

Pontarddulais

Preliminary Ecological Appraisal

April 2019

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Executive Summary

Sustrans have undertaken a preliminary ecological appraisal to inform the creation of a new traffic-free path between land to the north of Grovesend and Pontarddulais. This report considers three main (Option 1, 2 and 3) and a single subsidiary alignment (Option 1a). The different route options are located within a variety of different habitats incorporating wooded and scrub covered former railway lines, road verge, existing earth tracks, way leaves and paved paths.

In order to provide an initial assessment of the likely ecological constraints of this proposal, a Preliminary Ecological Appraisal (PEA) has been conducted. The field work which underpins this PEA comprised of two separate visits completed on 14th June and 3rd-4th October 2018. The PEA provides a summary of the assessments completed to date and as such an assessment of nature conservation sites, habitats and protected and notable species identified along the route and details mitigation, where required to address the potential ecological impacts identified.

None of the route options are considered likely to have significant direct or indirect impacts on any nationally or internationally designated sites of wildlife conservation interest. Options 1 and 2 will have direct and significant impacts upon four non-statutory wildlife sites – Coed Bach Park SINC, Loughor to Pellergaer Railway SINC, Waungron to Gowerton Line SINC, Waungron Marsh SINC. The different route options would result in the loss of 0.0004 – 3.4% of the habitats within these designations. Option 2 would also have a minor adverse effect on M4 Corridor SINC, but this is not considered likely to be significant as the area to be impacted is less than 0.08% of the total designated area.

Path improvement works are proposed within woodland listed on the Ancient Woodland Inventory, within Coed Bach Wood (ASNW). Works within Coed Bach Wood are relatively small scale and would focus on improvements to existing surfacing. Mitigation and compensation measures, agreed in-consultation with NRW will be required to allow works to take place within Coed Bach Wood.

Overall the scheme will result in the direct loss of semi-natural habitat. The overall area of habitat loss is not considered to be high (c.0.17 – 1.65ha) as several of the route options are physically constrained (preventing opportunities to widen the route). However, given the high nature conservation value of the wider corridor, the works could result in a reduction in structural and species diversity. As such a series of indicative mitigation and enhancement measures have been set-out within Section 7.

The PEA has identified that water vole and otter are unlikely to be impacted by the proposals. Surveys completed to date would suggest that protected species of amphibian are likely to be absent, although further survey of a single water body within Coed Bach Park is recommended. Mammal activity, including entrance holes suggestive of badger usage were found. Further badger survey is recommended. The scheme will also have direct impacts upon suitable nesting habitat for birds, as the scale of clearance in association with either of Option 1 or 2 are relatively high, liaison with NRW including the preparation of a Woodland Management Plan is recommended.

Based on the findings of the field survey, it is recommended that Option 2 is not progressed. This is due to the extent of level change noted along this route. Ground works and vegetation clearance necessary to allow for a suitably accessible path particularly parallel with the existing railway line would likely lead to remove of a significant amount of mature scrub and woodland.

Design of Option 1 should also be informed by a topographical survey, as an alignment following the former track bed would significantly reduce the level of vegetation clearance required.

The likelihood of hazel dormouse utilising habitats to be impacted by any of the route options is considered to be low, however owing to the relative importance of these habitats in the local landscape further assessment for hazel dormouse is recommended. Potential impacts during construction have been identified for reptiles. It is anticipated that these construction impacts can be readily avoided through the application of reasonable avoidance measures and ecological

supervision; with actions summarised in a series of Methods Statements to be prepared following the grant of planning consent.

Current planning policy requires that development projects not only minimise their ecological impacts but include enhancements wherever possible in proportion to their scale. The Local Authority and NRW should be consulted to determine appropriate measures. Recommendations included with this report include the development of a Woodland Management Plan and Habitat Management Plan, the control of invasive weed species including Japanese knotweed, as well as the construction or implementation of a series of micro-features to benefit amphibians, bats, birds, hazel dormouse, invertebrates and reptiles.

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1 Background

1.1 Project Introduction

Sustrans has been commissioned to undertake a feasibility study for creating a traffic-free route for walking and cycling which connects an existing route to the north-east of Grovesend with the centre of Pontarddulais.

As part of this assessment three principal alignments and a single subsidiary alignment has been assessed:

- Option 1 – Allt-Y-Graban Road to Water Street, Pontarddulais via Pentre Farm and Coed Bach Park
 - Option 1a – South-eastern corner of Coed Bach Park to Gwynfryn Road, Pontarddulais
- Option 2 – Allt-Y-Graban Road, Grovesend to Birch Rock Road, Pontarddulais via Mynydd Lilw
- Option 3 - B4296 to land to the east of Park Terrace, Pontarddulais.

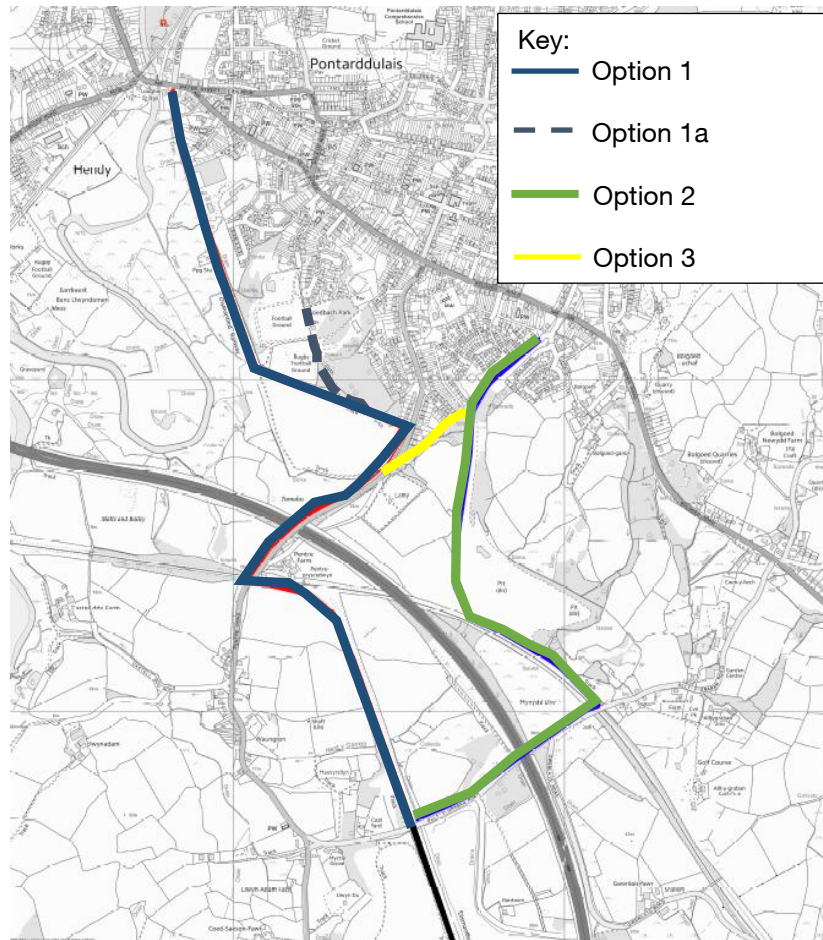
Option 1 is 3.9km in length and follows a combination of disused railway lines, public highway (B4296) and public footpath between SN 59537 01634 and SN 58820 03887.

Option 1a 0.5km in length and is an alternative alignment for the northern part of the route. The path would pass through Coed Bach Park between SN 59426 02892 and SN 59415 03228.

Option 2 is 2.7km in length and follows a mixture of public highways (Allt-Y-Graban Road), public footpath and private land between SN 59537 01634 and SN 59991 03183.

Option 3 is 0.4km in length and follows an existing access track and permissive route to the east of houses along the B4296 between SN 59503 02763 and SN 59746 02945

The three route alignments as well as subsidiary option are shown on Drawing 1.1.



Drawing 1.1: Proposed Route of Path

1.2 Ecological Assessment

In order to provide an initial assessment of the likely ecological constraints of this proposal, a Preliminary Ecological Appraisal has been conducted. This assesses the possible impacts of the proposed works on nature conservation sites, habitats and protected or notable fauna. Due to the lighting proposals, an additional assessment of habitats likely to be important for bats has been undertaken.

A desk study has been undertaken to determine likely ecological impacts of the proposal, identify any further ecological assessments required and provide an evaluation of whether any ecological features identified might form a barrier or significant constraint to the proposal.

The desk study comprised a data search, an assessment of the likelihood of ecological features being present and an assessment of potential impacts.

A data search was undertaken to determine the presence of any designated nature conservation sites and protected or notable species recorded near the route. Natural Resources Wales (*MAGIC* website) and LERC Wales Aderyn Search Environmental Information Search were contacted to obtain data relating to the route. The following information was determined;

- Designated sites of international importance within a 5km radius of the route;
- Other statutory designated sites within a 1km radius of the route;
- Non-statutory designated sites within a 1km radius of the route;
- Records of protected and notable species within 1km of the route*; and,

- Priority habitats within 1km of the proposed route

*These are species which have European and/or UK Legal Protection, Section 6 species (Environment (Wales) Act, UK BAP Priority Species, Global Red List, British Red Data Book, Nationally Rare & Scarce, RSPB Red and Amber Birds, Welsh Vascular Plant Red Data List, Local Biodiversity Action Plan (LBAP) Species, and Locally Important Species as identified by local experts.

1.2.1 Habitat Survey

An initial habitat survey of the proposed route was undertaken on 14th June and 3rd and 4th October 2018 by James Whiteford MCIEEM MRSB (Sustrans Ecologist). A slow walkover survey was conducted and habitats were recorded in and adjacent to the proposed works area using the standard Phase 1 Habitat Survey technique. This is a nationally recognised means for classifying habitats and was undertaken in accordance with the methodology issued by the Joint Nature Conservation Committee (JNCC, 2010).

In addition to this basic survey, supplementary information was collected such as the presence of invasive species and descriptions of habitat condition, management and other observations that would affect value of habitats. During the survey the presence of fauna or their field signs were noted and habitats assessed for their potential to support protected or notable species. The extent of habitats has been mapped in 3.1.1 and 3.1.2 with features of interest shown as Target Notes.

1.2.2 Badgers

A full survey of the route as well as 30m buffer either side was not completed as part of the field work in support of this PEA. However, any incidental signs of badger were mapped and recorded. This included any badger setts, worn pathways in vegetation and/or across field boundaries, footprints, hairs, dung pits/latrines, bedding and evidence of foraging activity including snuffle holes.

Evidence was recorded in accordance with a standard approach as in 'The history, distribution, status and habitat requirements of the Badger in Britain, (1990)'.

Particular attention was paid to habitats of suitable topography or supporting suitable vegetation for sett-building as well as to those features particularly favoured by badgers including hedgerows, areas of dense scrub, woodland, ditches and banks.

All holes of an identified sett were examined closely and the number of active and inactive entrances and evidence of its usage were recorded. Where possible, setts identified during the survey were categorised using nationally recognised sett classification as described below:

- **Main sett:** These are large setts comprising a number of well-used, active holes with conspicuous spoil heaps. They are well established with worn paths to and from the sett and between entrances. Main setts are breeding setts and are normally in continuous use throughout the year, with only one main sett per social group of badgers;
- **Annexe sett:** Where present they occur in close association with the main sett (normally less than 150m away) and are linked to them by clear, well-worn paths. Annexe setts arise for the purposes of rear cubs should a second litter be born, and have several entrances (though not all in use at the same time);
- **Subsidiary sett:** These setts usually consist of three to five entrances which are not in continuous use. They are usually more than 50m away and may not have well-used paths connecting them to other setts; and
- **Outlier sett:** These typically comprise one to three holes with small spoil heaps indicating that they are not very extensive underground. They are used sporadically and are thought to serve multiple functions, including allowing efficient and safe travel to important parts of their home range.

1.2.3 Tree Assessment – Bats

As part of the field survey conducted 3-4 October, 2018 an assessment of trees for roosting bats within 10m of the proposed route was completed. Trees were assessed in accordance with the criteria presented within the Bat Conservation Trusts Best Practice Guidance (2016). The field survey was completed by James Whiteford MCIEEM MRSB.

Trees of low, moderate or high bat roosting potential and the features they supported were inspected from the ground using high powered binoculars (8x Magnification) and a hand torch (Clulite 1 million candlepower). Any directly accessible features (i.e. below 2m height) were also checked using a hand torch. The location of individual trees and their bat roosting potential was recorded and mapped as part of the assessment.

1.2.4 eDNA Survey – Great Crested Newts

The eDNA survey was completed as per Natural England's and National Resource Wales' Technical Note. The collection was completed by a NRW Great Crested Newt Licence Holder. The analysis of the eDNA samples was completed by Nature Metrics (<https://www.naturemetrics.co.uk/>).

1.2.5 Assessment Aims

This report includes an assessment of the potential impacts on ecological features from the proposed works. Where impacts are anticipated, the value of the ecological feature and scale of the impact have been assessed. This has been undertaken in accordance with CIEEM Guidelines for Ecological Impact Assessment (CIEEM 2018). This is considered in light of current ecological legislation and planning policy and so considers impacts on designated nature conservation sites, protected and notable species and landscape scale impacts such as habitat fragmentation.

This report makes recommendations regarding what implications ecology has on the feasibility of the proposed route creation, what further studies would be required and what measures to avoid, mitigate or compensate for ecological impacts are likely to be necessary.

1.2.6 Constraints

Site visits, conducted at any time of year will miss a proportion of the species present. The initial visit was timed to coincide with the peak emergence period for woodland ground flora as this was the primary habitat of interest and also to allow sufficient time for further great crested newt survey work to be undertaken this season, if required.

The HSI and eDNA surveys were completed as per the agreed protocols. Full access around the pond was available and therefore no significant constraints applied to these surveys.

The ground based tree bat roost assessment was partially hampered by the uneven and often steep terrain which on occasion, prevented a full and complete inspection of trees of interest. Where views were hindered high powered binoculars were used from a range of vantage points. A precautionary principle in terms of categorising a trees bat roosting potential was applied in circumstances where it could not be fully assessed from the ground.

The badger assessment focused on the incidental recording of activity along the route, rather than a systematic search of a 30m buffer on either side. The survey was also completed when trees, hedgerows and scrub was partially in leaf which may have also resulted in signs of badger activity being overlooked. To compensate for this limitation, at least in part, where trails or other signs (e.g. setts) were noted they were either followed or approached (where access allowed) and inspected closely.

2 Baseline Information

2.1 Landscape

The route is situated within the Swansea Bay National Landscape Character Areas (NLCA38). The principal habitats inland comprise a coastal plain punctuated by major river estuaries including the River Loughor which is located to the south-east of Pontarddulais. The Lough Estuary is identified as being of high ecological value, reflected in its designation as a SAC, SPA, Ramsar and SSSI. Areas of wet marshy grassland on poor draining gley soils are also noted as being ecologically important.

Option 1 is located within a dense line of maturing dense scrub and woodland along a former railway embankment. The route then reverts to existing road verge and footpath, before crossing improved pasture. The remaining section passes south along the edge of Coed Bach Park, before following an existing way leave along a dismantled railway line. The final section of the route follows hard standing.

Option 1a passes Coed Bach Park (Ancient and semi-natural broadleaved woodland).

Option 2 passes through moderately species rich highway verge before crossing through areas of disused, former railway embankment and sidings. Habitats within these areas support a full range of naturally regenerating habitats common to mineral rich, polluted soils ranging from lichen carpet to dense scrub.

Option 3 is located along an existing grassed access track adjacent to a ditch and then passes through a small area of broadleaved woodland.

All the areas of woodland along the route have been identified by NRW as being worthy of improvement and enhancement to maintain and increase their value as important components of the local habitat network¹.

