

6 CULTURAL HERITAGE

Introduction

This chapter considers the Scheme in relation to archaeology and cultural heritage. It encompasses standing monuments, historic structures, buried archaeology and areas of heritage value such as historic landscapes, parks and gardens and Conservation Areas.

Any development has the potential to disturb both known remains and undiscovered archaeology. It also has the potential to impact upon features and areas for which setting is an essential concern, including World Heritage Sites (WHS), Scheduled Ancient Monuments (SAMs), Listed Buildings, Conservation Areas and historic parks, gardens and landscapes.

The purpose of this chapter is to outline the archaeological and cultural heritage resource of the Scheme and its environs, to identify potential constraints to the Scheme, to formulate mitigation measures where an impact is identified, and to quantify any residual effects.

The following tasks were undertaken for this assessment:

- Legislation and policy context review
- Consultation with statutory and non-statutory bodies to identify interests and concerns regarding cultural heritage
- Desk-based study to obtain baseline archaeological and historical data
- Site survey and field investigation to augment desk-based baseline data
- Identification of the potential impacts of the Scheme and assessment of their significance
- Formulation of mitigation of potential impacts

6.1 Methodology

The assessment conforms to the methodology defined in the *Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 2. Cultural Heritage* (HA 208/07).

6.1.1 Study areas

The data search for the desk-based assessment is primarily based upon a study area extending 500m either side of the original limit of construction. This study area was agreed with Gwynedd Archaeological Planning Service (GAPS).

The search for high-value assets (WHS, SAMs, Listed Buildings, Conservation Areas, and historic parks, gardens and landscapes) was made on a broader basis, guided by the ZVI for the Scheme. In practice this led to the consideration of sites up to 5km from the Scheme.

As described in section 6.2.2 the field-based aspect of this study was more tightly focused, concentrating on the Scheme footprint and its immediate margins.

Details of the cultural heritage assets identified within these study areas are listed in Volume 3, Appendix C.1.

6.1.2 Information sources

Sources consulted for this assessment comprise:

- Historic Environment Record (HER), curated by the Gwynedd Archaeological Trust (GAT) ²
- National Monuments Record (NMR), curated by the Royal Commission for the Ancient and Historical Monuments of Wales (RCAHMW)
- Aerial photographs, curated by the Central Register for Aerial Photography in Wales
- Records and cartographic sources held by the Gwynedd Record Office
- Records held by Cardiff University Library
- Records held by Bangor University Library
- Miscellaneous published and 'grey' literature

A full list of consulted sources can be found in Chapter 18.

6.1.3 Site survey and field investigations

Site survey has been ongoing since the 2009/10 Key Stage 2 assessment. The present study included the following staged programme of site survey and field investigation:

- Site walkovers, April – December 2015, undertaken by the author
- Survey of historic field boundaries, May 2015, undertaken by TACP
- Watching brief on Geotechnical Investigation trial trenches, April 2015, undertaken by the author
- Geophysical survey, May – June 2015, undertaken by Stratascan
- Field evaluation, March 2016, undertaken by Gwynedd Archaeological Trust (GAT)

The purpose of the fieldwork was:

- to review the current condition of known archaeological sites, features and deposits
- to identify new archaeological sites, features and deposits, or areas that may contain them
- to record archaeological sites, features and deposits
- to assess the vulnerability of archaeological sites, features and deposits
- to assess potential impacts on setting

6.1.4 Stakeholders and Consultation

Stakeholders identified for heritage comprise:

² Gwynedd Archaeological Planning Service (GAPS) is part of the Gwynedd Archaeological Trust (GAT). GAPS performs a curatorial role, while GAT has a broader heritage management and commercial function: see <http://www.heneb.co.uk>.

Cadw

Gwynedd Archaeological Planning Service (GAPS)

Consultation with these stakeholders has been an ongoing, integral part of this assessment.

Gwynedd Archaeological Planning Service

GAPS responded to the Environmental Scoping Report, the principal comments being as follows:

- The study area for HER data should be based on a 500m buffer from the limit of construction, with a narrower study area for other sources such as aerial photographs and historic maps
- All ancillary areas, offline works, and areas of landscaping and ecological mitigation should be included in the impact assessment
- Given their proximity to the Scheme, the assessment should include potential impacts on the registered historic landscapes of Dinorwig and Dyffryn Nantlle
- The assessment of visual impacts should be guided by the ZTV for the Scheme, and by the LVA, as opposed to adopting an arbitrary radius of impact
- Assessment of sites' historic setting, and impacts upon those settings, should be in accordance with current guidance
- Archaeological investigations should be commenced at an early stage of the assessment, such that they can inform the design and be presented within the Environmental Statement
- Mitigation: the preference is for archaeological matters to be addressed as far as possible before construction (by redesign, prior excavation, and/or strip, map and record), rather than as a watching brief during construction. Opportunities for enhancement, for increased protection of sites, and/or the use of landscaping measures should be considered.
- Attention should be given to the post-excavation programme, which will form a large part of the mitigation strategy and may well continue after the opening of the Scheme

Subsequent to the Scoping Report, GAPS have been consulted on the following:

- The watching brief on selected GI trial pits
- The scope, specification and reporting of the geophysical survey for archaeology
- The scope and specification of archaeological evaluation, including its analysis and reporting stages
- The draft Environmental Statement
- The scheme of investigation for Key Stage 6

The majority of GAPS' comments have been addressed in this Environmental Statement. The principal area of divergence at KS3 relates to evaluation trenching: for reasons discussed in section 6.1.6, although an evaluation has been undertaken its scope has been substantially less than that recommended by GAPS.

At the time of writing full agreement had not been reached with GAPS on the KS6 mitigation strategy.

Cadw

Cadw responded to the Environmental Scoping Report, the principal comments being as follows:

- The assessment of impacts on historic settings must be informed by the ZTV, and should include any more distant upland monuments which might overlook the scheme
- The assessment should consider the setting of the World Heritage Site at Caernarfon, with the effect on the views from Caernarfon Castle needing special consideration
- Significant concerns were expressed about potential impacts upon the Caerlan Tibot SAM. Early-stage discussion of this issue was requested
- In addition to archaeological responses, mitigation options should include, landscaping, planting, monument management, access and interpretation as potential means to ameliorate any unavoidable adverse effects on designated sites or monuments

Subsequent to the Scoping Report, Cadw have been consulted, as follows:

- Field visits to the SAMs at Caerlan Tibot and Bryn Glas, to consider potential impacts on these monuments' setting, and possible mitigation
- The scope and specification of archaeological evaluation
- The draft Environmental Statement

6.1.5 Assessment Methodology

Assessment criteria: value

The value (or sensitivity) of cultural heritage sites is assessed against the criteria that are set out in DMRB Volume 11 Section 3 Part 2, Annexes 5 and 6, and are as follows:

