prevent disturbance to these species.			
Aquatic macroinvertebrates	Local (Low)	Habitat degradation and disturbance - impacts to water quality through pollution spills or surface run-off, leading to mortality of aquatic species. Temporary (short-term), reversible.	The Trawsfynydd works site contains no running water. Drains are understood to be present nearby: the closest approximately 12 m from the Trawsfynydd works site where it is culverted beneath the existing access road, which will remain unmodified. Loss or fragmentation of these watercourses will not be required. No works will be undertaken within 10 m of watercourses which is sufficient to mitigate for potential hazards such as chemical and soil spills to avoid potential direct impacts to watercourses. Standard environmental protection measures, will be provided in the CEMP (**Volume 8, Appendix 5.2.A: Outline Construction Environmental Management Plan**), will be implemented.	Low	Negligible	No
Aquatic macrophytes	Local (Low)			Low	Negligible	No
Fish	National (High)			Low	Minor adverse	No

Operation and Maintenance

5.8.17 Operation of the proposed works is not anticipated to result in any adverse impacts or significant effects to the relevant IEFs (designated sites, habitats and species) and is not discussed further in this section.

5.8.18 The maintenance phase of the proposed works will largely comprise monthly inspections. These maintenance tasks are not likely to cause any adverse impacts or significant effects to the relevant ecological features and are not discussed further.

5.8.19 There is the potential for maintenance to include refurbishment or replacement works which would be considered more intrusive. These are likely to only give rise to indirect effects such as short-term disturbance due to noise, lighting and visual, or habitat degradation due to pollution or dust. On the assumption that the embedded mitigation measures set out in paragraphs 5.8.4 - 5.8.14 are implemented for these works, the magnitude of impacts and resulting effects on relevant IEF are likely to be less than those identified for construction phase. There would be no significant residual effects from operation and maintenance.

5.9 Mitigation and Residual Effects

Additional Mitigation

5.9.1 No additional mitigation measures have been recommended over and above the application of embedded mitigation measures described in paragraphs 5.8.4 - 5.8.14.

Monitoring

Pre-Construction

5.9.2 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, and inform any protected species licensing that may be required should species distribution change or detailed design result in licensing requirements for species such as bats, badger or otter, which are currently not anticipated to be necessary.

Construction

5.9.3 Ongoing monitoring of habitats and species will be carried out throughout construction of the proposed works, overseen by an appointed Ecological Clerk of Works (ECoW) with suitable experience. The ECoW will have the authority to review RAMS, oversee works and recommend action as appropriate, including temporarily stopping works where necessary to safeguard protected species and their habitats, or where any other breaches of environmental legislation are could occur.

Residual Effects

5.9.4 With the implementation of suitable embedded mitigation (as detailed in paragraphs 5.8.4 - 5.8.14), the assessment of effects on the IEFs 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. No additional mitigation is required, and the residual effects remain the same as the likely effects presented in **Table 5-6**.

5.10 Summary

5.10.1 As the entirety of the proposed works will be confined to the existing hardstanding area of the Trawsfynydd substation plus the small areas of self-seeded vegetation within the Trawsfynydd substation, likely significant effects are not anticipated for IEFs.

6. Historic Environment

6.1 Introduction

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

6.1.2 This chapter describes the baseline conditions currently existing within the Study Area (as defined in **Section 6.3**) and the scope of the assessment.

6.1.3 This chapter is supported by appendices as listed below:

- **8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 5.6.A: Historic Environment Desk Based Assessment.**
- **Volume 8, Appendix 5.6.B: Gazetteer of Historic Assets and Archaeological Investigations.**

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. Full details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

6.2.2 The following legislation is relevant to the 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 2016 (Ref 6.3).

National Policy

6.2.3 The following national policy is relevant to Historic Environment:

- Future Wales: The National Plan to 2040 (Ref 4.2).
- PPW – Edition 12 (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:

- Eryri Local Development Plan 2016 – 2031 (Ref 4.8).

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 Trawsfynydd 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 5.6.A.1 in Volume 8, Appendix 5.6.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 and Conservation Areas containing a number of assets of the highest value) will be considered, up to 3 km from Trawsfynydd 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, some of which may be at distance from the Trawsfynydd works site.

Non-designated Historic Assets

6.3.3 A Study Area of 500 m from the Trawsfynydd works site has been defined to provide historical and archaeological context and to identify non-designated assets with the potential to be affected by the proposed works (refer to **Figure 5.6.A.2 in Volume 8, Appendix 5.6.A: Historic Environment Desk Based Assessment**). This Study Area will allow for non-designated heritage assets to be set within their wider context and allow for the assessment of archaeological potential within the Trawsfynydd works site.

6.4 Assumptions and Limitations

6.4.1 The current assessment examines possible physical and setting impacts resulting from the Project during the construction and operational phases.

6.5 Baseline

6.5.1 A detailed baseline is set out in **Volume 8, Appendix 5.6.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 within the Trawsfynydd works site.

6.5.2 All historic assets (the designated assets and non-designated assets) were scoped out of further assessment in the baseline study (**Volume 8, Appendix 5.6.A: Historic Environment Desk-based Assessment**) due to the lack of potential for impacts resulting from the proposed works at Trawsfynydd.

Future Baseline

6.5.3 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).

Existing Baseline (2024)

6.5.4 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 within the 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

6.5.5 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 therefore 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.

Consultation

Table 6-1 – Consultation responses in response to Historic Environment

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	The DBA (**Volume 8, Appendix 5.6.A: Historic Environment Desk-based Assessment**) has been

Consultee	Date and nature of consultation	Summary of response	How and where addressed
		Investigation (WSI) was required in advance of Historic Environment Record (HER) data request.	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 within the Trawsfynydd works site and within 500 m of the Site was requested.	HER data received from Heneb was used in the DBA assessment (**Volume 8, Appendix 5.6.A: Historic Environment Desk-based Assessment**) and to support the ES.

Scope of the Assessment

6.6.2 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 phases of the proposed works.

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

6.6.4 **Table 6-2** summarises the potential Historic Environment receptors that have been reviewed and states whether they have been included or excluded from the Historic Environment assessment.

Table 6-2 – Scope of the Historic Environment assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Scheduled Monuments	Out	Out	There is no intervisibility between the Trawsfynydd works site and the assets, and the proposed works would not result in changes to the setting of the asset.
Listed Buildings	Out	Out	There would be no intervisibility between the Trawsfynydd works site and listed buildings, and the proposed works would not result in changes to the setting of assets.
Unknown archaeological remains	Out	Out	Negligible potential to impact unknown archaeological remains. The proposed works are in the existing Trawsfynydd substation where potential unrecorded buried archaeological remains would already have been removed.

6.7 Summary

6.7.1 All assessment of historic environment effects has been scoped out of this volume of the ES due to there being no intervisibility between either Scheduled Monuments and Listed Buildings and the proposed works, and a negligible potential to impact unknown archaeological remains, with significant effects unlikely to occur.

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 proposed works as described in **Chapter 2: Trawsfynydd Substation 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 5.7.1:** Made Ground and Superficial Geology.
- **Figure 5.7.2:** Bedrock Geology.
- **Figure 5.7.3:** Hydrogeology.
- **Figure 5.7.4:** Groundwater Vulnerability.
- **Figure 5.7.5:** Potential Sources of Contamination.
- **Figure 5.7.6:** Historic Potential Sources of Contamination.
- **Figure 5.7.7:** Mining Quarrying and Mineral Resources.
- **Figure 5.7.8:** 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 5.7.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 the Geology, Hydrogeology, Land Use and Agriculture (Soils) assessment. Full 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 (Wales) 2021 (Ref 4.7).
- The Environmental Protection Act (EPA) 1990 and Part IIA (the Contaminated Land Regime) (Ref 7.1).
- 2017 TCP EIA Regulations (Ref 3.1).
- 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 5.12).
- Groundwater (England and Wales) Regulations 2009 (Ref 7.7).
- The Private Water Supplies (Wales) Regulations 2017 (Ref 7.8).
- The Environmental Permitting (England and Wales) Regulations 2016 (Ref 7.9).
- The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2015 (Ref 7.10).
- Contaminated Land (Wales) Regulations 2006 (Ref 7.11).
- Hazardous Waste (England and Wales) Regulations 2005 (as amended) (Ref 7.12).
- Anti-Pollution Works Regulations 1999 (Ref 7.13).
- Control of Asbestos Regulations 2012 (Ref 7.14).
- Construction (Design and Management) Regulations 2015 (“CDM Regulations”) (Ref 7.15).
- Confined Spaces Regulations 1997 (Ref 7.16)

National Policy

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

- PPW – Edition 12 (Ref 4.3).
- Future Wales – the National Plan 2040 (Ref 4.2).

Local Policy

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

- Eryri Local Development Plan 2016 – 2031 (Ref 4.8).
- Eryri Local Development Plan Review Report 2023 (Ref 5.16).

Guidance

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

- Contaminated Land Statutory Guidance for Wales (Ref 7.17).
- Environment Agency's online guidance for the management of land contamination 'Land Contamination Risk Management' (LCRM) (Ref 7.18).
- National House Building Council (NHBC), Environment Agency, Chartered Institute of Environmental Health (CIEH) report R&D Publication 66 'Guidance for the Safe Development of Housing on Land Affected by Contamination' (Ref 7.19).
- CIRIA C552 'Contaminated Land Risk Assessment - A Guide to Good Practice' (Ref 7.20).
- Welsh Local Government Association (WLGA), Welsh Land Contamination Working Group: 'The Development of Land Affected by Contamination: A Guide for Developers' (Ref 7.21).
- BS 10175 (2011 + A2:2017), 'Investigation of Potentially Contaminated Sites - Code of Practice' (Ref 7.22).
- BS 5930 (2015 + A1:2020), 'Code of practice for Site Investigations' (Ref 7.23).
- BS 8576 (2013), 'Guidance on Investigations for Ground Gas. Permanent Gases and Volatile Organic Compounds (VOCs)' (Ref 7.24).
- CIRIA C811 (2015), 'Environmental Good Practice On Site Guide'. 5th edition. (Ref 7.25).
- 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 7.26).
- CIRIA C665 (2007), 'Assessing Risks Posed by Hazardous Ground Gases to Buildings' (Ref 7.27).
- Design Manual for Roads and Bridges (DMRB), 'LA 109 Geology and Soils' (2019) (Ref 7.28).
- DMRB, 'LA 104 Environmental Assessment and Monitoring' (2020) (Ref 7.29).
- DMRB, 'LA 113 Road Drainage and the Water Environment' (2020) (Ref 7.30).
- CL:AIRE, 'Definition of Waste: Development Industry Code of Practice' (2011) (Ref 7.31).
- Ministry of Agriculture, Fisheries and Food, Agricultural Land Classification 1988 (Ref 7.32).
- Defra, Construction Code of Practice for the Sustainable Use of Soils on Construction Sites 2009 (Ref 7.33).
- Institute of Environmental Management and Assessment (IEMA)[1], A New Perspective on Land and Soil in EIA 2022 (Ref 7.34).

[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.

- Institute of Quarrying, Good Practice Guide for Handling Soils in Mineral Workings 2021 (Ref 7.35).
- Welsh Assembly Government, TAN 6: Planning for Sustainable Rural Communities 2010 (Ref 7.36).
- Welsh Assembly Government, The Code of Good Agricultural Practice for the Protection of Water, Soil and Air for Wales No. 20 2011 (Ref 7.37).
- British Society of Soil Science, Guidance Document 3 Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction 2022 (Ref 7.38).

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 including maintenance.

7.3.2 The direct effects on geology, hydrogeology, land use and agriculture (soils) 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 or operation, to migrate offsite to nearby residential or commercial properties.

7.3.4 The Study Area for geology, land use and agriculture (soils) is the entirety of the ground within the Trawsfynydd works site (**Figure 5.7.1**). The hydrogeology Study Area is the entirety of the ground within the Trawsfynydd works site with a 250 m buffer extending to 1 km, around the Trawsfynydd works site to identify potential offsite sources of contamination to inform the baseline condition within and adjacent to the Trawsfynydd works site. This includes the temporary works. With regards to groundwater abstractions and Source Protection Zones (SPZs) the Study Area includes a buffer extending 1 km beyond the Trawsfynydd 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 within the Trawsfynydd 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 250 m Study Area from the Trawsfynydd 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 Design Manual for Roads and Bridges (DMRB) LA 109 Geology and Soils (Ref 7.21). The DMRB LA109 (Ref 7.21) is aimed at road projects but it is considered reasonable to reference this document in the absence of any other guidance on the assessment of potential direct and indirect effects on geology, hydrogeology, land use and soils from the proposed works.

7.3.8 The Study Area distance has been used to identify potential receptors such as designated sites as well as identifying potential sources of contamination such as landfills. The environmental datasets obtained for the Trawsfynydd works site included a 250 m, 500 m and 1 km (hydrogeology) buffer for the Trawsfynydd 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 information obtained and evaluated at the time of reporting (October 2024 to March 2025), and has referenced published data, records and web-based information obtained to date.

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

7.4.3 The assessment includes consideration of the construction, operation and maintenance, phases of the proposed works and is based upon the design information in **Chapter 2: Trawsfynydd Substation Works**.

7.4.4 This assessment has been undertaken on the assumption that all proposed activities will be confined wholly within the boundaries of the existing Trawsfynydd substation, specifically within existing hardstanding areas. It is assumed that the Trawsfynydd works site will be accessed via the existing Trawsfynydd substation access road, which will not require any modifications from its current condition.

7.4.5 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 within the CEMP included in **Volume 8, Appendix 5.2.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 Trawsfynydd 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 within the Trawsfynydd works site; however, relevant significant sources and receptors identified that are outside of the Trawsfynydd works site that may affect or be affected by the proposed works, are also identified in the baseline.

Data Sources

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

- British Geological Survey (BGS) 1:50,000 mapping Sheet 119 – Snowdon (Ref 7.39).
- BGS 1:10,000 mapping, SH63NE (Ref 7.40).
- Geological Memoirs Geology of the country around Snowdon 1985 (Ref 7.41).
- BGS GeoIndex Online Mapping Service (Ref 7.42).
- Groundsure Free Data Viewer (Ref 7.43).

- Natural Resource Wales (NRW), LANDMAP (Ref 4.16).
- Welsh Government (Data Map Wales) for geological SSSI, Geological Conservation Review (GCR) sites, Regionally Important Geodiversity Sites (RIGS), SPZ and Licensed Water Abstractions (Ref 5.30).
- Unexploded Ordnance (UXO) Risk Map Risk Maps | Zetica UXO (Ref 7.44).
- Mineral Safeguarding Areas (MSA) GIS data from Gwynedd Council received 31 May 2024(Ref 7.46).
- Mining Remediation Authority Map Viewer (Ref 7.47).
- Private Water Abstraction Record from Gwynedd Council received 26 November 2024 (Ref 7.48) covering the Eryri National Park area.
- Potential Land Contamination Points from Gwynedd Council received 23 January 2025 (Ref 7.49) covering the Eryri National Park area.
- Defra MAGIC maps (Ref 5.30). Groundsure Enviro, Geo and Map Insight data referenced GSIP-2024-16474-21178 and 21179 (provided as GIS data on 21 November 2024) (Ref 7.50).
- The Eryri National Park Authority Geoportal (Ref 7.51)

Geology

Published Records

7.5.3 The published 1:50,000 scales geological map of the area Sheet 119 – Snowdon (Ref 7.39), 1:10,000 SH63NE (Ref 7.40) and GIS data sourced from the BGS online (Ref 7.41) indicate the Trawsfynydd works site is underlain by the geological succession summarised in **Table 7-1** and shown on **Figure 5.7.1** and **Figure 5.7.2**.

Table 7-1 – Geological succession across the Trawsfynydd works site and 250 m Study Area

Age	Group	Geological stratum
Quaternary period (116 thousand and 11.8 thousand years ago)	Superficial deposits	Till
Cambrian period (526 million and 508 million years ago)	Bedrock	Rhinog Formation – Sandstone and Mudstone
		Hafotty Formation Mudstone

Artificial Deposits

7.5.4 Artificial Deposits (also considered as Made Ground) is shown on the BGS GeoIndex (Ref 7.41) within the Trawsfynydd works site and further to the east along the northern shore of Llyn Trawsfynydd towards the A470 which is consistent with the hardstanding associated with Trawsfynydd works site. Artificial Deposits are also shown extending to the west beneath the adjacent former Trawsfynydd Nuclear Power Station and west along the northeastern shore of Llyn Trawsfynydd.

Superficial Deposits - Till

7.5.5 Devensian Till deposits are recorded adjacent to the northern perimeter of the Trawsfynydd works site. No Till or other superficial deposits are shown within the Trawsfynydd works site. 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 (diamicton)'*.

Bedrock Geology

7.5.6 The main bedrock underlying the Trawsfynydd works site is the Rhinog Formation Sandstone and Conglomerate interbedded, described by the BGS as '*grey to bluish grey, thick bedded turbiditic sandstones, conglomerates and laminated sandstones, with thin siltstone and mudstones intercalations'.*

7.5.7 The northern edge of the Trawsfynydd works site is underlain by the Hafotty Formation Mudstone, described by the BGS as '*grey, thinly-bedded turbiditic sandstones and mudstones interbedded with manganiferous mudstones*'.

Faults & Linear Features

7.5.8 The published 1:50,000 scale geological map of the area (Ref 7.39) indicates there are no faults or linear features within the Trawsfynydd works site. However, the closest linear features relate to an inferred approximate north-south trending fault/displacement approximately 230 m west of the Trawsfynydd works site and another approximately 290 m to the north-east.

Historical BGS Borehole Logs

7.5.9 There are four borehole logs available on BGS Geoindex (Ref 7.41) within the Trawsfynydd works site all dating from 1958. The date of the borehole logs pre-dates the construction of the former Trawsfynydd Nuclear Power Station. A summary of these borehole logs is presented in **Table 7-2**.

Table 7-2 – Geological succession from published mapping

Borehole record	Depth encountered metres below ground level (m bgl)	Description of strata
SH63NE66	G/L - 0.5	Peat and moss.
	0.8 – 1.0	Clayey sand and gravels with cobbles and large boulders (Moraine).
	1.0 - 2.5 (borehole terminated)	Fractured massively bedded fine to medium grained greywacke with some quartz calcite veining.
SH63NE67	G/L – 0.8	Peat and moss.

Borehole record	Depth encountered metres below ground level (m bgl)	Description of strata
	0.8 – 3.8	Clayey sand and gravel with cobbles and large boulders (Moraine).
	3.8 – 6.7	Moderately fractured massively bedded medium to fine grained greywacke with occasional irregular siltstone or shaley mudstone intercalations.
	6.7 – 14.9	Badly shattered and quartz-calcite veined interbedded fine and medium grained greywacke with thin irregular shaley mudstone intercalations.
	14.9 – 15.8	Badly shattered shaley mudstone with 'sisty cleavage'.
	15.8 – 17.55 (borehole terminated)	Badly shattered fine grained greywacke.
SH63NE68	G/L – 0.48	Peat.
	0.48 – 4.75	Large boulders with clayey sand and gravel (Moraine).
	4.75 – 13.1 (borehole terminated)	Badly fractured massively bedded fine grained greywacke with quartz veining and enrichment. In places the quartz enrichment has resulted in the formation of quartzite.
SH63NE69	G/L – 0.3	Topsoil.
	0.3 – 0.9	Clay and silt.
	0.9 – 3.65	Sand, gravel and boulder (Moraine).
	3.65 – 7.5	Fine to medium greywacke with steeply inclined iron-stained fissures and minor fractures.
	7.7 – 9.4	Medium greywacke with coarse bands, thin quartz and chlorite veins, and steeply inclined iron-stained fissures. Fine grained bands 12 mm thick indicate a dip of approximately 30°.
	9.4 – 9.75 (borehole terminated)	Medium greywacke with considerable quartz and chlorite veins.

Ground Stability

7.5.10 The following information was obtained from the Groundsure data (Ref 7.50) for the Trawsfynydd works site and 250 m Study Area:

- Collapsible Ground Stability.
  - Class B *'Deposits with potential to collapse when loaded and saturated are unlikely to be present'*.
- Compressible Ground Stability.

- Class B '*Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.*

- 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*.'
- 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.*'
- 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*.'
- Shrinking or Swelling Clay Ground Stability.
  - Class A '*Ground conditions predominantly non-plastic.'*

Soils

7.5.11 The UKSO Soilscapes viewer shows the existing Trawsfynydd works site sits principally within an area of slowly permeable, seasonally wet, acid loamy and clayey soils. A smaller portion of the Trawsfynydd works site in the east was developed from freely draining acid loamy soils over rock. The natural landcover would have been seasonally wet pasture and woodland, with surrounding land rising to steep acid upland pastures and moorland. The preliminary model of ALC identifies some areas of the Trawsfynydd works site as Grade 4, but this is an artefact of the resolution of the model. The Trawsfynydd works site is entirely within developed land, identified within ALC survey methodology as urban land use.

Sites Designated for Geodiversity Interest

7.5.12 The NRW LANDMAP (Ref 4.16) indicates the overall valuation of Geological Landscape Aspect Area for Trawsfynydd works site 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 an contain classic, rare or unique features.'*

7.5.13 A review of currently available information on MAGIC.gov.uk (Ref 5.30) has not identified any SSSIs, SACs or Geological Conservation Review within 500 m of the Trawsfynydd works site.

Mineral Safeguarding Areas

7.5.14 The sterilisation of minerals occurs when other non-minerals developments take place on, or close to, mineral deposits and render them incapable of being extracted. Safeguarding Mineral Resources and Infrastructure paragraph 5.14.7 (Ref 7.57) states inter alia that minerals safeguarding areas should be identified in Development Plan Documents to avoid such sterilisation of sandstone, slate and igneous rocks identified across the proposed works. Whilst the extraction of these resources may not be currently viable for reasons of price, geology, quality and previous extractive work, this

situation may change, and they may be required at some point in the future. The spatial extent of these deep and shallow resources, excluding certain areas of constraint, are identified as safeguarding areas.

7.5.15 A review of the British Geological Survey Northwest Wales Aggregates Safeguarding Map of Wales (Ref 7.52) indicates the majority of the Trawsfynydd works site is in an area of Category 2 for sandstone. Category 2 is indicated as comprising resources which are important for serving regional and local markets. The south-western corner of the Trawsfynydd works site is in an area Category 1 for sandstone and igneous rock. which is a high specification aggregate that are specifically referenced in policy as being of limited occurrence and therefore particularly susceptible to sterilisation, and those which are particularly economically important due to their high quality and/or limited occurrence across the UK.

7.5.16 GeoIndex shows the Trawsfynydd works site is in a mineral resource area for sandstone but does not indicate igneous rocks or sand and gravel within the 250 m Study Area of the Trawsfynydd works site.

7.5.17 According to MSA GIS data (Ref 7.48), Trawsfynydd works site and the 250 m Study Area is not within a MSA for sand and gravel.

7.5.18 According to the Joint Local Development Plan 2017 Proposals Map (Ref 7.16), there are no sand and gravel preferred areas within the Trawsfynydd works site or 250 m Study Area.

Historical and Current Mineral Surface Ground Workings, Quarrying and Mining

7.5.19 The following information was obtained from the Groundsure data and Mining Remediation Authority Map Viewer (Ref 7.47) for the Trawsfynydd works site and 250 m Study Area.

Surface Ground Workings

7.5.20 In the Study Area directly adjacent to the west of the Trawsfynydd works site, there is an area of surface ground workings relating to sewage works. To the south of the access road, approximately 65 m there are surface ground workings relating to the Afon Prysor Llyn Trawsfynydd reservoir.

7.5.21 There are other isolated areas in the Study Area to the east of the Trawsfynydd access road (between 90 m and 150 m east) that are cuttings worked in 1887 and 1901 and surface ground works relating to a lake from 1949. These isolated occurrences have not been considered within the assessment as it is not anticipated that any works to the access road would be required.

Underground Workings

7.5.22 There are no areas of underground workings within the Trawsfynydd works site or within the 250 m Study Area.

Coal Mining

7.5.23 The Mining Remediation Map Viewer (Ref 7.47) does not show the site to be in a coal mining reporting area.

Non-Coal Mining

7.5.24 According to the Groundsure data, the Trawsfynydd 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.'

Hydrogeology

Aquifer Designation

7.5.25 Aquifer designations within the works site and Study Area are shown on **Figure 5.7.3**. The aquifers within the Study Area are summarised in **Table 7-3**.

Table 7-3 – Summary of aquifer designations

Stratum	Description	Aquifer designation
Superficial deposits	Till	Secondary undifferentiated
Bedrock	Rhinog Formation -sandstone and mudstone	Secondary A
	Hafotty Formation - mudstone	Secondary B

Groundwater Vulnerability

7.5.26 Groundwater vulnerability is an assessment of groundwater vulnerability to a pollutant discharge at ground level based on the hydrological, geological, hydrogeological and soil properties within a 1 km square grid.

7.5.27 The BGS Geoindex (Ref 7.42) identifies the groundwater vulnerability of the bedrock beneath the majority of the Trawsfynydd works site Study Area as being medium vulnerability. There is a small corner in the west of the site and the western Study Area where groundwater vulnerability is high.

7.5.28 The BGS indicate that groundwater vulnerability identified as high are areas able to easily transmit pollution to groundwater, likely to be characterised by high leaching soils and the absence of low permeability superficial deposits. Medium vulnerability are areas that offer some groundwater protection and are intermediate between high and low vulnerability.

Source Protection Zones (SPZ)

7.5.29 There are no SPZ within 1 km of the Trawsfynydd works site according to Data Map Wales (Ref 5.31).

Groundwater Abstractions

7.5.30 According to Data Map Wales (Ref 5.31), there are no groundwater abstractions within 1 km.

Private Water Supplies

7.5.31 There are no private water suppliers within the Study Area for Trawsfynydd works site.

Groundwater Records from Historical Logs

7.5.32 One of the historical BGS logs (SH63NE68) within the Trawsfynydd works site indicates that groundwater was encountered between 35 feet (10.67 m) and 37 feet 9 inches (11.51 m) depth in badly fractured greywacke bedrock with quartz veining. The groundwater was noted as being under pressure sufficient to cause a free flow from the borehole at ground level.

7.5.33 There were no groundwater observations from the other three historical records (SH63NE66, 67 and 69).

Hydrology

7.5.34 The closest watercourses to the Trawsfynydd works site are unnamed tributaries of the Afon Tafarn-helyg, located approximately 40 m north-east of the Trawsfynydd works site. The watercourses originate immediately west of the Trawsfynydd works site and appear to be fed by surface water outfalls from the north-western and eastern sides of the Trawsfynydd substation, in addition to an outfall from a Sewage Treatment Works

7.5.35 According to Data Map Wales (Ref 7.58), the chemical, biological and overall quality of the Afon Tafarn-helyg is 'moderate' (as of 2016).

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

7.5.37 According to Data Map Wales (Ref 5.30), there are two surface water abstractions within 1 km. The nearest relates to an abstraction for effluent dispersal at Trawsfynydd Power Station 370 m to the south-west and from Nant Tyddyn-yr-yn for 'aquaculture fish' by Pysgotfa Prysor Fishery approximately 180 m south-east of the Trawsfynydd works site access junction with the A470, nearly 700 m from the existing Trawsfynydd substation. Nant Tyddyn-yr-yn flows into Llyn Trawsfynydd.