2.2 Nature Conservation Sites

Carmarthen Bay and Estuaries Special Area of Conservation (SAC) covers a large section of coastline along the southern coast of Wales (66000ha). The boundaries of the SAC incorporate the Loughor estuary and its banks along the western edge of the Pontarddulais. Option 1 at its closest point passes within 0.8km of the boundary of the SAC. The SAC at its closest point is 1.5km north-east of Option 2. Option 3 at its closest point is 0.9km west of the SAC.

The closest SSSI unit (Burry Inlet and Loughor Estuary) belonging to the SAC, comprises the upper reaches of the Loughor estuary and includes areas of saltmarsh, sand and mud flats.

The primary reason for award of the SAC is supports a series of Annex I habitats including:

- **1110 Sandbanks which are slightly covered by sea water all the time** – These habitats within the bay support a range of notable species including bivalves, amphipods and worms which are specially adapted to these conditions.
- **1130 Estuaries** - The SAC supports a complex of four estuaries which allow interchange of sediment and wildlife between. This interchange, combined with the wide range of sediments present, provide specialist conditions for a range of aquatic worms and molluscs.
- **1140 Mudflats and sandflats not covered by seawater at low tide** – The SAC includes extensive areas of intertidal mudflat and sandflat. Large areas of these are densely populated by bivalves. The lower Loughor Estuary supports the nationally rare worm *Ophelia bicornis* and nationally scarce dwarf eelgrass *Zostera noltei*.
- **1160 Large shallow inlets and bays** – The SAC is in effect an extensive shallow bay. Physical conditions across the bay vary considerably. Resulting in sediments supporting a

¹ <http://le.gov.wales/catalogue/item/HabitatNetworks/?lang=en>

large number of species, including bivalve molluscs, worms, burrowing urchins, brittlestars and sand stars.

- **1310 Salicornia and other annuals colonizing mud and sand** – The SAC supports pioneer glasswort *Salicornia* spp. which along with the other habitats present provide a complete sequence of saltmarsh vegetation.
- **1330 Atlantic salt meadows (Glauco-Puccinellietalis maritimae)**. The SAC includes a full range of salt marsh vegetation incorporating areas of high and low marsh, with grazed salt marshes supporting areas of sea rush *Juncus maritimus* and marshmallow *Althaea officinalis* being of significant important.

Other primary reason for designation include the presence of an Annex II species:

- 1130 – Twaite shad *Alosa fallax*. Members of these species are **known to migrate** though the waters of the SAC to reach spawning sites in the Afon Tywi.

Secondary reasons for designation include:

- Presence of internationally important populations of sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, Allis shad *Alosa alosa* and otter *Lutra lutra*

The accompanying SSSI which covers the section of the SAC closest to the site (354.2ha) makes the following additional observations:

- The Loughor Estuary supports nationally important colonies over wading and wintering birds (in excess of 46,000 in an average year)
- The salt marshes within the estuary are the most historic and mature, of all those found along the Welsh coastline
- The SAC incorporates nationally important geological outcrops
- The principle habitats associated with the estuary closest to the two routes is swamp comprising a mixture of common reed *Phragmites australis* and sea club rush *Scirpus maritimus*. All of these habitats provide suitable conditions for wildfowl.
- The river provides a breeding site for a number of declining and more common bird species. As well as a number of wildfowl and open ground species either in decline, or listed on Schedule 1 of the Wildlife and Countryside Act e.g. Kingfisher and barn owl
- Two nationally scarce lower plants are also found along the river; the liverwort *Porella pinnata* and moss *Schistidium platyphyllum*.
- Greater *Rhinolophus ferrumequinum* and lesser horseshoe bats *R. hipposideros*. (Annex II species) and common pipistrelle *Pipistrellus pipistrellus* also forage and commute along the river.

Nationally Designated Nature Conservation Sites

A single site with statutory protection (Site of Special Scientific Interest (SSSI) was identified within 1km of the route; Burry Inlet and Loughor Estuary. A breakdown of the designating features for this sites is set-out in the SAC section above.

Locally Designated Nature Conservation Sites

The search identified a series of non-statutory wildlife sites within 1km of the route. For the purposes of this assessment this information is summarised in Table 1 below.

Name	Proximity	Designating features
Lower Lliw Corridor & Llan Confluence SINC No. 326	1km south-east	30ha site incorporating estuarine, scrub and mixture of grassland habitats of at least district/county level importance. Site also supports a diverse assemblage of wading, woodland and birds of open ground.
Grovesend Woodland SINC. No. 394	1.1km south-east	9.64ha site supporting a combination of wet and ancient semi-natural woodland and moderately species rich grassland.
Cwm-y-llech SINC. No. 390	1.5km east	4ha area of woodland and open ground. Key designating features including ancient woodland, moderately species rich scrub and purple moor grass (UK Priority Habitat).
Coed Bach Park Pontarddulais SINC. No. 384	Option 1a – Onsite Option 1 – Follows southern boundary Option 2 - 0.7km north Option 3 – 0.15km north	Established country park incorporating a range of wet and ancient woodland habitats, diverse native scrub and neutral grassland. Small area of lowland heathland also present. Three RPSB red list species known to use this site.
Loughor Corridor SINC. 380	2.4km north	Narrow corridor incorporating the Loughor River, surrounding bank side vegetation and wet woodland. Otter and several nationally notable bird species including Kingfisher form designating features for this site.
Loughor to Penllergaer Railway line SINC. 376	Option 1 – Located within SN601020 to SN597022 Option 2 – Crosses Option 3 – 0.5km south	Linear site straddling either side of the railway line. Southern section (remote from either route) incorporates ancient and wet woodland. Northern reaches classified as ‘continuous semi-natural linear vegetation’, with block of rush pasture close to Bolgeod Lane (320m south of Option 1 at closest point).
Waungron to Gowerton Line SINC. 334	Option 1 – Crosses at southern end Option 2 – Located within SN59790095 to SN59160237 (0.85km) Option 3 - 0.45km south	49ha site which is located along a disused railway line. Designating habitats of relevance to Route 1 and 2 include dense species rich scrub. Species records linked to the designation make reference to a range of open ground and woodland edge species in decline. As well as small number of invertebrates and higher plants of conservation interest.

Name	Proximity	Designating features
Brynlliw Grasslands SINC. 329	Located directly south of Allt-Y-Grabau road.	Extensive area (75ha) of semi-improved grassland, meadow, rush pasture and reed bed. Citation makes reference to range of bird and invertebrates listed as conservation priorities for Wales (S42 species).
Middle Lliw SINC. 319	1.9km east	A large site (86ha), which incorporates a number of discrete habitat patches spread from east to west through the valley. Habitats listed under the designation including ancient woodland, acid and neutral grassland, rush pasture, scrub and bracken.
Waungron Marsh SINC. 301	Option 1 – Onsite between SN59060303 to SN58990325 (0.25km) and then adjacent to SN58990325 to SN58840365. Option 2 – 0.7km west	Marshland within the upper reaches of Loughor Estuary. Designating habitats directly associated with Option 1 including native wet woodland and moderately species rich grassland. Adjoining habitats including valley mire and species rich native scrub. Wider citation includes mixture of estuarine habitats.
Bolgoed Quarry SINC. 240.	0.6km east	Former quarry now covered in naturally regenerating broadleaved woodland
M4 Corridor SINC. 238.	Option 1 and 2 cross.	Site incorporates motorway as well as buffer planting and native species rich scrub on either side.
Banc Darren Fawr SINC. 1	1.5km north-east	Very large site (2085ha) spread across the local landscape. Incorporates a very wide range of habitats from grassland to mature woodland as well as areas of wetland comprising bog, mire and fen. Citation includes reference to an extensive list of bird and invertebrate species of national interest, including Hen Harrier.
Penllergaer Forest SINC. 117	2.9km north-east	High forest incorporating areas of native woodland and species rich scrub. Secondary habitats include reedbed, neutral grassland and rush pasture.

Table 2.2.1 – Summary of non-statutory wildlife sites within approximately 1km of proposed traffic free route between Grovesend and Pontarddulais.

2.3 Species and Habitats

Notable Amphibian and Reptile Species

The data search identified six records for grass snake *Natrix natrix* within 1km of the two route options. Grass snake have been recorded within the scrub/grassland mosaic at the northern tip of Option 1. Several of these records are within 150m to the east of this option.

Notable Bird Species

The LERC search returned more than 310 records relating to 15 different locally and nationally notable bird species for habitats within 1km of the route.

Species reported by the search included a mixture of open ground - barn owl *Bubo bubo* (Schedule 1 of WCA 1981) and skylark *Alauda arvensis* (Section 7, Environment (Wales) Act) and wetland species such as common sandpiper *Actitis hypoleucos* and great white egret *Ardea alba*, as well as those associated with woodland and parkland habitats including red kite *Milvus milvus*.

Notable Invertebrate Species

LERC returned 62 records attributable to 26 different invertebrate species. The records related to butterflies (35 records), dragonfly (5 records), moths (21 records) and grasshopper (1 record).

Records for butterfly: Marsh fritillary *Euphydryas aurinia*, silver-studded blue *Plebejus argus* and dingy skipper *Erynnis tages* (all Red Data book 1 species (all vulnerable²). Records for damselfly and dragonfly included species listed as national priorities including banded demoiselle *Calopteryx splendens* (damselfly), golden-ringed *Cordulegaster boltonii* and keeled skimmer dragonflies *Orthetrum coerulescens*.

16 moth species were returned by the search, including four Section 7 species (The Environment Act (Wales), 2016): buff ermine *Spilarctia luteum*, powdered quaker *Orthosia gracilis*, rustic *Mesapamea secalis* and sallow *Xanthia icteritia*. Records for marsh fritillary were returned for grassland fields immediately to the south of the start of the two options. A single record for short-winged cone-head grasshopper *Conocephalus dorsalis* was also returned for a location approximately 400m south-west of Option 1 (NGR: SN587028).

The presence of a range of different Section 7 species within a relatively small search area, would suggest that the quality of the local invertebrate assemblage is high.

Notable Plant Species

As described in Section 2.2 above the citations for the designated sites located within 1km of the route include reference to local and national rarities present in those sites. These are primarily species associated with the river and estuarine habitats.

A comparatively large number of flowering and lower plant records of local and district interest were returned by the search (n=438) which together represented 136 higher and five bryophyte species.

Records of nationally rare plant species (colloquially referred to as Red Data Book species) included:

- Small flowered catchfly *Silene gallica* – 2 records
- Good King Henry *Blitum bonus-henricus* – 1 record
- Narrow fruited water starwort *Callitriche palustris* – 1 record
- Bulbous foxtail *Alopecurus bulbosus* – 2 records
- Marsh mallow *Althaea officinalis* – 5 records

² Vulnerable: A vulnerable species is one which has been categorized by the International Union for Conservation of Nature as likely to become endangered unless the circumstances that are threatening its survival and reproduction improve.

- Rock Stonecrop *Sedum forsterianum* – 1 record (record within 120m of Route 1 – NGR: SN595026)

The record search returned six notable lichen and moss records. Five of these records related to Red Data Book species (all lower conservation concern – LC) including: *Cladonia ramulosa*, common threadwort *Cephaloziella divaricata*, grove earwort *Scapania nemorea*, Hampe's threadwort *Cephaloziella hampeana* and Micheli's least pouncewort *Lejeunea cavifolia*. Several of these species have been identified in areas of woodland and scrub within less than 250m of the proposed routes.

Notable Mammal Species (including bats)

Records for four protected and notable mammal species were identified by LERC within the 1km search area. 86% of the records returned were attributable to otter *Lutra lutra*.

Detailed review of the records confirm that otter have been regularly recorded along the Afon Lliw. The Afon Lilw as its closest point is located approximately 0.6km south-east of the southern end of either option.

A single record for suspected water vole *Arvicola amphibius* activity associated with the River Loughour and adjoining fresh water habitats was reported by the search. This record was located approximately 0.55km west of Option 1, at its closest point.

No badger *Meles meles* records, including road fatalities were returned by the search. No records for commoner mammal species including European hedgehog *Erinaceus europaeus*, stoat *Mustela erminea* or weasel *Mustela nivalis* were identified by LERC.

A total of 10 bat records, mostly attributable to common pipistrelle were identified by the search. These included evidence of these species activity foraging and commuting around the local area, with surveyor bias focusing activity in more urban and peri-urban locations. A confirmed roost was reported for a house located 0.8km south-east of the southern end of the two route options. Based on the quality of the habitats present and review of the JNCC's recent report (JNCC, 2013) this is likely to be a significant underestimate of the diversity of the local bat population, as no Myotis, or horseshoe species were reported by the search it is reasonable to expect at least three to four of these species to be present in the local area.

Notable Fish Species

Two of the qualifying species associated with SACs (detailed in Section 2.2) within 5kms of the proposed route were found by the search, these included allis shad and twaite shad. Records for both of these were returned for Burry Inlet SSSI – approximately 1km south-east of Route 1, at its closest point.

Notable Habitats

Coed Bach Wood is listed on the Ancient Woodland Inventory (AWI) for Wales. The proposed route would travel through land currently covered under this designation. **(Figure 2.3.8.1).**

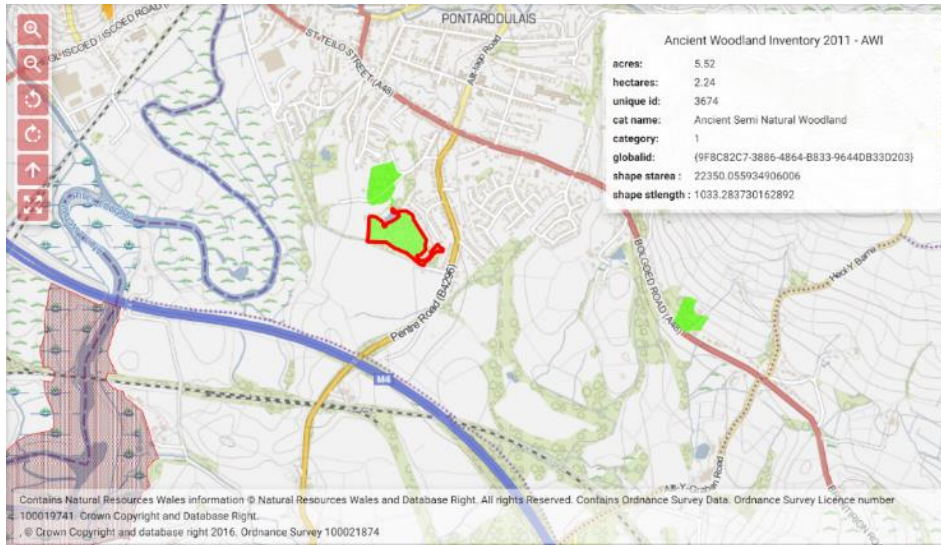


Figure 2.3.8.1 – Extract from Ancient Woodland Inventory – Coenbach Wood, Pontarddulais. Source: Natural Resources Wales

As shown on Figure 2.3.8.2 below, all of the woodland compartments along either route are mapped either as broadleaved woodland or broadleaved shrub, which all constitute Section 7 habitats (Environment Act (Wales) 2016).