- Very high (international importance): World Heritage Sites including nominated sites on the Tentative List
- High (national importance): SAMs or archaeological sites and remains of comparable quality, assessed using the Secretary of State's criteria; Grade I and Grade II* Listed Buildings; Grade I and Grade II* Parks and Gardens
- Medium (regional importance): archaeological sites and remains which, while not of national importance, fulfil several of the Secretary of State's criteria and are significant remains in the regional context; Grade II Listed Buildings; Grade II Parks and Gardens; Conservation Areas
- Low (local importance): archaeological sites and remains comparable to those listed in UK County Historic Environment Records (HER) or other sources which are either of very low potential or of minor importance; areas of local importance can be designated by local planning authorities; buildings of special local interest
- Negligible (lesser importance): areas in which investigative techniques have produced negative or minimal evidence of antiquity, or where large-scale destruction of deposits has taken place
- Unknown: this category applies to a site or feature where data are insufficient to allow a judgement to be made on character, age, extent or rarity

SAMs will always be of at least national importance and are protected under the Ancient Monuments and Archaeological Areas Act 1979; setting is rendered a material consideration by Welsh Office Circular 60/96.

The Planning (Listed Buildings and Conservation Areas) Act 1990 defines and provides equal protection for all Listed Buildings, although these buildings are graded in importance, from Grade I (most important), II* and II. Buildings listed at Grade I are considered as being 'of paramount importance to the nation' whilst those listed at II* are of 'outstanding interest'. Such buildings are therefore considered within this assessment to be of national importance. Structures listed at Grade II are usually considered as being of national or regional importance.

The assessment of the value of other site-types that are not afforded statutory protection is based upon the expert judgement of the project team. Value is determined by a site's individual importance, by its context within the wider landscape, and by its present condition.

Assessment criteria: condition

The condition of individual sites and the general overall condition of surviving remains has a bearing on the value of the sites themselves and on the value that they impart within a wider landscape context. The condition of sites is recorded using the following criteria:

- Intact
- Near intact
- Damaged
- Near destroyed
- Destroyed
- Restored
- Moved (usually finds)
- Not known

The condition of all sites impacted by the Scheme, or on its margins, has been verified by field visits. However, the study area for this assessment encompasses a substantial number of sites that are beyond the area of physical impact, and for which there would be no impact upon their setting (either because they are beyond the zone of the Scheme's visual influence, or because the site is one for which setting does not apply). In these instances field visits have not always been undertaken, as this was neither necessary nor practical. Instead, condition is based on the evidence of modern maps and aerial photographs.

Significance of Impact

Magnitudes of impact are assessed in the categories high, medium, low and imperceptible, and are described in Table 6.1.1.

Table 6.1.1 Definitions of Magnitude of Impact

High	Impacts that fundamentally change the baseline condition of the receptor, leading to total or major alteration of character or setting
Medium	Impacts that change the baseline condition of the receptor materially but not fundamentally, leading to partial alteration of character or setting
Low	Detectable impacts which do not alter the baseline condition of the receptor materially
Imperceptible	A very slight and barely distinguishable change from baseline conditions, approximating to a “no change” situation
None	No discernible change to the baseline condition of the character or setting of the receptor

Table 6.1.2 is a matrix that combines site value criteria with impact magnitudes. The value criteria given by DMRB have been slightly simplified: DMRB gives five categories, but these have been reduced to a four-point scale that ranges from A (international / national) to D (lesser or low) importance. The equivalent DMRB criteria are given in italics in Table 6.1.2.

Impacts are either positive or negative, and either significant or not significant. For the purposes of this assessment, moderate and major impacts are considered to be significant.

Table 6.1.2 Matrix for Assessing Significance of Impact

	Value / Sensitivity (DMRB equivalent)			
Magnitude	Lesser/Low (D) <i>Negligible</i>	Local (C) <i>Low</i>	Regional (B) <i>Medium</i>	National/ International (A) <i>High / Very High</i>
High	Minor	Moderate	Major	Major
Medium	Negligible	Minor	Moderate	Moderate / Major
Low	Negligible	Negligible	Minor	Minor / Moderate
Imperceptible	Negligible	Negligible	Negligible	Minor
None	Neutral	Neutral	Neutral	Neutral

6.1.6 Assessment of Impacts upon Historic Setting

There is no accepted methodology for the assessment of visual impacts on cultural heritage features, or for ‘setting’ criteria. DMRB does not define an assessment methodology for this aspect, although it offers guidance on study areas for visual impacts. Nevertheless, the principles of historic setting are expressed in a number of planning-related documents, including for Wales the Cadw document *Conservation Principles* (2011).

This assessment takes its definitions of ‘setting’ from a peer-reviewed article by Colcutt, which provides a thorough overview of the issue in relation to development.^{6.1} While this work does not comprise formal guidance, it is in widespread use by archaeologists and shares the same fundamental principles as more recent guidance, for example that issued by Historic England as *Historic Environment Good Practice*

Advice in Planning Note 3 (not applicable in Wales).^{6.2} Colcutt articulates historic setting under four basic headings:

- Intrinsic visual interest – the visual qualities of the archaeological features themselves as seen from other points
- Topographic setting – the visual relationship of the archaeological features to the surrounding topography and to such major elements, for example, hills and river valleys
- Land use setting – the visual relationship of the archaeological features to the land use and particularly those elements of the current land use which had remained unchanged or were similar to those which existed at the time the features were occupied/in use; and
- Group setting – the visual relationship of the features to other visible archaeological remains in the vicinity, in terms of both contemporary and diachronic ('palimpsest') groupings or patterning

It is notable that Colcutt places emphasis on the visual attributes of the setting of upstanding monuments and standing buildings. In so doing there is a clear distinction between a site's visual relationship with its surroundings, and less tangible associations with its wider environment – that is to say buried features which provide an archaeological context. It is recognised here that some archaeologists contend that the latter also comprises a 'setting' which has the potential to be impacted upon by modern development. Colcutt also ignores non-visual impacts such as noise – a relevant consideration for upstanding archaeological or historic features in the vicinity of a potential new road: this aspect is included in the assessment of the Scheme.

The preceding concepts, principles and guidance have shaped the assessment methodology applied to the Scheme. The assessment process for each asset was as follows:

- To establish whether an asset would have views of the Scheme, or may be viewed in combination with the Scheme
- To establish whether an asset's setting would be affected in any non-visual way, for example by increased traffic noise
- To establish the key characteristics of the asset's historic setting. What was its original setting? What was the landscape character at that time? What visual connections would have existed with other contemporary sites?
- To assess the surviving quality of that original, 'historic', setting. To what degree does the original (or subsequent relevant) setting of the asset still persist?
- To consider potential, appropriate mitigation strategies for any impacts arising from the Scheme

6.1.7 Survey extents and data quality

Desk-based assessment

At the outset of this study the available baseline data was derived from desk-based sources. Identified sites were mainly those visible at ground level, or noted in antiquarian records. The field work undertaken for this study has enhanced this baseline, particularly in terms of the identification of sites shown on historic maps, and buried archaeological features.