Ground Investigation Information

7.5.38 No information has been received regarding previous ground investigations at the Trawsfynydd works site.

7.5.39 A search of the Council's planning portal (10 February 2025) has not located any previous ground investigation information for the Study Area.

Unexploded Ordnance

7.5.40 Online Zetica UXO risk mapping (Ref 7.44) shows "Low Risk" for the whole Study Area.

Landfilling

7.5.41 A historical landfill is indicated approximately 120 m west of the Trawsfynydd works site on the Groundsure GIS Mapping. The licence for this historical landfill was held by Central Electricity Generating Board from 1972 to 1993. The site accepted inert, industrial, household and special liquid sludge waste.

Waste Sites

7.5.42 There is a historical waste site indicated on the Groundsure Mapping approximately 190 m south-west of the Trawsfynydd works site. The Groundsure record states that this is a planning application for a Waste Recycling Plant but there is no indication this has been constructed.

Ground Gas

7.5.43 There is a potential source of ground gas from the historic landfill approximately 120 m west of the Trawsfynydd works site as this was licensed to accept household waste.

7.5.44 A historical landfill site is approximately 120m west of the Trawsfynydd works site (at the closest point) which was licensed to accept inert industrial, household and special liquid sludge waste from 1972 to 1993. This is at the northern end of the former Trawsfynydd Nuclear Power Station.

Radon

7.5.45 The Groundsure data shows that the majority of the Study Area lies within an area where less than 1% of the properties are above the Action Level. In this area radon protection should not be required.

7.5.46 The north-west Study Area and a small area of the Trawsfynydd works site at the western extent is within a radon affected area, where between 1 and 3 % of properties are above the Action Level. Basic radon protective measures are necessary in accordance with BR211 (Ref 7.53) which provides guidance for reducing the concentration of radon in new buildings, extensions, conversions, and refurbishment projects, and so reducing the risk of occupants being exposed to it.

Regulated Activities

7.5.47 The following information was obtained from the Groundsure data for the Trawsfynydd works site and 250 m Study Area.

7.5.48 The former Trawsfynydd Nuclear Power Station operated adjacent to the Trawsfynydd works site from 1965 up until 1991 when the site ceased generation with defueling completed in 1997. Decommissioning of the former power station is continuing.

7.5.49 Pylons and masts have been mapped within 250 m of the Trawsfynydd works site. A historical tank is mapped within the Trawsfynydd works site and another tank is mapped in the south approximately 130 m north-west of the western edge of the Trawsfynydd works site.

7.5.50 There is a sewage works approximately 25 m from the western edge of the Trawsfynydd works site.

7.5.51 There are seven off-site licensed discharges to controlled waters within the Study Area, details of which are presented in **Table 7-4**.

Table 7-4 – Summary of off-site licensed discharges to controlled waters within 250 m Study Area.

Direction from Trawsfynydd works site	Description	Effective date	Revocation date	Receiving water
North-west	Trade discharge northern outlet Trawsfynydd Decommissioning Site.	30 November 2016	Stil Effective	Trib of Afon Tafarn-helyg
North	Trawsfynydd substation	01 June 1994	-	Afon Tafarn-helyg

	sewage discharge			
East	Trawsfynydd Power Station Gatehouse - unspecified	17 May 1991	12/06/2003	Afon Tafarn-helyg
South-east	Trawsfynydd STW – sewage and trade combines	26 November 2012	-	To ground
South	Diversion culvert storm overflow – trade discharges, site drainage	30 November 2016	-	The Gwylan Stream
South	Trawsfynydd Gatehouse – sewage discharges, final treated effluent not water company.	30 November 2016	-	The Gwylan Stream
South	Diversion culvert - trade discharges, site drainage	17 January 2017	-	Llyn Trawsfynydd

7.5.52 There are two radioactive substance authorisations within the south of Trawsfynydd works site Study Area for Magnox Electric Limited. The authorisations were approved 18 November 1991 and 10 November 1995 and both had a last received date of 01 January 2015, and are now revoked.

7.5.53 One pollution incident within the Study Area south of Trawsfynydd works site is recorded in the Groundsure report. The pollutant type was diesel and fuel and occurred in the Trawsfynydd reservoir on 03 November 2003.

7.5.54 Three areas are identified within the Study Area for Trawsfynydd works site for List 2 Dangerous Substances referring to Trawsfynydd Decommissioning site. Two are situated to the south of the Trawsfynydd works site and relate to arsenic, boron, chromium, copper, iron, lead, nickel and zinc. The third is on the west side of the Trawsfynydd works site and relates to copper iron and zinc.

7.5.55 An Historic Licensed Industrial Activity is recorded south-west of the Trawsfynydd works site within the 250 m Study Area. This relates to Magnox Electric Limited at the Trawsfynydd Power Station which was operational from 1993 but is now surrendered.

7.5.56 The Trawsfynydd works site and area within the 250 m Study Area south-west of the Trawsfynydd works site is classed as an historical Control of Major Accident Hazard (COMAH) site. The COMAH site in the area south-west of the Trawsfynydd works site is listed as having an historical consent to store hazardous substances.

7.5.57 There are no licensed pollutant releases (Part A(2)/B), pollution inventories, sites determined as contaminated land or regulated explosive identified within the Groundsure GIS data sites within the Trawsfynydd works site or Study Area.

Environmental Designated Sensitivities

7.5.58 A review of currently available information on MAGIC (Ref 5.30) did not identify any SSSI, Ramsar sites, SAC, NNR or LNR within 250 m of the Trawsfynydd works site.

7.5.59 There is one Priority Habitat for Lowland Fens and Reedbeds approximately 55 m north-east of Trawsfynydd works site.

Site History

7.5.60 Online data from National Archives of Scotland show from 1842 to 1952 the Trawsfynydd works site is fields and pastureland. South of the Trawsfynydd works site there is the Llyn Trawsfynydd reservoir within the Study Area. Afon Tafarn-helyg is shown within the Study Area, north-west to south-east of the Trawsfynydd works site.

7.5.61 From 1944 to 1974 mapping, the former Trawsfynydd Nuclear Power Station is visible in the footprint of the Trawsfynydd works site and Study Area. To the west and north of the Trawsfynydd works site, within the Study Area forest is shown on mapping. No further changes appear in the footprint of the existing Trawsfynydd works site up to the most current (2023) mapping available.

Contaminated Land Records

7.5.62 There are five contaminated land records (historical potential contaminative land uses or current potential contaminative land uses) within 250 m of Trawsfynydd works site. These are summarised in **Table 7-5.**

Table 7-5 – Summary of contaminated land records within 250 m of Trawsfynydd substation

Site ref no.	Direction from the Trawsfynydd works site	Contaminant description	Maps date
03830	West	Sewage Works and Sewage Farm	1977
03214	West	Electricity Production and Distribution (including large transformer)	1977
04065	South-west	Factory or Works not specified	1963
03831	South	Outfalls	Not Known
03450	East	Railway land	1977

Potential Areas 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.

7.5.64 On-site

- Made Ground – Made Ground is anticipated in the vicinity of Trawsfynydd works site and roads and car parking areas associated with current and historical development.
- Trawsfynydd substation – uses associated with substation and presence of Made Ground.

7.5.65 Off-site (within 250 m)

- Wider former Trawsfynydd Nuclear Power Station - uses associated with substation, potential for legacy radiological contamination and presence of Made Ground
- Historical landfill (at the power station).
- Sewage works and sewage farm.
- Railway lines.

7.5.66 No other potentially contaminating land uses have been identified within 250 m. In the wider area are a number of farms where potential contamination sources could include fuels, oils and lubricants, chemicals including sheep dip, slurry pits.

Contaminated Land Risk Assessment

7.5.67 A qualitative risk assessment for contaminated land has been undertaken for the construction and operational phase of the proposed works. The risk assessment is based on the assumption that standard best practices would be implemented during the works and has been used to identify where additional mitigation measures would be required.

7.5.68 The initial Conceptual Site Model (iCSM) and qualitative preliminary risk assessment for the proposed works has been provided in **Volume 8, Appendix 5.7.A: Initial Conceptual Site Model and Risk Assessment.**

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

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

Future Baseline

7.5.71 The Trawsfynydd works site is in an area of predominantly open land. The site occupies an electricity substation (built 1959), and associated land uses such as roads, car parking areas, masts and pylons.

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

7.5.73 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. Should contamination be identified, the developer would be required to carry out remediation to ensure the development is suitable for its proposed use. Furthermore, natural attenuation processes have the potential to mitigate risks over time from any existing sources of contaminants present within soil and

groundwater. New changes in groundwater abstractions could affect the groundwater flow regime and climate change could influence the future baseline conditions, due to changes on 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 Trawsfynydd works site, which have been derived by a qualitative assessment based on desk study research, iCSM and risk assessment presented in **Volume 8, Appendix 5.7.A: Initial Conceptual Site Model and Risk Assessment**. In order to accurately mitigate the impacts of potential contaminants, the actual nature, extent and magnitude of the presence of any significant potential contamination needs to be assessed through investigation during the construction works if contamination is encountered.

7.6.3 **Table 7-6** 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 Geology, Hydrogeology, Land Use and Agriculture (Soils) assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 7-6 – Scope of the 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 evaluation of the Geological Landscape Aspect Area where the Trawsfynydd works site is located is 'High' which is defined as *'The Aspect Area contains features (including sites) of high regional significance for scientific studies, typically linked to a high educational potential. Some of these sites may also have some historical value or demonstrate well-developed geological or geomorphological features. Other Aspect Areas evaluated as 'High' form the major landscape features in a district, such as prominent escarpment and upland tracts.'* In accordance with DMRB LA 109 (Ref 7.29), it is considered to be a 'medium' sensitivity receptor (of regional importance with limited potential for replacement. Geology meeting regional designation citation criteria which is not designated as such).

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			Construction impacts have been scoped in as although most of the works are in the existing, developed substation area, additional disturbance of geology may occur through redevelopment.
Sites designated for geodiversity interest	Out	Out	No geological SSSI, GCR sites or RIGS within the Trawsfynydd works site or within the 250 m Study Area.
Ground Stability	In	Out	Changes in subsoil or rock structure or shallow groundwater that could affect ground instability. The Study Area is in an area where underground vein mineral 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. Ground stability risks for the proposed works will be considered further as part of a detailed geotechnical Preliminary Sources Survey Report desk study and/or Ground Investigation Report (GIR) or Geotechnical Design Report (GDR) to inform the detailed design and will not be assessed as part of this chapter. It is not anticipated that ground stability risk will arise from the proposed works, the basis of the assessment in this ES has been undertaken as a worst case scenario.
Hydrogeology (from physical works)			
Groundwater - Secondary A, B and undifferentiated aquifers.	In	Out	Foundation and trench work may affect the hydrogeological regime such as groundwater flow and groundwater levels (through dewatering activities, for example). No effect is anticipated during the operational stage. There are no groundwater abstractions or private water supplies within 1km Study Area.
MSA (from physical works)			
MSA	In	Out	Trawsfynydd works site is in an area of Category 2 for sandstone (resources which are important for serving regional and local markets). The south-western corner of the Trawsfynydd works site is in an area Category 1 for sandstone and

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			igneous rock (of limited occurrence) their high quality and/or limited occurrence across the UK.
Preferred areas for minerals	Out	Out	No preferred areas for sand and gravel within the Trawsfynydd works site or within the 250 m Study Area.
Agricultural Soils (from Physical Works)			
Agricultural land	Out	Out	Temporary and permanent loss of land is not anticipated during the construction works or the operational stage as the works are entirely within the boundary of the existing Trawsfynydd works site (already developed land).
Receptors to Land Contamination			
Construction workers	In	Out	Contamination could be present in some areas i.e., Made Ground and around the existing Trawsfynydd works site and former Trawsfynydd Nuclear Power Station. 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 encountering Unexploded Ordnance (UXO) and 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 (residential property within 250 m Study Area)	In	Out	The nearest off-site human health receptor is a residential property 25 m south of the access road and within 250 m of the main works area. Potential to expose residents to contaminants in dust and vapours.
Off-site human health receptors	Out	Out	The land at Trawsfynydd is not agricultural and not farmed, therefore these receptors are scoped out of the assessment.

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
(agricultural land users)			
Surface water - Afon Tafarn-helyg and Llyn Trawsfynydd	In	In	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 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. An effect could occur during the operational stage only when maintenance works may be required (same potential impacts as during construction – from residual contamination/potential accidental leaks and spillages).
Development infrastructure (foundations and underground cables)	In	Out	Potential impacts from direct contact with contaminated land (known and unknown) – aggressive ground conditions. No further effect is anticipated during the operational stage.
Ecological sites and flora and fauna (cWS and ancient woodland)	In	Out	There are no NNR, Ramsar sites, SSSI, SAC or SPA within the Trawsfynydd works site and 250 m Study Area. There is one priority habitat for lowland fens and reed beds approximately 55 m north-east of Trawsfynydd works site.

7.6.4 No effects are anticipated for Land Use and Agriculture (Soils) which have been scoped out of the assessment and are not considered further in this assessment.

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 and Hydrogeology elements and features during construction, operation and maintenance of the proposed works are outlined as follows.

Construction

7.8.2 A number of the potential effects are associated with an assumed worst case relating to geology and hydrogeology 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, the actual nature, extent and magnitude of the presence of any significant potential contamination needs to be assessed through investigation during the construction works if contamination is encountered.

7.8.3 The potential effects for geology and hydrogeology are detailed below along with the mitigation measures and the overall residual effect and its significance.

7.8.4 Potential receptors in the context of the geology and hydrogeology assessment are geology (superficial and bedrock geology), hydrogeology (Aquifers, SPZ's and groundwater abstractions), human health (construction and maintenance workers) and development infrastructure.

Geology

7.8.5 The geology underlying the Trawsfynydd works site is classified as having medium sensitivity.

7.8.6 There are no sites designated for geodiversity interest within 250 m of the Trawsfynydd works site requiring mitigation.

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

7.8.8 The overall potential for ground instability is considered low. No evidence of mining has been identified within the Study Area. However, on a worst case scenario basis, there is a potential ground instability risk which is associated with the Alluvium being present. The Alluvium could cause ground instability due to compressibility and uneven settlement hazards and the potential for running sand conditions. Risk from ground stability will be assessed through detailed Geotechnical Desk Study, Ground Investigation Report (GIR) and/or Geotechnical Design Report (GDR) to provide geotechnical parameters to inform the detailed design.

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).

Land Contamination

During construction:

- Contamination of shallow groundwater from accidental leaks and spills, or plant breakdown. Other temporary impacts may 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;

- 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 and/or 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 sensitive receptors (including human health, controlled waters and ecological receptors) during construction; and
  - The potential mobilisation of 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/reinstate spoil resulting from the removal of the buried cables (redundant, oil-filled), tanks, existing foundations and other services, posing a potential risk to human health and the environment.
- Exposure of construction workers to contaminants in soil or groundwater, gases or vapours during excavations or in confined spaces.
- Potential exposure of buried structures (building foundations/infrastructure) to aggressive ground conditions.

Effects Realised Post-Construction:

- It is anticipated that if the requirement for remediation due to contamination was identified within the Trawsfynydd 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/or property from contamination, including from ground gases or vapours, to an acceptable level.

Operation and Maintenance

7.8.10 Upon completion and operation of the proposed works, the Trawsfynydd works site will remain covered by the Trawsfynydd substation and internal roads will form an effective barrier to residual contamination at the substation.

7.8.11 Mitigation will be implemented during the 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.

7.8.12 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.

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

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

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 and land contamination during all phases of the proposed works would be to ensure good site practice and management. A CEMP (**Volume 8, Appendix 5.2.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: Trawsfynydd Substation Works** to minimise the risk to construction workers, and pollution of uncontaminated strata and controlled waters (groundwater and surface waters). Measures contained within 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 run off, soil quality degradation and wind dispersal of dusts. The CEMP will also establish procedure 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 Trawsfynydd works site will be undertaken in accordance with the relevant guidance including Eurocode 7 (BS EN 1997-2:2007) (Ref 7.54), BS 5930 (2015 + A1 2020) (Ref 7.24) and BS 10175 (2011 + A2 2017) (Ref 7.24) and using the UK Specification for Ground Investigation (2022) (Ref 7.55).

7.9.5 The ground investigation will be designed to target the potentially contaminative sources identified within the site associated with the existing Trawsfynydd substation. There will also be a need to obtain geotechnical information to inform the proposed works including on the potential for ground instability. The ground investigation will be undertaken to achieve the following objectives:

- Determine the ground conditions to allow design of foundations and structures.
- Assess the nature, extent and magnitude of soil and groundwater contamination present.

- Assess the risks (if any) from potential contaminants to human health and controlled waters.
- Assess the ground gas regime.

7.9.6 If areas of the Trawsfynydd works site are shown to pose an unacceptable 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 off site users including residential properties) during the construction phase would be controlled and mitigated by the following measures and through working in accordance with CIRIA C811 (Ref 7.26):

- 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. Whilst the approach will need to be confirmed by the construction works contractor, this typically involves the preparation of a materials management plan following the protocols within the Contaminated Land Application in the Real Environment (CL:AIRE) (Ref 7.32) Definition of Waste: Development Industry Code of Practice to ensure that excavated materials are suitable for re-use, they are re-used appropriately, sustainably and remain outside the waste hierarchy. Materials which need to be removed from the Trawsfynydd works site are 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 Trawsfynydd works site, such as for supporting foundations, will be natural quarried stone or, if recycled, the material will undergo chemical and geotechnical testing to confirm material suitability. The suite of contaminants and site use criteria will be agreed with regulatory authorities to demonstrate that the material is suitable for use on 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 within the Trawsfynydd works site boundary. 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 7.15) and CAR-SOIL 2016 (Ref 7.56). As asbestos only presents a risk if it is disturbed, it is considered that the highest risk would be during the construction 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 Trawsfynydd 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 7.57) and then once this is established, the appropriate disposal facility will be determined through Waste Acceptance Criteria (WAC) analysis, as required.

7.9.14 A Soil Management Plan will be prepared 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 7.34) and other relevant documents such as The Institute of Quarrying's Good Practice Guide for Handling Soils in Mineral Workings (Ref 7.36).

Soil and Groundwater Pollution Control Mitigation

7.9.15 It is unlikely that the proposed works will require deep excavations although currently the foundation construction is unknown. There will be a requirement 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):

- A Pollution Prevention Plan will outline key pollution mitigation measures to be adopted including a Control of Substances Hazardous to Health (COSHH), 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/or 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 within the proposed works boundary 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 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. An environmental permit will be required for any discharging activity to surface waters or groundwater associated with the dewatering or a trade effluent consent for discharge into foul sewer. Dewatering will be developed in consultation with NRW and other stakeholders if appropriate.

Operational Phase Mitigation

7.9.21 Where possible, measures will be put in place during the construction phase through the CEMP 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

7.9.22 The potential effects assessment is detailed below along with the mitigation measures and the overall residual effect and its significance.

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

7.9.24 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**.

7.9.25 The magnitude of the potential impacts have 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.

7.9.26 In relation to ground stability, the ratings are drawn on the basis of a worst case scenario from published policy and / or good practice guidance and based on professional judgements within AECOM and have been successfully used on other assessments.

Table 7-7 – Residual effects

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[2] C	O	M
Geology						
Impact on geological receptors	Potential adverse impact loss of and/or damage to sensitive geological receptors (i.e., the bedrock geology)	Geology	The overall evaluation of the Geological Landscape Aspect Area where the Trawsfynydd works site is located is 'High' (*'of high regional significance for scientific studies, typically linked to a high educational potential. Some of these sites may also have some historical value or demonstrate well-developed geological or geomorphological features. Other Aspect Areas evaluated as 'High' form the major landscape features in a district, such as prominent escarpments and upland tracts.*) and is therefore a 'Medium' sensitivity receptor. There is no ground investigation information available for the Trawsfynydd works site and therefore the extent/depth of superficial deposits above the bedrock is unknown. The proposed works at the Trawsfynydd works site[3], aren't anticipated to involve significantly deep excavations. Given the unlikely potential for deep excavations, and the development already present at the Trawsfynydd works site, the magnitude of impact is 'negligible'. The	✓	✓	

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

[3] Including removal works (electrical apparatus / earth tape / old existing redundant oil filled cables and tanks, concrete foundations and other services) and new installations (electrical equipment and cables)

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[2] C	O	M
			significance would be a **'neutral to slight' adverse (not significant)** effect.			
		Minerals	Trawsfynydd works site is in an area of Category 2 for sandstone (resources which are important for serving regional and local markets). The south-western corner of the Trawsfynydd works site is in an area Category 1 for sandstone and igneous rock (of limited occurrence) their high quality and/or limited occurrence across the UK. According to MSA GIS data (Ref 7.48), states that Trawsfynydd works site, and the 250 m Study Area is not within a MSA for sand and gravel. The Joint Local Development Plan 2017 Proposals Map (Ref 7.16) indicates there are no sand and gravel preferred areas within the Trawsfynydd works site or 250 m Study Area. Given the Trawsfynydd works is within the existing Trawsfynydd substation no further impact to mineral resource is likely. Therefore, the significance would be a '**neutral**' **(not significant)** effect.	✓		
Ground instability	Potential adverse impact and damage during excavations and to structures	Structures, excavations	Majority of the site identified as low potential for ground instability. Potential for aggressive ground conditions associated with physical, chemical and biological processes occurring at the Trawsfynydd works site. Potential for encountering shallow groundwater within the superficial deposits during	✓	✓	✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[2] C	O	M
			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 mitigation and also to inform the foundation design for structures. Mitigation will be implemented in accordance with the CEMP, such as during excavations and dewatering. The significance would be a **'neutral' (not significant)** effect.			
Hydrogeology						
Requirement for dewatering, reducing flow to groundwater abstractions and surface water bodies.	In order to excavate below groundwater, dry working will be required for the installations and foundations, and dewatering may be required within the excavations during construction. Groundwater is likely to be extracted from sumps within the excavation and discharged to surrounding ground. Groundwater levels could be locally and temporarily affected, and a reduction in levels could lead to reduced	Hydrogeology and hydrology	Shallow groundwater could be encountered within the superficial deposits. In order to excavate below groundwater, dry working will be required for the installations/foundations, and, therefore, temporary dewatering may be required within excavations. The Trawsfynydd works site is underlain by 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	✓		

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[2] C	O	M
	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.		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 paragraph 7.9.18 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 and B and surface water courses, the significance of effect would be **'slight' adverse (not significant)**.			
Land Contamination						
Groundwater and ground pollution due to chemical spillages and leaks.	Potential for plant to leak or spill oil and/or fuel. Leaks and spillages could occur in any area of the Trawsfynydd 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 Trawsfynydd works site to	Groundwater and surface watercourses	Spillages or leaks are unlikely to occur due to the construction management measures that will be put in place as part of the CEMP, 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 'medium' based on Secondary A and B aquifers and the significance of effect would be **'neutral or slight' adverse (not significant)**.	✓	✓	✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[2] C	O	M
	facilitate construction. There is potential that such spillages could enter the underlying uncontaminated strata and contaminate shallow groundwater.		Two surface water abstractions relating to effluent dispersal at Trawsfynydd Power Station and the Pysgotfa Prysor Fishery within the 1 km Study Area for Trawsfynydd works site. Spills are unlikely to be widespread and mitigation management measures will be put in place as part of the CEMP should spills occur. The surface watercourses are 'low' sensitivity and the significance of effect would be **'neutral or slight' adverse (not significant)**.			
		Human Health	The most sensitive human health receptors are the construction and maintenance workers; these are 'medium' sensitivity receptors. The residual effect from chemical spillages and leaks during construction would be **'neutral to 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').	✓	✓	✓
Risks from existing potential contamination from: - Creation of new contaminant linkages (e.g. foundation construction through existing	The excavation and disturbance of the sub-soils during construction could lead to a number of effects associated with contaminated ground: • Vehicles tracking over potentially contaminated ground have the potential to	Soils (supporting ecological receptors), groundwater and surface watercourses	The baseline assessment has identified potential contaminative land uses in the Trawsfynydd works site and Study Area and a number of potential effects associated with the presence of contaminated materials. The baseline has demonstrated that the potential scale and type of ground contamination within the Trawsfynydd works site is a low to moderate risk with the majority of potential contamination sources being associated with Made Ground and the existing Trawsfynydd substation. No	✓	✓	✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[2] C	O	M
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 sensitive receptors (including human health, controlled waters and ecological receptors) during construction; and - The potential mobilisation of any existing contamination via	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; • Disturbance of ground may alter the chemical conditions within the Trawsfynydd works site resulting in mobilisation of potential contaminants; • The surfaces of contaminated material may be exposed in excavations, which could cause mobilisation of contaminants by percolating rainwater; and • Arisings from the excavation of ground could potentially result in the stockpiling of contaminated soils on		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. 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. Trawsfynydd substation already appears to have a connection to the wider water environment. The Trawsfynydd works site is shown to lie outside of any mapped fluvial or coastal flood extents. There is an area of mapped flood risk from surface water and small watercourses, though this is not anticipated to significantly impact the proposed works. It is assumed there will be no increase in impermeable area as a result of the proposed works. An operational drainage system is in place at the existing Trawsfynydd substation. Access will be via the			

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[2] C	O	M
the exposure of soils and increases in rainwater infiltration through changes in ground cover and in excavations or bulk earthworks.	the Trawsfynydd substation works, and reuse on-site. The exposed soils could lead to increased migration of potential contaminants both on-site and off the Trawsfynydd works site through dust generation and to underlying soils and controlled waters through leaching and surface water runoff.		existing Trawsfynydd substation access road. No new watercourse crossings or culverting required to facilitate the works. A CEMP will be produced and cover relevant mitigation measures for the onsite works. including mitigation for excavations and stockpiling. Therefore, for the reasons indicated, there will be a 'negligible' magnitude of impact for the low to moderate 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. As these measures would prevent measurable adverse health effects on construction and maintenance workers (medium sensitivity), '**slight' adverse (not significant)**.	✓		✓
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 recycled aggregates during construction and maintenance, for example for the construction of access tracks and/ or compounds, etc, may pose a risk to underlying soils and groundwater quality, and to construction workers, if the aggregates were to be contaminated. However, mitigation measures outlined in the CEMP 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	✓	✓	✓

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[2] C	O	M
			effects on the identified receptors. The magnitude of impact would be negligible to the low to medium sensitivity receptors. The significance would be **'neutral to slight' adverse (not significant)** effect.			
Requirement to remove and reinstate spoil from the removal of the buried cables (redundant, oil-filled), tanks, existing foundations and other services, posing a potential risk to human health and the environment.	Spoil from the excavations could be generated and be reused elsewhere within the Project or require removal from the Trawsfynydd works site	Soils (supporting ecological receptors), geology	Where superficial deposits are excavated as part of the proposed works, these materials may be re-used on-site for reinstatement during the construction phase. Materials would be re-used under the CEMP to ensure they would be physically and chemically suitable for re-use. The natural 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 CEMP. Further details on Excavated Materials and Soils and Waste Management have also been provided in paragraphs 7.9.9 to 7.9.14. 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 the presence of sulphate for buried concrete or organic	✓		

Residual effect	Description	Receptor	Mitigation and significance (with consideration of the magnitude of impact and sensitivity of the receptor)	Phase[2] C	O	M
			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. The significance would be a **'neutral' (not significant)** effect.			
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 within the Trawsfynydd works site (if encountered), there will, in most instances, be overall beneficial effects. Given the anticipated low to moderate potential for contamination, the magnitude of impact is anticipated to be negligible to minor to the low to medium sensitivity receptors resulting in a **'neutral to slight' beneficial (not significant)** effect.	✓	✓	✓

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 Water Quality, Resources and Flood Risk effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Trawsfynydd Substation Works.**

8.1.2 This chapter describes the baseline conditions currently existing within the Study Area (as defined in **Section 8.3**) and the scope of the assessment.