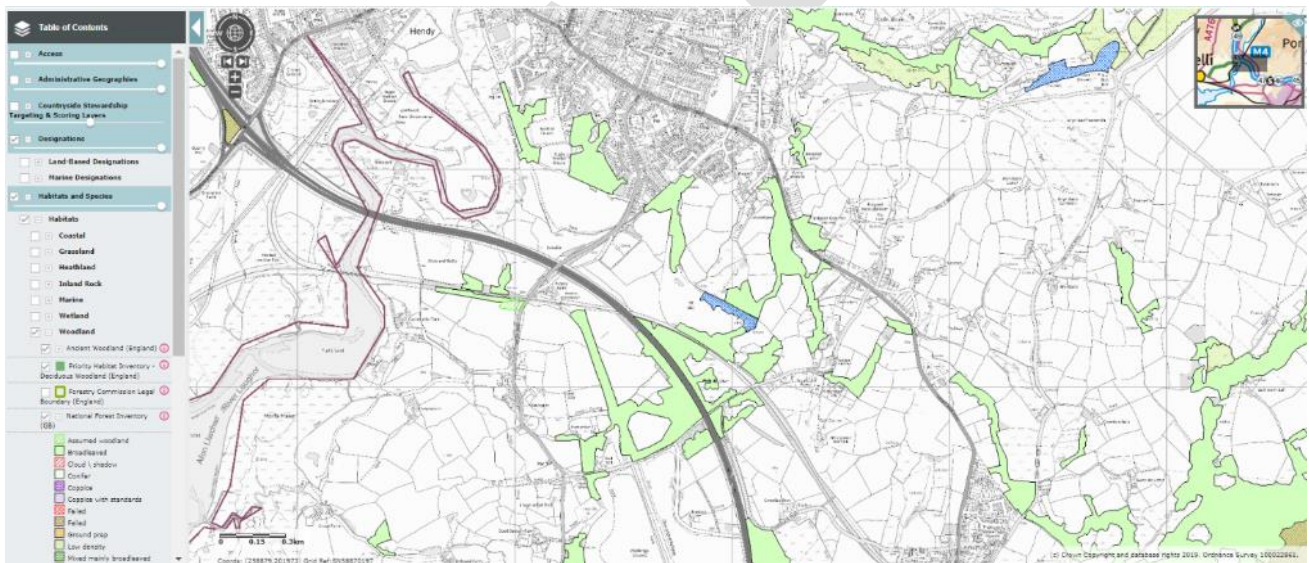


Figure 2.3.8.2 - Extract from National Forest Inventory: Pontarddulais. Source: Multi-Agency Geographical Information System (MAGIC)

3 Phase 1 Habitat Survey

The following habitat types were recorded along the proposed path improvement works;

- Bare ground;
- Broadleaved and mixed semi-natural woodland;
- Broadleaved and scattered tree;
- Broadleaved plantation woodland;
- Buildings and hard standing;
- Cultivated land: amenity grassland;
- Dense and scattered scrub;
- Dry ditch;
- Dry heath/acid grassland;
- Intact species rich and poor hedgerow, including hedgerow trees;
- Lichen/bryophyte heath;
- Marsh/marshy grassland;
- Other habitat – post-industrial mosaic (grassland, heath and scrub);
- Poor semi-improved grassland;
- Running water;
- Standing water; and
- Swamp.

Bare ground

Option 1 and 1a

The majority of the route is located within areas of dense scrub and woodland which have colonised the disused railway lines, as a result bare ground is largely absent. Areas of bare ground were noted in association with the wood chip path through the ancient woodland within Coed Bach Park.

Option 2

The route follows a combination of road verge and earth track along its route. Areas of higher footfall close to the existing residential housing to the north-east which had subject to regular footfall by people and dog walkers had developed in to patches of compacted and poached bare earth. This was principally along a permissive route within the former railway siding. More extensive areas of bare ground associated with the areas of ballast associated with the active railway line which runs parallel with the central part of Option 1.

Broadleaved Semi-Natural Woodland

Option 1 and Option 1a

Areas of secondary woodland were recorded along the former railway line to the south of the B4296, with more established and mature woodland associated with Coed Bach Park. The most mature parts of Coed Bach Park are listed as Ancient Woodland.

Dominant canopy species within the areas of secondary woodland along the former railway line (W1, W2 and W3, Figure X) included ash *Fraxinus excelsior*, oak *Quercus petraea*, silver birch *Betula pendula*, with wetter areas supporting extensive patches of willow *Salix sp.*. The majority of these specimens were found to be relatively small in diameter (0.05 – 0.1m diameter at breast height (DBH)), with few if any trees noted growing along areas of former, heavily compacted track bed.

Drier, areas located away from the former track supported a greater density of oak with specimens on the areas of raised embankment on either side regularly exceeding 0.3-0.4m DBH. The understory within the stands of woodland (even taking in to account the sub-optimal timing of the assessment) was moderately species rich, with a mixture of commoner ruderal species tolerant of shade and high moisture/impeded drainage noted (e.g. tufted hair grass *Deschampsia cespitosa*, pendulous sedge *Carex pendula* and willowherb *Epilobium sp.*). Several discrete patches of agrimony *Agrimonia eupatoria*, a wildflower indicative of alkaline soils was noted growing in more open areas along the track bed.

A mature stand of oak rich woodland was recorded to the east of the B4296, opposite Pontarddulais Show Ground (W4, Figure X). Other canopy species recorded included alder and ash with holly *Ilex aquifolium*, field maple *Acer campestre* and hazel *Corylus avellana* comprising the balance of the understory. Ground flora largely comprised of shade tolerant grasses and ivy *Hedera helix*.

The woodland block associated with Coed Bach Park (W5, Figure X) was more mature and fully established, with trees within these compartments regularly exceeding 12m in height, with girths in excess of 0.5m DBH. The composition of the woodland either side of the route, was oak rich, and incorporated extensive areas of alder in lower lying wetter areas, especially near existing drainage ditches. Several mature oak specimens directly overhang the proposed route, with their corresponding root system considered likely to be present beneath. The understory within the woodland block was floristically diverse and evenly spread. Scrub and shrub species recorded included elder *Sambucus nigra*, bramble *Rubus fruticosus*, field maple and hazel. An accurate assessment of ground flora was not possible owing to the timing of the assessment, however the route is likely to follow an existing mulched path which was found to support very little herbaceous or grass cover. Adjoining areas of less disturbed woodland supported indicators of ancient woodland including dogs mercury *Mercurialis perennis* and enchanter's nightshade *Circaea lutetiana*.

The woodland block to the west (W6, Figure X) was of a different, less established character to that within Coed Bach Park (W4). Mature alder (0.1-0.15m DBH) was the dominant tree species with ash also present throughout. The understory comprised a mixture shrub and scrub species (field maple, elder and alder *Alnus glutinosa*). Ruderal species such as common nettle *Urtica dioica* and willow herb *Epilobium sp.* were a common feature within the ground flora layer along with banks of Himalayan balsam *Impatiens glandulifera* (Invasive weed) to the west and clumps and patches of Japanese knotweed *Fallopia japonica* (Invasive weed) within the centre. A gas pipeline way-leave was responsible for the creation of a corridor of more open ground ran through the centre of the woodland block from north to south.

Option 2

Several blocks of mature broadleaved woodland are present along the proposed route. None of those are classified as Ancient Woodland.

The areas of woodland vary along Option 2 varied in terms of composition and character. For the purposes of clarity the location and description of the different woodland blocks is tabulated below;

Woodland Reference (see Figure X)	Central NGR:	Description	Section 7 Priority Habitat?
W7	SN 59972 02146	Oak rich. Understorey limited in terms of diversity and composition (bramble, honeysuckle <i>Lonicera periclymenum</i>), ground flora reasonable, relatively ruderal in character. Himalayan balsam present to the south-east	Yes
W8	SN 59697 02295	Small area. Oak rich. Some mature specimens (c.0.4-0.5m dbh) on embankment.	Yes
W9	SN 59720 02847	Mature oak rich. Alder, ash and field maple all present (0.15-0.2m dbh). Holly also locally abundant. Hazel present in understorey.	Yes

Table 3.1 – Broadleaved woodland compartments Option 2 – Grovesend to Pontarddulais

Option 3

This route incorporates the same areas of woodland as Option 2 – see W9 in Table 3.1 above.

Broadleaved plantation woodland

Option 1 and 1a

Even aged stands of mature planted native trees (c. 8-10m tall) were recorded as belts of screening planting either side of the B4096, to the east of the M4. Tree species noted included field maple, ash with occasional Scots pine *Pinus sylvestris*. A good range of mid and understorey species were recorded within habitat including hazel, common hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa* and bramble *Rubus fruticosus*. Ground flora species included male fern *Dryopteris filix-mas* within dense, unbroken mats of ivy *Hedera helix*.

Option 2

Broadleaved planting of a similar composition and age was recorded along the southern edge of Allt-Y-Graban Road, to the east of the underpass beneath the M4.

Broadleaved and scattered tree

Option 1

Free standing, mature trees were recorded within areas of dense scrub along the former railway line between Allt-Y-Graban Road to the south and the B4296 to the north. These were largely distributed either side of the former track bed and included a mixture of mature English oak *Quercus robur*, alder and willow *Salix sp.*

A single very mature, potential veteran oak tree was identified on the southern edge of Coed Bach Park. The tree was of large diameter (1.5m+ dbh) and showed signs of crown dieback, which is a common feature of ancient or veteran trees – Target Note 16, Fig. 1.4.

Option 2

All of the mature trees along the route were incorporated in to existing areas of scrub or woodland.

Buildings and Hardstanding

Several structures were recorded along the three route options, for clarity these are summarised in the table below;

Structure ID	Name	Route Option / NGR	Description
B1	Redundant agricultural shed	1 and 2 /NGR : SN 59773 00960	Corrugated metal shed. Exposed brick to east and southern elevation. Remote from proposed path.
B2	Allt-Y-Graban Road Bridge over former railway line	1 and 2 / NGR: SN 59552 01657	Brick and stone bridge. Minor defects in parapet walls. Single arch largely intact. Some ferns and other vegetation present
B3	Culvert along former railway line	1 / NGR: SN 59465 01899	Brick culvert, partially collapsed. Water free flowing. Approx. 0.75m (h) x 0.75m (w).
B4	Network Rail Signal Box	1 / NGR: SN 59234 02370	Brick built, flat felt covered roof. Superficially well sealed (not inspected in detail due to proximity to active railway line).
B5	Cattle pass beneath railway line.	1 / NGR: SN 59147 02384	Brick spandrel, stone parapet. Stone wing walls and abutment. South face lightly ivy clad. Underside of span well pointed, no major defects. North face lightly ivy clad, no major defects.
B6	B4296 bridge over railway line	1 / NGR: SN 59065 02408	Metal span and parapets. Abutments, wings and associated parapet walls are stone. No obvious defects, but could not be viewed in its entirety due to constraints of road and rail.
B7	B4296 bridge over M4	1 / NGR: SN 59195 02557	Concrete. Metal parapet. Not surveyed as unsafe to do so because of traffic.
B8	Road bridge over tributary	1 / NGR: SN 58826 03788	All concrete construction metal parapet. Stone abutments on either side: west face some gaps in stone work, appear likely to be subject to being overwhelmed by storm surge. East face not accessible.
B8	Allt-Y-Graban Road underpass beneath M4	2 / NGR: SN 59879 01866	All concrete construction. No obvious defects, except for expansion joints beneath main deck.
B9	Allt-Y-Graban Road Bridge over active railway line	2/ NGR: SN 60095 02007	Concrete construction. Minor defects in parapets. Restricted viewed as part of survey.
B10	Network Rail Signal Box	2 / SN 60025 02090	Brick walled, concrete tiled roof. Generally well-sealed. Open doorway ajar to south-east.

Table 3.2 – Structures along Option 1 and 2 – Grovesend to Pontarddulais

Hardstanding

Option 1 and 1a

The majority of the route is located on either former railway track bed, or unsurfaced earth tracks. The route will utilise, at least in part, existing areas of tarmac path between the B4296 bridge over the railway line (B6) and Coed Bach Park and then existing path along Tidal Reach.

Option 2

The path is due to be located along former railway track bed, road verge or through existing bare earth permissive routes.

Cultivated land: Amenity grassland

Option 1 and 1a

Areas of close mown, species poor amenity grassland ran parallel with the route within Coed Bach Park. Areas of amenity grassland included sports pitches and areas of formal recreational space. A common assortment of sown grass (e.g. perennial rye grass *Lolium perenne*) and herbaceous species (e.g. white clover *Trifolium repens*) were recorded within this habitat.

Option 2

A small area of amenity grassland of similar composition to those located along Options 1 and 1a, was noted within an area of public open space at the northern end of this route near Golwyg-y-Twr Road (NGR: SN 59728 02973).

Dense Continuous and Scattered Scrub

Option 1 and 1a

Dense scrub was the principal habitat along the former railway line extending north from Allt-y-Graban road to the B4296. This area of scrub was characterised by even aged, multi-stemmed specimens containing a mixture of oak, grey and goat willow *Salix cinerea*, *S. caprea*, silver birch *Betula pendula*, alder, blackthorn *Prunus spinosa* and European gorse *Ulex europaeus*. The dense scrub were continuous and regularly exceeded 6-10m in height. Ground flora beneath comprised a typical assortment of shade tolerant herbaceous and grass species including herb Robert *Geranium robertianum*, ground ivy *Glechoma hederacea* and wood avens *Geum urbanum*. Deeply shaded areas also supported dense banks and lines of pteridophytes including bracken *Pteridium aquilinum* and scaly male fern *Dryopteris affinis*.

Other banks and lines of scattered and dense scrub were distributed to the north of the B4296, adjacent to Coed Bach Park, with an extensive patch of willow scrub along the bank adjacent to Tidal Reach Road. These areas of dense scrub were populated by native shrub and tree species with little evidence of recent management, or disturbance. The stand of dense scrub north of the B4296 was noted as being species rich with five different woody species recorded, with the scrub along Tidal Reach likely providing an important buffer and visual screen to the estuary to the west.

Option 2 and 3

Several belts of dense and scattered scrub are located to the north and south of Allt-Y-Graban Road. The bank furthest west was willow dominated, with sections of ash, mature gorse, silver birch and oak. Dense scrub further east (towards the M4) comprised of a greater concentration of common hawthorn. Scrub to the east of the M4 was similar in composition with field maple and silver birch (8-10m) dominant. Patches of Japanese knotweed were recorded within the belt of dense scrub toward the active railway line. Dense and scattered scrub to the north of the existing railway line and beyond was dominated by mature birch, alder and field maple.

Dry Ditch

Option 1 and 2

A single section of wet ditch was recorded along the eastern edge of the former railway line to the south of Allt-Y-Graban road. This was comparatively narrow 1-1.5m width, 0.5m depth. The ditch was overhung in part by adjoining areas of dense scrub and broadleaved woodland. The ditch sides and base were populated by an assortment of grass and herbaceous species common to the adjoining areas of intensively grazed arable pasture to the east.

Dry heath/acid grassland

Option 1 and 1a

Patches of acid grassland characterised by abundant sheep's fescue *Festuca ovina* and tormentil *Potentilla erecta* supporting discrete patches of ericaceous shrubs including *Calluna vulgaris* were noted along the western edge of the disused railway line south of Allt-Y-Graban Road, within a larger area of semi-improved grassland (Target notes 34 and 36, Figure 1.1).

Option 2

Small drifts and patches of acid grassland and heath were identified along the route, these are described within the Other Habitat description below.

Intact Species Rich and Poor Hedgerow, including hedgerow trees

Option 1 and 1a

A series of agricultural hedgerows were identified extending east and west to of the former railway line north of Allt-Y-Graban Road. The majority of these were found to be species poor dominated and dominated by common hawthorn and blackthorn. Hedgerows considered to be of greater ecological importance included a tree lined hedge extending to the east, south of the current railway line (J2.3.2 pg 2, Figure 1.1). Further intact, closely clipped hawthorn rich hedgerow was noted along the eastern boundary of the show ground.

Option 2

No intact hedgerow was mapped along this route, all woody vegetation encountered is detailed within the scrub, or woodland descriptions above.

Lichen/bryophyte heath

Option 1 and 2

A dense matt of grazed *Cladonia* spp. incorporating clumps of field scabious *Knautia arvensis* were recorded adjacent to the areas of acid grassland/heath to the south of Allt-Y-Graban Road (Target note 35, Figure 1.1)

Option 2

No discrete lichen/bryophyte heath was recorded along Option 2.