Geophysics

The geophysical survey, based on a 25m buffer around the Scheme footprint, was specified to cover 112 ha. However, ten land plots were either totally or partially unsurveyable. This arose from a combination of land use (quarry; holiday park), wet or steep ground, woodland and standing crops. In total, 98 ha was surveyed (Volume 3, Appendix C.2, Figures 1-4). These unsurveyed areas were distributed across the northern and central parts of the Scheme, as far as the intersection with the present A487. Southwards of this point, the entire Scheme corridor was surveyed. Geophysical coverage is therefore good, albeit not comprehensive. Given that anomalies have been revealed in all of the surveyed areas, it is reasonable to assume that the unsurveyed areas would have revealed a similar density of anomalies. While not all of these will be archaeological (being either natural/geological or modern), this data gap must be acknowledged.

Geophysics, as all archaeological techniques, has limitations when conducted in isolation. It is, firstly, well known that a geophysical survey will not necessarily reveal all buried features. The recent discovery of a prehistoric settlement at Llanfaethlu, Anglesey, is a pertinent local example. Here, a well-preserved, multi-phase Neolithic domestic site comprising three houses, a pit group and several other features was found to underlie a later-dated field system: only the field system had been detected by the geophysical survey carried out on this site.^{6.3}

In terms of detected anomalies, the survey data will only portray these in two dimensions. At the analysis stage, only some of these (generally modern features) can be interpreted with certainty. Much interpretation is subjective, and there can be difficulties distinguishing between anomalies that are cultural and those which are natural. Moreover, geophysical survey cannot prove the depth, date or archaeological content of any buried feature. This can only be achieved through traditional methods – that is to say by intrusive ground investigation.

Evaluation

In consultation with GAPS, an archaeological evaluation was agreed. Given the scale of the Scheme and the constraints imposed by landownership (see below) its emphasis was on perceived higher potential areas. To achieve this, the intention was to:

- investigate known or suspected archaeological sites within the Scheme corridor and on its immediate margins
- selectively investigate areas of the Scheme corridor which were deemed to have higher archaeological potential

The evaluation design comprised 96 trenches, distributed along the length of the Scheme – albeit somewhat unevenly, and with a greater focus on known or suspected archaeological sites. However, the Highways Act does not give an automatic right of access to third party land for intrusive archaeological works. Evaluation may, therefore, only be undertaken with voluntary landowner consent. From a technical standpoint – and regardless of the legal and procedural context – this situation can give rise to substantial difficulties, reducing or entirely precluding the ‘ground-truthing’ which can be achieved by evaluation.

During the mobilisation stage of the evaluation trenches, the public liaison officer for the Scheme contacted the relevant landowners to seek permission for land access.

Several of the affected landowners declined access and as a consequence the number of evaluation trenches dropped from 96 to 30.

This circumstance, although unavoidable, creates significant difficulties for this assessment. While the geophysical survey makes it clear that there is a substantial number of below-ground features within the Scheme corridor, the exact character of many is unknown (or at the very least, unproven). The impact tables must therefore respond to potential negative effects upon features that may or not be archaeological, and therefore may have substantial value or none at all. And, where archaeology can confidently be said to exist, comment on its character, age(s), stratigraphic complexity and value is necessarily a matter of conjecture. The question of the depth of that archaeology – and thus whether construction groundworks will go deep enough to cause damage – is another key issue which in most cases is unresolved.

6.2 Baseline Conditions

6.2.1 Policy context

DMRB

The requirements for the assessment of the impacts that trunk road projects may have on cultural heritage are defined in DMRB Volume 11 Section 3 Part 2 Environmental Assessment – Cultural Heritage (HA 208/07). DMRB Volume 10a, Section 6, Part 1, Environmental Design (HA 75/01) sets out the requirements for trunk roads and archaeological mitigation.

National-level legislation, policies and guidance

The following are relevant to the assessment:

- Historic Environment (Wales) Act 2016 ³
- Ancient Monuments and Archaeological Areas Act 1979
- Planning (Listed Buildings and Conservation Areas) Act 1990
- Welsh Office Circular 60/96 Planning and the Historic Environment: Archaeology
- Welsh Office Circular 61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas
- Welsh Office Circular 1/98 Planning and the Historic Environment: Directions by the Secretary of State for Wales
- Hedgerow Regulations 1997
- Planning Policy Wales (Edition 8 – Jan 2016), Chapter 6.

³ The Historic Environment (Wales) Bill was passed by the National Assembly for Wales on 9 February 2016 and received Royal Assent in March 2016. In response to this additional primary legislation, there is an ongoing review of planning policy, which includes the development of a suite of updated guidance. At the time of writing this guidance is not available.

Gwynedd Unitary Development Plan

The Gwynedd UDP (2001-2016) includes Strategic Policy 3 – Built and Historic Environment. This states that: ‘The area’s built and historic environment will be protected from development that would significantly harm it and new developments in historic areas will be expected to conform to particularly high design standards which will maintain or improve their special character’.

The UDP contains seven policies under the heading of Historic Resources, as listed below. All are relevant considerations for this assessment.

B1 – Demolition of Listed Buildings

There is a general presumption in favour of preserving Listed Buildings. In accordance with national regulations, permission to wholly or substantially demolish Listed Buildings would be given only when there is no other practical option is available to preserve the building or structure and the site is to be redeveloped

B2 – Alterations to Listed Buildings or buildings in their curtilage

This Policy identifies the need to ensure that the character of historic buildings is protected from conversions or extensions that would endanger a building’s distinctive architectural or historical features

B3 – Development affecting the setting of Listed Buildings

The Local Planning Authority will pay particular attention to the need to safeguard the setting of Listed Buildings. The addition of intrusive elements or the loss of important features would be unacceptable

B4 – Developments in or affecting the setting of Conservation Areas

In determining an application for a development, which would affect a Conservation Area, the Local Planning Authority will consider the development’s impact on views across, within and outside the Conservation Area as well as the effect that the development would have on natural features that play an important role in the setting of a Conservation Area

B5 – Demolition of buildings in Conservation Areas

Permission to demolish will only be given where it can be shown that the building is not an integral part of the character or appearance of an area or, under exceptional circumstances, where the reasons for demolition are more important than the positive contribution of the building to the character or appearance of the area

B6 – Caernarfon Castle and Town Walls World Heritage Site

The World Heritage Site is a material consideration when determining planning applications and applications for Listed Building consent for development on sites within or adjacent to the inscribed area, or which form part of key views from the WHS

B7 – Sites of archaeological importance

Proposals that will damage or destroy archaeological remains of national importance (whether scheduled or not) or their setting will be refused. A development which affects other archaeological remains will be permitted only if the need for the development overrides the significance of the archaeological remains.