8.1.3 This chapter is supported by the appendix listed below:

- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

8.1.4 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).**

8.2 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 Framework Directive (England and Wales) Regulations 2017 (Ref 5.14).
- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (Ref 8.1)
- Environment (Wales) Act 2016 (Ref 5.5).
- Environmental Permitting (England and Wales) Regulations 2016 (Ref 7.9).
- Floods and Water Management Act 2010 (Ref 8.2).
- Water Resources Act 1991 (Ref 7.4).
- Water Act 2003 (Ref 7.2).
- Environment Act 1995 (Ref 7.3).
- Land Drainage Act 1991 (7.5) and 1994 (Ref 8.3).
- Environmental Protection Act 1990 (Ref 7.1).
- Control of Pollution Act 1974 (Ref 8.4).

National Policy

8.2.3 The following national policy is relevant to Water Quality, Resources and Flood Risk:

- TAN 15: Development and flood risk (Ref 8.5).
- 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 8.5) provides guidance in relation to development and flooding and is supported by the Flood Map for Planning (Ref 8.6) which incorporates flood risk extents based on predicted climate change over the next century.

8.2.5 In the revised 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:

- Eryri Local Development Plan 2016 – 2031 (Ref 4.8).
- Eryri Local Development Plan Review Report 2023 (Ref 5.16).
- West of Wales Shoreline Management Plan (Ref 8.7).

Guidance

8.2.8 The following National Grid Guidance is relevant to Water Quality, Resources and Flood Risk:

- National Grid Policy Statement (Transmission) 095 - Flood Mitigation Policy (Ref 8.8.

8.3 Study Area

8.3.1 The proposed works are in the existing Trawsfynydd substation compound. The Study Area for the effects of the proposed works consists of the substation and the immediate surrounding environs within 1 km of the site.

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 (March 2025), and has referenced published data, records and web-based information obtained to date.

8.4.2 The assessment includes consideration of the construction, operation and maintenance, phases of the proposed works and is based upon the design information in the proposed works (**Chapter 2: Trawsfynydd Substation Works**).

8.4.3 As, the works will be confined to hardstanding areas, accessed via the existing Trawsfynydd substation access road, neither a detailed Flood Consequence Assessment or Drainage Strategy are required and, this assessment is based on a review of desk study data and aerial photography.

8.5 Baseline

8.5.1 Review of OS Mapping shows that the closest watercourses to the Trawsfynydd works site are unnamed tributaries (~12 m away) of the Afon Tafarn-helyg (~40 m away). The watercourses originate immediately west of the Trawsfynydd works site and appear to be fed by surface water outfalls from the north-western and eastern sides of the Trawsfynydd substation, in addition to an outfall from a Sewage Treatment Works. There are no direct interactions between the proposed works and the watercourses.

8.5.2 The Trawsfynydd works site (and wider Trawsfynydd substation) is bounded to the north and the east by networks of unnamed small watercourses.

8.5.3 Given that the Trawsfynydd works site is in the middle of two areas of higher topographical elevation, including Tomen y Mur to the east, it is assumed that these watercourses all drain to the Afon Tafarn-helyg.

8.5.4 Llyn Trawsfynydd is south of the Trawsfynydd substation and former Trawsfynydd Nuclear Power Station. At its closest point the Llyn Trawsfynydd is 30 m south of the Trawsfynydd works site, though this is limited to the existing access road. Llyn Trawsfynydd is a Water Framework Directive (WFD) Lake waterbody (ID GB31034870) which retains a Moderate overall status.

8.5.5 The Afon Prysor is the nearest designated Main River which flows through Llyn Trawsfynydd. It is approximately 1.8 km to the west of the Trawsfynydd works site. The Afon Prysor is also recorded as a WFD waterbody though depending on location is recorded as two different reaches (downstream Llyn Trawsfynydd Ref: GB110065053751) and (upstream Llyn Trawsfynydd Ref: GB110065053752). The Afon Prysor (downstream Llyn Trawsfynydd Ref: GB110065053751) is in the Llyn and Eryri Catchment and retains an overall Moderate waterbody status (Cycle 3, 2021). The Afon

Prysor (upstream Llyn Trawsfynydd Ref: GB110065053752) is in the Llyn and Eryri Catchment and retains an overall Poor waterbody status (Cycle 3, 2021).

8.5.6 The Trawsfynydd works site is shown to lie above the following geological classifications:

- Superficial
  - Artificial Deposits/Made Ground.
  - Bordered by Till, Devensian – Diamicton. Sedimentary superficial deposit formed between 116 thousand and 11.8 thousand years ago during the Quaternary period.
- Bedrock
  - Rhinog and Hafotty Formation - Sandstone and mudstone. Sedimentary bedrock formed between 526 and 508 million years ago during the Cambrian period.

8.5.7 Further details of the geology at the Trawsfynydd works site is provided in **Chapter 7: Geology, Hydrogeology, Land Use and Agriculture (Soils).**

8.5.8 The Trawsfynydd works site and surrounding area lie above the Llyn and Eryri WFD groundwater body which retains a Poor overall status under the WFD.

8.5.9 The Trawsfynydd works site is over 1 km from the nearest designated site SSSI, Ramsar, SPA, SAC and NNR.

8.5.10 In accordance with NRW Flood Map for Planning (Ref 8.6), the Trawsfynydd works site is:

- Not in the vicinity of a Main River – the closest Main River to the Trawsfynydd works site is the Afon Prysor approximately 1.8 km to the west.
- Shown to lie outside of the mapped areas of fluvial or tidal flooding therefore in Flood Zone 1 (Rivers and Tidal/Sea) and at a low risk from this source.
- Shown to lie predominantly outside of the mapped areas of flooding from small watercourses/surface water flooding therefore considered within Flood Zone 1, with a small expanse of Flood Zone 2 extending along the existing access road/within existing transformer areas (flooding from Small Watercourses and surface water mapping). The Trawsfynydd works site is predominantly at a low risk from this source.
- Shown to lie within the mapped reservoir flood extents, however flood risk from this source is very low due to the regulations imposed on reservoirs under the Reservoirs Act (Ref 8.6).
- Not shown to be impacted by any historic flood events.

8.5.11 In accordance with Development Advice Map (Ref 8.6), the Trawsfynydd works site is shown to lie in Flood Zone A.

Future Baseline

8.5.12 The future baseline scenario has considered Trawsfynydd substation as developed and operational. There would be minimal change in future baseline scenarios unless the substation was decommissioned and demolished. Impermeable area coverage is unlikely to change and as such changes to surface water and groundwater regimes are unlikely.

8.5.13 Climate Change is expected to influence hydrological processes in the Trawsfynydd 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 increase flood risk.

8.5.14 Peak rainfall intensity is predicted to increase between 20 % to 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 % to 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 Quality, Resources and Flood Risk receptors that have been reviewed and states whether they have been included or excluded from the Water Quality, Resources and Flood Risk assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 8-1 – Scope of the Water Quality, Resources and Flood Risk assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Unnamed tributary of the Afon Tafarn-helyg – Flood Risk and Water Quality	Out	Out	Trawsfynydd substation already appears to have a connection to the wider water environment. Minor works being undertaken within the existing Trawsfynydd substation. The Trawsfynydd works site is shown to lie outside of any mapped fluvial or coastal flood extents. There is an area of mapped flood risk from surface water and small watercourses, though this is not anticipated to significantly impact the proposed works. The development is categorised as “less vulnerable development” in TAN15. There will be no increase in impermeable area as a result of the proposed works. An operational drainage system is in place at the existing Trawsfynydd substation. Access will be via the existing Trawsfynydd substation access road.

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			No new watercourse crossings or culverting required to facilitate the works. CEMP will be produced and cover relevant mitigation measures for the onsite works.
Afon Prysor (upstream Llyn Trawsfynydd) WFD River waterbody (ID GB1100650 53752)	Out	Out	Currently at Poor status. Minor works being undertaken within the existing Trawsfynydd substation and at a distance greater than 1 km from the Afon Prysor.
Afon Prysor (downstream Llyn Trawsfynydd) WFD River waterbody (ID GB1100650 53752)	Out	Out	Currently at Moderate status. Minor works being undertaken within the existing Trawsfynydd substation and at a distance greater than 1 km from the Afon Prysor.
Llyn Trawsfynydd WFD Lake waterbody (ID GB31034870)	Out	Out	Currently at Moderate status. Minor works being undertaken within the existing Trawsfynydd substation and at a distance of 500 m from the Llyn Trawsfynydd, though the works area is separated from Llyn Trawsfynydd by the existing Trawsfynydd substation infrastructure.

8.7 Summary

8.7.1 It has been demonstrated that the proposed works at Trawsfynydd substation are not anticipated to have significant impacts on Water Quality, Resources and Flood Risks in the immediate or local area. The embedded mitigation measures included in the CEMP are expected to prevent any effects during construction, operation and maintenance.

9. Traffic and Transport

9.1 Introduction

9.1.1 This chapter presents an assessment of the likely Traffic and Transport effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Trawsfynydd works site**.

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 figures and appendices as listed below:

- **Figure 5.9.1:** Traffic and Transport Study Area and Traffic Survey Locations.
- **Figure 5.9.2:** Study Area Road Network.
- **Figure 5.9.3:** Traffic Accident Locations.
- **Figure 5.9.4:** Indicative HGV (Heavy Goods Vehicle) Routeing.
- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**
- **Volume 8, Appendix 5.9.A: Traffic Flow Diagrams.**
- **Volume 8, Appendix 5.9.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. Full details are in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**

Legislation

9.2.2 The following legislation is relevant to Traffic and Transport:

- Active Travel (Wales) Act 2023 (Ref 9.1).

National Policy

9.2.3 The following national policy is relevant to Traffic and Transport:

- PPW – Edition 12 (Ref 4.3).
- National Transport Delivery Plan (2022 – 2027) (Ref 9.2).
- Future Wales – the National Plan 2040 (Ref 4.2).

Local Policy

9.2.4 The following local policy is relevant to Traffic and Transport:

- Eryri Local Development Plan 2016 – 2031 (Ref 4.8).
- Eryri Local Development Plan Review Report 2023 (Ref 5.16).
- 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 Guidelines – 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 Trawsfynydd works site, several roads on the local and strategic highway network have been identified as roads that would 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 Trawsfynydd works site from the Strategic Road Network (SRN) and from local and regional population centres between a 30–45-minute drive time of the Trawsfynydd 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 A470.
- A470 east of A487.
- A487 south of A470.
- A487 south of Trawsfynydd substation access road.
- Trawsfynydd substation access road.

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 **Section 9.4** and **Table 9-6** summarises the average annual daily traffic flows. A plan of the locations which, collectively, define the extent of the Study Area as shown in **Figure 5.9.1**.

9.4 Assumptions and Limitations

9.4.1 The details provided in this ES chapter are accurate as of the reporting date and are based on the maximum land area required for the proposed works' construction and operation.

9.4.2 The Trawsfynydd works site is in a predominantly rural area where access may be limited by highway design and 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 a 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 **48 months** is considered 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, if construction were to commence later than modelled, the impacts would remain unaffected.

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.

9.5.3 This section is also supported by the traffic count data provided in **Volume 8, Appendix 5.9.B: Traffic Base Counts**.

Strategic Road Network

A470

9.5.4 The A470 is a major north-south trunk road that spans the length of Wales, connecting Cardiff in the south with Llandudno in the north. In the vicinity of the Trawsfynydd works site, the A470 plays an important role in regional connectivity, linking communities to broader areas of North and Mid Wales. This road is expected to be a primary route for both staff and HGVs travelling to the Trawsfynydd works site.

9.5.5 In this region, the A470 is predominantly a single carriageway road, with one lane in each direction. The road is characterised by a rural setting, with sections flanked by grass verges, hedgerows, and occasional stone walls. There are minimal direct frontage developments, reflecting the road’s passage through largely open countryside and woodland areas.

9.5.6 Near Trawsfynydd, the A470 is subject to the national speed limit, being well-trafficked year-round, with a mix of local and tourist traffic, and a noteworthy proportion of HGVs, especially those servicing agricultural and industrial sectors.

9.5.7 Key considerations for the A470 close to Trawsfynydd include its alignment, which features several sharp bends, undulating terrain, and areas with limited visibility. These characteristics, coupled with the road’s importance as a regional artery, mean that

careful management of construction traffic will be necessary to minimise disruption and ensure safety.

A487

9.5.8 The A487 is a strategic route running in a generally north-south direction, providing connectivity between coastal and inland areas across Wales. Although the A487 is to the north-west of the Trawsfynydd works site, it remains a key route for traffic originating from the western parts of Wales, particularly for vehicles travelling from Porthmadog, Caernarfon and other coastal towns.

9.5.9 In the vicinity relevant to the Trawsfynydd works site, the A487 is a single carriageway road with one lane in each direction. The road is bordered by a mix of rural landscapes, including agricultural land, woodlands and occasional residential properties. The A487 is subject to the national speed limit in most rural sections, with speed reductions near built-up areas or significant junctions.

9.5.10 Traffic on the A487 includes a mix of local, tourist, and commercial vehicles, with HGVs frequently using this route to serve local industries and agricultural operations. The road's alignment close to Trawsfynydd includes several challenging features, such as sharp bends, varying elevations, and occasional pinch points where the carriageway narrows. These characteristics require careful navigation, particularly for larger vehicles.

9.5.11 Given its strategic importance, the A487 is likely to be a main route for construction-related traffic, particularly for deliveries coming from the western parts of Wales or from the A55 North Wales Expressway near Bangor.

Local Highway Network

A4212

9.5.12 The A4212 is a secondary route that runs in an east-west direction, connecting the A470 near Trawsfynydd with the A494 at Bala. This road is less likely to be used by vehicles travelling to the Trawsfynydd works site. The A4212 acts as an important link that offers a direct route for east-west travel across this part of Wales.

9.5.13 In the Study Area, the A4212 is a single carriageway road, characterised by its rural and scenic nature. The road passes through a varied landscape, including agricultural land, forestry, and areas of open moorland. The A4212 is typically flanked by narrow grass verges, with occasional stone walls and hedgerows marking property boundaries. There are no formal footways, reflecting the rural context of the road.

9.5.14 The road is subject to the national speed limit in most sections, with lower limits applied near settlements or sharp bends. The alignment of the A4212 includes several challenging sections, with tight bends, steep gradients, and areas where the road narrows significantly. These factors, combined with the road's relatively low traffic volumes, mean that the A4212 is less suitable for high volumes of traffic or HGVs.

Walking and Cycling

9.5.15 The Eryri National Park Rights of Way System (Ref 9.7) 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.

9.5.16 An extract from the Definitive Map highlights the four nearest PRoW and the one nearest NCN route (currently under development) to the Trawsfynydd works site. However, these PRoW and NCN routes are not expected to be impacted by the proposed works. The identified PRoW and NCN routes and closest distances are:

- Maentwrog 18 footpath (50 m north of the Trawsfynydd works site access road entrance).
- NCN Route 82 (under development) (300 m west of the Trawsfynydd works site).
- Maentwrog 5 footpath (210 m west of the Trawsfynydd works site).
- Maentwrog 5 bridleway (290 m north of the Trawsfynydd works site).
- Maentwrog 21 footpath (350 m north of the Trawsfynydd works site).

9.5.17 These routes do not intersect the Trawsfynydd works site.

Public Transport Facilities

Bus

9.5.18 There is one service 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 only one bus route that provides access to key locations (see **Table 9-1**). The T2 (TrawsCymru) route offers two levels of service frequency, with are essential for local connectivity.

Table 9-1 – Public transport services – bus

Route section	Bus route	Frequency
A470	T2 TrawsCymru	2 hours
A487	T2 TrawsCymru	1 hour

9.5.19 The bus services in the Study Area offer two frequencies, from one to two-hour intervals. This frequency ensures that the area is reasonably well-served by public transport, facilitating movement for both residents and visitors. However, it is noted that the variability in services may influence the convenience and reliability of public transport as a primary mode of travel, particularly during off-peak hours.

Rail

9.5.20 The nearest rail facilities to the Study Area include Penrhyndeudraeth (11.5 km), Minffordd (12.6 km), and Llandecwyn (12.7 km), all of which are west of the Trawsfynydd works site. 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 the construction workers.

Summary

9.5.21 In summary, it can be concluded that opportunities to support sustainable travel are limited.

9.5.22 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

9.5.23 A review of road safety on the local highway network has been carried out. Personal Injury Collision statistics have been obtained from CrashMap (Ref 9.8) 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 5.9.2** and the accident locations are shown in **Figure 5.9.3**.

9.5.24 Over the seven years, 13 collisions occurred in the accident Study Area, each 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.

9.5.25 **Table 9-2** provides a summary of collisions by severity and year and shows that the greatest number of collisions occurred in 2016 with a total of four collisions (two slight, two serious); 2022 recorded the lowest number, with no reported collisions. The information also shows that since 2016, there have been two fatal collisions in the Study Area (2018 and 2019).

Table 9-2 – Collisions by year and severity

Year	Slight	Serious	Fatal	Total
2016	2	2	0	4
2017	2	1	0	3
2018	1	0	1	2
2019	0	0	1	1
2020	1	1	0	2
2021	0	1	0	1
2022	0	0	0	0
Total	**6**	**5**	**2**	**13**

9.5.26 The data has been split to show collisions on road links, as shown in **Table 9-3**, and collisions that occurred at or near junctions, as shown in **Table 9-5**. The highest number of collisions were recorded on the A487 North of A470 (ten), with the remaining links having significantly fewer recorded incidents.

Table 9-3 – Collisions by link and severity

Link	Slight	Serious	Fatal	Total
A487 North of A470	5	3	2	10
A470 East of A487	0	0	0	0
A487 South of A470	0	1	0	1
A487 South of Trawsfynydd Road	1	1	0	2
Trawsfynydd Substation Access Road	0	0	0	0
Total	**6**	**5**	**2**	**13**

9.5.27 The information in **Table 9-4** further analyses the temporal variation in terms of collisions on A487 North of A470.

Table 9-4 – Collisions on A487 north of A470 by year

Year	A487 north of A470
2016	4
2017	2
2018	2
2019	1
2020	1
2021	0
2022	0
Total	**10**

9.5.28 The collision record on the A487 North of A470 link shows that collisions occurred each year from 2016 to 2020, with a total of ten collisions. The highest number of collisions (four) occurred in 2016, while no collisions were recorded in 2021 and 2022.

9.5.29 **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
A487/A470	1	0	0	1
A470/Trawsfynydd Substation Access Road	0	1	0	1
Total	**1**	**1**	**0**	**2**

9.5.30 The data indicates that only two junctions in the Study Area saw accidents between 2016 and 2022, with one slight collision at the A487/A470 junction and one serious collision at the A470/Trawsfynydd Substation Access Road.

9.5.31 Based on the information available, the A487 North of A470 link has demonstrated a consistent pattern of collisions. The collision record on this stretch of the network, potentially due to its complex alignment and a 40-mph speed limit, suggests a notable hotspot compared to other road links in the Study Area, where collision numbers and severity were generally lower and more variable.

Baseline Traffic Flows

9.5.32 To understand baseline traffic levels, ATC surveys were carried out at five 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.

9.5.33 The ATC locations form the extent of the Study Area, shown in **Figure 5.9.1**.

9.5.34 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.

9.5.35 The following traffic data has been included: 24-hour Annual Average Daily Traffic (AADT).

9.5.36 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 the timing of the proposed works. However, the worst-case scenario for traffic impacts is still expected to be in peak periods of the summer months.

9.5.37 **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

ATC	Link description	24 Hour AADT	
		Total vehicles	HGVs
5.1	A487 North of A470	6,369	315
5.2	A470 East of A487	1,026	21
5.3	A487 South of A470	6,982	306
5.4	A487 South of Trawsfynydd Substation Access Road	6,866	274
5.5	Trawsfynydd Substation Access Road	400	6

Future Baseline

9.5.38 This section considers 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.

9.5.39 Subject to being granted consent and following a final investment decision, the earliest construction could start in **2027**.

9.5.40 The proposed work involves works in the existing Trawsfynydd substation compound, including the replacement of existing cross-site underground cables, amendments to the downleads from Tower 4ZC005 into a new gantry, the installation of a new shunt reactor and 400 kV cables, along with other new equipment. Additionally, amendments to the substation compound fence line will be made to accommodate the revised downleads.

9.5.41 The peak year for traffic movements is assumed to be 2027 and this has been used as the future assessment year.

9.5.42 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 growth factors include a forecast of local development growth and attempts to capture growth attributed to these other developments. Theoretically, cumulative schemes have been captured in the future baseline. The Gwynedd 009 – W02000018 – Blaenau Ffestiniog & Trawsfynydd locations were used to apply a growth factor to the baseline data:

9.5.43 This growth factor as shown in **Table 9-7** has been applied to the existing traffic flows to derive a baseline future traffic flow.

Table 9-7 – TEMPro growth factors (2024-2027)

Period	Region	Growth Factor
2024-2027	Gwynedd 009	1.0274

9.5.44 The **2027** 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 – 2027 baseline traffic flows (Two-Way) –Total vehicles and HGVs

		24 Hour AADT	
ATC	Link description	Total vehicles	HGVs
5.1	A487 North of A470	6,543	324
5.2	A470 East of A487	1,054	21
5.3	A487 South of A470	7,174	315
5.4	A487 South of Trawsfynydd Substation Access Road	7,064	291
5.5	Trawsfynydd Substation Access Road	411	6

9.6 Scope of Assessment

9.6.1 This section describes the scope of the assessment of effects on Traffic and Transport.

9.6.2 **Table 9-9** summarises the potential Traffic and Transport receptors that have been reviewed 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 the 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 traffic volumes, which may disrupt local connectivity and access. Operational traffic volumes are expected to be no different from the baseline. Therefore, the traffic volumes will be significantly less than in construction, leading to a negligible impact.

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 no different from the baseline. Therefore, the traffic volumes will be significantly less than in construction, leading to a negligible impact.
Pedestrian Delay	Out	Out	Significant effects related to pedestrian delay are unlikely during construction and operation due to low expected levels of pedestrian activity surrounding the Trawsfynydd works site.
Non-motorised user (NMU) amenity	In	Out	Construction may generate potentially significant impacts on pedestrian and cyclist amenities due to increased traffic levels affecting the safety and comfort of non-motorised users. Operational traffic volumes are expected to be no different from the baseline. Therefore, the traffic volumes will be significantly less than in construction, leading to a negligible impact.
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 no different from the baseline. Therefore, the traffic volumes will be significantly less than in construction, leading to a negligible impact.
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 no different from the baseline. Therefore, the traffic volumes will be significantly less than in construction, leading to a negligible impact.
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 development. Operational traffic volumes are expected to be no different from the baseline. Therefore, the traffic volumes will be significantly less

			than in construction, leading to a negligible impact.
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 amenities. Operational traffic volumes are expected to be no different from the baseline. Therefore, the traffic volumes will be significantly less than in construction, leading to a negligible impact.
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**. This appendix provides comprehensive guidance on the methodologies applied, ensuring the assessment's conclusions are based on well-established and recognised standards.

Sources of Information

9.7.2 In preparation of this chapter, the following sources of published information have been referenced:

- Personal Injury Collision data has been gathered from CrashMap (Ref 9.8).
- ATCs have been undertaken at five 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 5.9.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.
- Ordnance Survey (OS)/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 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. These observations were also used to support the road link sensitivity designations, as provided in **Table 9-10**.

Methodology

9.7.4 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.

9.7.5 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

9.7.6 The methodology for assessing the impact of the proposed works generated traffic will be based on that outlined in the IEMA Guidelines and is stated in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

Link Sensitivity

9.7.7 The road link sensitivity has been based upon the worst-case sensitivity of the whole link considering the criteria outlined in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**. The links are represented by the ATC locations:

Table 9-10 – Link sensitivity

ATC number	Link description	Sensitivity
5.1	A487 North of A470	Low
5.2	A470 East of A487	Very Low
5.3	A487 South of A470	Low
5.4	A487 South of Trawsfynydd Site Road	Low
5.5	Trawsfynydd Site Road	Low

Magnitude

9.7.8 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 is outlined in **Table 7.2** of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

Significance

9.7.9 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

9.7.10 This section outlines the trips generated by the proposed works during construction and operation. It is important to highlight that there is very limited data in the Trip Rate Information Computer System trip generation database for standalone cabling upgrades, 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 48 months construction period. The peak of construction in terms of generated trips is projected to occur between Months 1–12 of the construction programme.

9.7.11 The peak construction year is expected to be 2027, which has been incorporated into the assessment.

Construction Staff

9.7.12 The current estimate is that a peak of 40 Full Time Equivalent workers will be on-site per day at the Trawsfynydd works site. These numbers include workers associated with the replacement of the existing cross-site cables and those associated with the installation of the new shunt reactor and cables.

9.7.13 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 to be set out in the contractor's Travel Plan. 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 (**Table 9-12**). A percentage of workers that may engage in car-sharing has been estimated based on professional judgement.

9.7.14 It is assumed that approximately 50% of the workforce (around 20 out of 40 workers) will participate in car-sharing. This estimate is informed by car-sharing uptake observed at other similar infrastructure projects in the wider area. A realistic car-sharing ratio of 1.5 workers per vehicle has also been applied. This results in an estimated 13 one-way daily car movements for the car-sharing workers.

9.7.15 For the remaining 20 workers who do not engage in car-sharing, it is assumed they will travel individually by private vehicles. Adding these 20 movements to the 13 movements generated by car sharing workers results in a total of 33 one-way daily vehicle movements per day for the workforce.

9.7.16 For the purposes of this assessment, it is assumed that the proposed works will generate a total of 66 two-way daily worker vehicle movements (33 in and 33 out).

Construction HGVs

9.7.17 It is estimated there would be a peak of up to eight HGV deliveries (including waste removal) per day (16 two-way, e.g. eight inbound and eight outbound). These numbers include all HGVs associated with the proposed works.

9.7.18 During construction, there is expected to be a total of up to eight AIL movements (16 two-way) associated with the delivery of the shunt reactor and cables to the Trawsfynydd works site. These are expected to arrive intermittently across the construction period.

Total Vehicles

9.7.19 **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 proposed works across a full 24-hour period, without breaking down specific time periods.