Marsh/Marshy grassland

Option 1 and 1a

An extensive stand of rush rich, wet grassland was identified within the floodplain of the Loughor River, to the west of Tidal Reach at the base of the embankment. As well as common neutral grassland species (e.g. tufted hair grass, cocks foot *Dactylis glomerata*), indicators of consistently high water levels such as willow herb, soft and hard rush, as well as sedge were recorded. This habitat is also inundated with invasive weed (Japanese knotweed) and being encroached by scrub (European gorse).

Option 2

None recorded.

Other habitat – post-industrial mosaic (grassland, heath and scrub);

Option 1 and 1a

None recorded.

Option 2

An extensive mosaic of grassland, heath and native self-sett scrub was recorded within the grounds of former railway sidings, to the south-east of Pontarddulais (red fill, Figure 1.1 pg 7). The soils within this location appear to be highly mineralised (black and purple in colour), with bare ground making up a significant component of the ground cover. Heathland species noted growing along the alignment of the proposed route included common heather *Calluna vulgaris*, sheeps fescue *Festuca ovina* and lichen including dog lichen *Peltigera canina* and *Cladonia* spp.

Silver birch was the dominant scrub species along with patches of European gorse. To the north, the grassland became more neutral in character with a great concentration of finer leaved grass species and range of wildflowers including common bird's foot trefoil *Lotus corniculatus* and hawkweed *Hieracium* sp.

Semi and poor semi-improved grassland

Option 1, 2 and 3

Fields of intensively grazed sheep pasture were located either side of the proposed route associated with the different route options. As these areas of habitat were relatively remote from the alignments proposed detailed floristic surveys of these fields were not undertaken, however based on the site walkover, all of them showed signs of improvement, with herbaceous cover generally found to be low and restricted to productive and palatable species (e.g. white and red clover *Trifolium pratense*). Grassland species noted as part of the assessment also included those suited to agricultural management (e.g. perennial rye grass *Lolium perenne*, red fescue *Festuca rubra* and Yorkshire fog *Holcus lanatus*).

Running Water

Option 1 and 1a

A narrow 'v' shaped channel supporting running water connected within the brick culvert beneath the former railway line (B3). The channel was narrow (0.5m wide) and fast flowing. The cover of submerged, emergent or floating leaved vegetation was noted as being low with pendulous sedge *Carex pendula* the principle species recorded.

Another watercourse was recorded north of the B4029, adjacent to the cemetery within Pontarddulais. This was also free flowing (0.02-0.08m depth) and flowed beneath the road. The watercourse formed part of the field boundary and lined by mature alder and sycamore, with field maple and elm *Ulmus* sp. below. Banks of the ditch were bramble lined. No obvious signs of pollution were identified.

A tributary of the Loughor River passed beneath the route along Tidal Reach. The watercourse was canalised both sides of the route and measured approximately 5m width. Water was free flowing and relatively shallow (0.2-0.3m depth).

Option 2

A single narrow watercourse was identified adjacent to the existing railway line. The stream was heavily shaded by dense scrub and was approximately 1 wide and 0.4m deep.

Option 3

A wet ditch was recorded approximately 4m east from the existing track. The ditch was heavily overshadowed and supported free flowing water with a depth of 0.2-0.3m. The channel was relatively narrow (1m width).

Standing water

Option 1 and 1a

No areas of standing water were recorded as part of the assessment.

Option 2

A single pond (approximately 100m²) was recorded within the former railway sidings towards the northern end of this route option. The pond appeared to be rain and groundwater fed and supported a good range of submerged and floating leaved species including stoneworts *Chara spp*, Potamogeton *Potamogeton sp*, lesser spearwort *Ranunculus flammula* and deer grass *Eleocharis palustris*. No obvious signs of pollution (e.g. surface films, or high levels of suspended sediment) were noted within the waterbody.

Swamp

Option 1 and 1a

Dense stands of common reed *Phragmites australis* were recorded at the base of the slope to the west of Coed Bach Park and between areas of dense scrub along Tidal Reach.

Option 2

None recorded.

3.1 Importance of habitats present

Several Habitats of Principal Conservation Importance, listed under Section 7 of the Environment (Wales) Act were recorded along the route. The following table should be studied in conjunction with Figures 3.1.1 and 3.1.2.

Habitat of Principal Conservation Importance listed under Section 7, Environment (Wales) Act, 2016	Option 1 and 1a	Option 2	Option 3
Dry shrub heath	Patches south of Allt-Y-Graban road	Patches south of Allt-Y-Graban road	None
Hedgerows	Field boundaries north of Allt-Y-Graban road and bounding showground	None	None
Lowland dry acid grassland	Patches south of Allt-Y-Graban road	Patches south of Allt-Y-Graban road	None
Lowland meadow	South of Allt-Y-Graban road	South of Allt-Y-Graban road	Along existing track
Lowland mixed deciduous woodland	W1, W2, W3, W4, W5*, W6	W7-W9	W9
Open mosaic habitats on previously developed land	None	Former railway sidings, north of active railway line	None
Reed bed	Along western edge of Tidal reach road	None	None
Rivers and streams	Drainage channel beneath B3, watercourse crossing B4029 near showground, tributary to Loughor River.	Small drainage ditch beneath active railway line	Wet ditch 4m east of track
Standing and open water	None	Pond within former railway sidings, north of active railway line	None

Table 3.1.1 – Summary of Section 7 habitats along Option 1, 2 and 3 of proposed traffic free route between Grovesend and Pontarddulais * - Ancient Semi-Natural Woodland

The mosaic of semi-natural habitat present along the former Waungron to Gowerston railway line is considered to have high importance for nature conservation locally. It has a high species and structural diversity and forms part of a series of interlinked natural corridors. Within the mosaic habitats of greatest importance are the areas of woodland, running water, mature hedgerow and dry shrub heath.

The importance of the mature woodland within Coed Bach Park (W5) is recognised in its designation as ancient woodland, with the other woodland blocks mapped as part of this assessment qualifying as priority habitat and therefore worthy of conservation and enhancement. It should be noted that there is an existing woodland path within Coed Bach Park which could be repurposed to allow for improved walking

and cycling opportunities. Other paved routes within lower quality habitats are also present, these could also be enhanced.

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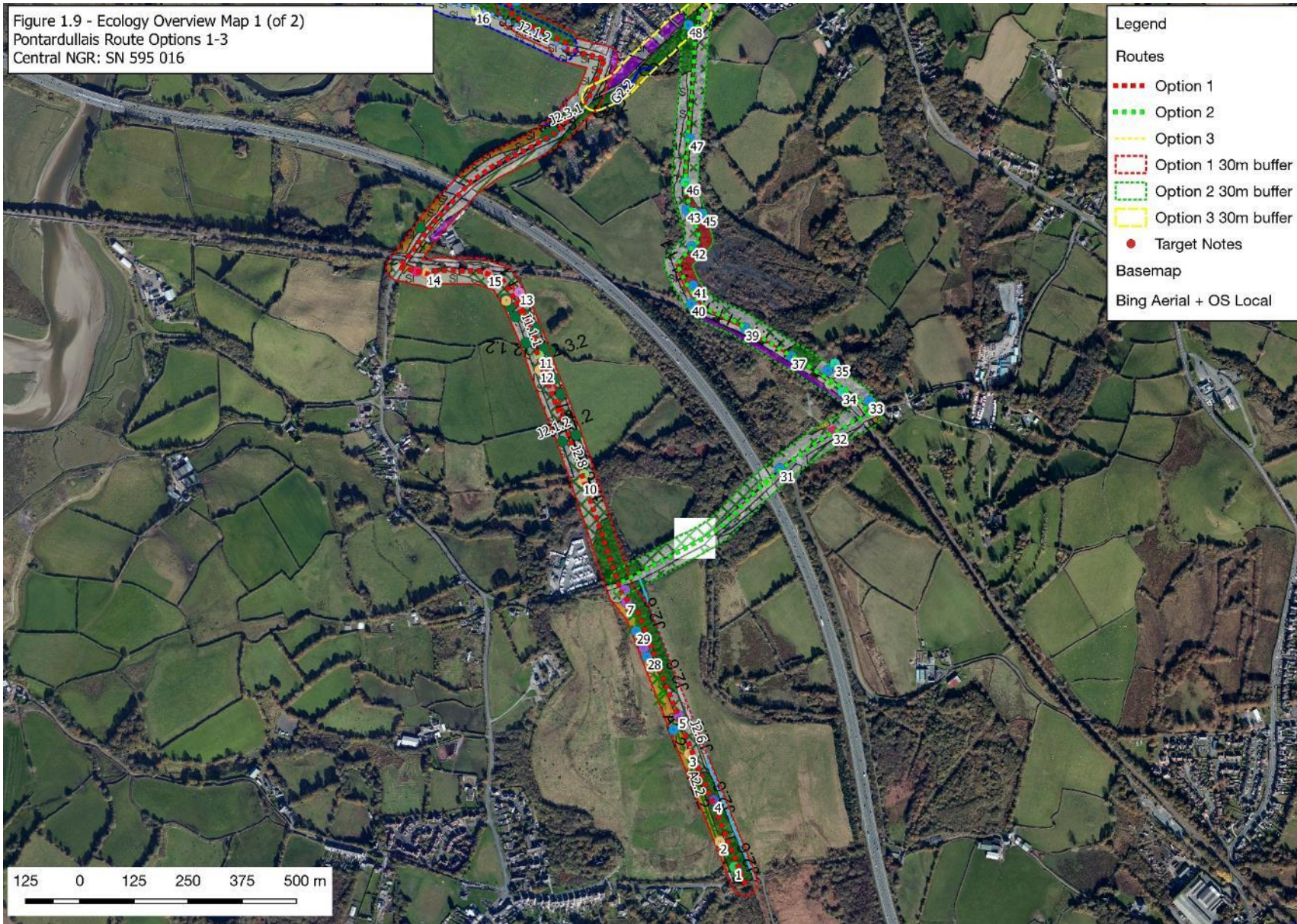


Figure 2.0 - Ecology Overview Map 2 (of 2)
 Pontarddulais Route Options 1-3
 Central NGR: SN 594 029

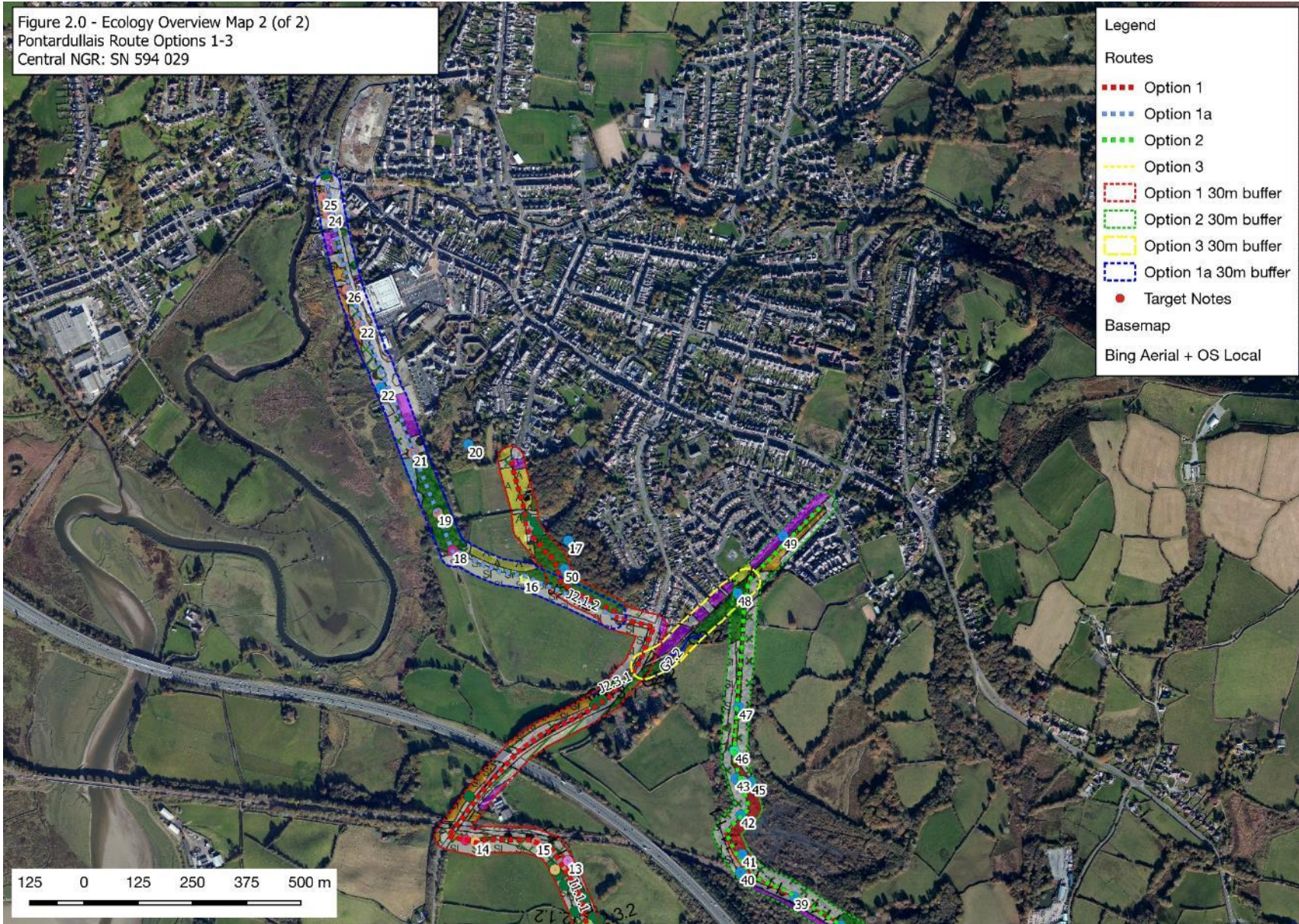


Figure 1.8 - Route Option 2 and Option 3. Ecology Survey.
 Suth of Golwg-Y-Twr to Birch Rock Road
 Central NGR: SN 597 029