In areas where there are likely to be archaeological remains, the developer will be required to commission either an archaeological assessment and/or field evaluation in order to determine the archaeological impact of the proposed development before the planning authority determines the application. The assessment/evaluation results must be submitted with the planning application, in addition to a plan showing how the impact of the proposal on the archaeological remains will be mitigated.

If a proposed development will have an adverse impact on archaeological remains, then the developer should prepare sympathetic plans, which retain the remains in situ. Planning conditions or agreements will be used in appropriate cases to ensure that the work of excavating and recording the remains takes place prior to commencement of the development. Schemes that will facilitate the management and interpretation of archaeological sites for educational or tourism purposes will be supported.

Anglesey and Gwynedd Joint Local Development Plan

The draft Local Development Plan of the Anglesey and Gwynedd Joint Local Development Plan (draft, for consultation, closing March 2015) contains several policies for heritage and archaeology, grouped within Strategic Policy PS17, Preserving and Enhancing Heritage Assets. These policies are as follow:

Policy AT1 – Conservation Areas, World Heritage Sites and Registered Historic Landscapes, Parks and Gardens

Proposals within or affecting the setting and/ or significant views into and out of Conservation Areas, World Heritage Sites and Registered Historic Landscapes, Parks and Gardens shown on the Constraints Map must, where appropriate, have regard to: adopted Conservation Area Character Appraisals, Conservation Area Plans and Delivery Strategies; World Heritage Site Management Plans; the Register of Landscapes, Parks and Gardens of Special Historic Interest in Wales; other detailed assessments adopted by the Local Planning Authority. Development proposals should be supported by a Heritage Impact Assessment, where appropriate.

Policy AT2 – Enabling Development

This policy aims to secure the appropriate long-term preservation and/or alternative use of a listed building or a building which makes a significant positive contribution to the character of a conservation area or a Registered Historic Landscape, Park and Garden.

Policy AT3 – Locally or regionally significant non-designated heritage assets

Proposals will be required to conserve and seek opportunities to enhance buildings, structures and areas of locally or regionally significant non-designated heritage assets.

Policy AT4 – Protection of non-designated archaeological sites

Proposals which may affect sites that are of potential national archaeological importance or are of acknowledged local heritage importance including sites of industrial archaeology that are not scheduled will: be assessed in terms of the intrinsic importance of the 'site' and the potential extent of harm; require, where appropriate, either an archaeological assessment and/ or field evaluation by an archaeological body or a professionally qualified archaeologist in order to determine the archaeological impact of the proposed development before the Planning Authority determines the application.

A proposal which affects locally important archaeological remains will only be granted if the need for the development overrides the significance of the archaeological remains. Where proposals are acceptable, a condition will be attached to the permission stating that no development should take place until an agreed programme of archaeological work has taken place.

Caernarfon World Heritage Site

The World Heritage Site Management Plan: the Castles and Town Walls of Edward I in Gwynedd (2004) provides a framework for the comprehensive management of the inscribed areas of the WHS, including Caernarfon.^{6.4} Within that framework are policies relating to the protection and enhancement of the WHS' setting; their presentation to the public; and the encouragement of education and research.

6.2.2 The archaeological and historical context

The following sections describe the archaeological and historical context of the study area and the known sites within it. Full details are contained in the cultural heritage gazetteer: Volume 3, Appendix C.1. The sites are shown in Volume 2, Figures 6.1 – 6.3, with selective photographs in Figures 6.4 and 6.5.

Palaeolithic and Mesolithic

Evidence for human activity during the Palaeolithic period is extremely sparse across Wales as a whole, with the principal find-sites being concentrated on the Carboniferous Limestone zone of the south-west coast and north-east Wales (mainly Denbighshire).^{6.5} The known settlement sites in north-east Wales have been discovered within caves, with no open sites yet recognised. Two sites of Palaeolithic age are known, on the Great Orme peninsula, both yielding finds from the Late Upper Palaeolithic period, but there is nothing closer to the study area (including on Anglesey), nor have any stray finds been recovered from the county.

The Mesolithic period (c. 10,000-4000 BC) is somewhat better represented in north-west Wales, with a number of open- and cave sites being known, including on Anglesey.^{6.6} Again, many of these discoveries have been made on the modern coast, but during this earlier stage of the present Flandrian Interglacial these locations were in fact quite well removed from the sea. No Mesolithic sites are known on the tract of the Caernarfonshire coast facing Anglesey, nor have any stray finds of this age been recovered from the study area for this project (including the somewhat broader Key Stage 2 study area).

Neolithic and Bronze Age

The Neolithic period (c. 4000-2200 BC) witnessed a rising population, and the adoption of a farming economy and permanent settlement. From this period the evidence for human activity increases significantly across Wales, and it becomes possible to discuss the study area specifically, as opposed to the broader regional pattern.

The earliest-dated remains within the study area belong to either the later Neolithic, or the subsequent Bronze Age (c. 2200-800 BC). There appears to be a notable concentration of activity in the northern part of the study area, around Crug House and to the south. The name itself is suggestive, crug translating as 'mound' – implying some form of cairn or burial. This is supported by 19th-century antiquarian discoveries (PRN 36). An interment was found at Crug about 1855, including burial urns, a small tanged bronze knife blade, a pin with a pierced flat head, and a double-looped palstave axe. Farming operations in 1868 revealed an inverted cinerary urn, within which was a second urn containing burnt bones, a pygmy cup, and a bronze pin.^{6.7} The ploughing must have destroyed the above-ground traces of the barrow, and neither its location nor that of the 1855 finds are known (if indeed they were not one and the same).^{6.8} The finds themselves are now in museum collections, which at least removes all doubt about their authenticity and age. Meanwhile, 350m to the south of Crug there has been the further find of a Bronze Age spearhead (PRN 24093), while 650m southwest another bronze axe has been recovered (PRN 24019). All of these sites and finds find their context in a zone where there are several undated cropmarks (assumed but not proven to be of Iron Age or Roman date), and where the geophysical survey shows a considerable density of features; these are as yet also undated, but the burnt mound revealed in Trench 18 of the evaluation is almost certainly prehistoric (see 6.2.3 below).