Table 9-11 – 24-hour AADT Trip Generation by Vehicle Type

Vehicle Type	In	Out	Total (two-way)
Cars	33	33	66
HGVs	8	8	16
Total	**41**	**41**	**82**

Vehicle Distribution

9.7.20 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

9.7.21 Construction staff will be encouraged to take the most direct route to the Trawsfynydd works site using 'higher' order roads, such as A and B classified roads.

9.7.22 Workers will park in the Trawsfynydd works site during construction.

9.7.23 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 in 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.

9.7.24 The locations, settlement weightings, and the resulting distribution are provided in

9.7.25 **Table 9-12**.

Table 9-12 – Worker distribution

Town	Population	Distance (km)	Distance^2	Population/ Distance^2	Distribution
Aberystwyth	16,413	77.6	6,022	2.7	3%
Anglesey	69,291	77.2	5,960	11.6	12%
Caernarfon	9,827	46.8	2,190	4.5	5%
Porthmadog	3,970	17.2	296	13.4	14%
Colwyn Bay	10,576	60.8	3,697	2.9	3%
Prestatyn	16,680	73.2	5,358	3.1	3%
Mold	9,891	80.1	6,416	1.5	2%

Town	Population	Distance (km)	Distance^2	Population/ Distance^2	Distribution
Bangor	15,060	62.4	3,894	3.9	4%
Anglesey	69,291	77.2	5,960	11.6	12%
Llandudno	19,716	60.8	3,697	5.3	6%
Conwy	15,725	55.7	3,102	5.1	5%
Oswestry	17,509	81	6,561	2.7	3%
Barmouth	1,988	34.3	1,176	1.7	2%
Criccieth	1,738	24.3	590	2.9	3%
Pwllheli	3,622	38.1	1,452	2.5	3%
Blaenau Ffestiniog	3,449	13.4	180	19.2	20%

9.7.26 The potential route choices from these origins to the Trawsfynydd 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 Trawsfynydd works site.

Construction HGVs

9.7.27 Construction HGVs will travel to the Trawsfynydd works site firstly via the SRN, then use the most appropriate routes to avoid unnecessary routeing though local villages and rural areas.

9.7.28 HGVs have been distributed across the road network based on the routeing set out below. The vehicle routeing plan showing the routeing strategy for HGVs is shown in **Figure 5.9.4**. Further details are also shown in **Volume 8, Appendix 5.9.A: Traffic Flow Diagrams**.

- A487 from the north – 50%.
- A470 from the north – 25%.
- A470 from the south – 25%.

9.7.29 Travelling from the SRN to the Trawsfynydd works site, HGVs will take the following routes:

- HGVs travelling south on the A487 will continue travelling south until the A487 merges into the A470, then travel along the A470 for 1.3 km until the right turn onto the Trawsfynydd works site access road.
- HGVs travelling south on the A470 will continue travelling south until the A470/A487 junction, turning left onto the A470. HGVs will then travel along the A470 for 1.3 km until the right turn onto the Trawsfynydd substation access road.
- HGVs travelling north on the A470 will continue travelling north until the left turn onto the Trawsfynydd substation access road.

Trip Assignment

Construction Staff Assignment

9.7.30 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 worker(s)	Total driving	Private car	Car share (vehicle 1.5 ratio)
Aberystwyth	1	1	0	1
Anglesey	5	2	2	4
Caernarfon	2	1	1	2
Porthmadog	6	3	2	5
Colwyn Bay	1	1	0	1
Prestatyn	1	1	0	1
Mold	1	0	0	1
Bangor	2	1	1	1
Anglesey	5	2	2	4
Llandudno	2	1	1	2
Conwy	2	1	1	2
Oswestry	1	1	0	1
Barmouth	1	0	0	1
Criccieth	1	1	0	1
Pwllheli	1	1	0	1
Blaenau Ffestiniog	8	4	3	7
Total	**40**	**20**	**13**	**33**

9.7.31 The traffic movements have been distributed across the ATC locations in the Study Area based on the distribution parameters outlined in **Section 9.7**. The daily two-way movements are presented in **Table 9-14**. These are also shown in traffic flow diagrams provided in **Volume 8, Appendix 5.9.A: Traffic Flow Diagrams**.

9.7.32 The distribution is based on access arrangements outlined in **Section 9.7**.

Table 9-14 – Daily profile of total two-way construction traffic link by link*

ATC	Link	All vehicles	HGV
5.1	A487 North of A470	22	8
5.2	A470 East of A487	29	4
5.3	A487 South of A470	73	12
5.4	A487 South of Trawsfynydd Substation Access Road	10	4
5.5	Trawsfynydd Substation Access Road	83	16

** Rounded to the nearest whole number*

9.7.33 It is considered that individual junction assessments are not required at these locations as traffic will be zero during the network AM peak hour (8.00am – 9.00 am) and will be minimal due to management of traffic movements during the network PM peak hour (5.00pm – 6.00pm).

9.8 Potential Effects

9.8.1 The anticipated effects resulting from the increases in traffic associated with the construction at 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 1 and 12**, with Month 6 of construction potentially occurring as early as **2027**.

9.8.3 Access to the Trawsfynydd works site will be taken from the A470, with all staff and HGV movements entering and existing though the Trawsfynydd substation access road. Both staff vehicles and HGVs will use this access point exclusively. 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.

9.8.4 **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 AADT (Two-Way)

ATC	Link	24 hour AADT				
		Base	Development	Total	All vehicle % increase	HGV % increase
5.1	A487 north of A470	6,543	22	6,565	1%	2%
5.2	A470 east of A487	1,054	29	1,083	3%	19%
5.3	A487 south of A470	7,174	73	7,247	1%	4%

ATC	Link	24 hour AADT				
		Base	Development	Total	All vehicle % increase	HGV % increase
5.4	A487 south of Trawsfynydd Substation Access Road	7,064	10	7,074	0%	1%
5.5	Trawsfynydd Substation Access Road	411	83	494	20%	254%

*The numbers highlighted in **bold** represent where there is an increase in traffic of >30%.*

9.8.5 The results in **Table 9-15** indicate the following:

- The proposed works are anticipated to have the largest proportional increase in daily traffic levels at ATC 5.5 (Trawsfynydd substation access road), with a 34% increase in average daily traffic. However, this percentage increase is due to the low baseline flows.
- The proposed works are anticipated to have the largest proportional increase in HGV traffic levels also at ATC 5.5 (Trawsfynydd substation access road), with a 254% increase in average daily traffic. However, the base count for this ATC in terms of HGV traffic levels is six two-way flows. Therefore, the 16 two-way flows lead to a 254% increase. ATC 5.5 will predominately be used for access to and from the Trawsfynydd substation only, meaning that public traffic will not be affected.
- Trawsfynydd substation access road is predicted to experience the highest level of additional traffic associated with the proposed works during the construction period. On an average day, it is expected that 66 two-way construction worker vehicles, including private car workers, will travel along the network to arrive at the Trawsfynydd works site, contributing to the overall increase in AADT on the road network.

9.8.6 With reference to the IEMA Guidelines (Ref 9.5), 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.

9.8.7 **Table 9-15** indicates that one of the links would experience an increase in average daily traffic (AADT) of more than 30%, which is highlighted in bold.

9.8.8 Where there is an increase of more than 30%, the 2027 baseline hourly two-way traffic flows were very low (between 2024 and 2027 depending on the link and period). As per **Table 7.2** in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**, to take account of this low baseline, the magnitude of impact has been lowered by one step so that the impact magnitude is medium instead of high, which given the low baseline is appropriate. This methodology is based on professional judgement and is considered a reasonable approach with regard to the assessment of very low traffic routes. It is also

noted that the route with a >30% increase is a specifically designated access road for Trawsfynydd substation, with the majority of existing traffic associated with it.

9.8.9 **Table 9-16** below shows the links where the peak flow is very low which, for the purposes of this assessment, is less than 500 two-way vehicles per day. This figure has been chosen based on professional judgment and experience of traffic flow capacity on specific road types.

Table 9-16 – Links with low AADT 2027 base flows

ATC number	Link description	AADT
5.5	Trawsfynydd Substation Access Road	411

9.8.10 With the addition of construction traffic, this results in a high percentage increase, on the ATC 5.5 which is the link that will be used by 100% of workers to access the proposed works.

9.8.11 During construction, the impact would be temporary and would be managed through embedded mitigation measures (the construction trip generation already takes these into account). The above impact represents the peak of the activity at the proposed works.

9.8.12 The following sections summarise the likely effects on receptors in terms of total construction traffic, severance, pedestrian amenity, fear and intimidation and highway safety.

9.8.13 **Table 9-17** indicates the magnitude of impacts measured against the criteria set out in **Table 7.2** of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

9.8.14 As noted, for the purposes of the assessment, professional judgement has been used to amend the ‘high’ magnitudes for road links to ‘medium’ where baseline flows are low, and it is considered there is sufficient capacity on the road network to accommodate the trips generated by the proposed works. The basis of this assumption is detailed as part of **Table 7.2** of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

9.8.15 For the purposes of the highway safety analysis, all links estimated to experience increases in total traffic flows above 30% have been analysed further on a case-by-case basis.

Table 9-17 – Magnitude of impact (construction) – 2027

ATC	Link	Sensitivity	All traffic increase %	Construction traffic	Severance of communities	NMU amenity	Fear and intimidation	Road vehicle driver and passenger delay	Accidents and safety
5.1	A487 North of A470	Low	1%	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
5.2	A470 East of A487	Very Low	3%	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
5.3	A487 South of A470	Low	1%	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
5.4	A487 South of Trawsfynydd Substation Access Road	Low	0%	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
5.5	Trawsfynydd Substation Access Road	Low	20%	Low	Low	Very Low	Low	Very Low	Low

9.8.16 As shown in **Table 9-17**, no links experience a medium or high magnitude of impact. ATC 5.5 experiences the highest percentage increase in traffic (20%), which remains below the 30% threshold.

9.8.17 With reference to **Table 7.3** of **Volume 8, Appendix 1.4.A: Topic Assessment Methodology** (significance of effects matrix), and based on the impact magnitudes and the applied sensitivity of the transportation links, the traffic and transportation-related significance of effects are detailed in **Table 9-18** for the peak construction year (2027), as expressed in terms of AADT.

Table 9-18 – Summary of the assessment (significance of effect) - 2027 + construction AADT

ATC	Link	Construction traffic	Severance of communities	NMU amenity	Fear and intimidation	Road vehicle driver and passenger delay	Accidents and safety	Overall significance
5.1	A487 North of A470	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Not Significant
5.2	A470 East of A487	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Not Significant
5.3	A487 South of A470	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Not Significant
5.4	A487 South of Trawsfynydd Substation Access Road	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Not Significant
5.5	Trawsfynydd Substation Access Road	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant	Not Significant

9.8.18 As shown in **Table 9-18**, none of the links assessed are predicted to experience a significant effect across any of the assessment criteria.

Summary

9.8.19 A summary table of the assessments of the potential effects for Traffic and Transport is provided in **Table 9-19**.

Table 9-19 – Summary of assessment effects – Traffic and Transport

Phase	Potential Impacts	Duration	Embedded mitigation	Likely significance of effect
Construction	Construction Traffic Increase	Short Term Temporary (construction only)	Embedded mitigation is described in **Section 9.9**.	Not significant at any locations.
	Severance of Communities	Short Term Temporary (construction only)	Embedded mitigation is described in **Section 9.9**.	Not significant at any locations.
	NMU Amenity	Short Term Temporary (construction only)	Embedded mitigation is described in **Section 9.9**.	Not significant at any locations.
	Fear and Intimidation	Short Term Temporary (construction only)	Embedded mitigation is described in **Section 9.9**.	Not significant at any locations.
	Road vehicle driver and passenger delay	Short Term Temporary (construction only)	Embedded mitigation is described in **Section 9.9**.	Not significant at any locations.
	Road user and pedestrian safety	Short Term Temporary (construction only)	Embedded mitigation is described in **Section 9.9**.	Not significant at any locations.

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 are 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 Proposed Works Design

9.9.3 The specific measures embedded into the proposed works design are outlined below with respect to the construction and operation/maintenance phases.

Construction Phase

9.9.4 During construction the following embedded mitigation measures will be included:

- Existing access points will be used to facilitate vehicle movements into the Trawsfynydd works site.
- Swept path analysis for AILs and HGVs would be carried out to ensure suitable routeing.
- HGVs and AILs will follow the designated routes as shown in **Figure 5.9.4**.
- Utilisation of internal routes in the Trawsfynydd works site to avoid using the existing road network.
- 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 generally would give priority to other road users.
- Restricting HGV movements to ensure arrivals/departures between 09:00 and 17:00 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 routeing. In addition, adequate space would be made available in the Trawsfynydd 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 site, to record any non-compliance with the agreed routeing strategy/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 Trawsfynydd 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 would be implemented to match potential sharers and to help staff identify any colleagues who could potentially be collected along their route to/from the Trawsfynydd works site.
- Providing limited (but sufficient) on-site car and cycle parking to accommodate the expected parking demand of workers on Trawsfynydd works site, as shown in **Figure 5.2.2**.
- A specialised haulage service would be employed to allow the shunt reactor AIL to travel with the necessary escort, permits and traffic management, with the contractor consulting 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).

Residual Effects

9.9.5 This section summarises the residual effects of the proposed works on Traffic and Transport following the implementation of embedded mitigation.

Construction Phase

9.9.6 Based on the outcome of the assessments, no significant 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.

9.10 Summary

9.10.1 This section summarises the findings of the 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 are not likely to be significant at any of the assessed links. Despite the increase in traffic on some links, none are predicted to experience substantial adverse effects.

9.10.3 Given that the overall increase in traffic across all assessed links is minimal and the magnitude of impacts remains within acceptable limits, no further mitigation measures beyond those already embedded are necessary. This assessment confirms that the proposed works will not materially affect traffic conditions or road safety in the Study Area.

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: Trawsfynydd Substation Works**.

10.1.2 This chapter describes the baseline conditions currently existing within 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 the figure and appendices as listed below:

- **Figure 5.10.1:** 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 and documents 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. Full 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 5.5)
- The Environment Act 2021 (Ref 4.7).
- The Air Quality (Wales) Regulations 2000 (Ref 10.1).
- The Air Quality Standards (Wales) Regulations 2010 (Ref 10.2).
- The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (Ref 10.3).
- Environment (Air Quality and Soundscapes) (Wales) Act 2024 (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 Air Quality Standards

Pollutant	Averaging period	Value (micrograms per metre cubed ($\mu g/m^3$))
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 4.3).
- The Clean Air Plan for Wales: Healthy Air, Healthy Wales 2020.
- The 2007 Air Quality (England) Strategy England, Scotland, Wales and Northern Ireland (Ref 10.6) (superseded by the Clean Air Plan for Wales (Ref 10.7) with the exception of air quality objective values given in Table 2 of the Strategy).
- Clean Air Plan for Wales (Ref 10.7).
- Future Wales – the National Plan 2040 (Ref 4.2).

Local Policy

10.2.5 The following local policy is relevant for Air Quality and Emissions:

- Eryri Local Development Plan 2016 – 2031 (Ref 4.8).
- Eryri Local Development Plan Review Report 2023 (Ref 5.16).

Guidance

10.2.6 The following guidance is relevant to Air Quality and Emissions is provided below:

- IAQM Guidance on the assessment of dust from demolition and construction (Ref 5.25).
- IAQM and Environmental 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 and emissions impacts from maintenance activities have been scoped out of the assessment (see **Section 10.5**).

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 5.25). An area within 10 km of the Trawsfynydd works site has been considered with respect to published baseline information on existing air quality. A 10 km Study Area has been considered due to the lack of monitoring sites in close proximity to the Trawsfynydd works site. 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 within:

- 250 m of the limits of construction activity within the Trawsfynydd works site; or
- 50 m of the construction route on the public highway, up to 250 m from the Trawsfynydd works site entrance.

10.3.4 An ecological receptor within:

- 50 m of the limits of construction activity within the Trawsfynydd works site; or
- 50 m of the construction route on the public highway, up to 250 m from the Trawsfynydd works site entrance.

10.3.5 The Study Area is effectively 250 m from the Trawsfynydd works site. **Figure 5.10.1** illustrates this 250 m buffer around the Trawsfynydd works site, along with surrounding air quality 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. There are no residential properties or other amenities identified within 250 m of the Trawsfynydd works site which will have sensitivity to dust soiling impacts.

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). There are no residential properties or other amenities identified within 250 m of the Trawsfynydd works site which will have sensitivity to dust soiling impacts.

Ecological Receptors

10.3.8 Ecological receptors are designated nature conservations sites and priority habitats. There are two Ancient Woodland ecological receptors identified within 50 m of the Trawsfynydd works site.

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 to ensure 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 5.30).

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 Eryri National Park Authority (ENPA).

10.5.5 As part of Local Air Quality Management duties, local authorities are required to monitor pollutant concentrations. The recent Local Air Quality Management report publicly available on Gwynedd Council website is the North Wales Authorities Collaborative Project 2023 Air Quality Progress Report (Ref 10.11). There are no monitoring sites within 10 km of the Trawsfynydd works site. The closest monitoring sites are in Gwynedd Council (GCC044 and GCC045), approximately 25 km east from the Trawsfynydd works site and not representative of the Study Area.

10.5.6 The UK-AIR website provides data for background concentrations of NO_X, NO_2, PM_{10} and $PM_{2.5}$. These background concentrations represent 1 km^2 grid squares. **Table 10-2** shows the range in estimated background concentrations within 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 – Defra mapped pollutant background concentrations for the Trawsfynydd works site (µg/m^3)

NO_2	NO_X	PM_{10}	$PM_{2.5}$
2.57 – 3.29	3.16 – 4.06	8.12 – 8.24	5.21 – 5.25

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 and Emissions receptors that have been reviewed and states whether they have been included or excluded from the Air Quality and Emissions 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	
Human health – construction traffic emissions	Out	Out	No residential properties within 250 m of the Trawsfynydd works site, therefore significant effects are unlikely. The IAQM/EPUK guidance (Ref 10.8) screens out road traffic emissions impacts on human health receptors where average development heavy goods vehicle (HGV) flows are less than 100 two-way movements per day on any given road link. For nature conservation impacts, we would refer to DMRB LA 105 guidance (Ref 10.12), which screens out road traffic emissions where development HGV flows (and cumulative flows associated with committed and reasonably foreseeable development in the area) are less than 200 two-way movements per day on any given road link.
Human Health and amenity - dust	In	Out	Llyn Trawsfynydd is within 250 m of the Trawsfynydd works site, this is a popular leisure site and therefore there is potential for

			the construction works to generate dust emissions which may impact this location.
Ecological receptors	In	Out	There are two Ancient Woodland ecological receptors within 50 m of the Trawsfynydd works site, therefore there is potential for the construction works to generate dust emissions which may impact the Ancient Woodland sites.
All		Out	Operational emissions will be limited to intermittent and short-term maintenance activities, these emissions are not capable of contributing to significant effects on local air quality.

10.7 Methodology

10.7.1 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 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 change to Air Quality and Emission elements and features during construction, operation and maintenance of the proposed works are outlined as follows:

Construction

10.8.2 The source of potential Air Quality and Emissions effects during the construction phase includes:

- 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 is unlikely to exceed the criteria 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 Trawsfynydd works 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 10.8). This process is summarised in the sub-sections below.

Step 1: Screen the Requirements 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 Trawsfynydd works site and/or within 50 m of a public road used by construction traffic that is within 500 m of the Trawsfynydd works site entrance.
- Nature conservation receptors within 50 m of the Trawsfynydd works site and/or within 50 m of a public road used by construction traffic that is within 500 m of the Trawsfynydd works site entrance.

10.8.7 **Figure 5.10.1** shows a 250 m buffer from the edge of the site in which human health and amenity receptors may be impacted by construction activities. The surrounding areas are predominantly rural with Llyn Trawsfynydd within 250 m of the Trawsfynydd works site, this is a popular leisure site which may be impacted by dust soiling.

10.8.8 There is no SAC, SSSI, NNR within 50 m of the Trawsfynydd works site, nor are there SPA or Ramsar sites.

10.8.9 There are two Ancient Woodland sites. Due to the presence of these nature conservation sites, the more detailed assessment of construction dust impacts is required and is 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), and should be classified as Small, Medium, or Large.

10.8.11 Construction activities associated with the proposed works are described in **Chapter 2: Trawsfynydd Substation Works**. Works are limited to the replacement of existing underground cables, the installation of new underground cables with the Trawsfynydd works site and the installation of a new shunt reactor at the Trawsfynydd works site.

Demolition

10.8.12 No demolition is anticipated as part of the proposed works**.**

Earthworks

10.8.13 The Trawsfynydd works site will require earthworks associated with excavation of existing hard surface and subsurface material, to access the existing cables being replaced and areas for the new cables to be installed. For this assessment, the area of earthworks is <less than18,000 m^2, and there is anticipated to be fewer than 5 heavy earth moving vehicles in operation at any one time. The IAQM guidance (Ref 10.8) classifies the dust emissions magnitude of such a site for earthworks as **Small.**

Construction

10.8.14 The Trawsfynydd works site will require limited construction activity that is not already covered by the earthworks element of the assessment. The volume of construction work is less than 12,000 m^3, which is the lowest criteria set by the IAQM guidance (Ref 10.8)

for this element of the works. The dust emissions magnitude for construction is also assigned as **Small.**

Trackout

10.8.15 Trackout is associated with the deposition of mud and potentially dusty material onto the public network from construction vehicles leaving site. There is anticipated to be less than 20 outward constructions related Heavy Duty Vehicle (HDV) (all vehicles over 3.5 tonnes) movements in any one day. The dust emissions magnitude for trackout is also assigned as **Small**.

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** presents the distribution of receptors which are sensitive to dust soiling and **Table 10-5** presents the distribution of nature conservation sites.

Table 10-4 – Receptors sensitive to dust soiling

Receptor sensitivity	Distance from the Trawsfynydd works site			
	0 – 20 m	20 – 50 m	50 – 100 m	100 – 250 m
High	0	0	0	0
Medium	0	0	0	1
Low	0	0	0	0

Table 10-5 – Receptors sensitive to ecological impacts

Receptor sensitivity	Distance from the Trawsfynydd works site	
	0 – 20 m	20 – 50 m
High	0	0
Medium	0	0
Low	2	0

10.8.18 There are no receptors sensitive to dust soiling or human health receptors sensitive to dust within 250 m of the Trawsfynydd works site.

10.8.19 There is one receptor sensitive to dust soiling within 250 m of the Trawsfynydd works site. Llyn Trawsfynydd is a popular leisure site. In line with the IAQM guidance, the sensitivity, number and proximity of receptors results in a Low sensitivity area to dust soiling effects.

10.8.20 There are two Low sensitivity receptors within 20 m of the Trawsfynydd works site. These are two Ancient Woodland sites. In line with the IAQM guidance, the sensitivity,

number and proximity of receptors results in a Low sensitivity area to nature conservation impacts.

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 The risk from dust impacts for dust soil amenity and nature conservation receptors are shown in **Table 10-6**.

Table 10-6 – Risk of dust impacts

Potential Impact	Earthworks	Construction	Trackout
Dust Soiling	Negligible	Negligible	Negligible
Ecology	Negligible	Negligible	Negligible

Construction Site Plant and Non-Road Mobile Machinery (NRMM) Emissions

10.8.23 According to the IAQM guidance (Ref 10.8), exhaust emissions from on-site plant (and NRMM) and 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 Trawsfynydd works site and the limited number of sensitive receptors nearby.

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 close to 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

Mitigation

Step 3: Determine the Level of Mitigation

10.9.1 As discussed in **Section 10.6**, 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 10.7**.

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/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/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 within the CEMP.

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 10-8), 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 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 Trawsfynydd works site is rural in nature with isolated residential properties beyond 250 m of the Trawsfynydd works site.

10.10.2 There are two Ancient Woodland sites within 50 m of the Trawsfynydd works. 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 within 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 nature 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 in operation, and the effectiveness of standard practice emissions control measures.

10.10.5 Construction road traffic emissions and operational road traffic emissions impacts were both screened out of the assessment. The increase in traffic during both construction and operation are such that there is no potential for them to contribute to a significant effect on local air quality.

11. Noise and Vibration

11.1 Introduction

11.1.1 This chapter presents an assessment of Noise and Vibration effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Trawsfynydd works site**.

11.1.2 This chapter describes the baseline conditions currently existing within the Study Area (as defined in **Section 11.3**) and the scope of the assessment.

11.1.3 The chapter is supported by the following appendix:

- **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance.**
- **Volume 8, Appendix 5.11.A: 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.**

11.2 Legislation and Planning Policy

11.2.1 This section summarises the legislation and planning policy framework that is relevant to the Noise and Vibration assessment. Full 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 8.4).
- Environmental Protection Act 1990 (Ref 7.1).

National Policy

11.2.3 National Planning Policy relevant to noise and vibration is detailed as follows.

- PPW – Edition 12 (Ref 4.3).
- Future Wales – the National Plan 2040 (Ref 4.2).

11.3 Study Area

11.3.1 The Study Area has been defined to include sensitive receptors that may 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 Trawsfynydd 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, it is considered reasonable to reference in the absence of any other guidance on construction vibration.

11.4 Assumptions and Limitations

11.4.1 No assumptions or limitations are applicable to this chapter.

11.5 Baseline

11.5.1 A desktop review has been undertaken of the surrounding area within 300 m of the Trawsfynydd works site. No receptors that are sensitive to noise or vibration are identified within 300 m of the Trawsfynydd works site. Sensitive receptors that may be affected by noise include, but are not limited to, residential properties, educational centres, places of worship, hospitals and hotels.

11.5.2 There are PRoW within 300 m of the Trawsfynydd works site. The Maentwrog No 18 footpath is approximately 50 m north of the Trawsfynydd works area access road entrance; Maentwrog No 5 Footpath is approximately 210 m west of the Trawsfynydd works site; Maentwrog No 21 Footpath is approximately 250 m north of the Trawsfynydd works site; and the Maentwrog No 5 Bridleway is 290 m north-west of the Trawsfynydd works site. In addition, Llyn Trawsfynydd is 155 m south of the Trawsfynydd works site and is a popular tourist attraction for leisure uses such as walking, cycling, fishing, canoeing and kayaking.

Future Baseline

11.5.3 No new developments are planned near the Trawsfynydd works site that would result in a material change to baseline ambient noise conditions at identified sensitive receptors. Assumptions made regarding baseline noise conditions are applicable to the future baseline.

11.6 Scope of Assessment

11.6.1 This section describes the scope of the assessment of Noise and Vibration effects on sensitive receptors.

11.6.2 **Table 11-1** 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.

Table 11-1 – Scope of the Noise and Vibration assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
All	Out	In	All works will be contained within the existing Trawsfynydd substation boundary and there are no noise sensitive receptors (except PRoW) within 300 m of the Trawsfynydd works site. Construction noise would only affect PRoW users and leisure users for limited periods of

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			time when they are close to a noise source. Given the dynamic nature of PRoWs users and leisure users, the range of noise impacts along them that forms the ambient noise environment, and the transient usage, a material change in the experience of PRoW users and leisure users as a whole as a result of construction 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. The results of the operational noise assessment are presented in **Volume 8, Appendix 5.11.A**, which states shunt reactor will be enclosed with a minimum sound attenuation of 15 dB which when model demonstrates a low impact, which at the nearest receptor external noise levels would be below 30 dB. A negligible impact is concluded.