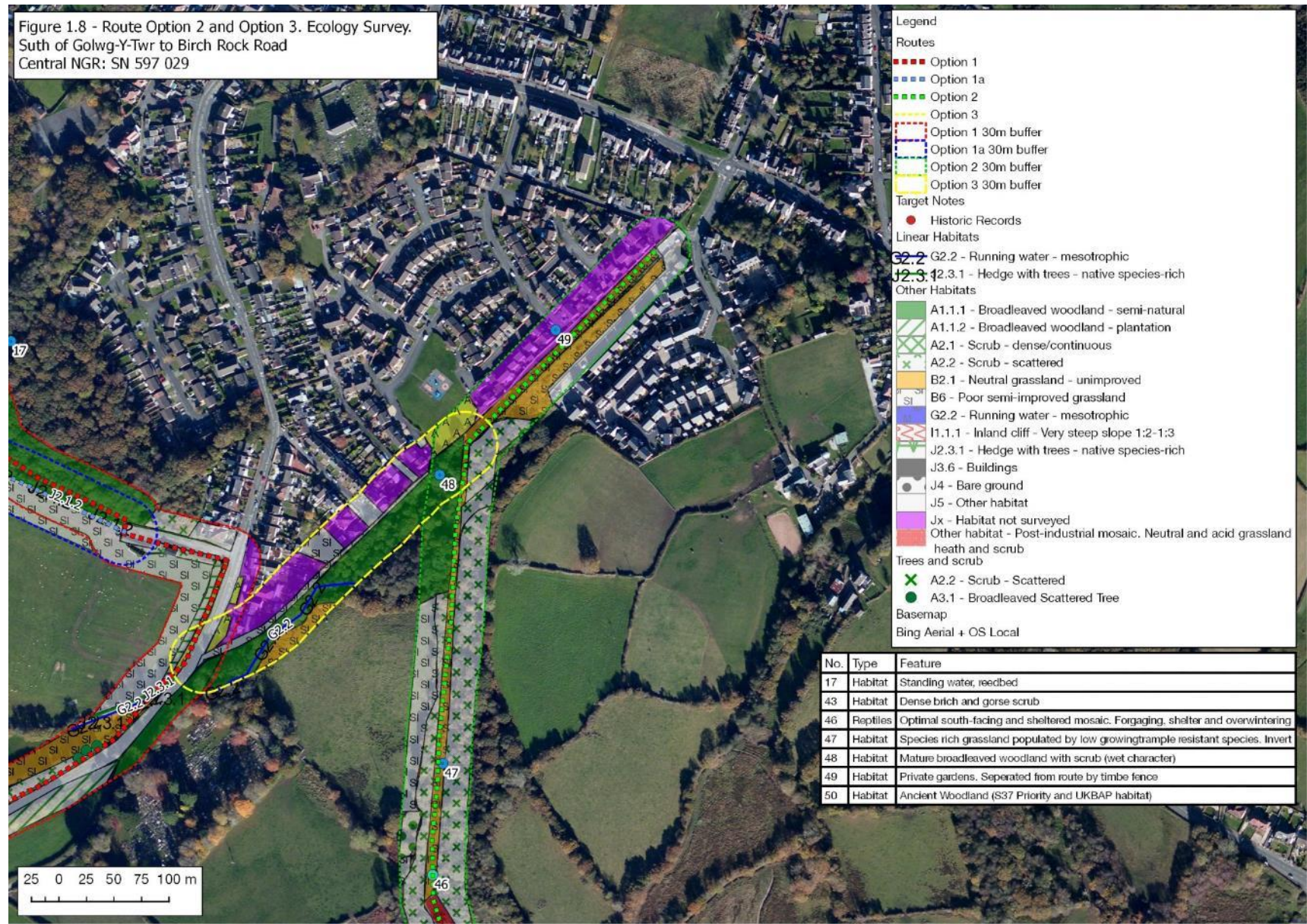
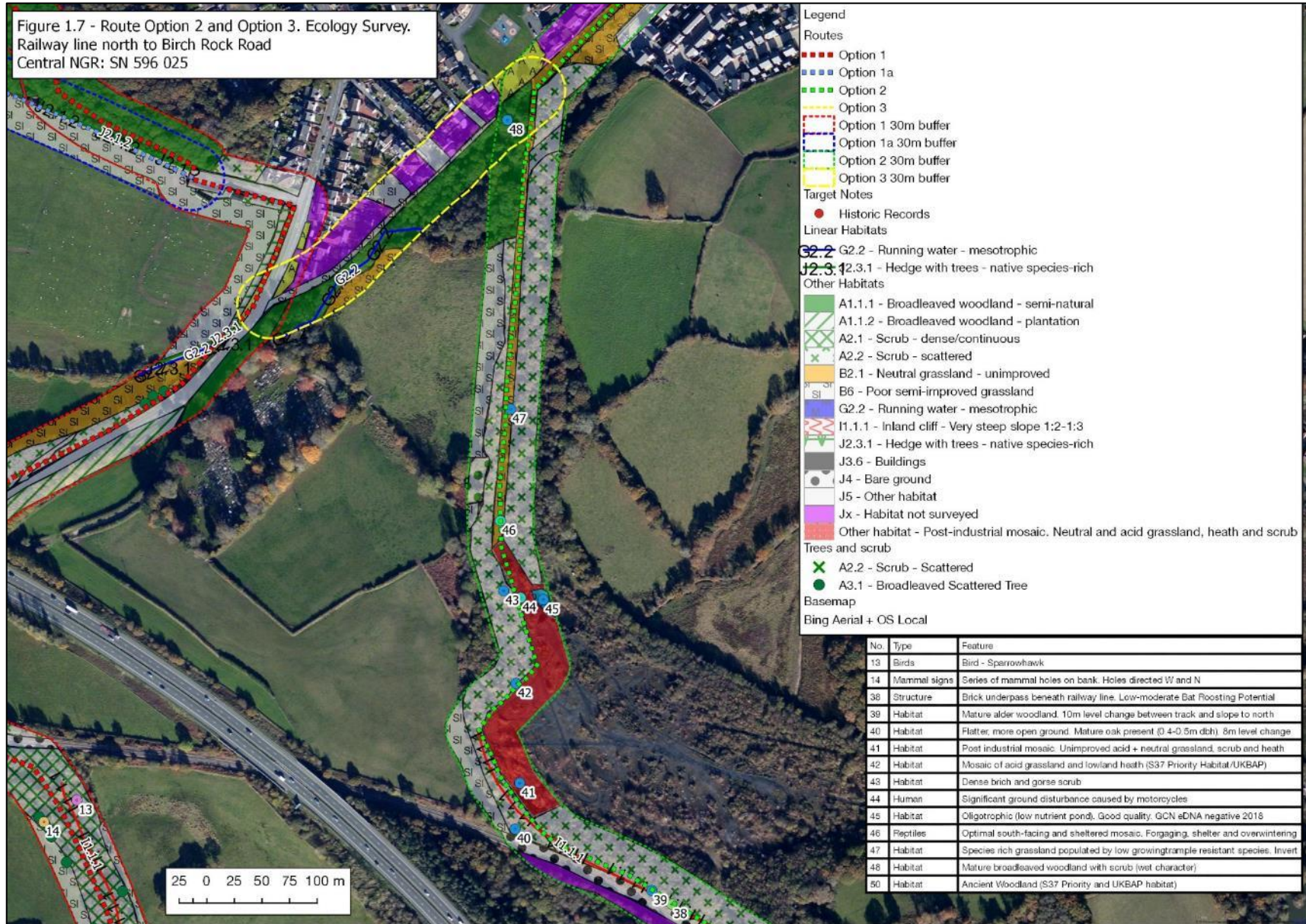


Figure 1.7 - Route Option 2 and Option 3. Ecology Survey.
 Railway line north to Birch Rock Road
 Central NGR: SN 596 025



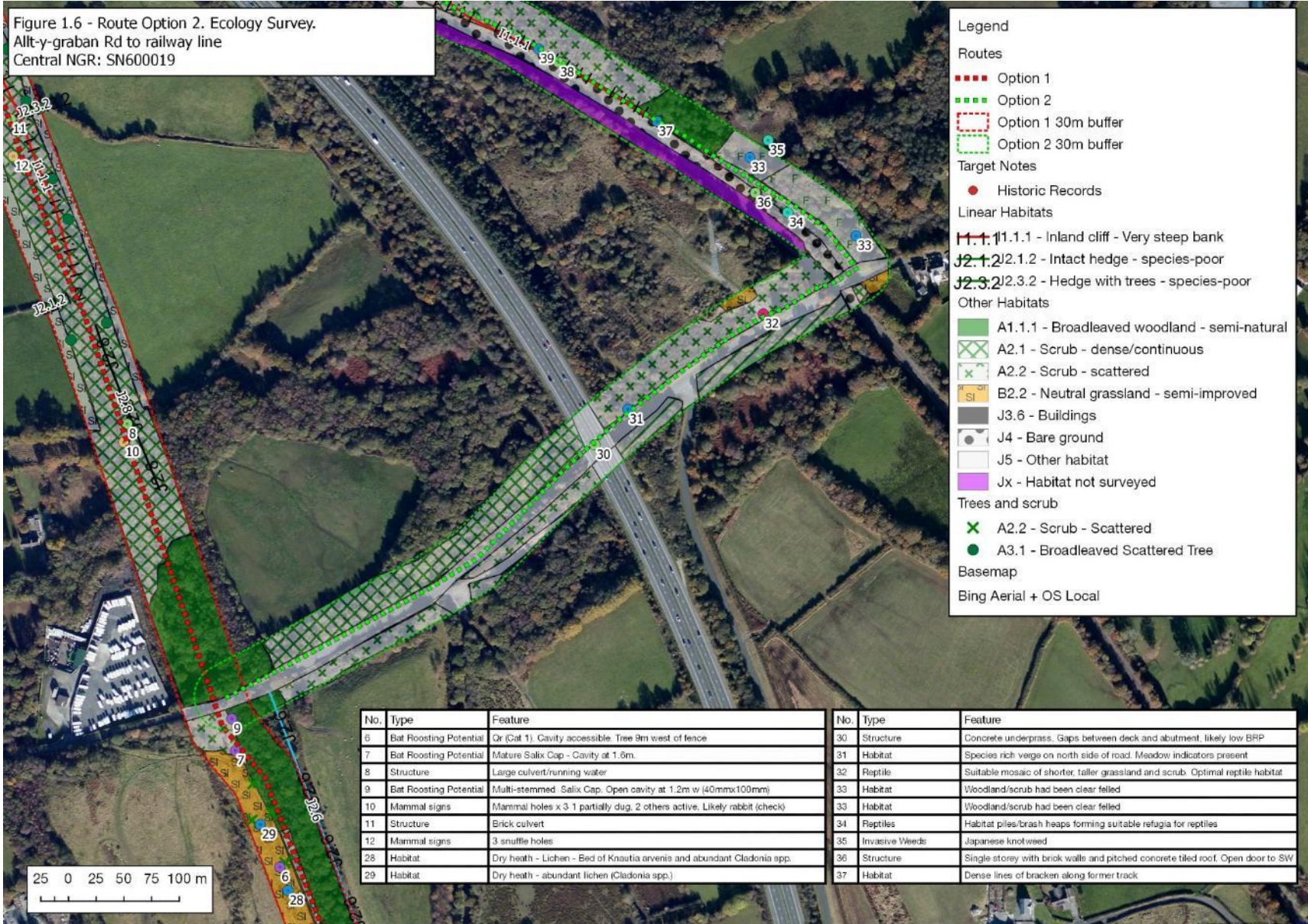


Figure 1.5 - Route Option 1a (northern end). Ecology Survey.
 North along way-leave and then along Tidal Reach
 Central NGR: SN 588 035

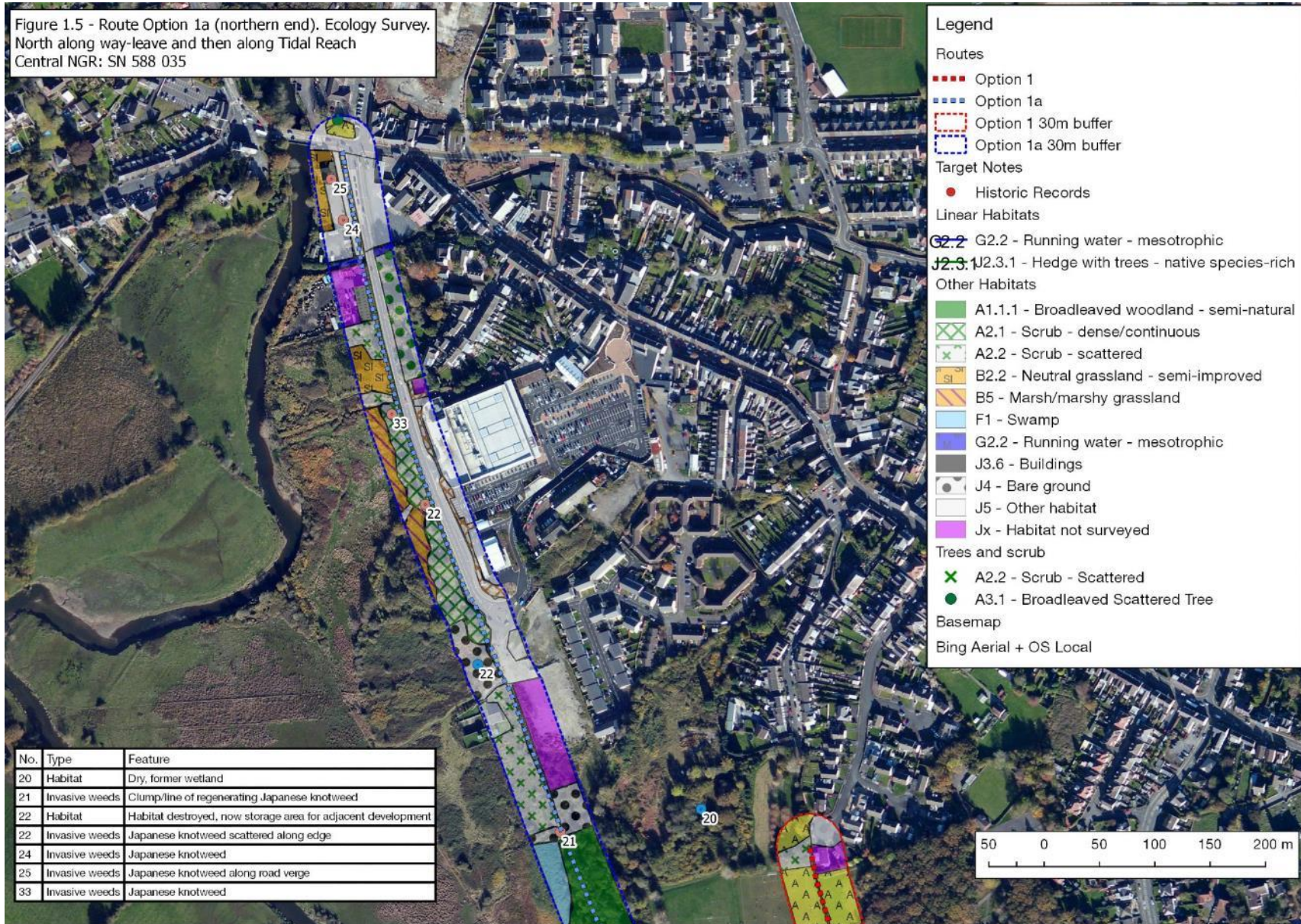


Figure 1.4 - Route Option 1 and Option 2 (southern end).
Ecology Survey.
Coed bach Park to Glasfryn Road
Central NGR: SN 592 031