Elsewhere within the study area, evidence for the Neolithic/Bronze Age is extremely sparse, and reliant on imprecise antiquarian accounts. A tumulus with several urn burials was reported near Bryn Seiont in the 19th century (PRN 3099), while a Bronze Age palstave axe was recovered from a garden at Glan Gwna in about 1780 (PRN 3704).^{6.9}

This patchy distribution of known sites and finds is curious, given the generally comparable topography that prevails throughout the study area. The suspicion must be that much is owed to chance, and perhaps to the fact that there was a greater amount of ploughing in certain areas in the recent past, thus bringing artefacts to the notice of local antiquarians. This comment would, of course, extend across all periods and not just to later prehistory. The discovery during the evaluation phase of this assessment, of a probable prehistoric site at Chainage 900, reinforces this point (see 6.2.3. below; Trench 92). Nevertheless, the concentration of sites and finds around Crug House and Caerlan Tibot may not be entirely fortuitous: in addition to the scheduled sites here, there is a markedly greater concentration of geophysical anomalies that are potentially of archaeological character.

Iron Age (c. 800 BC – AD 43).

Evidence for settlement during the Neolithic and Bronze Age – which was doubtless extant within the study area – emerges more strongly for the Iron Age.

The scheduled site near Pont Rug, SAM CN 229, comprises a stone-built hut circle associated with a field system, now surviving as a low earthwork feature. This site is typical of the rural farmsteads which existed in north-west Wales during the Iron Age,

and which continued to be built and occupied during Roman times.^{6.10} While significant numbers of hut circle settlements survive in adjacent upland or mountainous areas, CN 229 is a rare upstanding example of this site-type within a lowland setting. However, it is possible that others exist in the same locality: a ring ditch that shows as a cropmark may represent the ploughed-down remains of hut circles or a field system (PRN 1832), while more cropmarks, of an apparent curvilinear ditched enclosure c. 35-40m across, are recorded in the NMR database (NPRN 402206).⁴

There is a strong likelihood that these sites relate to the dominant monument in the locality: the scheduled enclosure of Caerlan Tibot (SAM CN400). The date and function of this monument is uncertain, and no archaeological investigation has ever clarified this issue. However, the most common interpretation of this site is as a defended enclosure dating to late prehistory.^{6.11} Its defensive character clearly implies an Iron Age date, when deteriorating climate and other factors led to a radically different social dynamic to that of the Bronze Age, and to the establishment of a more warfare-based, hierarchical society.

Two other putative defended sites are also present within the study area. That at Hen Gastell near Llanwnda comprises a small embanked enclosure on a river promontory, beyond the southern extreme of the Scheme (PRN 584). Although once suggested to be a promontory fort,^{6.12} new evidence replaces the recent consensus of the site as an enclosed Iron Age/Romano-British settlement; instead, Hen Gastell is now proven to be of medieval age.^{6.13} It is suggested that a nearby lynchet and ditch (the latter now infilled but visible on old maps and quite recent aerial photographs) may derive from contemporary activity associated with Hen Gastell (PRN 37972).⁵

The second site is Dinas Dinoethwy, on open ground between Bontnewydd and Llanwnda. Tradition since at least the 18th century holds this as an ancient fortified site, despite a lack of obvious defensive features (PRN 5531; NPRN 58891). It is the site of a large country house (Plas Dinas; PRN 1830) and its surrounding landscaped grounds. Most of the promontory has been landscaped except for an area at the north-west, which is still a field. Here there is a definite wide but very low ridge along the edge of the promontory, which seems artificial, not an agricultural feature, and thus possibly the remains of a defensive bank. There was an antiquarian find of Roman coins made here about 1850, but their whereabouts is not known.

Roman (AD 43 – AD 410)

Allowing for some simplification, the Roman conquest of North-West Wales may be said to have been complete by AD 60, although resistance continued long after this date. The region fell very much within the 'military zone' of Roman Britain, characterised, as the term suggests, by a strong Army presence and with a far lesser

⁴ These two records, one in the NMR database and the other in the HER, are both placed in the same field, south-west of Caerlan Tibot, their grid references separated by 150m. It is unclear from these records whether in fact they refer to the same site. The descriptions are sufficiently different to suggest that this is not the case. Both are well beyond the Scheme footprint, so the matter has not been pursued.

⁵ Lynchet: a bank of earth that builds up on the downslope of a field ploughed over a long period of time.

adoption of the trappings of Roman society than seen in the south and south-east of the province.

The principal focus of Roman settlement in the district was the fort of *Segontium*, now a scheduled site within the built-up area of Caernarfon. The fort began as a standard earth and timber construction in c. AD 78, with stone rebuilding taking place in stages during the 2nd century.^{6.14} Occupation appears to have been continuous throughout the 2nd, 3rd and 4th centuries, with abandonment occurring far later than most other military bases in Wales – perhaps around AD 393.^{6.15}

The fort was the focal point for communication and settlement in the district. A *vicus* or extra-mural settlement existed outside the defences, and roads radiated out from the fort, linking it to the military bases to the east at Bryn-y-Gefeiliau and Caerhun (*Canovium*), and Pen Llystyn and Tomen-y-Mur to the south/south-east.

A recent study of Roman roads in north-west Wales classifies them under three headings:^{6.16}

- Known. A proven road. Extant earthwork or as a well-recorded buried feature.
- Proposed. Conjectural sections either linking known segments or as hypothetical road alignments for which there is some physical evidence.
- Predicted. Virtually no substantive evidence for a road other than someone's belief and/or conjectural road alignment with no known traces. Where the authenticity of a road is in significant doubt this is the highest level of status that can be achieved

Eight Roman roads (or road branches) are suggested to pass through the study area adopted for this assessment (see Volume 2, Figure 6.2a-c). Some must have existed, but others are simply supposition – and in cases seem to have no basis. Only a short stretch of one of these roads has actually been identified on the ground. This is denoted by PRN 17831/17832, which heads north-eastwards out of *Segontium* towards Caerhun. The Roman road crosses the Scheme at chainage 7350, at which point it shows as a cropmark on an air photograph, continuing from a straight alignment of hedgerows. Although it is difficult to see on the ground, a slight bank (or agger) is visible in low light angles.^{6.17} The same feature seems to register on the geophysics survey (site G68). The alignment of the other Roman roads is only surmised, and each falls within the 'predicted' category. There is no firm evidence for any of them, either from existing studies or those undertaken for this assessment.

Roman roads are known to have been focal points for settlement and activity, both of military and civilian character. One such site exists within the study area, this being the Brynglas enclosure (SAM CN188). This is a small rectilinear earthwork which stands near to the line of the proven road leading out of Caernarfon towards Caerhun. It is commonly interpreted as a fortlet or signal station, and this is the title given in its Cadw scheduling record. However, while its dating seems reasonably secure, indicative of a brief occupation at the end of the 1st century AD, its function remains debateable.^{6.18}

As noted above, beyond the principal military sites, the region remained fairly unaltered by the Roman occupation. As Arnold and Davies observe, 'the enduring feature of the Romano-British settlement pattern is the stone-built homestead of open or enclosed type. Recent excavations have reinforced evidence for their later prehistoric origins'.^{6.19} The scheduled settlement at Pont Rug (CN 229) and the other

potential sites discussed above under the Iron Age may well have continued into the Roman period, and indeed into the subsequent Post-Roman/Early Christian era.