11.7 Summary

11.7.1 It has been demonstrated that the proposed works at Trawsfynydd substation are not anticipated to have any significant impacts on Noise and Vibration in the immediate or local area and have therefore been scoped out of the assessment of this volume of the ES.

12. Socio-Economics

12.1 Introduction

12.1.1 This chapter presents an assessment of Socio-Economics effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Trawsfynydd works site**.

12.1.2 This chapter describes the baseline conditions currently existing within the Study Area (as defined in **Section 12.3**) and the scope of the assessment.

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

- **Figure 5.12.1:** Socio-Economic Land Use Receptors.
- **Figure 5.12.2:** 60-minute peak Hour Drive Time from Trawsfynydd Substation.
- **Figure 5.12.3:** 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.**
- **Chapter 15: 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-Economics 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:

- 2017 TCP EIA Regulations (Ref 3.1).
- Environment (Wales) Act 2016 (Ref 5.6).
- 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 (Ref 12.2).

National Policy

12.2.3 The following national policy is relevant to Socio-Economics:

- PPW – Edition 12 (Ref 4.3).
- 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 4.2).
- 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:

- Eryri Local Development Plan 2016 – 2031 (Ref 4.8)
- Eryri Local Development Plan Review Report 2023 (Ref 5.16).

Guidance

12.2.6 The following guidance is also 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 12.16). 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 Trawsfynydd works site.	Professional judgement and experience from other proposed developments in the UK.
Agricultural land holdings (farms)	500 m radius from the Trawsfynydd works site.	Professional judgement and experience from other proposed developments in the UK.
Community facilities	1 km radius from the Trawsfynydd 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 Trawsfynydd works site.	Professional judgement and location of sensitive receptors for impacts arising from the proposed works as informed by other assessments. Visitor attractions are likely to be accessed by residents from a wider catchment, thus a wider radius has been considered for this receptor to fully appreciate the effect of severance on access to these facilities.

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 Trawsfynydd 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 Trawsfynydd works site; this consists of 146 Lower Layer Super Output Areas (LSOAs) and as shown in **Figure 5.12.2**, this takes in most of Gwynedd, a small part of Isle of Anglesey, large parts of Conwy, parts of Denbighshire, parts of Powys and parts of Ceredigion. 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 Trawsfynydd 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 (i.e. via severance or amenity impacts) as shown in **Figure 5.12.1**. 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 245,949 in 2021, larger than Gwynedd's population (117,393). The Principal Economic Impact Area constituted approximately 7.9% of Wales' 3,107,494 population (Ref 12.19). In the Principal Economic Impact Area, 24.9% of the population were aged over 65, a higher proportion than Gwynedd (23.1%) and Wales (21.3%). The Principal Economic Impact Area had a smaller proportion of working age residents (60.1%) than Gwynedd (61.4%) and Wales (62.1%). **Plate 12-1**Error! Reference source not found. displays the population age profile across the three geographies.

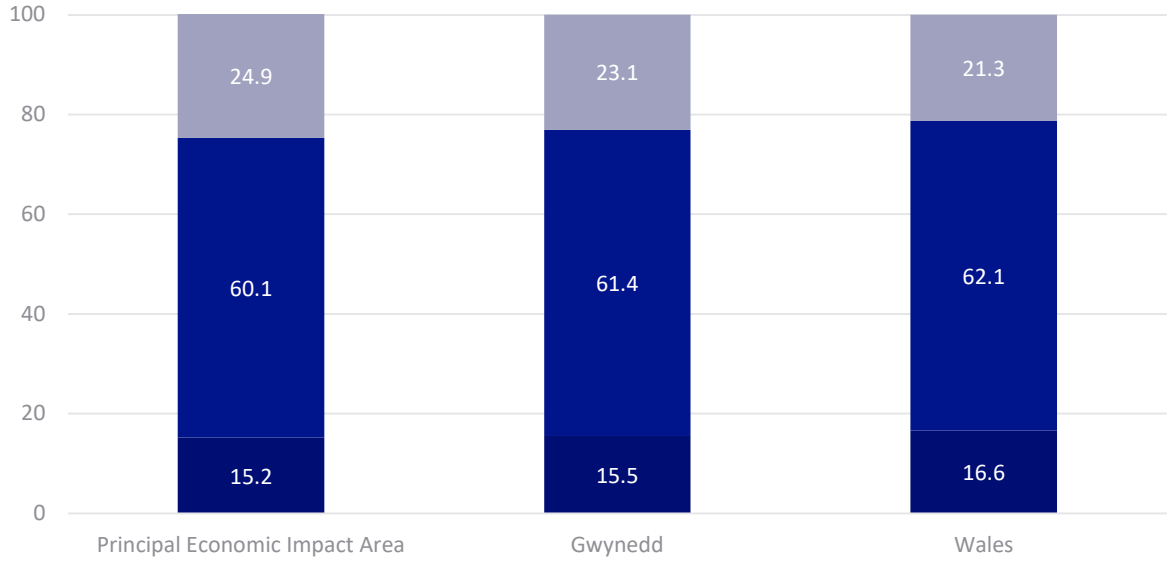


Plate 12-1 Population Age Profile

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 slightly larger proportion of economically active individuals than Gwynedd (56.4% compared to 56.1% respectively); the national average (56.6%) is slightly higher again. Of those who are economically active, the Principal Economic Impact Area has the lowest proportion of unemployed individuals (2.8%), compared to 3.2% in Gwynedd and 3.1% in Wales. 28.4% of the Principal Economic Impact Area's 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 (%)	56.4	56.1	56.6
Employee: Part-time (%)	13.3	13.5	13.0
Employee: Full-time (%)	28.4	28.0	32.2
Self-employed (%)	11.9	11.2	8.3
Unemployed (%)	2.8	3.2	3.1
Economically inactive (%)	43.5	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 add up 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). 35.2% of the Principal Economic Impact Area are qualified to level 4+, higher than both the Gwynedd (34.5%) and Wales (31.5%) averages. Of the three geographies, the Principal Economic Impact Area had the joint highest proportion of individuals with apprenticeships, along with Gwynedd (both 5.8%). The proportion of individuals in the Principal Economic Impact Area with no qualifications (16.5%) was substantially lower than the average across Wales (19.9%), but marginally higher than the Gwynedd average (16.3%).

Table 12-3 – Highest level of qualification

	Principal Economic Impact Area	Gwynedd	Wales
No qualifications (%)	16.5	16.3	19.9

	Principal Economic Impact Area	Gwynedd	Wales
Level 1 and entry level qualifications (%)	7.8	7.6	8.7
Level 2 qualifications (%)	14.4	14.6	14.4
Apprenticeship (%)	5.8	5.8	5.6
Level 3 qualifications (%)	17.7	18.8	17.2
Level 4 qualifications+ (%)	35.2	34.5	31.5
Other qualifications (%)	2.5	2.5	2.7

Note: some columns on the table may not add up 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) (**Table 12-4**). In the Principal Economic Impact Area, the largest industry is Q: human health and social work activities (17.0% 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 motorcycles is the second largest industry in all three geographies. Sector P: Education is the third largest industry in all three geographies. Overall, 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 (7.3%); Wales has the lowest proportion of all three geographies (5.2%).

Table 12-4 – Employment by industry

	Principal Economic Impact Area	Gwynedd	Wales
A Agriculture, forestry and fishing (%)	5.0	3.9	1.8
B Mining and quarrying (%)	0.3	0.3	0.2
C Manufacturing (%)	5.6	5.2	8.7
D Electricity, gas, steam and air conditioning supply (%)	0.8	0.9	0.7
E Water supply; sewerage, waste management and remediation activities (%)	1.0	1.3	1.0
F Construction (%)	9.4	9.7	8.6
G Wholesale and retail trade; repair of motor vehicles and motorcycles (%)	13.2	13.3	14.5
H Transport and storage (%)	3.0	2.9	3.8

	Principal Economic Impact Area	Gwynedd	Wales
I Accommodation and food service activities (%)	7.3	8.5	5.2
J Information and communication (%)	2.3	2.3	2.7
K Financial and insurance activities (%)	1.0	0.8	2.9
L Real estate activities (%)	1.5	1.5	1.3
M Professional, scientific and technical activities (%)	4.2	3.6	4.4
N Administrative and support service activities (%)	4.2	4.3	4.2
O Public administration and defence; compulsory social security (%)	8.2	8.4	9.2
P Education (%)	11.0	11.4	9.6
Q Human health and social work activities (%)	17.0	16.6	17.0
R, S, T, U Other (%)	5.0	5.2	4.2

Gross Value Added (GVA)

12.5.7 The Office for National Statistics published data on GVA in 2024 for the year 2022 (Ref 12.23). The most granular level of GVA data available is at local authority level and therefore the Principal Economic Impact Area has been excluded from the GVA baseline. Gwynedd's GVA per person (£22,206) was lower than the average across Wales (£23,804). **Table 12-5** presents the composition of GVA by industry in Gwynedd and Wales (Ref 12.24). 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 (7.5%). 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

	Gwynedd	Wales
F Construction (%)	7.7	6.4
G Wholesale and retail trade; repair of motor vehicles and motorcycles (%)	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

*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. Note: some columns on the table may not sum due to rounding.

Deprivation

12.5.8 The 2019 Welsh Index of Multiple Deprivation presents deprivation data at LSOA level (Ref 12.25). 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.

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 12.26). Typical room occupancy is sourced from the Welsh Government's accommodation occupancy survey for 2023 (Ref 12.27). As of 2024, there are approximately 961 rooms in local hotel, bed and breakfast and inns accommodation within a 30-minute drive of the site, as well as 6,454 rooms within a 60-minute drive of the Trawsfynydd works site. This number has

been adjusted in **Table 12-6** and **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	961	509
February	56	961	423
March	59	961	394
April	63	961	356
May	69	961	298
June	71	961	279
July	76	961	231
August	80	961	192
September	75	961	240
October	66	961	327
November	56	961	423
December	60	961	384

Table 12-7 – Accommodation capacity within a 60-minute drive time

Month	Typical room occupancy (%)	Inventory rooms	Rooms available after existing demand
January	47	6,454	3,421
February	56	6,454	2,840
March	59	6,454	2,646
April	63	6,454	2,388
May	69	6,454	2,001
June	71	6,454	1,872
July	76	6,454	1,549
August	80	6,454	1,291
September	75	6,454	1,614
October	66	6,454	2,194
November	56	6,454	2,840

Month	Typical room occupancy (%)	Inventory rooms	Rooms available after existing demand
December	60	6,454	2,582

Public Rights of Way (PRoW)

12.5.10 There are four PRoW within 500 m of the Trawsfynydd works site (**Figure 5.12.3**):

- Footpath Maentwrog No 5.
- Footpath Maentwrog No 21.
- Footpath Maentwrog No 18.
- Bridleway Maentwrog No 5.

12.5.11 No PRoW directly cross the Trawsfynydd works site.

12.5.12 The National Cycle Network (NCN) Route 82 runs within 500m of the Trawsfynydd Works Site. The route runs along the lakeside to the South of the Works Site, before heading North on the West Side of the Works Site.

Open Space

12.5.13 There are no open space areas which are publicly accessible for community use within 500 m of the Trawsfynydd works site.

Community Facilities

12.5.14 Within 1 km of the Trawsfynydd works site, there is one community facility, the Utica Chapel adjacent to the A470.

Residential Properties

12.5.15 Within 500 m of the Trawsfynydd works site, residential receptors are limited to the sparsely distributed properties north of the Trawsfynydd works site. There are also three properties to the south of Trawsfynydd works site, next to the Llyn Trawsfynydd reservoir.

Business Premises

12.5.16 Within 500 m of the Trawsfynydd works site, there are two business premises:

- The Lakeside Café, adjacent to the Llyn Trawsfynydd reservoir.
- The Prysor Angling Association fish hatchery, also adjacent to the Llyn Trawsfynydd reservoir.

Visitor Attractions

12.5.17 There is one visitor attraction within 500 m to the Trawsfynydd works site: the Llyn Trawsfynydd reservoir. The reservoir provides recreational activities such as fishing and boating, as well as walking and cycling on the paths surrounding the reservoir.

Agricultural Land Holdings

12.5.18 Six agricultural land holdings supporting pastoral farming have been identified within 500 m of the Trawsfynydd works site.

Development Land

12.5.19 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 Trawsfynydd works site.

12.5.20 Within 2 km of the Trawsfynydd works site, there are no cumulative developments, planning applications or planning permissions.

Future Baseline

12.5.21 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 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 off 2018 data which use assumed levels of future fertility, mortality and migration. The projections did not consider the findings of the Census 2021.

12.5.22 In terms of the local economy, it would be reasonable to expect that employment and GVA would increase, associated with the expected increase in population. It is expected that PRoWs will continue to be used. Businesses and community facilities may open and close however it is not expected that there will be any perceptible changes to the local baseline assessment and the proposed works should be assessed against current baseline conditions and policies.

12.6 Scope of Assessment

12.6.1 This section describes the scope of the assessment of effects on Socio-Economics.

12.6.2 The baseline presented in **Section 12.3** does not identify any receptors on which the proposed works has the potential to cause Significant effects. Therefore, an assessment of Socio-Economic potential effects has been scoped out. **Table 12-8** below details the reasons for each impact being scoped out.

Table 12-8 – Scope of the Socio-Economics assessment

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Employment generation during construction phase and	Out	Out	The proposed works are likely to generate a limited number of construction and no operational phase jobs, relative to the existing workforce within the Principal

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
operational and maintenance phase (direct, indirect and induced impacts).			Economic Impact Area. Therefore, employment impacts are likely to be beneficial but not significant.
Skills and training	Out	Out	Due to the limited size of the construction and operational workforce, effects on skill levels and training are unlikely to be significant.
Gross Value Added	Out	Out	GVA generated is proportionate to the size of the construction workforce; therefore, as for employment impacts any effects in this context are anticipated to be not significant relative to the size of the Principal Economic Impact Area.
Temporary accommodation services	Out	Out	Due to the limited size of the construction and operational workforce, there is unlikely to be pressure on the local temporary accommodation sector. There is large capacity within a 30-minute and 60-minute drive time to accommodate workers.
PRoW	Out	Out	The proposed works will be contained within the existing Trawsfynydd substation compound and therefore no diversions or closures to the four PRoW identified in **Section 12.5** will be required. Therefore, impacts are not likely to be significant.
Agricultural land holdings	Out	Out	Land take including access tracks, turning areas, compounds and laydown areas are likely to be within the site and therefore effects on farms in proximity to the site are unlikely to be significant.
Residential properties	Out	Out	There are few residential properties within 500 m of the Trawsfynydd works site. Furthermore, the site is currently owned by NGET and no land take outside the Trawsfynydd works site is required, therefore effects on residential properties are likely to be not significant.
Business premises	Out	Out	There are only two business premises within 500 m of the Trawsfynydd works site. Furthermore, the site is currently owned by NGET and no land take outside the

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
			Trawsfynydd works site boundary is required, therefore effects on business premises are likely to be not significant.
Community facilities	Out	Out	There is only one community facility within 1 km of the Trawsfynydd works site. Furthermore, the Trawsfynydd works site is currently owned by NGET and no land take outside the boundary is required, therefore effects on community facilities are likely to be not significant.
Visitor attractions	Out	Out	There is one visitor attraction within 500 m of the Trawsfynydd works site. The Trawsfynydd works site is currently owned by NGET and no land take outside the boundary is required, therefore effects are unlikely to be significant.
Development land	Out	Out	The Trawsfynydd works site is currently owned by NGET and no land take outside of the Trawsfynydd works site is required. Therefore, impacts on development land are likely to be not significant. Furthermore, there are no planning applications or permissions within 2 km of the Trawsfynydd works site.

12.7 Summary

12.7.1 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 Trawsfynydd works site of the proposed works has relatively few receptors relevant to Socio-Economics in proximity to it.

12.7.2 On the basis of the rationale noted in **Section 12.6**, all potential Socio-Economic impacts have been scoped out of this volume of the ES.

13. Climate Change

13.1 Introduction

13.1.1 This chapter presents an assessment of the likely Climate Change effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Trawsfynydd works site**.

13.1.2 This chapter describes the baseline conditions currently existing within the Study Area (as defined in **Section 13.3**), the scope of the assessment, the potential effects, the mitigation measures required to prevent, 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 a number of 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 5.13.A: Climate Change Risk Assessment.**

13.1.5 Other chapters and documents 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. Full 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 5.5).
- Well-being of Future Generations (Wales) Act 2015 (Ref 13.6)

13.2.3 To align with the requirements of 2017 TCP EIA Regulations (Ref 3.1), 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 13.7).
- PPW – Edition 12 (Ref 4.3).
- Future Wales – the National Plan 2040 (Ref 4.2).

Guidance

13.2.5 The following guidance is relevant to climate change:

- IEMA – Environmental Impact Assessment Guide to: Climate Change Resilience and Adaption (Ref 13.8).
- IEMA – Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition (Ref 13.9).

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 Trawsfynydd works site as a result of the site clearance/remediation, construction, operation and maintenance activities.
- Indirect GHG emissions occurring off-site encompass embodied carbon in materials, transportation, upstream activities (such as well-to-tank processes and transmission and distribution losses), as well as 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 Impact 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.**

CCRA

13.4.2 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 2026 to 2029.

13.4.3 For the purposes of the CCRA a reference operational period of 40 years was assumed, in accordance with asset lifespans.

13.4.4 The CCRA has been carried out using the most up to date, reliable and publicly available climate data. Information has also been taken from internal documents provided by the client and wider ES chapters.

13.4.5 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.

13.4.6 For climate projections, UK Climate Projection 2018 (UKCP18) data was collected for periods between 2010 – 2039, 2040 – 2069, and 2070 – 2099 to adequately account for both short-term construction phase and long-term operational period.

13.4.7 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 10th, 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 Trawsfynydd works site. The current baseline consists of the carbon stock and sources of GHG emissions within the boundary of existing on-site activities.

13.5.2 The proposed works will be in the existing Trawsfynydd substation compound, meaning the current land use in the area is primarily associated with the operation and maintenance of the existing Trawsfynydd substation.

CCRA and ICCI Assessment

13.5.3 The CCRA and ICCI assessments consider how resilient the proposed works and surrounding environment are to the current and projected future climate hazards. The receptor for the CCRA is the construction 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 Trawsfynydd works site (Cwmystradllyn) (Ref 13.10). This is approximately 13 km north-west from the Trawsfynydd 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 Trawsfynydd 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)	17.9
Mean winter minimum daily temp (°C)	2.2
Warmest Month on Average (°C)	18.7
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

Climatic variable	Baseline data 1981-2010
Mean annual Rainfall levels (mm)	1284.6
Mean summer rainfall (mm)	143.3
Mean winter rainfall (mm)	175.2
Wettest Month on Average (mm)	218.1
Wettest Month on Average (Month)	November
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 the proposed works are not built. In this scenario, the future baseline assumes the continued operation and maintenance of the existing Trawsfynydd substation.

CCRA and ICCI Assessment

13.5.6 The future baseline for the CCRA and ICCI assessments is based on UKCP18 data from the Met Office (Ref 13.11) for the 25 km grid squares in which the Trawsfynydd 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 including 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 in **Table 13-2** below.

Table 13-2 – Climate Change baseline and projection

Climatic variable	Baseline data 1981 - 2010	Projection (change) 2020 - 2049	2040 - 2069	2070 - 2099	Beyond 2100	Projected trend	Source
Temperature							
Mean annual maximum daily temperature (°C)	12.4	+0.9 (+0.4 to +1.5)	+1.6 (+0.8 to +2.5)	+3.3 (+1.8 to +4.8)	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 +1.7)	+1.7 (+0.5 to +3.0)	+3.8 (+1.5 to +6.2)		↑	UKCP18
Mean winter minimum daily temperature (°C)	6.3	+0.8 (+0.7 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)	1284.6	+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)	175.2	+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	↑	UKCP18

Climatic variable	Baseline data 1981 - 2010	Projection (change) 2020 - 2049	2040 - 2069	2070 - 2099	Beyond 2100	Projected trend	Source
					winter rainfall could persist beyond this period.		
Wettest month on average (mm)	218.1 (November)	+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 13.12).					↑	Met Office
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					↑	Met Office

Climatic variable	Baseline data	Projection (change)				Projected trend	Source
	1981 - 2010	2020 - 2049	2040 - 2069	2070 - 2099	Beyond 2100		
	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 13.13).						
Wildfires	The wildfire hazard is classified as high according to the information that is currently available to the Think Hazard tool (Ref 13.14). 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** summarises the potential Climate Change receptors that have been reviewed and states whether they have been included or excluded from the Climate Change assessment. Justifications are provided where receptors have been both included and excluded from the assessment.

Table 13-3 – Scope of the 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. Therefore, 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 the climate and of climate change on the proposed works.

13.7.2 The methodology is provided for both the CCRA and GHG Impact Assessments. It includes details of the technical methodology used to determine baseline conditions, receptor sensitivity, magnitude of effects, and significance criteria for the climate assessments. These details are in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology.**

13.7.3 Granular activity data was unavailable to inform the GHG assessment. Consequently, a qualitative approach was used as an alternative for identifying 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**.

13.8 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 (PAS) 2080:2023 Guidance (Ref 13.15). Additionally, the Royal Institution of Chartered Surveyors

Guidance for whole life GHG assessments (Ref 13.16) have been integrated to inform the scope and reporting framework of the GHG assessment.

13.8.2 **Table 13-4** qualitatively summarises the GHG emissions associated with the construction and operation of the proposed works.

Table 13-4 – Qualitative lifecycle 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 lifecycle 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 anticipated to be substantial when considered 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 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 Trawsfynydd works site. While these direct GHG emissions are unlikely to impact the UK's and Wales's net-zero targets, it is important to note that the proposed works will also have wider, indirect effects on emissions through the enabling of a greater	~10%

Lifecycle stage	Qualitative assessment	Estimated GHG % contribution to the proposed works
	expansion of on- and offshore renewables that will increase the generation of low-carbon electricity and support the ongoing decarbonisation of the GB power grid. Operational efficiencies will be managed through regular equipment inspections to identify deterioration of components, which will be replaced where necessary.	

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 lifecycle stages.

13.8.4 NGET is committed to achieving carbon neutrality across all its construction projects by 2025/26 (Ref 13.17), focusing on reducing the carbon intensity of construction materials and the phasing out of diesel-powered construction plant. The Transport Decarbonisation Plan (TDP) (Ref 13.18) 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 13.19), 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 13.8), states that assessing the significance of a projects 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 13.4). There targets are as follows:

- Scope 1[4] and 2[5] 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.
  - 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[6] 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 5.13.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 13.20). This approach enables the proposed works to withstand the climatic conditions projected for the end of its design life. Additionally, a CEMP 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 13.8) (see **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**), the climate risks were assessed as moderate, unlikely, or rare. While the climate 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 were 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 detailed in **Volume 8, Appendix 5.13.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 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.

[4] Scope 1: Direct emissions from sources that are owned or controlled by the organisation.

[5] Scope 2: Indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting organisation.

[6] Scope 3: All other indirect emissions that occur in the value chain of the reporting company, both upstream and downstream.

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.

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. Therefore, it can be concluded that the risk posed by Climate Change to the proposed works is **Not Significant**.

14. Materials and Waste

14.1 Introduction

14.1.1 This chapter presents an assessment of the likely Waste and Materials effects that could arise from the construction, operation and maintenance of the proposed works as described in **Chapter 2: Trawsfynydd Substation Works.**

14.1.2 The scoping has been undertaken in accordance with current best practice guidance and is based on the methodology set out in the Institute of Environmental Management and Assessment (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 Waste and Materials 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:

- EU Waste Framework Directive 2008 (Ref 14.2).
- Environmental Protection Act 1990 (as amended) (Ref 7.1).
- The Hazardous Waste (England and Wales) Regulations 2005 (as amended) (Ref 14.3).
- The Waste (England and Wales) Regulations 2011 (as amended) (Ref 14.4).
- The Environmental Permitting (England and Wales) Regulations 2016 (as amended) (Ref 7.9).
- Environment Act 2021 (Ref 4.7).
- Environment (Wales) Act 2016 (Ref 5.5).
- The Waste Separation Requirements (Wales) Regulations 2023 (Ref 14.5).

National Policy

14.2.3 The following national policy is relevant to Materials and Waste:

- PPW – Edition 12 (Ref 4.3).
- Beyond Recycling: A Strategy to Make the Circular Economy in Wales a Reality (Ref 14.6).

- Towards Zero Waste, One Wales: One Planet – The Overarching Waste Strategy Document for Wales (Ref 14.7).
- Towards Zero Waste, One Wales: One Planet – The Waste Prevention Programme for Wales (Ref 14.8).
- Future Wales: The National Plan 2040 (Ref 4.2).

Local Policy

14.2.4 The following local policy is relevant to Materials and Waste:

- Eryri Local Development Plan 2016 – 2031 (Ref 4.8).
- Eryri Local Development Plan Review Report 2023 (Ref 5.16).

Guidance

14.2.5 The following guidance is relevant to Materials and Waste:

- IEMA Guidance (Ref 14.1).
- Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (DoW CoP), v2 (2011) (Ref 7.33).
- Separate Collection of Waste Materials for Recycling – A Code of Practice for Wales (Ref 14.9).

14.3 Scope of Assessment

14.3.1 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.

14.3.2 Materials are defined in the IEMA Guidance (Ref 14.1) to be:

"physical resources that are used across the lifecycle of a development. Examples include key construction materials such as concrete, aggregate, asphalt, and steel".

14.3.3 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.

14.3.4 Waste is defined, as per the Waste Framework Directive (2008/98/EC) (Ref 14.2), as:

"any substance or object which the holder discards or intends or is required to discard".

14.3.5 Impacts upon Mineral Safeguarding Areas (MSAs) are not assessed in this Materials and Waste assessment in accordance with the IEMA Guidance (Ref 14.1).

14.3.6 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; and
- 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.

14.3.7 **Table 14-1** describes the potential environmental effects of the proposed works with respect to Materials and Waste, and the justification for scoping them out from detailed 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 therefore 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).
Changes to allocated/safeguarded mineral site	Out	Out	Review of the Local Plan (Ref 7.17) indicates no allocated/safeguarded mineral or waste sites are located within the Trawsfynydd works site.
Changes to allocated/safeguarded waste site	Out	Out	Review of the Local Plan (Ref 7.17) indicates no allocated/safeguarded mineral or waste sites are located within the Trawsfynydd works site.