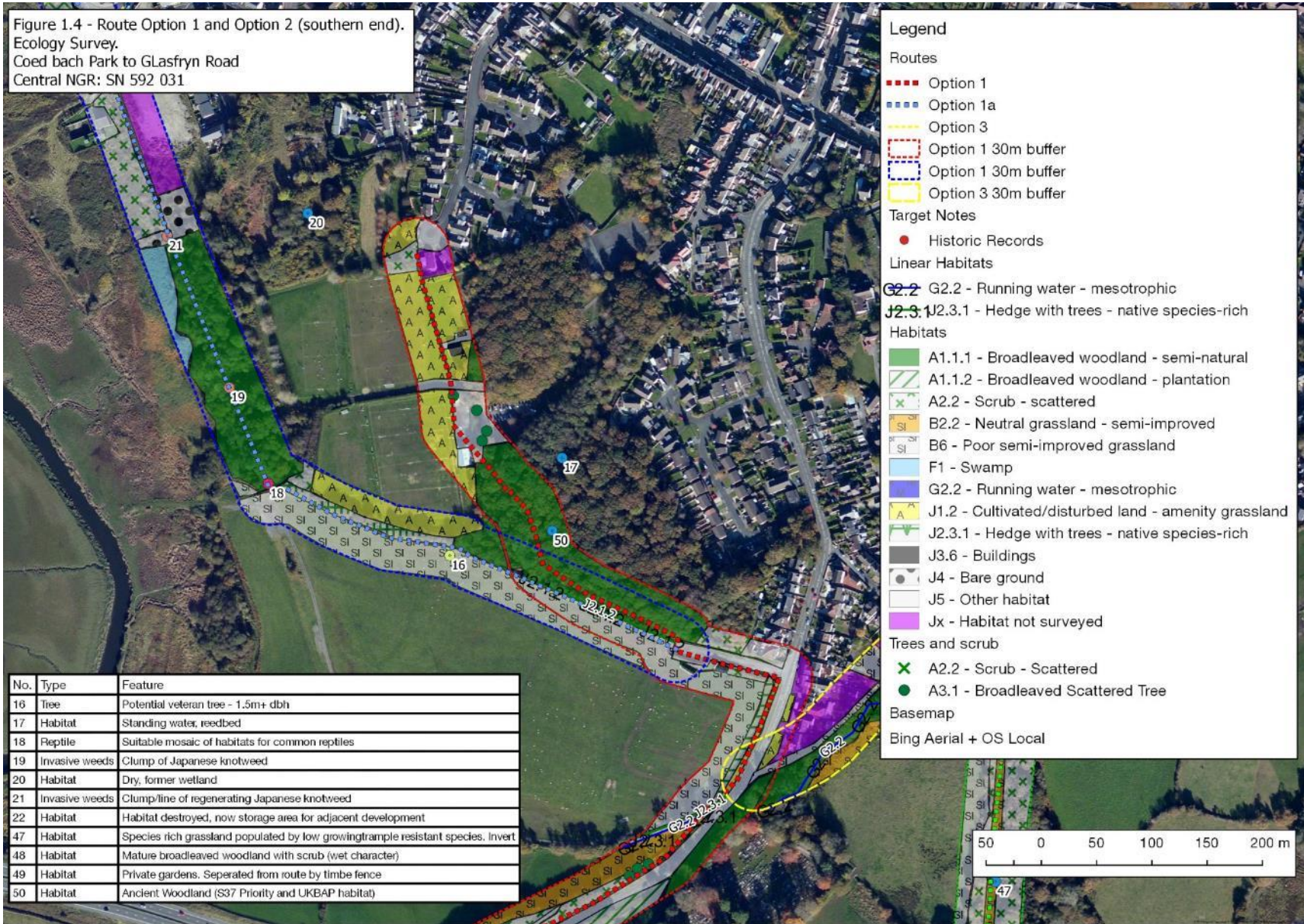
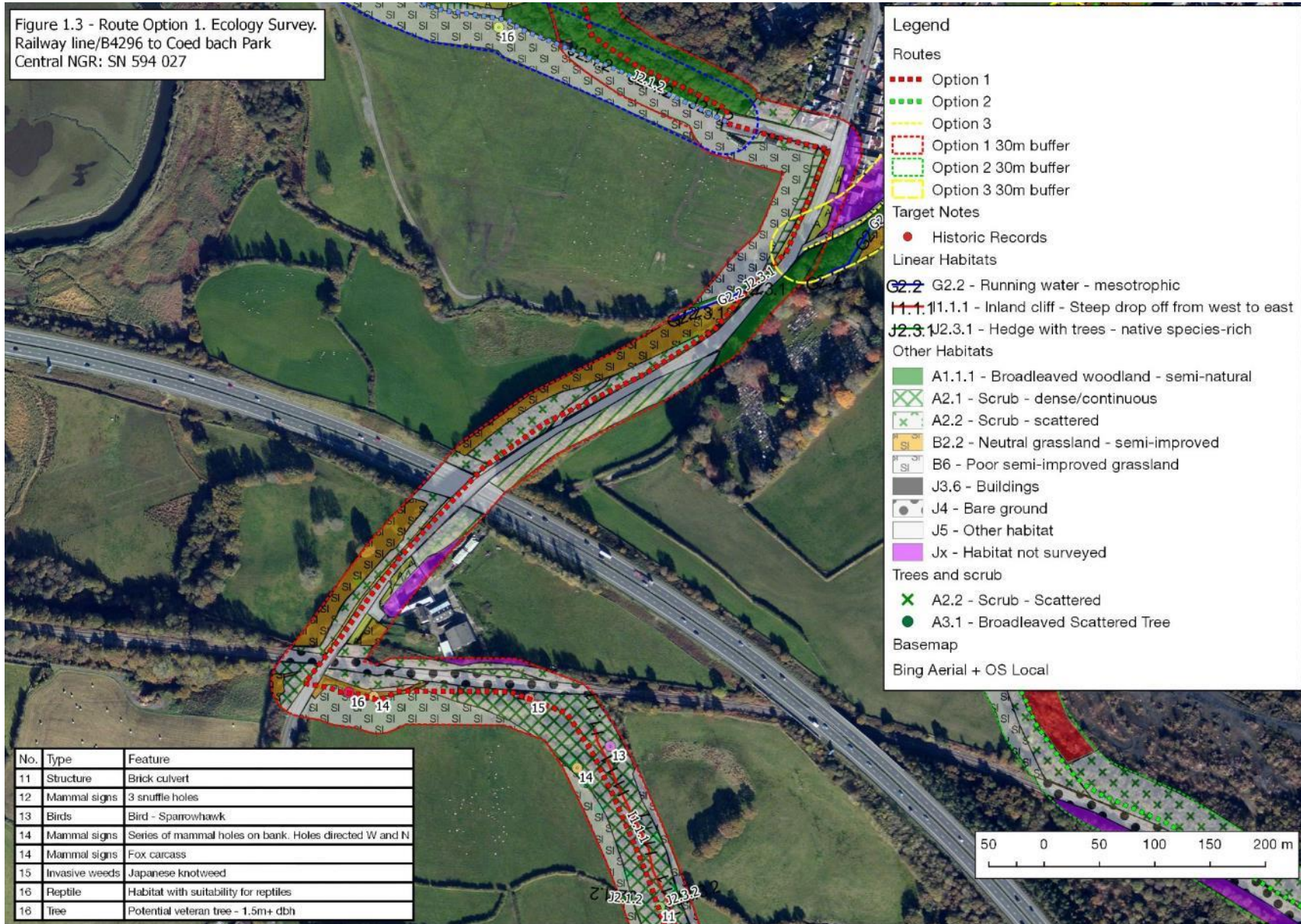
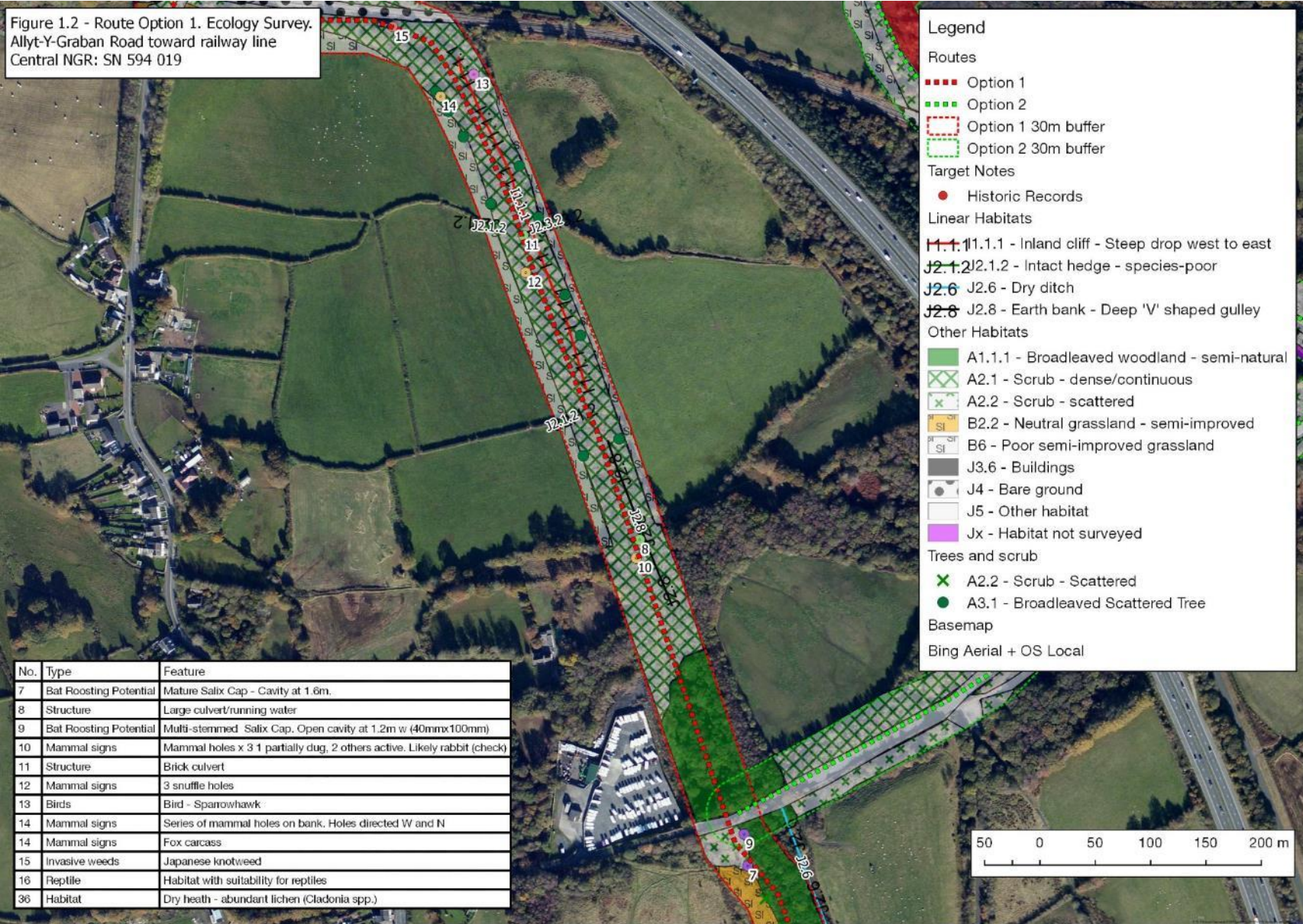
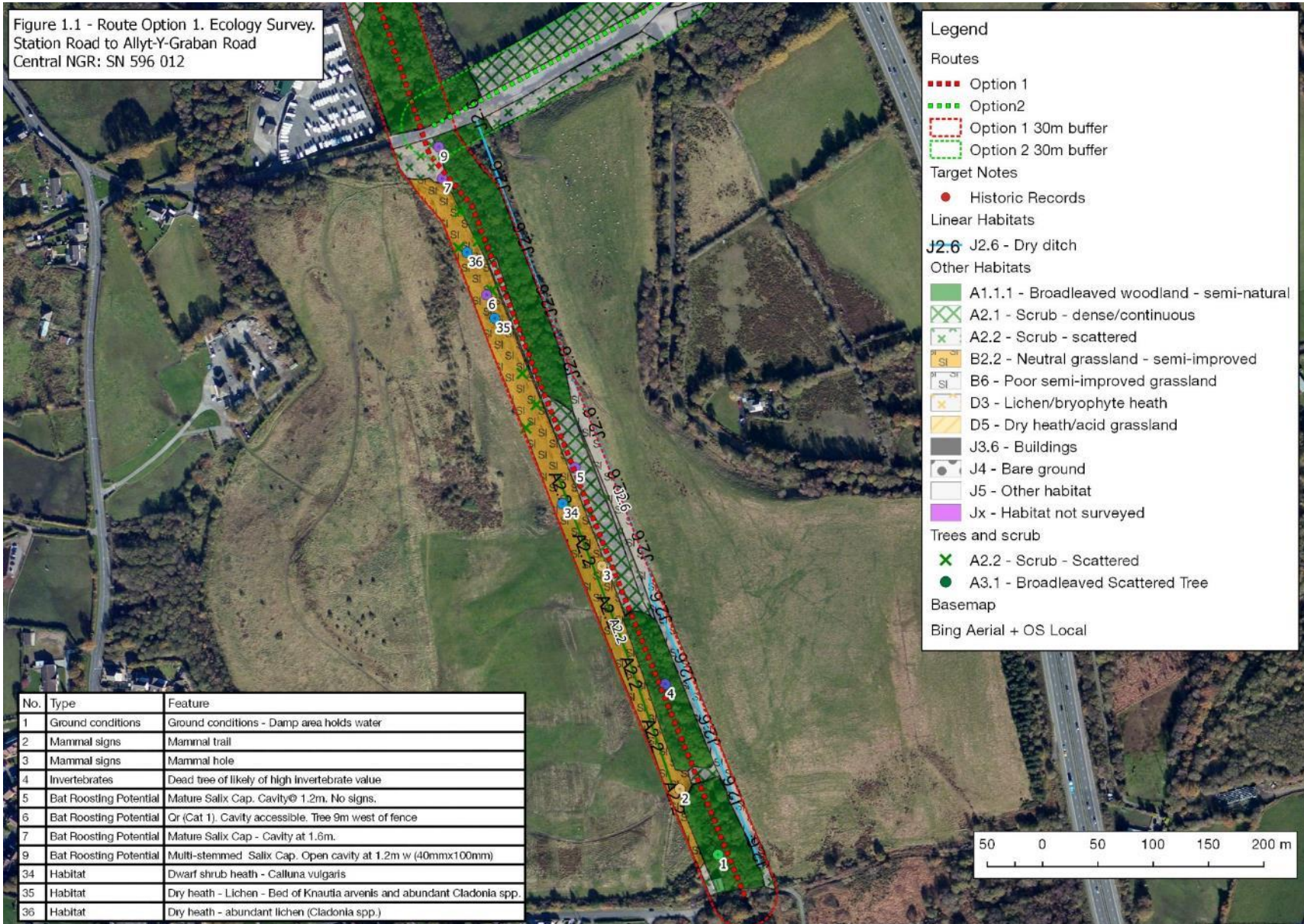


Figure 1.3 - Route Option 1. Ecology Survey.
 Railway line/B4296 to Coed bach Park
 Central NGR: SN 594 027







Drawing 1.1: Phase 1 Habitat 1 Map

3.2 Fauna

Amphibians and Reptiles

No records for amphibian were reported by LERC.

An eDNA assessment of Pond 1 (within 30m of Option 2, see Target Note 45, Fig. 1.7) was completed in June 2018. The eDNA returned a negative result (**Appendix 1**), Based on this assessment, great crested newt are considered likely to be absent from Pond 1.

Another potential water body marked on the OS Map was identified in the north-western corner of Coed Bach Park (see Target Note 20, Figure 1.4 above). This pond was visited in June 2018 and was found to be dry, with little sign of significant or sustained inundation, which is typically a requirement for amphibians to breed successfully.

A further pond (not shown on the OS map) was identified within Coed Bach Park (Target Note 17, Figure 1.4 above). This pond was not subject to an eDNA assessment as the site visit was timed outside of the approved window. Based on the high quality of this pond in terms of its condition and range of vegetation it supported, the pond is considered likely to provide suitable breeding grounds for amphibian.

The areas of woodland, dense scrub and semi-improved grassland all provide high quality foraging habitat for amphibian species.

LERC provided records for grass snake within 1km of the various route options. The woodland and dense scrub habitats which are common to all three route options are considered likely to be of lower value as potential basking or foraging sites for reptiles with the exception of the wetter/damper, slightly more open areas within Coed Bach Wood (W5) and adjoining dense scrub and woodland to the west (W6), especially along the western edge of Tidal Reach Road.

Optimal foraging and basking habitat was identified along the southern and western fringes of the stands of woodland and dense scrub adjacent to the active railway line associated with Option 2. The mosaic of bare ground, grassland and scrub associated with the former railway sidings to the north of the active railway line were also considered to provide a range of sheltered and more open areas ideal for a range of reptile species to forage, bask and shelter amongst. This is principally due to their structural diversity and the high level of invertebrate biomass they are likely to support.

Suitable overwintering habitat in the form of deadwood and vegetation piles were noted within the areas of dense scrub and woodland along all of the proposed route options.

Birds

LERC provided records of a large variety of bird species including seven species afforded additional protection whilst nesting under Schedule 1 of the Wildlife and Countryside Act (1982) and species recognised as being a conservation priority through their inclusion in Section 7 of the Environment (Wales) Act.

Species likely to be of relevance to the three route options, are those associated with woodland and parkland habitats including red kite *Milvus milvus*. It is likely that several of these species are resident within woodlands and areas of dense scrub along the various route options.

A variety of bird species were noted incidentally as part of the assessment, these observations are detailed in the table below.