Aside from these structural features, there have also been two stray finds of Roman date. These comprise a small bronze fibula (brooch; PRN 7042) and another pair of brooches (PRN 24093). The finds were made in close proximity to each other, in the field immediately east of Caerlan Tibot, thus adding to the impression that this area is one of archaeological interest.

Medieval (AD 410-AD 1540)

By contrast to the preceding Iron Age and Roman periods, there is little within the study area that can confidently be assigned to the Early Medieval period (AD 410 – AD 1066). There can be assumed to be settlement continuity, but this is not proven. Caernarfon is thought to have become the seat of local chieftains and a Celtic church was founded here, probably in the 5th or 6th centuries. One very plausible site was a cross-incised stone that once stood beside the Afon Beuno at Glan Beuno (PRN 3104; NPRN 301086). This cross is suggested to be a relic of St Beuno's short lived church at Gwardog and the date indicated is c. 630.

The stone was removed to Beddgelert in 1919 and subsequently to the church at Clynog Fawr on the Llyn peninsula.^{6,20}

Norman penetration into northwest Wales was brief, but a motte was created at Caernarfon and subsequently the Welsh princes of Gwynedd set up a manor there. Edward I's conquest of Wales in 1282–83 transformed the town, with the construction of new stone-built castle and an adjacent walled borough. The borough, to which he granted a charter in 1284, was made the capital of North Wales. The castle is one of several structures erected by Edward I in northern Wales that were collectively designated a UNESCO World Heritage site in 1986.^{6,21}

Comparatively little is known about Caernarfon's medieval hinterland, although many of the modern towns and villages certainly have their origins during this period. As noted below, the building stock of these settlements tends to belong to the later parts of the post medieval era, while the churches underwent substantial renovation (if not wholesale alteration) during the Victorian period. Some, for example Llanwnda, were completely demolished, though medieval fabric can still be seen in certain churches, such as Llanfair Isgaer.

Beyond the main settlements, two manufacturing sites are recorded within the study area: a fulling mill at 'Castellmai' (1km west of Bontnewydd) known from historical records to have operated during the 15th century but abandoned by the 16th century (PRN 1929); and a bloomery at Bryn Gefeiliu – a site noted by the NMR but about which it gives no further information (NPRN 302513). Otherwise, the picture is of an agrarian or pastoral landscape, some elements of which appear to feature in the geophysical survey, in the form of widely spaced, slightly curved parallel linear anomalies: these are related to ridge and furrow cultivation (Anomaly Type 5).

One further site requires discussion, this being the medieval well of Ffynnon Fair (PRN 38121). The HER entry states that the well was mentioned in a Llanfair estate document dating to 1458. Its location is given as being south of St. Mary's Church, near the Plas Menai roundabout, where it was either extensively damaged or totally destroyed by the construction of the Felinheli bypass. The HER entry (dated to 2013) states that all that remains is a stone base, though the water still runs and emerges

on the Parciau Farm side of the road. This is a difficult site to evaluate. The HER entry is based on a single letter from a member of the public, whose content is unverified and prior to which the site was unrecorded.^{6.22} The site does not appear in the *Holy Wells of Wales*, which is the standard text on the subject (though as with any such work, it should not be assumed to be comprehensive).^{6.23} On the other hand, there is a spring shown here on the 1901 OS map (un-named) and a search of the internet suggests a local tradition of use of this spring.^{6.24} That a spring was present seems clear; whether it was a historic holy well is much less so. A final problem is presented by the fact that the well base could not be found during field visits to this location, even though the grid reference should place the site within a 100m x 100m square.

Post-medieval and Modern (1540 – present)

The broad pattern of medieval settlement and agriculture within the study area has been eclipsed by that of the post-medieval era. Caernarfon underwent considerable expansion during the later post-medieval period, its outskirts being characterised by 19th and 20th century buildings. The lesser settlements of Bontnewydd and Llanwnda exhibit a similar pattern, albeit on a smaller scale: their built heritage, including the listed buildings present, mainly belongs to the 18th to 20th centuries. The same holds true for rural settlement, where many of the 18th and 19th century farm complexes plausibly have origins reaching back earlier, perhaps to medieval times. These buildings were augmented during the mid- to later 19th century by the construction of new country houses for the affluent upper middle class of Caernarfon. The Grade-II listed houses of Bryn Eglwys (ID 22038) and Bryn Eden (ID 22041) are examples of these villas. Glan Gwna Hall (the only Grade II* Listed Building within the study area) is a slightly later example, in this case a realisation of the Elizabethan vernacular revival style.

In the rural parts of the study area, two phenomena have substantially altered the medieval/early post-medieval landscape of the study area. The first and most significant was Enclosure, which transformed a predominantly open environment into one of small bounded land parcels. The parish tithe maps (dating from 1840-43) indicate that the present enclosed fieldscape was established by the mid-19th century. And, except in locations where large-scale modern development has occurred (the industrial estates and settlement fringes being the principal examples), this field pattern has been little changed up until the present. Individual field boundaries vary in type from earth and rubble banks (some very substantial), to stone walls and hedges. Many are a combination of these types, for example a hedge-topped earth/stone bank. Not all boundaries are original, but are recent post-and-wire or hedge replacements on the same alignment. There are, again, also combinations of historic and modern, such as wire fences added to stone walls, or hedges to earlier earth/stone banks.

The second alteration, less sweeping than Enclosure in terms of landscape change but significant nonetheless, concerned the construction of the railways. Their economic impact was very marked, prompting the rise of Caernarfon as a port and its expansion as a settlement.^{6.25} Several lines were built through the study area during the mid- to late 19th century. Caernarfon Station was originally the terminus of a single-track line from Menai Bridge, opened in 1852. A second line connecting Carnarvon to Portmadoc was completed in 1867 with a third, Llanberis to Carnarvon, opening in 1869. By 1870 all were part of the London and North West Railway (LNWR), later passing into the control of the London Midland & Scottish Railway (in 1923) and British Railways (London Midland Region; 1948). All of these lines cross-cut the recently established enclosure fieldscape, and included substantial cuttings,

embankments and bridges, as well as local stations. Each line was closed during the post-War cuts of the railways, with the last shutting in 1972. Subsequent to this, in 1997, work started on the Welsh Highland Railway Project to restore the line. Caernarfon is now linked through Dinas Junction (narrow-gauge track has been laid on the former standard-gauge formation) to Porthmadog, where a link has been made with the Ffestiniog Railway (NPRN 34660).^{6.26} Although the original track is long since gone (that for the Welsh Highland Railway being a replacement) some original elements of the railway lines still remain, including the grade II-listed bridge at Bontnewydd (ID 18618), and a number of other non-listed bridges and level-crossings.