Receptor	Scoped in/out per phase		Justification
	Construction	Operation	
Changes in demand for materials	Out	Out	The scale of the proposed works (in terms of material demand) is considered to be very small when compared with the overall UK construction sector, and once constructed there will be minimal need for materials during operation. Forecast effects are therefore (using professional judgement) 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 considered to be very small when compared to overall hazardous waste generation in England and Wales, and forecast effects are therefore (using professional judgement) considered negligible.
Changes in available landfill void capacity (non-hazardous waste)	Out	Out	Non-hazardous waste is scoped out of the assessment. The scale of construction and hence the associated quantity of non-hazardous waste generated by the proposed works is considered to be small when compared to the overall quantities of inert and non-inert waste generated in Wales and the available landfill capacity that would be available to manage any such waste that cannot be diverted from landfill. Furthermore, it is likely that a significant proportion of construction waste would be recovered, having regard to the overall recovery waste for construction waste in Wales (with only 6.2% of construction and demolition waste in Wales reported as being sent to landfill (Ref 14.10)) and NGET's commitment to phasing out landfilling of waste (Ref 14.11).

14.4 Summary

14.4.1 Materials and Waste has been scoped out of the assessment and has not been considered further.

15. In-combination Effects

15.1 Introduction

15.1.1 This chapter introduces the likely in-combination effects that could arise from the construction, operation and maintenance of the works at Trawsfynydd as described in **Chapter 2: Trawsfynydd works site** and how it is assessed within this ES.

15.1.2 In-combination effects could occur where a single receptor is affected by more than one type of effect arising from the proposed works. 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 4.3).

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 A full assessment of the potential in-combination effects is undertaken at a Project level and is discussed in **Volume 7: The Project and Cumulative Assessment**.

16. Cumulative Effects

16.1 Introduction

16.1.1 This chapter introduces the likely cumulative effects that could arise from the construction, operation and maintenance of the works at Trawsfynydd as described in **Chapter 2: Trawsfynydd works site** 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 4.3).

16.3 Study Area

16.3.1 A 2 km Study Area from the Trawsfynydd 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 in-combination effects broadly follows the Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment guidance (Ref 16.1). A full description of the

methodology used for in-combination effects is outlined in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

16.5 Potential Effects

16.5.1 No additional developments have been identified within the Gwynedd Council planning portal (Ref 16.2) and Eryri National Park planning portal (Ref 16.3) 2 km Study Area.

16.5.2 The Eryri Visual Impact Provision (EVIP) project will include the installation of a new shunt reactor at the existing Trawsfynydd works site. This development will be taken forward in the assessment of cumulative effects. Details can be found in **Volume 7: The Project and Cumulative Assessment.**

16.6 Summary

16.6.1 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 Trawsfynydd works site has been implemented to assess the cumulative effects.

16.6.2 One additional development, the new shunt reactor associated with the EVIP project, will be considered further in **Volume 7: The Project and Cumulative Assessment.**

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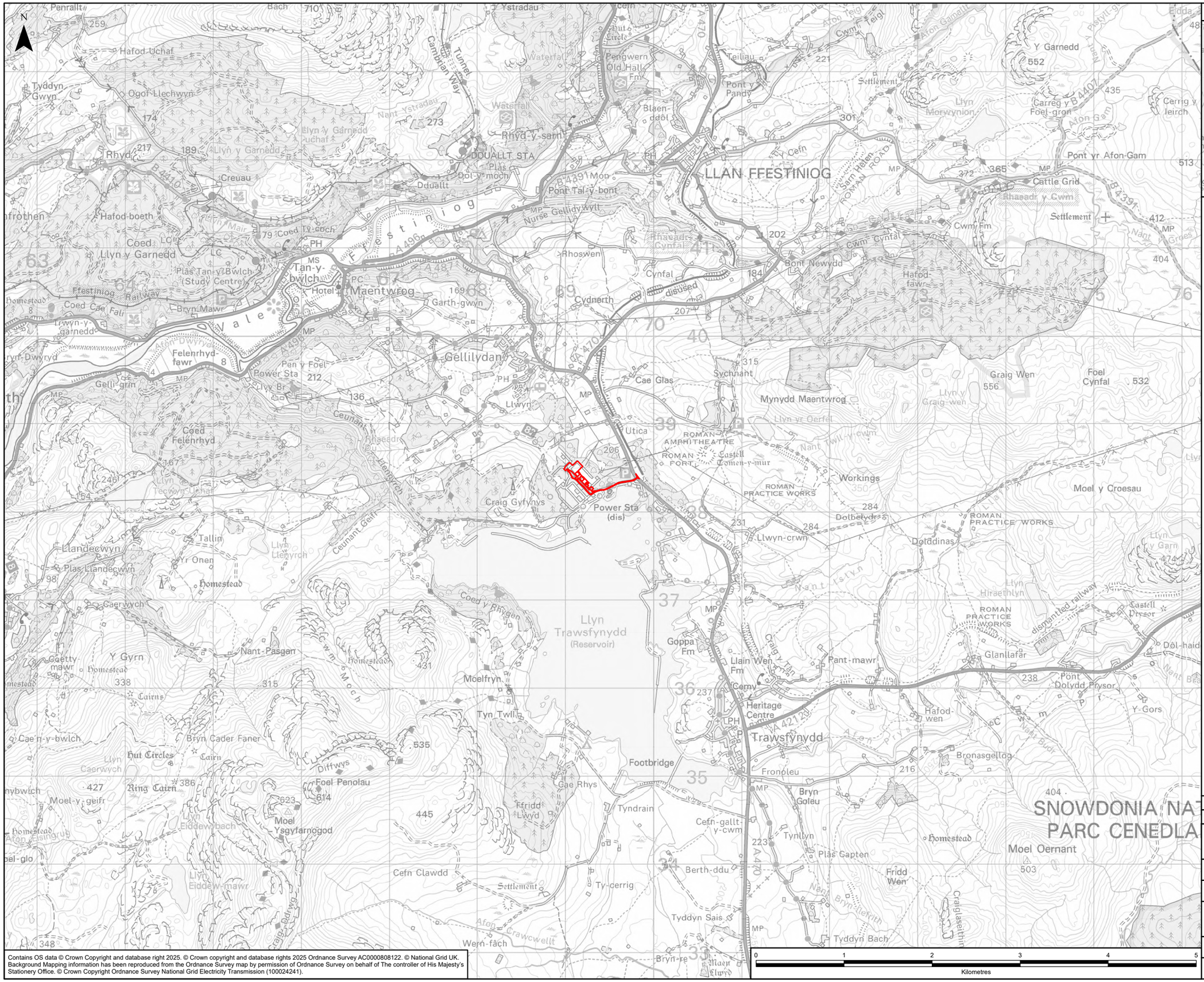
Figures



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND

Legend

Trawsfynydd Works Site Boundary

0 1 2 3 4 5
Kilometres

Rev	Date	Description	GIS	Chk	App
A	25/07/2025	Environmental Statement	AG	RD	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.2.1 LOCATION OF THE PROPOSED WORKS

Creator:	Date:	Checker:	Date:	Approver:	Date:
AG	25/07/2025	RD	25/07/2025	NL	25/07/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:40,000	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_Chp2_Fig_All_LocationOfProposedWorks.aprx

N

TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND

Legend

Trawsfynydd Works Site Boundary

Existing Transmission System

Existing Trawsfynydd Substation

Tower

275kV OHL

400kV OHL

132kV Cable

275kV Cable

400kV Cable

Other Cable

Proposed Works

New Equipment

Compound Area

Car Parking Area

Laydown and Material Storage Area

Vegetation Management

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	LP	RD	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.2.2 TRAWSFYNYDD WORKS SITE

Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	18/08/2025	RD	18/08/2025	NL	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:2,800	A3	1 OF 1	A

0 50 100 150 200 250

Metres

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N

Glynllifon SAC

Glynllifon Maen SAC

Coedydd Derw a Safleoedd Ystumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coedydd Derw a Safleoedd Ystumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Migneint-Arenig-Ddualit SAC

Migneint-Arenig-Ddualit SPA

Coedydd Derw a Safleoedd Ystumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Migneint-Arenig-Ddualit SAC

Rhinog SAC

Afon Eden - Cors Goch Trawsfynydd SAC

Coedydd Derw a Safleoedd Ystumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coedydd Derw a Safleoedd Ystumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC

Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC

SNOWDONIA NATIONAL PARK / PARC CENEDLAETHOL ERYRI

0 4 8 12 16 20
Kilometres

TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND

Legend

- Trawsfynydd Works Site Boundary
- 5km Buffer of Trawsfynydd Works Site Boundary
- 10km Buffer of Trawsfynydd Works Site Boundary
- 30km Buffer of Trawsfynydd 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 Trawsfynydd 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 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.5.1 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

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Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coed Cymerau NNR

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coedydd Maentwrog NNR

Coedydd Dyffryn Ffestiniog (Gogleddol) SSSI

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coedydd Dyffryn Ffestiniog (Gogleddol) SSSI

Ceunant Cynfal SSSI

Ceunant Cynfal NNR

Migneint-Arenig-Ddualllt SAC

Bryn Glas Quarry SSSI

Cwm Cynfal SSSI

Coedydd De Dyffryn Maentwrog SSSI

Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coedydd De Dyffryn (Maentwrog SSSI

Coed Camlyn NNR

Morfa Harlech SSSI

Coedydd Dyffryn Ffestiniog (Gogleddol) SSSI

Migneint-Arenig-Ddualllt SPA

Migneint-Arenig-Ddualllt SSSI

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Coed y Rhygen SSSI

Ceunant Llennyrch NNR

Coed y Rhygen NNR

Migneint-Arenig-Ddualllt SSSI

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Llafar River Section (Trychiad Afon Llafar) SSSI

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

Afon Eden Cors Goch Trawsfynydd SAC

Afon Eden - Cors Goch Trawsfynydd SSSI

Rhinog SAC

Rhinog SSSI

LLAN FFESTINIOG

Trawsfynydd

Llyn Trawsfynydd (Reservoir)

SNOWDONIA NATIONAL PARC CENEDLAETHOL

TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND

Legend

- Trawsfynydd Works Site Boundary
- 2km Buffer of Trawsfynydd Works Site Boundary
- 5km Buffer of Trawsfynydd 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)

0 0.5 1 1.5 2 2.5 Kilometres

Rev	Date	Description			
A	19/08/2025	Environmental Statement	MH	RR	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

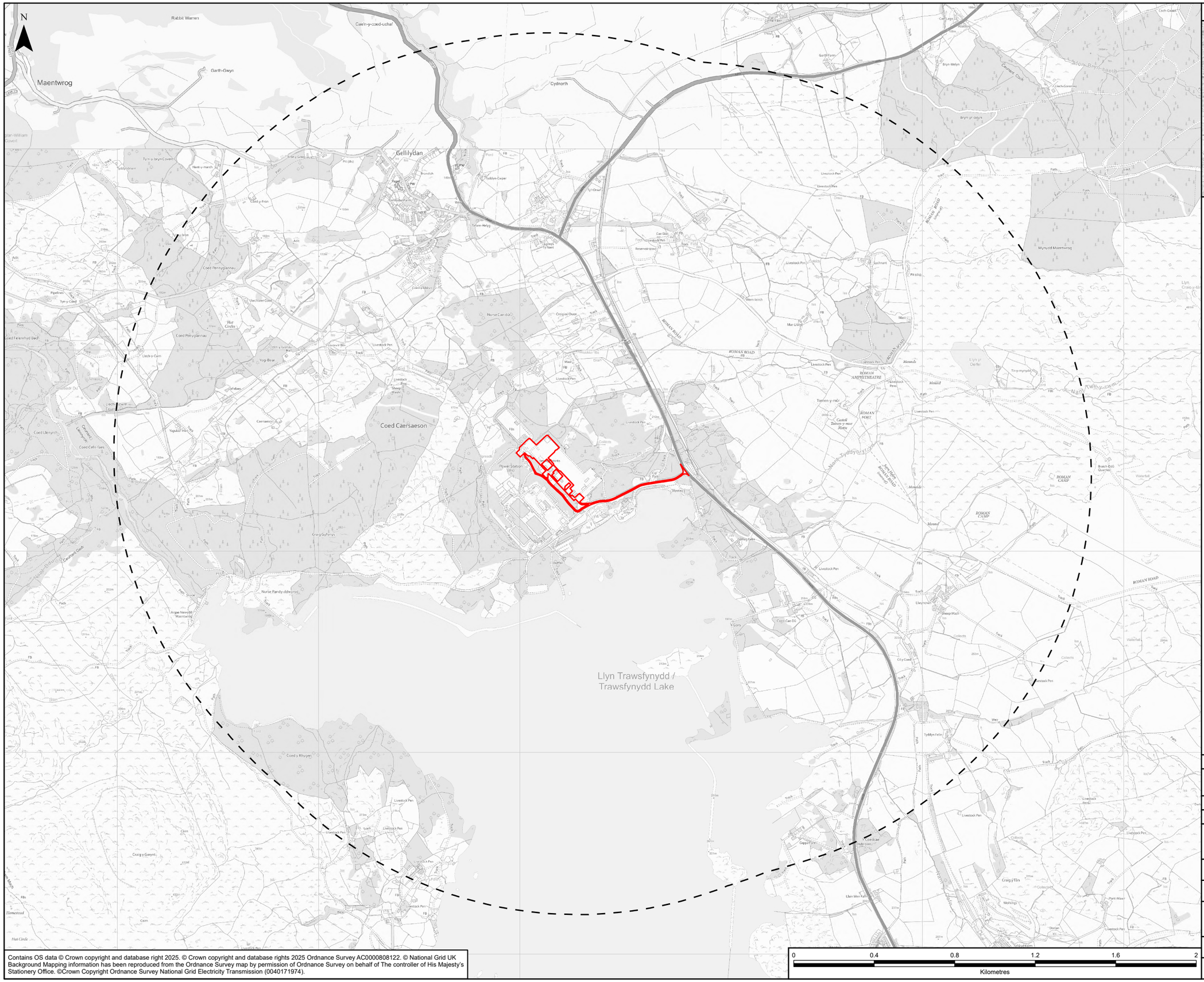
Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.5.2 STATUTORY DESIGNATED SITES FOR NATURE CONSERVATION

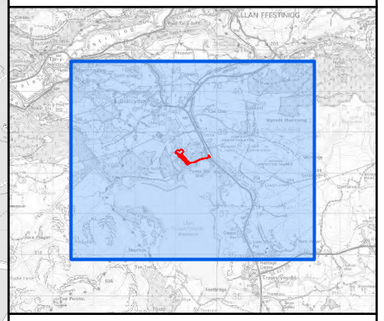
Creator:	Date:	Checker:	Date:	Approver:	Date:
MH	19/08/2025	RR	19/08/2025	NL	19/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:40,000	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_Chp5_Fig5.2_ECO_StatutoryDesignatedSites.aprx



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 2km Buffer of Trawsfynydd Works Site Boundary

NOTES

1. There are no non-statutory designated sites within 2km of Trawsfynydd works site boundary.

Rev	Date	Description	GIS	Chk	App
A	05/08/2025	Environmental Statement	CA	RR	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

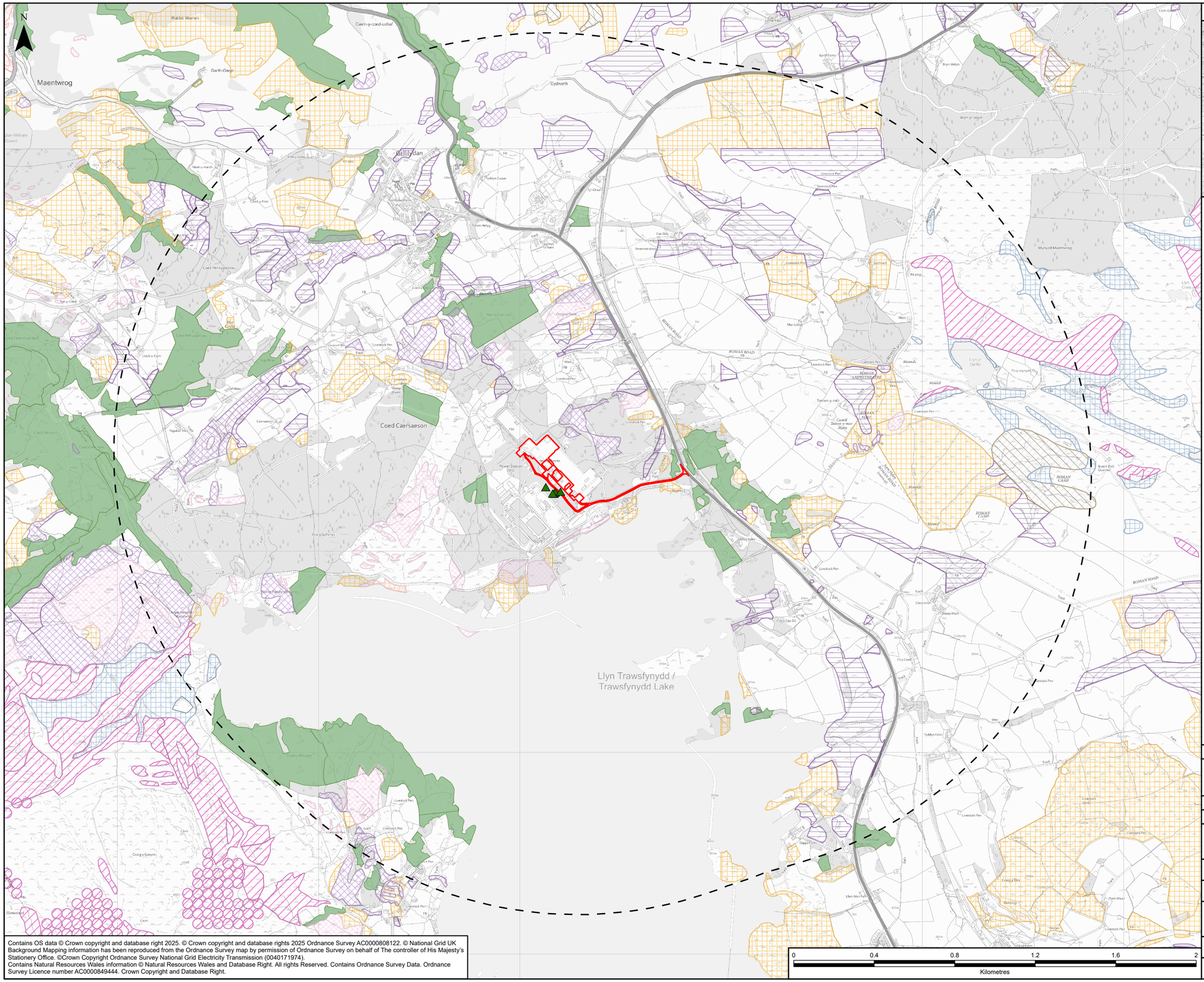
Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.5.3 NON STATUTORY DESIGNATED SITES FOR NATURE CONSERVATION

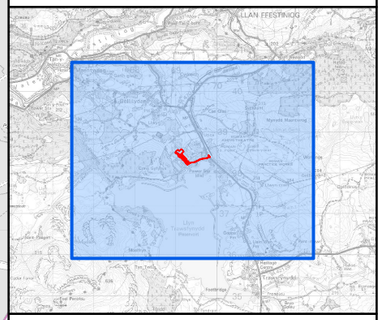
Creator:	Date:	Checker:	Date:	Approver:	Date:
CA	05/08/2025	RR	05/08/2025	NL	05/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:17,500	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_Chp5App_Fig_ECO_HabNonStatutoryDesignatedSites.aprx



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 2km Buffer of Trawsfynydd Works Site Boundary

Arboricultural Survey December 2024

- Ancient Tree

Habitats of Principal Importance (HoPI)[1]

- Ancient woodland
- Blanket bog
- Coastal and floodplain grazing marsh
- Lowland dry acid grassland
- Lowland fens and reedbeds
- Lowland heathland
- 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	29/08/2025	Environmental Statement	MH	RR	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.5.4
HABITATS OF PRINCIPAL IMPORTANCE
& ANCIENT WOODLAND

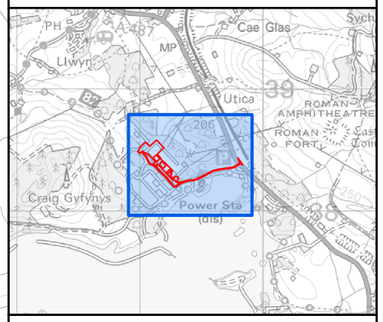
Creator:	Date:	Checker:	Date:	Approver:	Date:
MH	29/08/2025	RR	29/08/2025	NL	29/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:17,500	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_Chp5App_Fig_ECO_HabPriorityHabitats.aprx

Figure 5.5.5 CONFIDENTIAL

TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 50m Buffer of Trawsfynydd Works Site Boundary

Phase 1 Habitat Feature

- A3.1 - Broadleaved parkland/scattered tree
- A3.1 - Broadleaved parkland/scattered trees
- G2 - Running water
- A1.1.1 - Broadleaved woodland - semi-natural
- A1.1.2 - Broadleaved woodland - plantation
- A1.3.1 - Mixed woodland - semi-natural
- A1.3.2 - Mixed woodland - plantation
- A2.1 - Scrub - dense/continuous
- A2.2 - Scrub - scattered
- A3.1 - Broadleaved parkland/scattered trees
- B4 - Improved grassland
- B6 - Poor semi-improved grassland
- C3.1 - Other tall herb and fern - ruderal
- G1 - Standing water
- G2 - Running water
- J1.2 - Cultivated/disturbed land - amenity grassland
- J3.6 - Buildings
- J4 - Bare ground
- J5 - Other habitat
- Hardstanding

Rev	Date	Description	GIS	Chk	App
A	08/09/2025	Environmental Statement	AG	JM	NL

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.5.6 PHASE 1 HABITAT SURVEY

Creator:	Date:	Checker:	Date:	Approver:	Date:
AG	08/09/2025	JM	08/09/2025	NL	08/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:3,000	A3	1 OF 1	A

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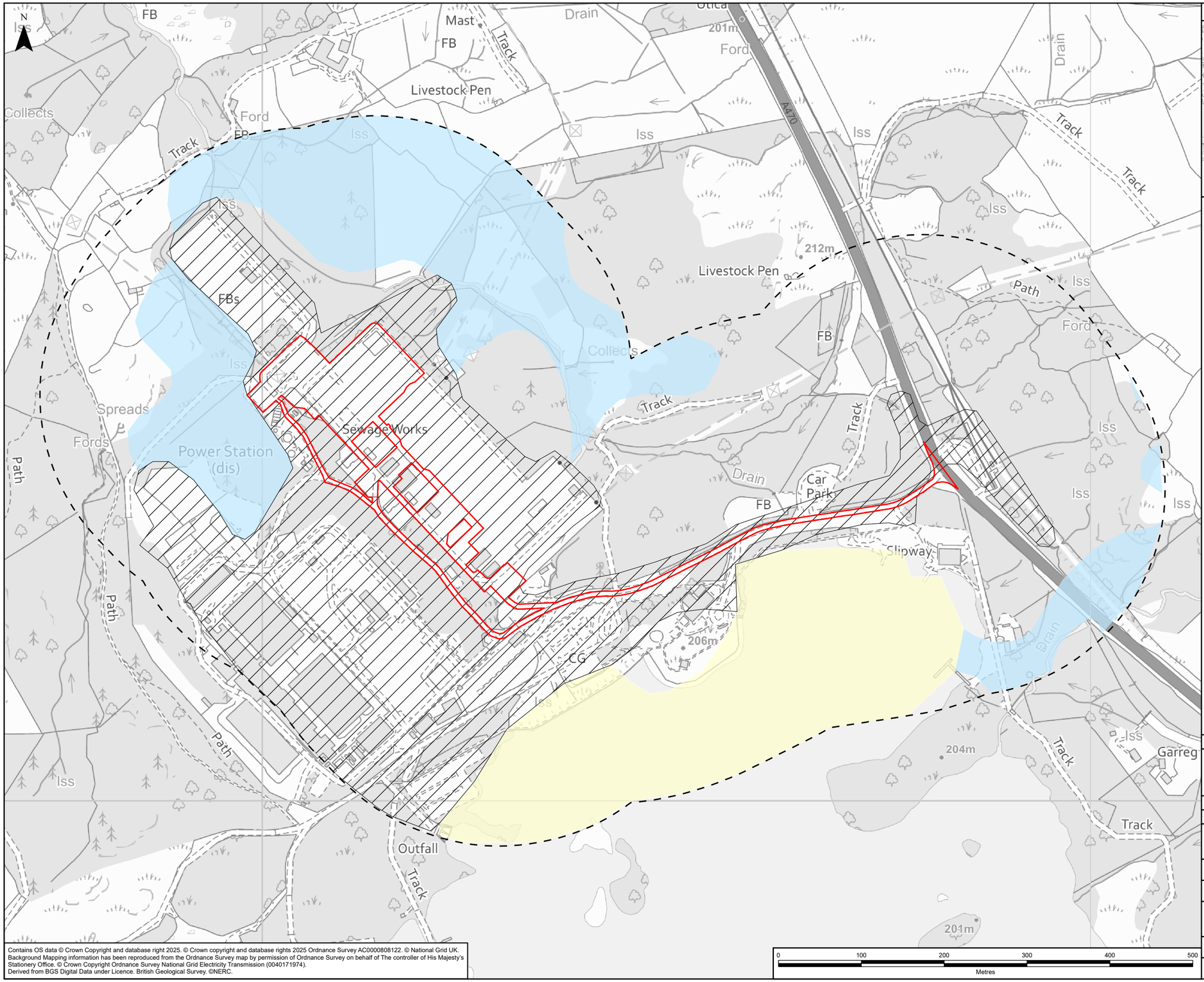
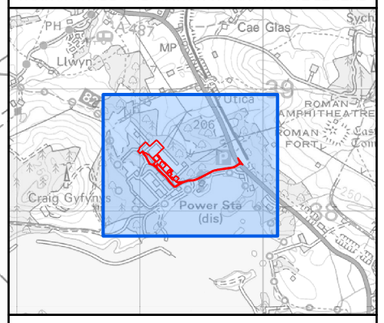
Metres

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_Chp5_Fig5.6_ECO_Phase1Habitats.aprx



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 250m Buffer of Trawsfynydd Works Site Boundary

BGS Artificial and Made Ground 50k

- Made Ground (Undivided)

BGS Superficial Geology 50k

- Superficial Theme Not Mapped - Water, Type Unspecified
- 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	11/08/2025	Environmental Statement	LP	SB	NL