Common name	Scientific Name	RSPB Status
Sparrowhawk	<i>Accipiter nisus</i>	Green
Greater spotted woodpecker	<i>Dendrocopos major</i>	Green
Robin	<i>Erithacus rubecula</i>	Green
Chaffinch	<i>Fringilla coelebs</i>	Green
Jay	<i>Garrulus glandarius</i>	Green
Great tit	<i>Parus major</i>	Green
Coat tit	<i>Periparus ater</i>	Green
Chiff-chaff	<i>Phylloscopus collybita</i>	Green
Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber
Wren	<i>Troglodytes troglodytes</i>	Green

Table 3.2.1: List of bird species recorded incidentally in October 2018 along Options 1, 1a, 2 and 3 of proposed new traffic free route between Grovesend and Pontarddulais.

A large variety of different habitats are present near the route, most of which could be used by foraging, nesting and roosting birds. Habitats of particular note for nesting birds along this route are the dense scrub, scattered trees and woodland.

Fish

LERC provided records for Allis shad and Twaite shad associated with Bury Inlet SSSI to the west. Allis shad and Twaite shad use freshwater habitats to spawn, currently comparatively little is known about their precise habitat requirements. Unlike salmonid species the two shad species do not travel, along or utilise narrow streams³.

Based on these conclusions the majority of the watercourses mapped are considered unlikely to support these species, the single exception to this is the watercourse which flows beneath the bridge along Tidal Reach (coinciding with Option 1). This watercourse connects with the adjacent estuary where both species have been recorded historically.

It is possible that shad and other migratory species may choose to move through this watercourse (due to lack of migratory barriers), although the locally canalised habitats associated with the bridge are considered unlikely to provide suitable spawning or nursery grounds for these species.

Invertebrates

The LERC provided records of 26 different nationally notable species including five Red Data Book species, all classified as 'vulnerable'.

The aquatic and wetland habitats, mature woodland compartments and small number of mature scattered trees located in the survey area are likely to be important for invertebrates and could support notable species.

The mosaic of grassland, heathland, scattered scrub and lichen along the western edge of the former railway embankment south of Allt-Y-Grabau Road (Option 1 and 2), as well as post-industrial mosaic to the north of the active railway line along Option 2, also likely to provide valuable foraging and potentially breeding grounds for a range of invertebrates, especially as areas are comparatively species rich, structurally diverse and largely undisturbed.

³ English Nature (2000) Ecology of the Allis and Twaite Shad <http://publications.naturalengland.org.uk/file/111013>

Significant deadwood habitats were noted within the blocks of woodland north and south of Allt-Y-Graban Road. Hanging deadwood was also noted on several of the mature trees within these compartments.

Habitat piles and lying deadwood was also noted within the stand of mature semi-natural woodland within and bounding Coed Bach Park. These habitats have the potential to support a number of important sacrophyllic (deadwood loving) beetle species.

Mammals (excluding bats)

Records for two protected and notable mammal species were identified by the LERC within the 1km search area. Species reported included otter and water vole.

No records of badger, hazel dormouse, polecat *Mustela putorius*, hedgehog, stoat or weasel were returned as part of the search.

The balance of records related to otter. No signs of otter activity were found as part of the assessment, although it should be acknowledged that a detail search for signs of these species was not undertaken. The majority of watercourses were considered unlikely to provide suitable foraging, or commuting grounds for these species as they were relatively narrow, supported low water levels with significant levels of potential prey species considered likely to be absent.

No evidence of water vole was found as part of the assessment, however access to several of the watercourses was restricted and a detailed assessment was not completed.

Based on the a visual assessment of habitats along the different watercourses mapped, they were considered unlikely to provide optimal foraging grounds for these species owing to their relatively low water levels and lack of palatable herbaceous and grass species along the banks.

No evidence of hazel dormouse was found (e.g. typically chewed hazel nuts), but a detailed assessment for these species was not undertaken as part of the assessment. Habitats considered to be of higher suitability included the mature woodland and scrub habitats. Those associated with the former railway corridor north and south of Allt-Y-Graban road appeared likely to provide a good potential dispersal route for dormouse. However, the comparatively species poor composition of these habitats combined with the relatively low cover of other fruiting species (e.g. bramble, honey suckle) may suggest that these habitats may not provide ideal foraging opportunities for these species.

Suspected signs of badger activity including sett entrances and snuffle holes were recorded and mapped as part of the assessment. Two groups of mammal holes were identified in association with the former track bed and western face of the former railway line to the north and south of Allt-Y-Graban Road (Target Notes: 3, Figure 1.1 and 14, Figure 1.2). A cluster of snuffle holes were also noted (Target Note 12: Figure 1.3). Evidence of rabbit and fox activity was also recorded.

No evidence of hedgehog, polecat, stoat or weasel was discovered as part of the assessment, although an exhaustive search for evidence of these species was not undertaken. Suitable habitats for these species including for the purposes of foraging and sheltering was identified along the three route options assessed.

Bats

All of the habitats along the route supported linear and point features of value to foraging bats. Likely hotspots of bat activity were associated with:

- Mature woodland blocks (W1-W9)
- Dense scrub habitats
- Intact hedgerows

- Watercourses

Connectivity across the landscape and between these hotspots was good, with a lack of street lighting, or other artificial lighting sources providing suitable conditions for rarer, light sensitive species including lesser and greater horseshoe to forage.

Trees with bat roosting potential were identified along both route options, with concentrations within Coed Bach Wood (W5) and woodland north and south of Alt-Y-Graban road (W1-3). The locations and relative suitability as bat roosting sites are indicated on Figures 1.1.1-1.1.19 above.

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4 Discussion and Assessment of Likely Impacts

4.1 Proposed Works

The proposal is to create a 3m width path with an all-weather surface where possible, with minimum head clearance of 5m. It is anticipated that the minimum work footprint to create this path would be 5m when machinery is being used or 3m where sections are being built by hand.

In the long term, the minimum level of vegetation management that would be required would be mowing 0.5m either side of the path to prevent long vegetation fall onto and obstructing the path (the frequency of mowing would depend on the vigour of the growth of vegetation) and occasional trimming of shrubs and trees to prevent branches impeding access along the path.

At this stage, no additional external lighting has been proposed. Site compounds to allow for storage of equipment and materials are likely to be required, although their precise size and location are yet to be confirmed.

Based on the proposed dimensions detailed above and habitats mapped, the various options will result in the following loss (temporary and permanent) of semi-natural habitat:

- Option 1 – 1.65ha
- Option 1a – 0.17ha
- Option 2 – 1.4ha
- Option 3 – 0.15ha

Impacts associated with Option 1 and 2 will principally within semi-natural habitat including dense scrub and woodland along the former railway line north and south of Allt-Y-Graban Road, as well as existing road verge. Option 3 will lead to the loss of semi-improved grassland and small areas of broadleaved woodland. The grassland within this location currently affords access to residential properties along the B42096 and Park Terrace.

There is scope to reduce the impact of the scheme within woodland and scrub habitats through detailed topographical mapping and design leading to the utilisation of previous track bed, which supports trees and scrub which are less mature.

This section considers the potential impacts of the proposal on designated nature conservation sites, habitats and protected and notable species. It also discusses whether these considerations are likely to form a constraint, or a barrier to the project.

4.2 Nature Conservation Sites

None of the options will directly impact upon any nationally or internationally designated nature conservation sites as they are all at least 750m away from the boundaries of these sites, with no significant connectivity between.

Option 1 includes works along Tidal Reach Road. Path works in this location will relate to re-purposing of an existing 3m width tarmac path and as such, although located near to the Loughour Estuary (which itself connects within other estuarine habitats incorporated within Carmarthen Bay and Estuaries SAC) will not impact upon this feature. As a result of this conclusion and the reasonable spatial separation between the other route options and the boundaries of nationally and internationally designated sites in the local area, no significant indirect impacts on these sites are anticipated.

The scheme if properly implemented and supported with educational material, may have scope to reduce visitor pressure on adjoining estuarine habitats by providing alternative recreational opportunities. A reduction in visitor pressure (e.g. trampling, littering, incidental disturbance of wildfowl) would have a positive (non-significant) effect on these sites.

The route options will have a direct and indirect adverse effects on a series of existing non-statutory sites of nature conservation interest in the absence of mitigation, the anticipated impacts and effects are summarised in the table below:

Site of Interest to Nature Conservation Interest	Option likely to give rise to an impact	Anticipated impact	Likely effect in absence of mitigation
Waugron Marsh SINC No.303	Option 1	Direct and indirect impact. Permanent and temporary loss of broadleaved woodland and species rich scrub. Potential disturbance and compaction of adjoining woodland soils, spreading of existing invasive weeds present in this location. Fragmentation of existing corridor, increased edge effects on belt of woodland to west of new path.	Adverse effect (significant) due to loss of 0.15ha of woodland/scrub within SINC boundary. Approximately 1.32ha of broadleaved woodland/scrub mapped by LERC. c.11.4% of mapped area would be lost, or damaged in the absence of mitigation. Total designated area – 34ha. Total loss within context of site (0.00004%).
Coed Bach Park SINC No.384	Option 1a	Direct and indirect impact. Disturbance and potential damage to ancient woodland trees and soils by machinery if works exceed edge of existing mulched path/materials stored in appropriately or soils are compacted. Potential pollution incidents. Introduction of invasive species. Minor disturbance of nesting birds including designating species if construction/vegetation	Significant adverse effect. Damage to key designating component - ancient woodland (which is classified as an irreplaceable habitat ⁴). c.0.0675ha to be damaged. Total area of c.3.3ha of ANSW mapped by LERC. Approximately 2.05% mapped ASNW habitat to be impacted.

⁴National Planning Policy Wales: December 2018 Paragraph: 6.4.26

Site of Interest to Nature Conservation Interest	Option likely to give rise to an impact	Anticipated impact	Likely effect in absence of mitigation
		clearance completed during bird nesting period.	
Coed Bach Park SINC No.384	Option 1	Indirect impact. Works within 15m of woodland edge to south could lead to compaction of roots belonging to trees within adjoining areas of Ancient Semi-Natural Woodland	Adverse effect (significant). Compaction of soils and root systems, harming trees within adjoining areas of ancient woodland.
Loughor to Penllergaer Railway line. SINC No. 376	Option 2	Direct impact. Temporary and permanent loss of scrub and woodland habitats within SINC boundary. Potential disturbance and compaction of adjoining woodland soils.	Adverse effect (significant). There is a significant level change the existing railway line and the remainder of the proposed route options which extends off to the north. Significant ground remodelling likely to be required to form suitable gradient for traffic free route. These works will likely lead to the temporary loss of approximately 0.375ha of habitat mapped as "continuous semi-natural linear vegetation". This represents c.1.35% of designated habitat.
Waungron to Gowerton Line SINC. 334	Option 1	Direct and indirect impact. Temporary and permanent loss of scrub and woodland habitats within SINC boundary. Potential disturbance and compaction of adjoining woodland soils.	Adverse effect (significant) 0.81ha of woodland/dense scrub be permanently or temporarily lost. Total mapped area of these mapped areas within designation is 24.03ha. c.3.4% of designated habitat to be impacted by the proposals.
Waungron to Gowerton Line SINC. 334	Option 2	Direct and indirect impact. Temporary and permanent loss of scrub and woodland habitats within SINC boundary. Potential disturbance and compaction of adjoining woodland soils.	Adverse effect (significant) 0.375ha of woodland/dense scrub be permanently or temporarily lost. Total mapped area of these mapped areas within designation is 24.03ha. c.1.6% of designated habitat to be impacted by the proposals.
M4 Corridor	Option 1	Minor direct and indirect impact.	Minor adverse effect (non-significant).

Site of Interest to Nature Conservation Interest	Option likely to give rise to an impact	Anticipated impact	Likely effect in absence of mitigation
SINC. 238.		Temporary and permanent loss of scrub and tree along edge of B4096 to allow widening of existing footpath. Potential disturbance and compaction of adjoining soils within root protection areas of trees to be retained.	Anticipated loss or damage of 0.071ha. Total mapped area is 92.3ha. c.0.08% of designated habitat to be impacted by the proposals).

Table 4.2: Assessment of likely impacts and effects on non-statutory nature conservation sites along Options 1, 1a, 2 and 3 of proposed new traffic free route between Grovesend and Pontarddulais.

4.3 Plants and Habitats

Path surface is absent along the majority of the proposed route, permanent habitat loss along these sections will not exceed 3m width.

Temporary habitat disturbance is likely to be associated with clearing back of vegetation on either side to allow construction access and to allow the establishment of a corridor allowing 5m clearance above and a 0.5-1m wide verge on either side of the new path.

The setup and operation of a construction compound may also be likely to lead to temporary habitat loss. The habitats immediately adjacent to the new path are also likely to be subject to greater management to prevent vegetation encroaching the path.

Proposed works may be situated within the root protection zones of mature trees and in close proximity to wetland habitats.

No information has been provided in relation to the need for a site compound or storage of materials. These would cause some temporary habitat disturbance. The long-term impact of this temporary disturbance is dependent on the type of habitat that would be affected.

4.4 Fauna

This section discusses the likelihood of protected or notable fauna occurring at the site and assesses the potential for impacts to occur from the proposed works. This assessment takes into account species with statutory protection and species afforded protection through the Environment (Wales) Act, 2017, enforced through the planning process. Where appropriate other notable species are considered.

4.4.1 Amphibians

The field surveys, have confirmed that great crested newts (and other protected species of amphibian) are likely absent from habitats to be impacted in association with Option 2. A single additional pond, which may have potential to support great crested newts has been identified within 40m of Option 1a and 100m of Option 1 (Target Note 17, Fig 1.4). Further assessment of this waterbody is recommended to determine the presence/likely absence of great crested newts.

No breeding habitat will be lost as a result of the development and the path will not create a barrier to amphibian movements, however the permanent loss of a small area of semi-natural habitat will reduce foraging habitat for amphibians such as common frog *Rana temporaria* and palmate newt *Lissotriton helveticus* as a minimum. Mitigation and compensation measures to minimise short-term impacts and provide long term benefits for amphibians should be developed.

4.4.2 Birds

A variety of common and widespread bird species were recorded during the site visit. Nesting habitat for a wide range of common bird species is present along the two route sections. Given the location, the surrounding environments and quality of the habitats along each route, the presence of Schedule 1 species⁵ cannot be entirely ruled out.

The trimming and cutting back of overhanging branches, scrub and tall ruderal vegetation have the potential to lead to the disturbance and destruction of birds' nests, if undertaken during the nesting season (March to September inclusive).

The anticipated scale of habitat loss is not considered likely to have any significant residual impacts on local bird populations, owing to the extent of suitable alternative habitat to be retained, or present within the local area.

4.4.3 Fish

The majority of water courses which cross the different route options are considered unlikely to support nationally or internationally important fish species or populations. A single tributary running beneath Tidal Reach, along Option 1 may provide suitable dispersal opportunities for Allis and Twite Shad. No works are proposed to this structure, or adjoining habitats and so no direct or indirect impacts on these species (if present) are anticipated.

Works are proposed within close proximity to other watercourses and as such mitigation will be required to ensure that existing fish populations are not adversely impacted by the work, therefore pollution and construction control measures will be required.

4.4.4 Invertebrates

The desk study and subsequent field surveys have identified the presence of important invertebrate species within the local area. No significant direct, or indirect impacts on any known populations are anticipated as part of the scheme. Opportunities exist to enhance retained areas for these species, and other more common invertebrates as part of the scheme post-construction.

4.4.5 Mammals (excluding bats)

The desk study and subsequent field survey of the route identified evidence of usage by badgers. A habitat appraisal looking at the watercourses present within 30m of the various route options concluded that the presence of otter or water vole was unlikely.

Based on the information gathered to date, development of Option 1 may impact upon badgers. This was based on the discovery of two groups of entrance holes of a suitable size and shape for these species. These entrance holes are within less than 20m of the preferred route alignment and as such could be accidentally damaged or disturbed as part of the initial construction and subsequent operation of the traffic free route.