6.2.3 Summary of fieldwork

The following sections provide a summary of the field investigations that were undertaken to augment the desk-based assessment of the Scheme. The full details of the geophysical survey can be found in Volume 3, Appendix C.2. The archaeological evaluation report can be found in Volume 3, Appendix C.3.

Site walkover

Site walkovers were undertaken between April and December 2015. While these clarified or confirmed the condition or character of known sites, no new sites were identified by this exercise.

Watching brief on geotechnical investigation

A watching brief was maintained on two of the GI trial pits: TP66 and TP67 (at NGRs 250717,363482 and 250818,363630 respectively. Both were in the immediate vicinity of known or suspected stretches of Roman road, where they cross through pasture fields north-east of the possible signal station at Bryn Glas.

Both trial pits were dug by mechanical excavator, using a toothed bucket. TP66 was excavated to a depth of 3.5m; TP67 was abandoned at 2.4m due to water filling the bottom of the trench at this depth. These limits were well beyond the depths of potential archaeological horizons. In both cases it was possible to observe the trench section, but in neither case were any archaeological features apparent, nor were any finds recovered from the excavated spoil.

These negative results are understandable. TP67 was positioned exactly on the alignment of a Roman road that is plotted on the HER but whose status is 'predicted' – in other words, surmised but not proven. This alignment, HER ID 17563, is quite possibly non-existent and the lack of evidence from the trial pit tends to reinforce this view. TP66 was near to the alignment of a separate Roman road, assigned HER ID 17831. There is far more compelling evidence for this road, which appears as a faint upstanding linear earthwork: it has also been revealed by the geophysical survey undertaken for this assessment. TP66, however, was 40m distant from this feature – presumably well beyond the road itself and any attendant side-ditches.

Geophysical survey

The geophysical survey was based on a 25m buffer around the Scheme footprint and encompassed 98 ha. Of the anomalies revealed, some features were evidently of natural origin or were man-made but modern. These are not discussed below. The remainder were interpreted as being either of a 'probable' or 'possible' archaeological origin, or assigned to agriculture (both historic and modern).

In the interpretation, the difference between a 'probable' and 'possible' archaeological origin is a confidence rating. Features that form recognisable archaeological patterns are interpreted as being of a probable archaeological origin. Features of possible archaeological origin tend to be more amorphous anomalies which may have similar magnetic attributes in terms of strength or polarity but whose morphology makes them more difficult to classify as being archaeological or natural.

Table 6.2.1 gives a summary of the probable and possible archaeological anomalies, and of historic agricultural features. Note that these are 'types', as assigned during Stratascan's post-survey analysis: many occur in several (sometimes many) different parts of the study area. Specific ID numbers have been assigned to individual features (see Volume 3, Appendix C.1).

The detected anomalies occur along the entire survey corridor, indicating potential archaeology at numerous locations. There is a notable concentration in the northern part of the site, particularly in the fields surrounding the Caerlan Tibot SAM. This dovetails with the existing data, which suggests that this is ground that is of proportionally greater interest than other parts of the Scheme corridor. Discrete areas elsewhere have also yielded potentially interesting clusters of anomalies. Meanwhile, a geophysical feature that is parallel to (though not quite coincident with) Roman road PRN 17831, would appear to confirm the line of this ancient route ('Type 4'; site ID G68).

These comments are made with relatively little supporting archaeological data. If investigated, some of the most promising anomalies could prove to be natural, or man-made but modern; others might have unexpected archaeological value. This situation is illustrated in the following section, which describes the results of the field evaluation. In part those investigations confirmed that the original interpretation was correct, but in some instances modified or entirely disproved it. The Type 11 pits are a particular enigma. Although grouped as a single feature type in Stratascan's interpretation, they occur across the whole survey corridor and in reality will have a wide range of origins and character. This is illustrated by Trenches 4 and 92 of the evaluation, both of which targeted Type 11 features: the first proved to be a natural deposit, while the second was a pit of probable prehistoric date. In summary, therefore, the generic 'types', and the individual feature interpretations should be treated only as a guide, and used with due caution.

Table 6.2.1 Geophysical anomalies within the survey area

Anomaly Type	Interpretation
Probable Archaeology	
1	At the northern extreme of the Scheme, a pair of curved, parallel, positive linear anomalies. These are cut off at the edge of the survey area suggesting that they are part of larger feature likely to extend to the north east and south west. They may form part of a boundary or larger enclosure Proven as archaeological by evaluation (Trenches 01 and 02).

Anomaly Type	Interpretation
2	A series of positive linear and curvilinear anomalies. These are indicative of former cut features and may represent an enclosure ditch, possibly associated with Caerlan Tibot (SAM CN400) which lies immediately to the west Proven as archaeological by evaluation (Trenches 18, 19, 21)
2b	A negative linear anomaly, indicative of a former bank or earthwork, related to Anomaly 2
3	A group of positive linear anomalies, indicative of former cut features such as ditches. Given their proximity to Caerlan Tibot (SAM CN400) and their similar characteristics to the probable archaeological features identified as Anomaly 2, these are also likely to be archaeological in origin
3b	A small, negative linear anomaly. This is indicative of a former bank or earthwork and is related to Anomaly 3
4	A linear anomaly which closely corresponds in position and orientation with the line of Roman road PRN 17831
Medieval/Post-medieval agriculture	
5	Widely spaced, slightly curved parallel linear anomalies. These are related to ridge and furrow cultivation
6	Closely spaced parallel linear anomalies at many locations across the site. These are likely to be related to modern agricultural activity, such as ploughing
7	A number of linear anomalies. These are related to former field boundaries present on available historic mapping from 1888 to 1991
8	A number of linear anomalies at many locations across the site. These are likely to be related to former field boundaries that are not visible on available historic mapping. Many of these are similar in character to those identified as known boundaries (Anomaly 7) and form long linear features stretching across the landscape
9a	A series of linear features forming crude rectilinear shapes. Due to the rectilinear shape of these features they could be related to a former field system
Other anomalies (including possible archaeology)	
9b	A number of very short, positive linear anomalies. These are indicative of former cut features and may be of archaeological origin. Due to the size of these features and the limitations of the survey area in places, further interpretation is difficult
9c	Positive linear anomalies forming rectilinear features These may be related to former cut features of archaeological origin, but due to their size further detailed interpretation is difficult