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

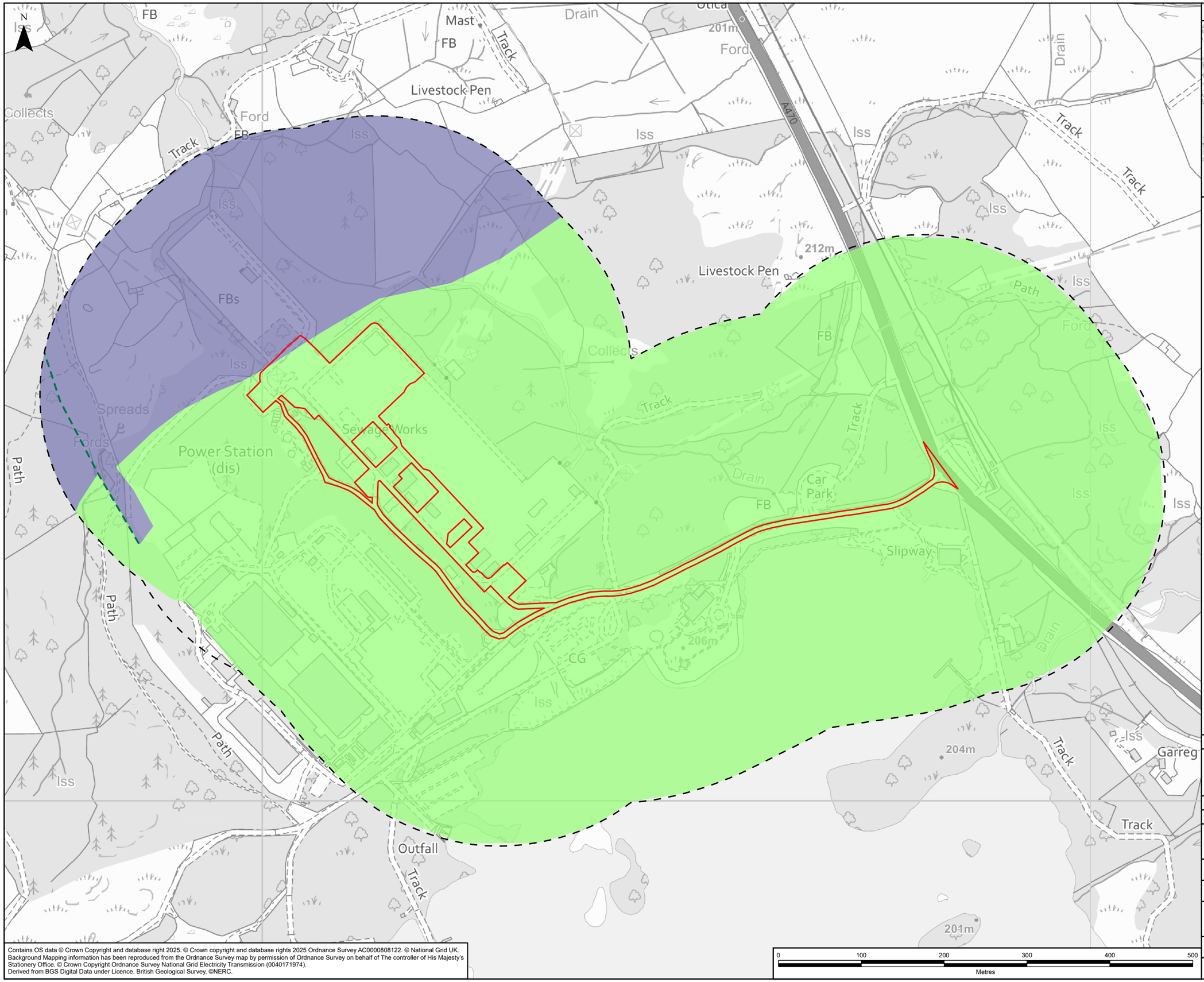
Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.7.1 MADE GROUND AND SUPERFICIAL GEOLOGY

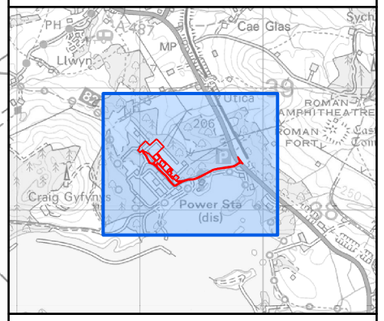
Creator:	Date:	Checker:	Date:	Approver:	Date:
AG	11/08/2025	SB	11/08/2025	NL	11/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:4,250	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



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 250m Buffer of Trawsfynydd Works Site Boundary

BGS Bedrock, Faults and Linear Features 50k

- Fault, Inferred, Displacement Unknown

BGS Bedrock Geology 50k

- Hafotty Formation - Mudstone
- Rhinog Formation - Sandstone And Mudstone

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

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

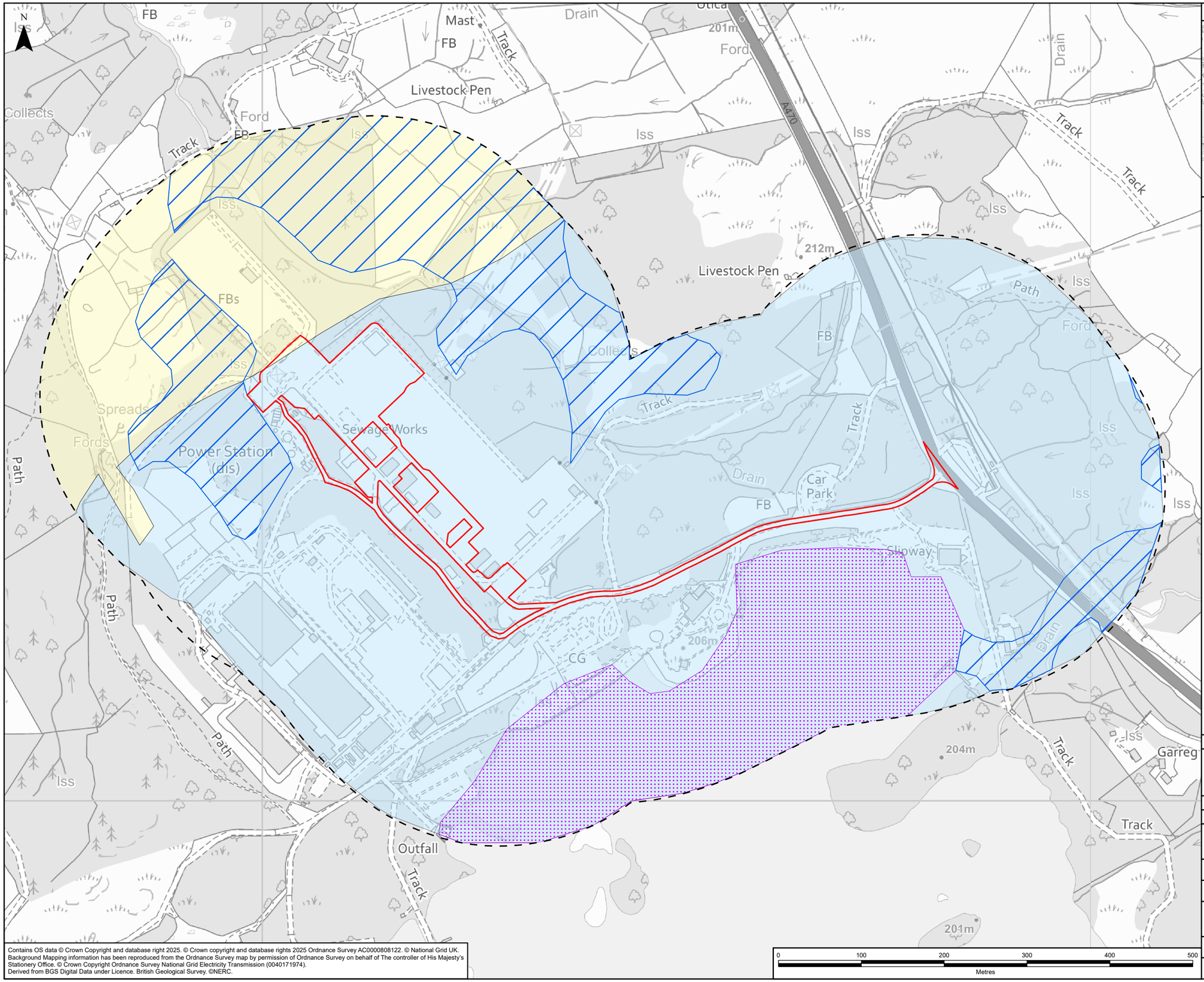
Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.7.2 BEDROCK GEOLOGY

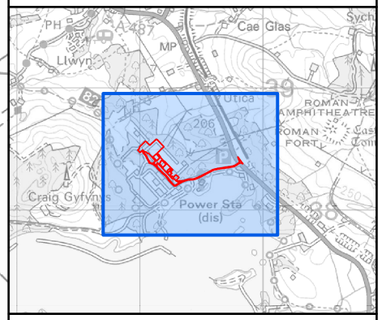
Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	11/08/2025	SB	11/08/2025	NL	11/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:4,250	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_Fig2_GEO_BedrockGeology.aprx



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 250m Buffer of Trawsfynydd Works Site Boundary

BGS Hydrogeology

- Superficial Secondary Undifferentiated Aquifer
- Superficial Unknown Aquifer
- Bedrock Secondary A Aquifer
- Bedrock Secondary B Aquifer

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	11/08/2025	Environmental Statement	LP	SB	NL

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.7.3 HYDROGEOLOGY

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	1:4,250	A3	1 OF 1	A

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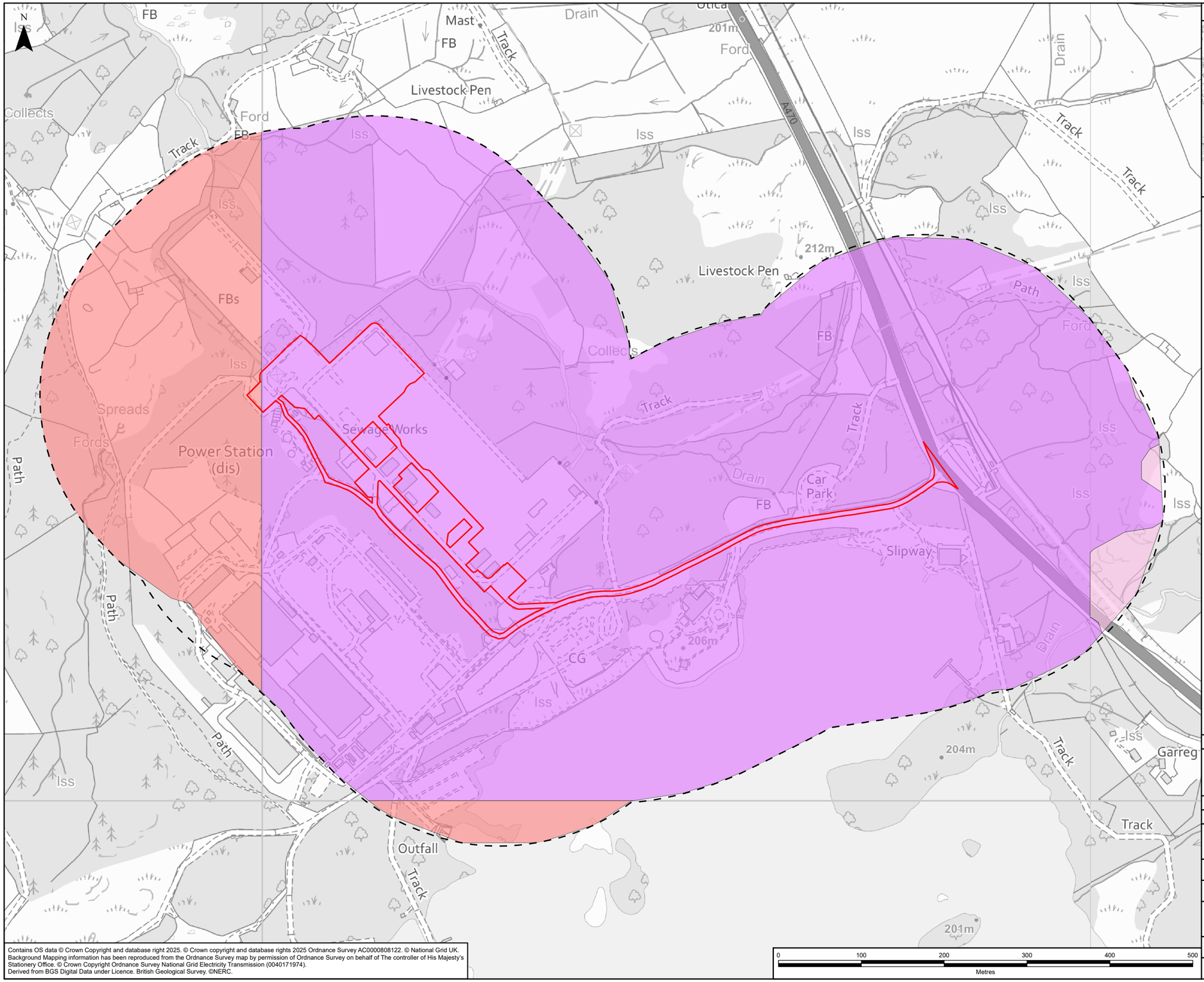
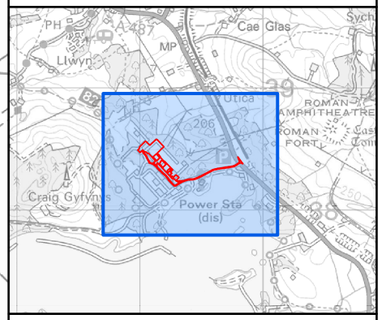
Metres

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_Fig3_GEO_Hydrogeology.aprx



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 250m Buffer of Trawsfynydd Works Site Boundary

BGS Groundwater Vulnerability

- Secondary Superficial Aquifer - Medium Vulnerability
- Secondary Bedrock Aquifer - High Vulnerability
- Secondary Bedrock Aquifer - Medium Vulnerability

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	11/08/2025	Environmental Statement	LP	SB	NL

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

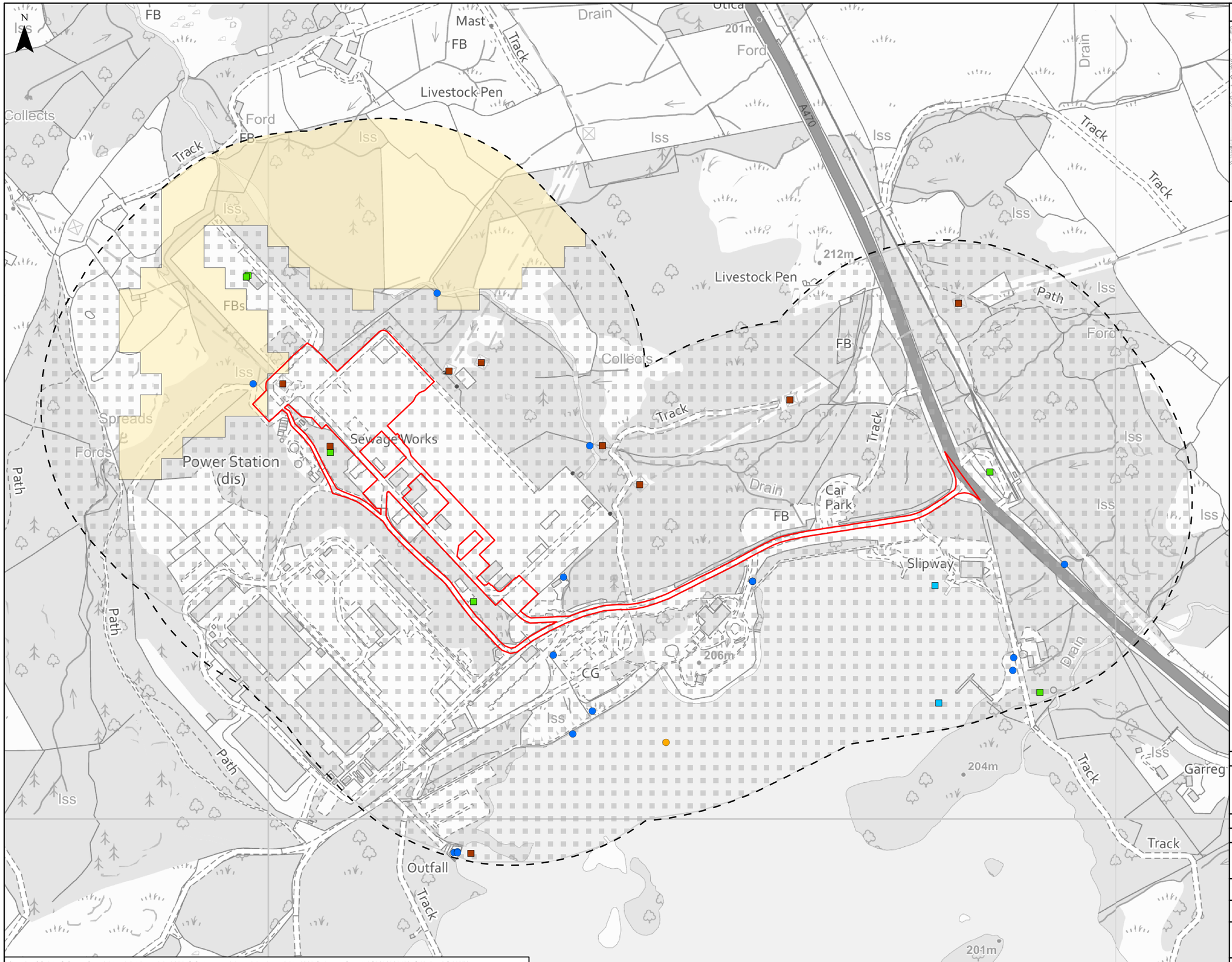
Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.7.4 GROUNDWATER VULNERABILITY

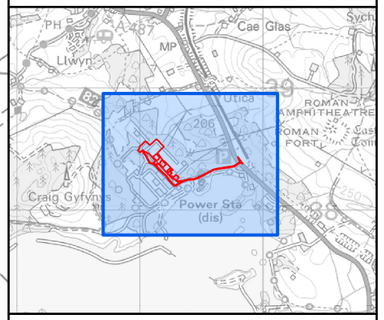
Creator:	Date:	Checker:	Date:	Approver:	Date:
LP	11/08/2025	SB	11/08/2025	NL	11/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:4,250	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_Fig4_GEO_GroundwaterVulnerability.aprx



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 250m Buffer of Trawsfynydd Works Site Boundary
- Licensed Discharge to Controlled Waters
- Pollution Incident

Current Industrial Land Use

- Industrial Features
- Infrastructure and Facilities
- Water

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

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.7.5 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	1:4,250	A3	1 OF 1	A

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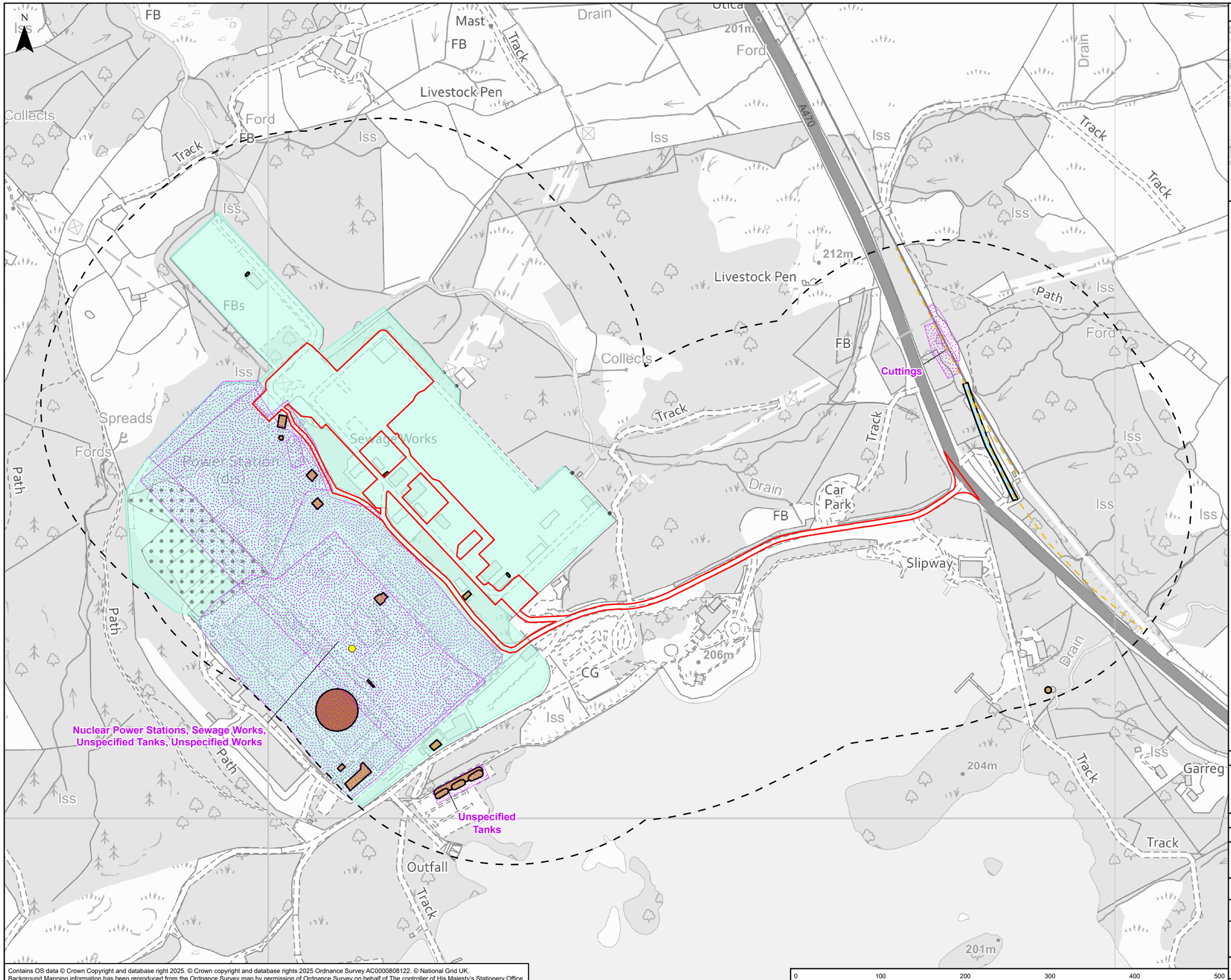
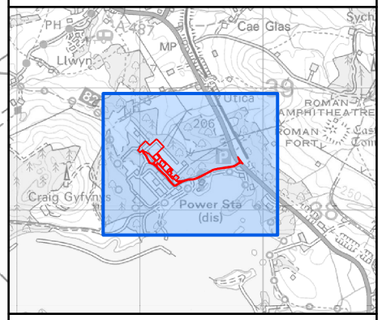
Metres



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 250m Buffer of Trawsfynydd Works Site Boundary
- Historical Licensed Industrial Activity
- Historical Railways
- Historical Landfill (Natural Resources Wales)
- Historical Industrial Land Use
- Historical Railway Feature HD
- Historical Tanks
- Historical Waste Site
- Historical Energy Feature

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 5: TRAWSFYNYDD SUBSTATION WORKS

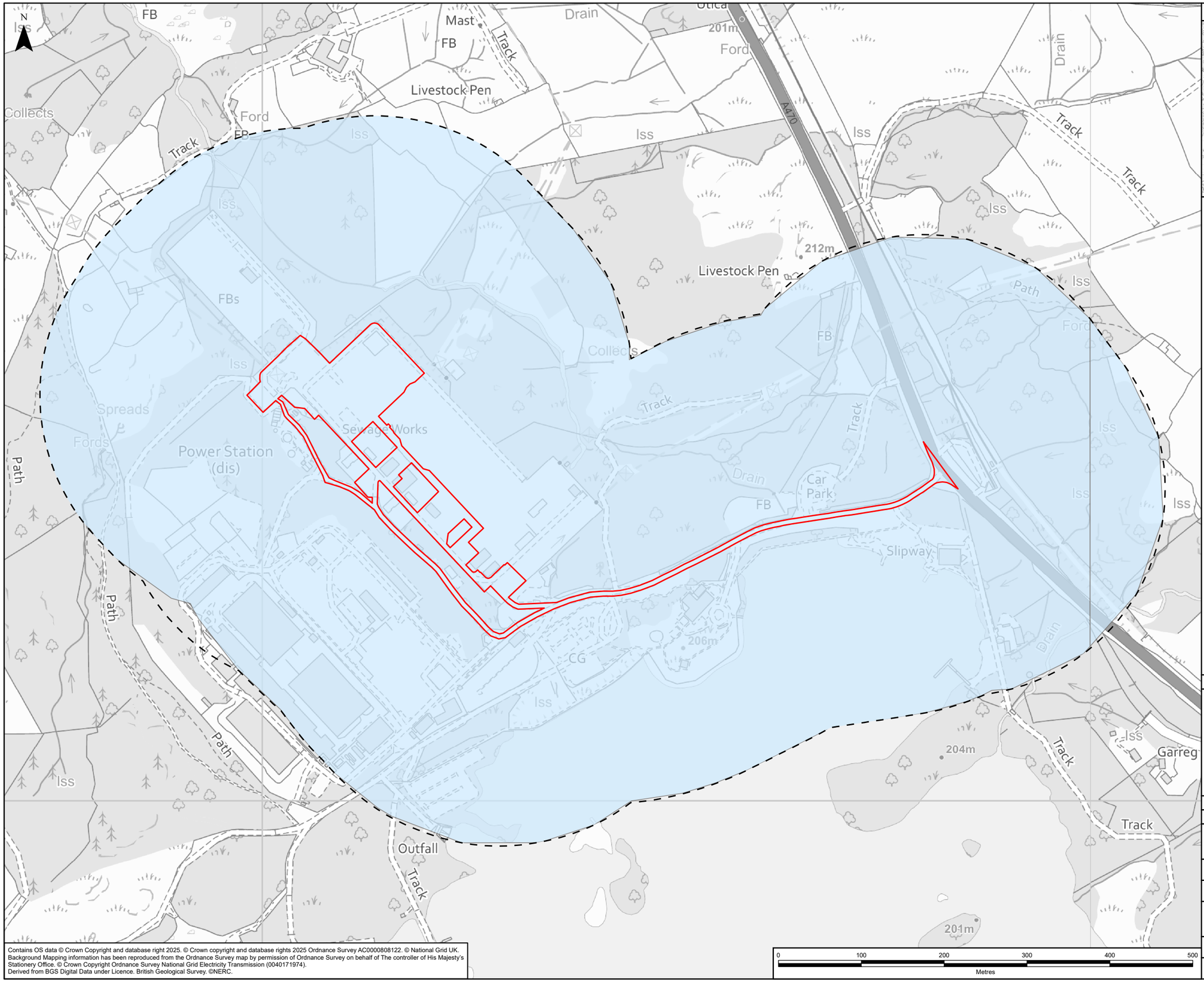
Document Title: FIGURE 5.7.6 HISTORICAL POTENTIAL SOURCES OF CONTAMINATION

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	1:4,250	A3	1 OF 1	A

0 100 200 300 400 500 Metres

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_Fig7_GEO_HistoricalPotentialSourcesContamination.aprx



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND

Legend

- Trawsfynydd Works Site Boundary
- 250m Buffer of Trawsfynydd Works Site Boundary
- Non Coal Underground Mine Workings[1, 2]

NOTES

1. Non coal underground mine workings 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.
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

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.7.7
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	1:4,250	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_Fig8_GEO_MiningQuarryingMineralResources.aprx

TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND

Legend

- Trawsfynydd Works Site Boundary
- 250m Buffer of Trawsfynydd 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 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

nationalgrid

Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.7.8 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	1:4,250	A3	1 OF 1	A