As badgers are highly mobile and frequently occupy different setts throughout the year, further monitoring is recommended. Ongoing monitoring should aim to:

- Confirm whether these entrances holes are used badger
- If so, the pattern of usage and therefore status of the sett

Creation of a new traffic-free route will cause an increase in human activity. Based on the field survey, the former railway line along which Option 1 and 2 would run is not freely accessible, therefore the local badger population is considered unlikely to be habituated to human activity.

⁵ Wildlife Countryside Act (1981) *Schedule 1*

Habitat reinstatement and long-term habitat management proposed as part of the scheme should ensure that sheltered foraging and commuting areas for badgers, independent from the path are maintained and enhanced.

The habitat appraisal has identified that woodland and hedgerow habitats, particularly to the north and south of Alt-Y-Graban road are of suitable structure to provide foraging and dispersal opportunities for hazel dormouse, particularly as these features are largely continuous and undisturbed. However, the lack of diversity within these habitats particular in relation to fruiting berry and seed producing species is likely to lower the overall value of these habitats for dormouse.

No records for dormouse were returned for habitats within and surrounding the proposed route, although the absence of records should not be taken as an indication that the species is not present.

As vegetation clearance along the former railway line will be comparatively extensive further assessment in respect of hazel dormouse is recommended.

Other mammal species with no legal protection may occur in the area including species such as hedgehog that are Section 7 Species in the Environment (Wales) Act (2016). The path will not constitute a barrier to mammal movements. The project will result in changes to the habitats along the route and the landscaping and long-term management should aim to minimise negative impacts on mammal species and enhance the route for wildlife wherever possible.

4.4.6 Mammals - Bats

No alterations to structures identified as having potential for roosting bats are anticipated as part of the scheme, in addition no lighting is proposed which might lower the accessibility, or suitability of these features for bats.

With increased public access, the bridges may need to be subject to greater levels of maintenance than currently required. Any repair work that affects the structure of any of the bridges along the route would need to be preceded by an assessment for bats although it is anticipated that the likelihood of bats choosing to roost within these structure would remain low.

Overall the site, is highly suitable for foraging and commuting bats and connects other habitats including a series of non-statutory wildlife sites to the north of Grovesend with the complex of mature broadleaved woodland adjacent to the A483, north of Pontarddulais. As the required extent of vegetation clearance is comparatively small at a landscape scale and no significant habitat fragmentation is anticipated, implementation of reasonable mitigation and enhancement measures is considered sufficient to compensate for these impacts.

The field survey identified a number of trees of moderate to high bat roosting potential. It is anticipated that the majority of these will be left undisturbed by the works, with the root systems considered and protected as part of the works. Any trees identified as having bat roosting potential which need to be removed will need to be subject to further ecological assessment and mitigation.

4.4.7 Reptiles

No evidence of reptile species has been recorded. The majority of the route is within shaded areas of lower suitability for these species. Habitats which may provide suitable basking and foraging opportunities for these species include the more open areas within Coed Bach Wood (W5), adjoining dense scrub to the west (W6) and the western edge of Tidal Reach Road.

Construction works also have potential to result in reptiles being injured or killed in contravention of current legislation. Any construction involving the removal, or modification of these features would need to consider potential impacts upon these species.

As discussed above the construction of a traffic-free path has potential to result in the permanent loss of a relatively small area of semi-natural habitat. A compensation strategy would be required to

maintain enough high quality reptile habitat, with features that can be used for shelter and hibernation, to maintain any existing population in the long-term.

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5 Conclusions and Recommendations

The proposed route options vary in length and are principally situated between Grovesend and Pontarddulais.

None of the route options are considered likely to give rise to any significant adverse effects on any internationally, or nationally designated sites. It is considered possible that progression of either Option 1, or 2 would likely have a minor non-significant beneficial effect on coastal and estuarine habitats associated with Carmarthen Bay and Estuaries SAC, as the paths would provide suitable alternative recreational opportunities for potential users of the SAC.

Options 1 and 2 in the absence of mitigation would have a significant adverse effect on four non-statutory wildlife sites of conservation importance – Coed Bach Park SINC, Loughor to Penlleger Railway SINC, Waungron to Gowerton Line SINC and Waungron Marsh SINC. Development of either option would result in the loss of between 0.0004 – 3.4% of the habitat designated within these sites. Path construction and subsequent operation would also increase existing edge and disturbance effects within these habitats.

Based on the observed level changes associated with Option 2, it is recommended that this option is not progressed as vegetation clearance and ground works along the edge of the live railway line would need to be highly extensive in order for a path with a reasonable gradient to be built.

Option 1 is also considered likely to have a negative, non-significant effect on the M4 Corridor SINC, although the anticipated scale of habitat loss in comparison to the overall size of the site is very small (0.08%).

Irrespective of the option chosen, a series of mitigation, compensation and enhancement measures will need to be implemented to maintain the ecological integrity of these wildlife sites, and the designating species they may support. The scale of vegetation clearance could be further reduced through existing former track bed being re-utilised. This would be best achieved by the design being informed by a detailed topographical survey.

Proposed path construction linked with Option 1a and to a lesser extent Option 1, would be located within, or directly abutting land currently designated by the Ancient Woodland Inventory as Ancient Semi-Natural Woodland (ASNW). The field survey confirmed that the Option 1a would follow existing mulched paths through the areas of ASNW and as such would not lead to the loss of significant areas of ground flora or mature trees. Uncontrolled construction activity would have an adverse effect and any importation of foreign soils or material and/or ground compaction could lead to changes in soil conditions which in turn could alter local hydrology, or lead to permanent damage of ancient woodland soils which would be a negative impact of county – regional ecological significance. Path construction along the southern edge of Coed Bach Wood in support of Option 1 would not give rise to any direct impacts, but may lead to indirect impacts due to compaction of soils containing roots belonging to trees within the ASNW.

The scheme overall, will result in a permanent loss of semi-natural habitat. The overall area of habitat loss is not considered to be high (c.0.15-1.65ha), but given the high value and sensitivity in which it is situated it will reduce the existing structural and species diversity of the habitat. As such an appropriate series of mitigation and enhancement measures is essential to enable this scheme to progress.

Protected species of amphibian are considered likely to be absent along with the majority of the route. However it is recommended that the pond within Coed Bach Park is subject to further assessment if Option 1a and 1 are to be progressed. Commoner amphibian species are considered

likely to be present. Construction methods and long term management will need to consider how these impacts can be avoided and compensated for.

Suspected signs of badger activity were identified along the disused railway line to the north of Allt-Y-Grabau Road. Further badger monitoring is recommended to ensure that relevant wildlife legislation is complied with and that no active badger setts are disturbed as part of future construction works.

The scheme is anticipated to have a minor negative impact upon bats, principally due to minor habitat loss. No confirmed roosts will be impacted and existing linear features (e.g. hedgerows, lines of trees) will be retained. Several mature trees identified as having bat roosting potential will likely need to be removed. As these trees have the potential to be used by roosting bats further assessment by a NRW bat licence holder will be required. The proposals provide an opportunity for additional roosting sites for bats to be provided.

Poorly controlled construction could cause damage to the root system of mature trees. It is anticipated that this impact can be minimised through adherence to best practice guidance for working by trees and consultation with the Local Tree Officer. Any trees removed, should be replaced on a ratio of 3:1, preferably by native species appropriate to local soil conditions (e.g. alder, English or sessile oak).

Rare and declining species of invertebrate form an important component of the local ecosystem in the wider landscape scale. The proposals are unlikely to lead to the loss of significant areas of habitat of value to invertebrates, or threaten important local populations. The scheme has the potential to provide improved foraging and overwintering opportunities for locally important species.

Option 1 and Option 2 are located within suitable habitat for hazel dormouse. The desk study confirmed that hazel dormouse have not been recorded in the local area. No further assessment has been completed beyond an appraisal of the habitat along the route for these species. The dense woodland and scrub habitats along the disused railway line are considered to be of lower suitability for these species, however further assessment in the form of a dormouse nest tube survey is recommended to confirm this conclusion.

No works are considered likely to significantly impact upon otter and water vole, subject to standard pollution control measures being enforced.

Whilst no long-term impacts have been identified on reptile populations from the proposals there is a small risk of these species being injured during construction primarily during any site clearance works. If any native reptiles species were to be killed, or injured this would be a contravention of current legislation. Given the small scale of works, it is anticipated that reasonable measures can be taken during construction to prevent an offence occurring.

No significant reduction in the quantity of nesting habitat is anticipated from this proposal but minor clearance of scrub or tall vegetation may be necessary where this overhangs the existing path, as a result there is a chance this could result in disturbance to nesting birds, in contravention of current legislation. This impact can be readily avoided through timing of works.

Other notable species have potential to occur on site including hedgehog. Suitable precautionary measures will need to apply when working within, or near habitats suitable for these species.

5.1 Recommendations

A series of mitigation and enhancement measures are required to offset and compensate the potential ecological impacts of the scheme.

R1 Consultation with NRW is recommended in relation to any work within Coed Bach Park Wood. A series of mitigation and enhancement principles are set-out below to guide these discussions:

Mitigation	Enhancement
<ul style="list-style-type: none"> - Minimise path width, passing places proposed in existing denuded areas and avoiding best areas - Works preceded by check for badger and dormouse by suitable qualified ecologist (SQE) - Work completed by hand where ever practicable (e.g. laying and installing flexipave, or addition of additional compost/mulch) - Retention of all trees except those identified at imminent risk of failure. Any trees removed replaced on ratio of 3:1 of local provenance. Construction works completed in line with guidance stipulated in BS 5837:2012 - All construction works including passage of machinery to be located along existing paths - No soil or other material to be taken off site - Any soils excavated to be placed on embankments on either side, or replaced carefully over excavations - All vegetation removal works completed outside of bird nesting period - No storage of materials, or establishment of compounds within 15m of any areas mapped as Ancient semi-natural woodland. Preferably kept on existing areas of hard standing. 	<p>Funding to update existing woodland management plan. WMP to include measures to favour:</p> <ul style="list-style-type: none"> - Invertebrates - Bats - Ground flora - Hazel dormouse <p>Coppicing of over-mature hazel coppice 20m either side of path</p>

Table 5.1 – Indicative ecological mitigation and compensation measures for works within Coed Bach Park Wood (Ancient semi-natural woodland)

R2 Amphibians – A presence/likely absence survey of the pond using either eDNA or traditional methods within Coed Bach Park Woods should be undertaken if either Option 1 or Option 1a are to be advanced.

R3 Bats – Wherever possible the design proposals should aim to ensure that any existing mature trees are retained. If in the event any trees identified by this report as having roosting potential for bats need to be removed, they should be subject to further assessment by a suitably qualified ecologist. This is likely to include either ground, or climber based inspection using endoscopes or hand mirrors and/or completion of nocturnal surveys.

R4 Badgers - A survey for badgers along the proposed route and accompanying 30m buffer (where accessible/appropriate) must be completed in advance of construction commencing, in addition mammal entrance holes identified by this assessment should be monitored for a period of at least 21 days to confirm whether they are used by badger and if so the pattern of usage. For the purposes of programming, it would be best to complete this survey in early spring or late autumn (Feb-Apr inclusive) or (Oct-Dec inclusive).

R5 Birds - Clearance of shrubs, trees and other bird nesting habitat should be undertaken outside the peak bird nesting season (i.e. works should occur October to February), taking in to account the requirement of the ARMS (R4 above) and findings of the hazel dormouse assessment (R7).

As the scale of vegetation clearance in relation to Option 1 and 2 are relatively high and will take a prolonged period to implement, it is recommended that NRW are contacted regarding the

opportunity to prepare a woodland management plan (WMP) covering all the areas of woodland and scrub along the disused railway line.

As part of the WMP discussion should be held regarding the targeted clearance of scrub and trees along the former track bed to create a woodland ride, through which the new route would run. This clearance work could be incorporated within a felling licence for the scheme with replanting/restricting providing to compensate for this loss. This approach would enable vegetation clearance works to be timed as sensitively as possible to minimise impacts upon nesting birds or other species. It would also enable vegetation to be cut back prior to planning consent being received. The woodland management plan will also need to include:

- Additional native under planting along the length of the corridor to diversify existing structural and floristic composition
- Species to be planted to include hazel and honeysuckle.
- 70-90cm bare-rooted stock planted, either side of route at a rate of 5 plants per 100m. To be supported by suitable canes and protected with guards.

R6 Hazel dormouse – It is recommended that a nest tube survey for hazel dormouse is completed along the sections of the disused railway line if Option 1 or Option 2 are to be progressed. This should be completed in accordance with NRW survey guidelines.

R7 Invasive weeds - Japanese knotweed and Himalayan/Indian balsam is prevalent in several locations along Option 1. To avoid the spread and assist in the eradication of these species, an Invasive Species Construction Method Statement (ISCMS) is to be prepared ahead of construction commencing. The ICMS is to include details on the handling, storage and treatment of contaminated soils disturbed as part of construction works. ICMS is to follow best practice. The ICMS is also include a programme of control of invasive species present within 20m either side of the chosen route option for at least 3 years post-construction.

R8 Topographical Survey – Sections of flat, more open ground are present along the disused railway lines through which Option 1 and part of Option 2 are proposed. To minimise the extent of vegetation clearance and earthworks necessary it is recommended that a topographical survey is commissioned to enable these areas to be accurately mapped and the route re-aligned to follow these sections accordingly.

R9 Trees - The root systems of semi-mature and mature trees must be protected throughout the works in accordance with BS 5837:2012: Trees in relation to design, demolition and construction recommendations. Discussion with the Local Tree Officer, should be held post-planning to agree the method of work in these areas.

R10 Pollution - Construction must follow best practice guidelines (e.g. principles outlined in PPG5: Works in, near or over watercourse) in relation to working by water to prevent negative impacts on watercourses e.g. from pollution or siltation.

R11 Reptiles - To avoid the risk of injury to reptiles during site clearance, a suitable Reptile Method Statement (RMS) should be prepared. It is anticipated that the RMS would be prepared following receipt of planning permission and in-conjunction with the appointed contractor. The statement must detail the timings and sequence of works to minimise impacts upon reptiles, with specific reference to periods when works will need to be subject to checks by a Suitably Qualified Ecologist (SQE)⁶.

R12 Ecological Enhancement – Measures to improve biodiversity should be designed into this scheme. This should be in proportion to the scale of the proposal. The Local Authority and NRW

⁶ SQE – An individual ecologist who is covered by a professional code of conduct, subject to peer review and that their expertise and experience is appropriate for the assessed project.

may be able to suggest appropriate measures. A series of enhancement measures are detailed in R1 above. In addition to these:

- Four hibernacula should be built along the preferred route to provide additional sheltering and over-wintering opportunities for reptiles and amphibians
- Installation of 15 timber bird boxes, supporting range of entry hole sizes.
- Installation of 10 dormouse nest boxes in-suitable trees/woodland scrub habitat along the route
- Installation of 12 Kent-style timber bat boxes. To be erected in suitable trees at min. 4m height, with south and west facing aspect.
- Works along existing road verges should allow for the over-seeding of replaced soils with native wildflower and grass species resistant to disturbance (e.g. Emorsgate EL1).

R13 – Habitat Management Plan - It is anticipated that a Habitat Management Plan (HMP) for the route will be produced following the grant of planning consent. This HMP will provide a 10yr programme of works and would complement the existing Woodland Management Plan (WMP) if one has been agreed in advance. The purpose of the Habitat Management Plan is to ensure that the enhancement measures detailed above are sustained in the long-term.

The HMP should include management prescriptions to favour:

- **Amphibians and reptiles** – Retention of deadwood, maintenance of log piles and hibernacula
- **Bats** - identification and retention of natural reserve trees with associated linkages for bats
- **Hazel dormouse** - including targeted coppicing, enrichment planting
- **Invertebrates** – targeted coppicing/creation of scalloped edges to provide continuum of full sunshine and shade
- **Nesting birds** – rotation coppicing/continuous cover, dead hedging to reduce human disturbance and provide for natural refuges

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Appendix 1 - eDNA results

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