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N

ATC 5.1

ATC 5.2

ATC 5.3

ATC 5.4

ATC 5.5

Maentwrog

Gellilydan

Bont-Newydd

Coed Caersaeson

Llyn Trawsfynydd / Trawsfynydd Lake

Trawsfynydd

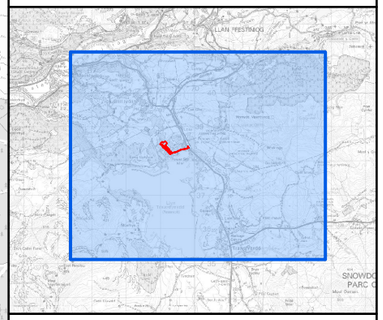
Afon Dwyryd

0 0.5 1 1.5 2

Kilometres

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

TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- Study Area
- Automatic Traffic Count (ATC) Location

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 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.9.1 TRAFFIC AND TRANSPORT STUDY AREA AND TRAFFIC SURVEY LOCATIONS

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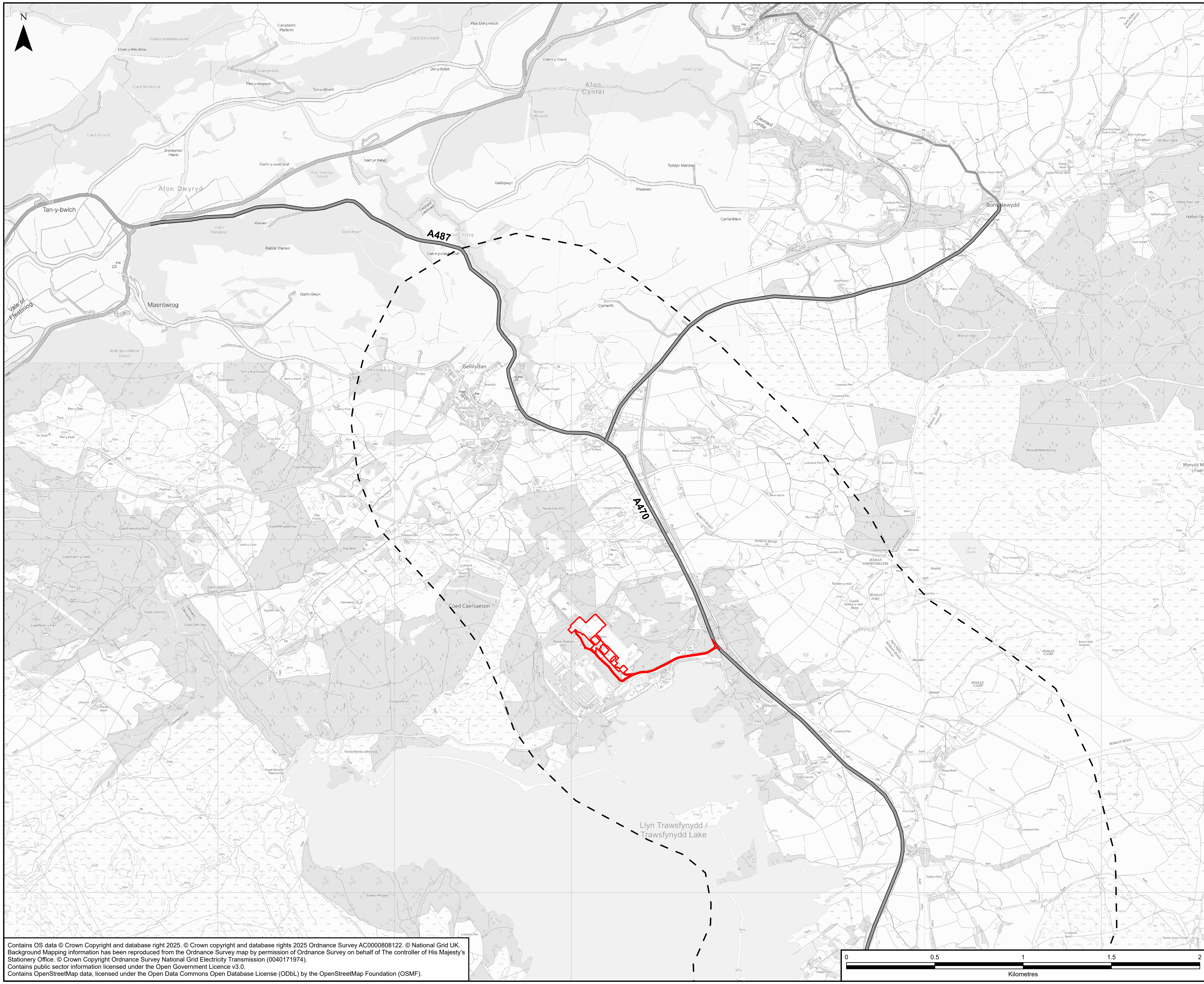
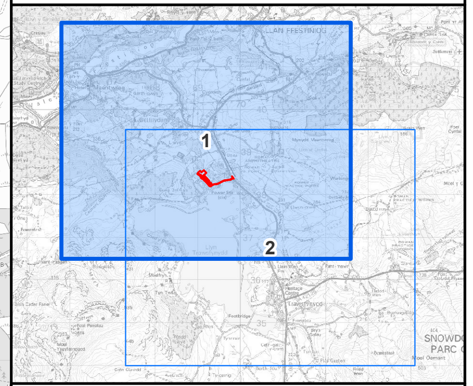
LP	18/08/2025	AB	18/08/2025	MR	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:22,000	A3	1 OF 1	A



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

Trawsfynydd Works Site Boundary

Study Area

Road Network

Trunk

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A	18/08/2025	Environmental Statement	LP	AB	MR

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title:

FIGURE 5.9.2
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 2	A

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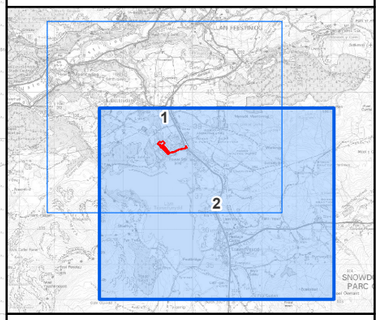
TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- Study Area

Road Network

- Trunk

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 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.9.2 STUDY AREA ROAD NETWORK

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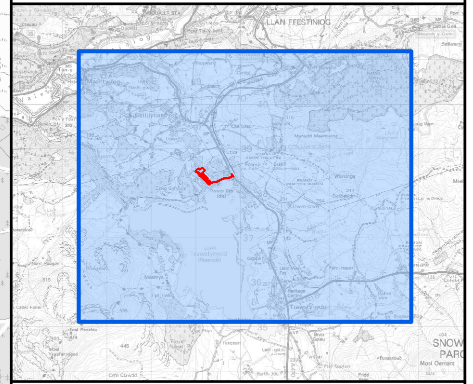
LP	18/08/2025	AB	18/08/2025	MR	18/08/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:20,000	A3	2 OF 2	A

0 0.5 1 1.5 2
Kilometres

TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- Study Area

Location of Recorded Accidents

Severity

- Fatal
- Serious
- Slight

Year

- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022

Rev	Date	Description	GIS	Chk	App
A	18/08/2025	Environmental Statement	LP	AB	MR

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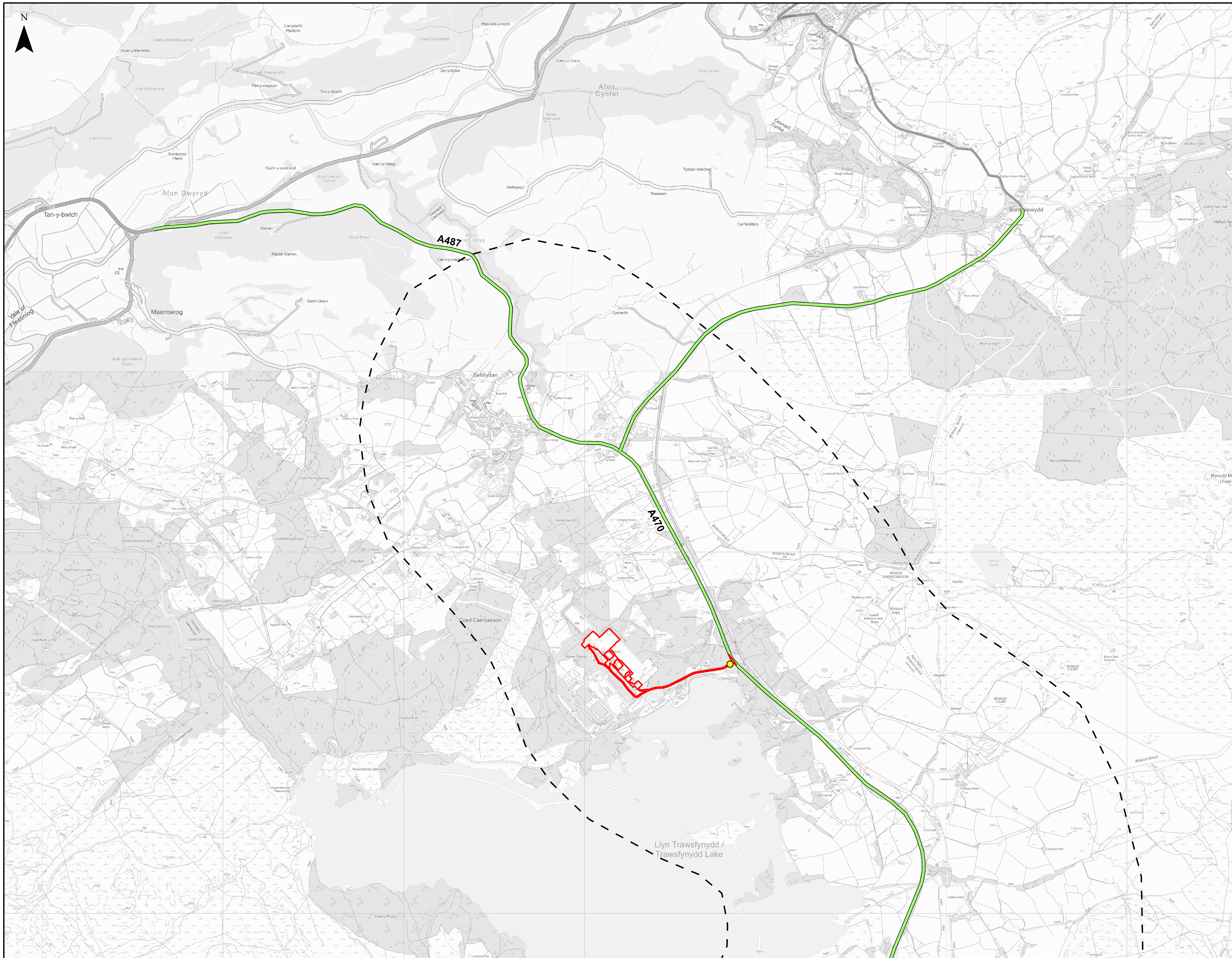
Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

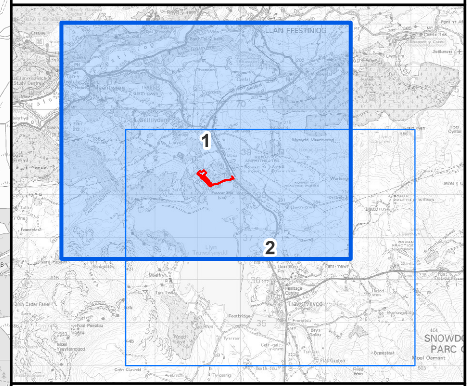
Document Title: FIGURE 5.9.3 TRAFFIC ACCIDENT LOCATIONS

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	1:22,000	A3	1 OF 1	A



TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- Study Area
- Site Access Point
- Indicative HGV Routeing

0 0.5 1 1.5 2

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 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title:
FIGURE 5.9.4
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 2	A

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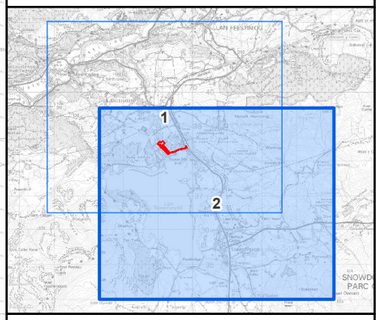
TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd 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 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.9.4 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 2	A

0 0.5 1 1.5 2
Kilometres

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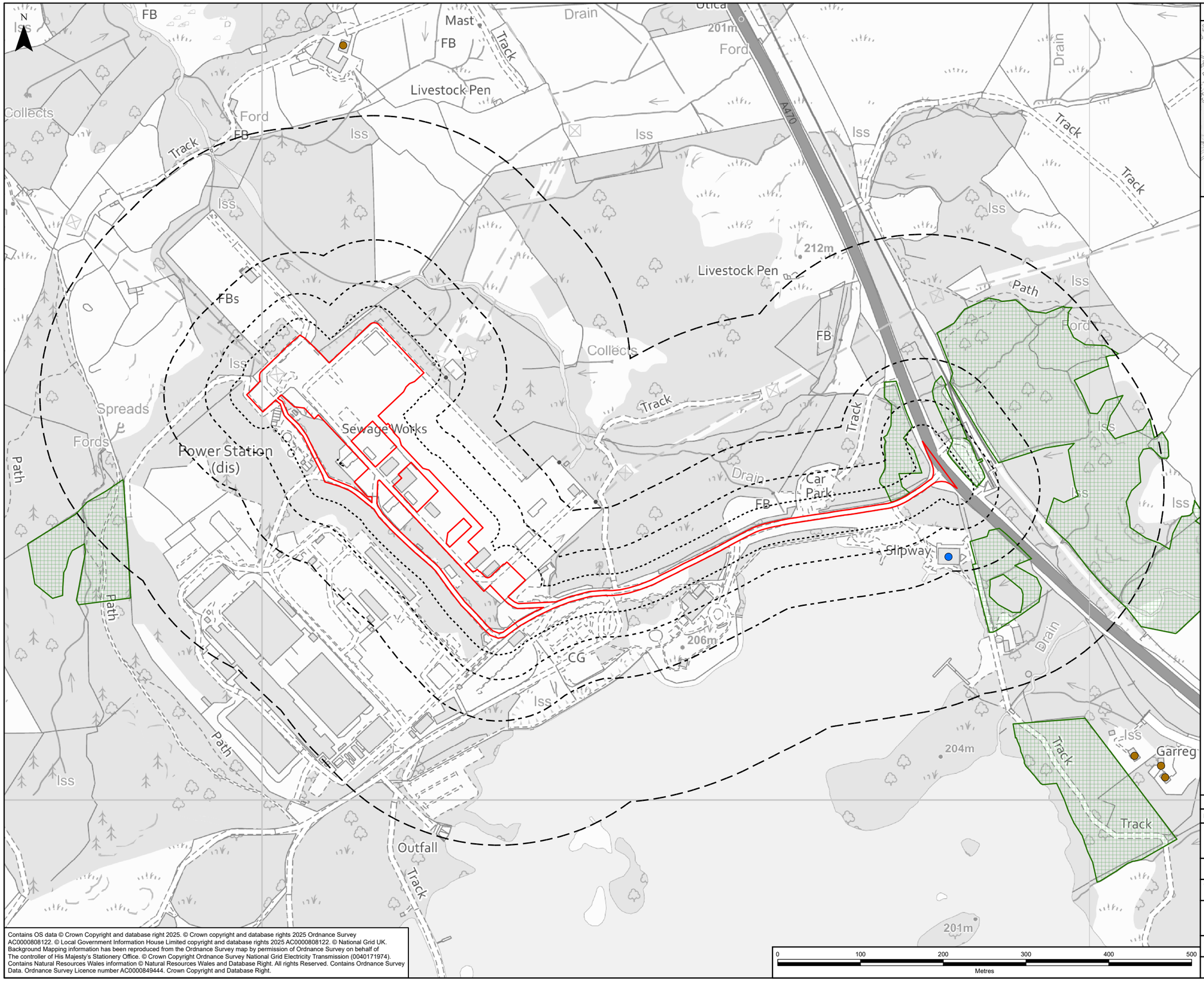
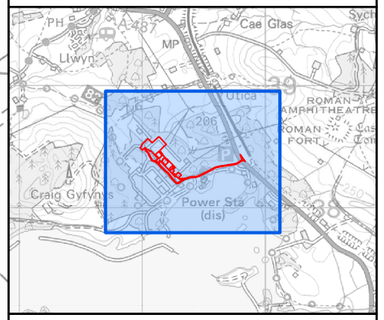


TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 20m Buffer of Trawsfynydd Works Site Boundary
- 50m Buffer of Trawsfynydd Works Site Boundary
- 100m Buffer of Trawsfynydd Works Site Boundary
- 250m Buffer of Trawsfynydd Works Site Boundary

Habitats of Principal Importance (HoPI)

- Ancient Woodland

Receptor

- Residential Property
- Business Premises

0 100 200 300 400 500
Metres

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A	27/08/2025	Environmental Statement	ID	GH	AS

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.10.1 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	1:4,250	A3	1 OF 1	A

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TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND

Legend

- Trawsfynydd Works Site Boundary
- 500m Buffer of Trawsfynydd Works Site Boundary
- 1km Buffer of Trawsfynydd Works Site Boundary
- Community Facility
- Residential Property
- Visitor Accomodation
- Business Premises

Greenspace

- Religious Grounds

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A	05/09/2025	Environmental Statement	AG	AB	JH

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

Volume: VOLUME 5: TRAWSFYNYDD SUBSTATION WORKS

Document Title: FIGURE 5.12.1 SOCIO-ECONOMIC LAND USE RECEPTORS

Creator:	Date:	Checker:	Date:	Approver:	Date:
AG	05/09/2025	AB	05/09/2025	JH	05/09/2025

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FIGURE	1:10,000	A3	1 OF 1	A

0 0.2 0.4 0.6 0.8 1 Kilometres

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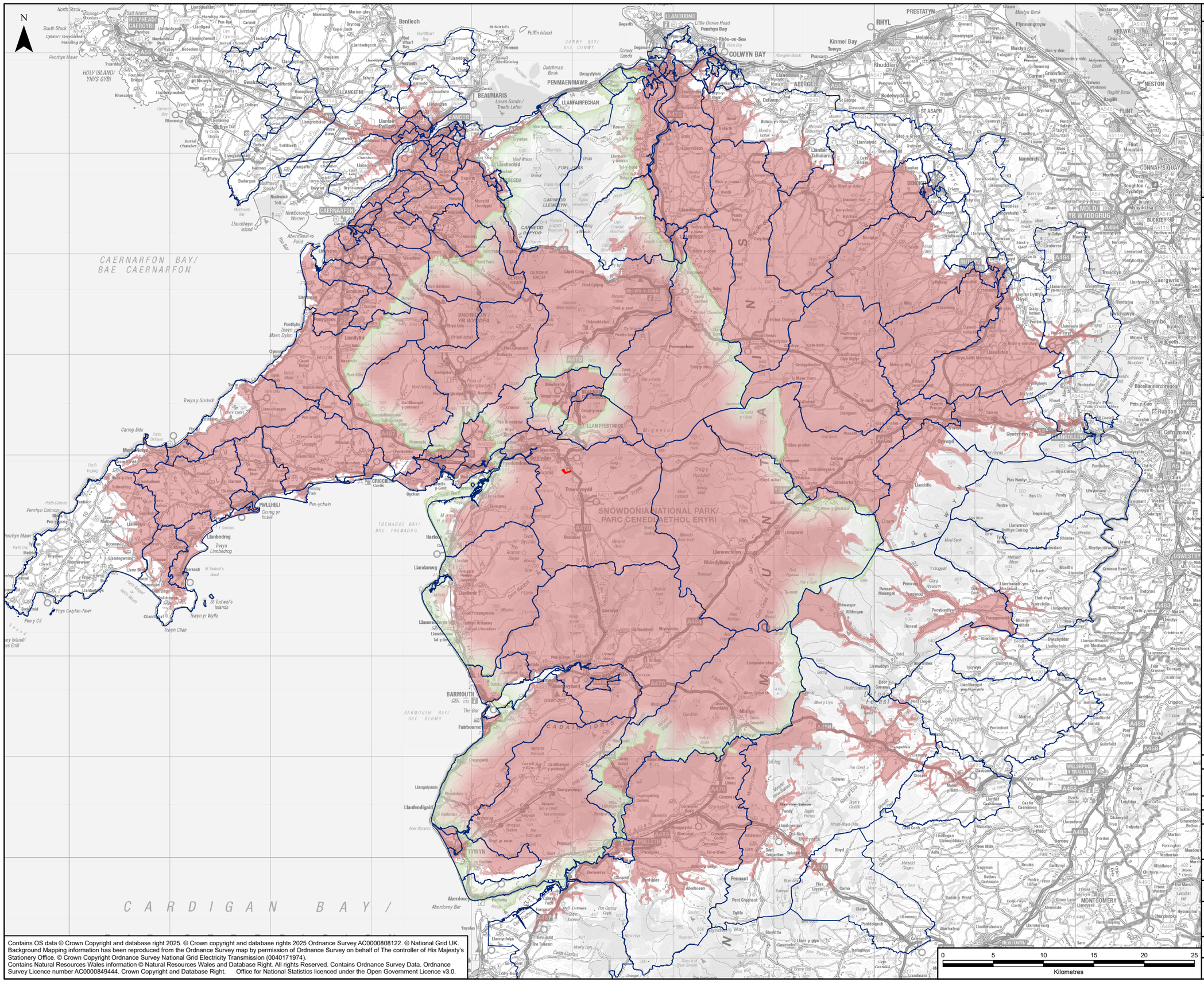
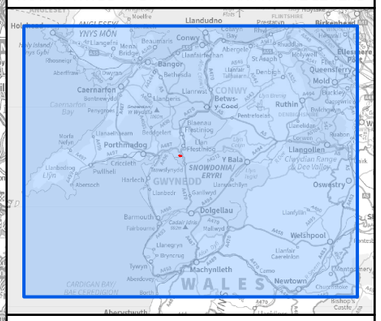


TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd 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 Trawsfynydd works site access point.

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Scheme: PENTIR TO TRAWSFYNYDD REINFORCEMENT

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Document Title: FIGURE 5.12.2 60 MINUTE PEAK HOUR DRIVE TIME FROM TRAWSFYNYDD WORKS SITE

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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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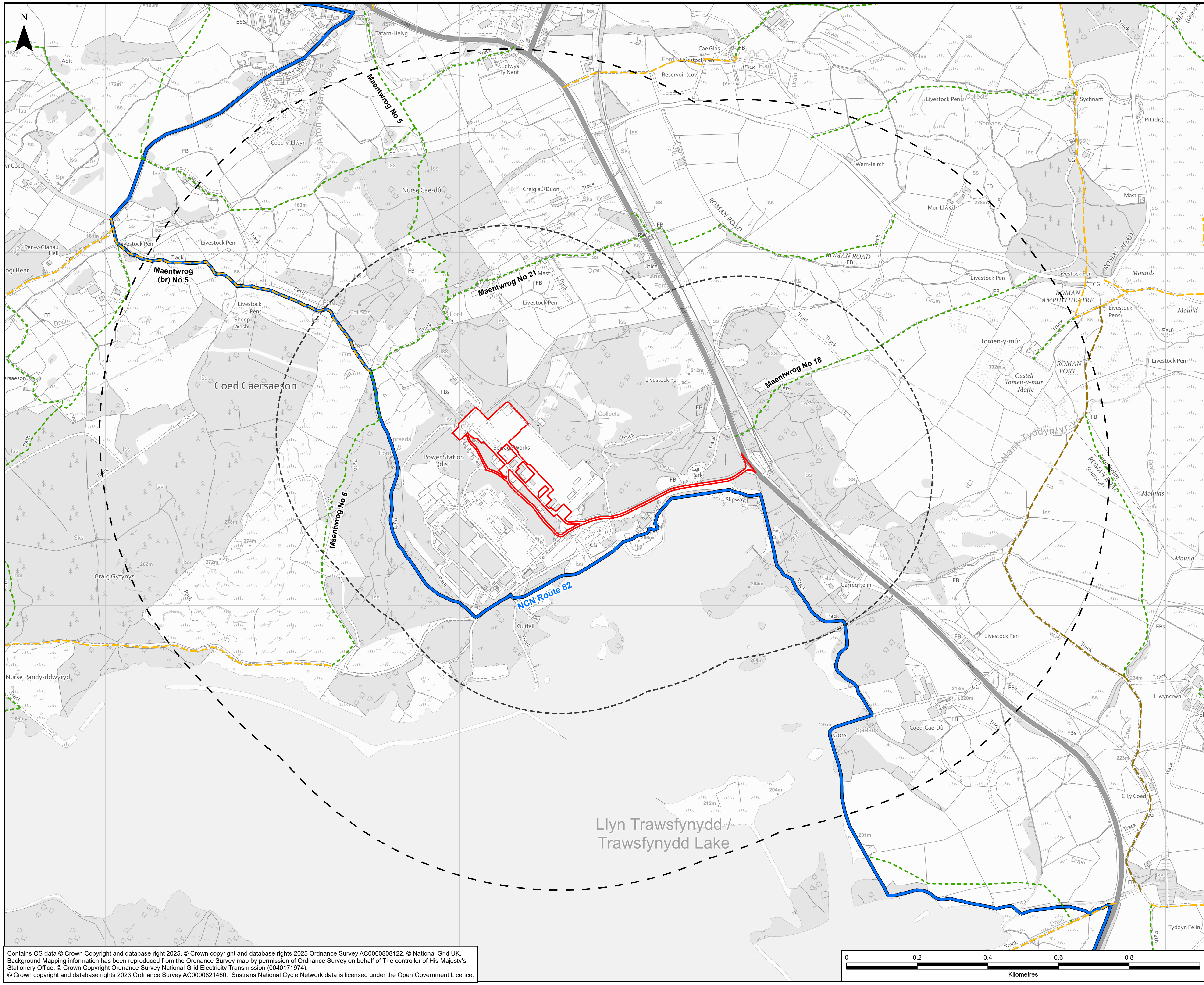
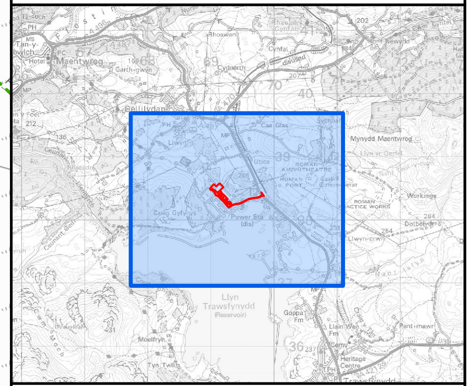


TRAWSFYNYDD SUBSTATION WORKS ROUTE LEGEND



Legend

- Trawsfynydd Works Site Boundary
- 500m Buffer of Trawsfynydd Works Site Boundary
- 1km Buffer of Trawsfynydd Works Site Boundary

Public Right of Way (PRoW)

- Footpath
- Bridleway
- Restricted Byway

Cycle Network

- National Cycle Network (NCN) Route

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Document Title: FIGURE 5.12.3 PUBLIC RIGHTS OF WAY

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AG	08/09/2025	AB	08/09/2025	JH	08/09/2025

Document Type:	Scale:	Format:	Sheets:	Rev:
FIGURE	1:10,000	A3	1 OF 1	A

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Kilometres

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