Anomaly Type	Interpretation
9d	A number of linear anomalies indicative of former cut features of possible archaeological origin. Due to the alignment of these features with modern agriculture, it is thought that these could also be related to agricultural activity such as ploughing; however, given the weakness of the features a more detailed interpretation is difficult
9e	A number of linear anomalies and possible former backfilled pits (see also Anomaly 11a). The density of the features here, and the combination of linear anomalies and pits could indicate that this is an area of possible former settlement activity
9f	Positive linear anomalies forming a rectilinear shape in and associated linear anomalies (Anomaly 12d). These may be archaeological in origin and relate to a former enclosure. A number of smaller positive linear anomalies are likely to be associated with the enclosure due to their close proximity
9g	Positive linear anomalies in form a rectilinear shape and may be related to a former enclosure. Proved as archaeological by evaluation (Trench 92).
10a	A positive area anomaly. This is indicative of a former cut feature and may be related to Anomaly 1 given its close proximity to the probable archaeological feature; however due to its location at the edge of the survey area interpretation is limited
10b	A positive area anomaly and associated negative anomalies (Anomaly 12b). Due to the proximity of the feature to the probable archaeology of Anomalies 2 and 3, and the similarity in appearance, these may be archaeological in origin. Despite this, the feature is very straight and runs parallel to the modern road which could mean it is modern in origin
10c	Several large positive anomalies contain characteristics of both archaeological and natural features. The anomalies run parallel to one another, as well as a possible enclosure to the south (Anomaly 9g), and also cut across modern field boundaries. This could suggest that they are of archaeological origin. On the other hand, the features are only seen in close proximity to the geological faults and may equally be natural in origin
11	A number of small discrete positive anomalies across the site. These are indicative of former cut features such as backfilled pits, and may be related to archaeological activity or the underlying geology of the site. Anomaly 11a is more likely to be related to former pits given their proximity to areas of possible archaeological activity One Type 11a feature investigated by evaluation (Trench 92). Proved to be archaeological; suggested as late prehistoric in date; yielded evidence of industrial activity.
12a	Negative linear anomalies. These are indicative of former banks or earthwork features and may be of archaeological origin. This is likely to be related to the possible field system seen in Anomaly 9a.
12b	Negative linear anomalies. These are associated with Anomaly 10b and may be related to the probable archaeology of Anomalies 2 and 3, or be modern in origin

Anomaly Type	Interpretation
12c	Two negative linear anomalies. These are possible banks or earthworks of archaeological origin; however, these may also have an agricultural origin. These are associated with Anomaly 9d
12d	Negative linear anomalies forming a rectilinear shape. These are associated with Anomaly 9f and are possibly archaeological in origin, related to a former enclosure
15	A small, curvilinear positive anomaly. The size of this feature makes interpretation difficult and it may be of archaeological, agricultural or modern origin
16	Two circular areas of strong magnetic debris. Interpreted as likely to be related to former ponds, but evaluation Trench 18 proves one of these to be a prehistoric burnt mound . The other has not been evaluated

Evaluation

The evaluation design comprised 96 trenches, but due to restricted land access only 30 of these were dug. The excavated trenches were primarily concentrated at the northern and southern limits of the scheme, predominantly within pasture fields. The report on the evaluation can be found in Volume 3, Appendix C.3. This includes drawings showing the location of the trenches, and of the features found within them.⁶

Of the 30 trenches excavated:

- 16 contained no archaeological features or deposits
- 10 contained only 19th and/or 20th century agricultural features such as shallow field boundaries or stone field drains
- 4 contained evidence of probable prehistoric archaeology

Trenches 01 and 02 were part of a group of four evaluation trenches located in land to the immediate north of the Plas Menai Roundabout off the A487. Trenches 01 and 02 were positioned to investigate two Type 1 features identified in the geophysical survey (denoted by site code G90). These features were successfully located in the trenches, at a depth of c. 0.3-0.5m beneath the modern ground surface. They are interpreted as part of a larger feature likely to extend to the north east and south west. They may form part of a boundary or larger enclosure. No artefacts were recovered which would aid with the dating of this feature.

Trench 18 was one of seven evaluation trenches located in a pasture field on a gentle east-facing slope to the southeast of the Caerlan Tibot SAM: Trench 18 was approximately 200m from the edge of the scheduled area. The trench was positioned over, and successfully located, Type 2 and Type 16 features identified in the geophysical survey. These features had respectively been interpreted as a possible enclosure ditch associated with Caerlan Tibot (part of the linear anomalies grouped

⁶ Trench numbers correspond to those assigned to them in the original evaluation design (i.e. 01 – 96). No attempt has been made to sequentially re-number the 30 trenches that were actually dug.

as site G77); and as an area with strong magnetic debris, most likely a former pond (site G78).

In the case of G77 there is no reason to depart from this interpretation, although no dateable artefacts were recovered. The same linear feature was probably also encountered in two adjacent evaluation trenches. The feature lay at the topsoil/subsoil interface, at a depth of c.0.3m below the modern ground surface.

G78, however, quite clearly has a different interpretation. It is an intact burnt mound, which in fact is a slightly upstanding feature.

Burnt mounds are a common site-type in Ireland and much of Britain, including North Wales. There are in excess of 200 such features recorded by the GAT HER, with that number continuing to rise, particularly as a result of discoveries made during development-funded projects. Allowing for some simplification, burnt mounds date to late prehistory. An archetypal burnt mound comprises a deep trough or fire site, covered or surrounded by a mound of heat-shattered burnt stone. It is thought that the stones were heated in a fire, placed in troughs to heat water, then discarded. Their purpose, whether for cooking, bathing or as a part of an industrial process, is still debated. So too is the relationship of burnt mounds to settlement: many, though not all, have not been associated with evidence for contemporary occupation sites. As a site-type they have intrinsic interest, are a marker for prehistoric activity, and have high palaeoenvironmental potential.^{6,27}

Trench 92 was one of five evaluation trenches located in a pasture field at Scheme Chainage 900. It was positioned over a Type 9g feature, interpreted as a rectilinear positive linear anomaly, possibly related to a former enclosure, and Type 11a anomalies, suggested as former pits on the basis of their proximity to possible archaeological activity (site G19).

Both the Type 9g and 11a features identified by the geophysical survey were encountered in the trench at the topsoil/subsoil interface (a depth of c. 0.4m). The Type 9g feature, based on the geophysical results and the evaluation data, is strongly suggestive of either a ring ditch or round house, but the lack of dateable artefacts hinders certainty: it can nevertheless be attributed to later prehistory with reasonable confidence.

No diagnostic artefacts were recovered from the Type 11a feature, but slag was retrieved from an upper layer, beneath which was a charcoal-rich fill. The working hypothesis is that this feature denotes an area of prehistoric industrial activity, including metalworking. Analysis of the slag and retrieval of C14 dates from bulk samples will provide more precise information about the processes occurring here and the date for this activity.⁷

Summary: as a whole, the results of the evaluation certainly indicate that a number of the features revealed by the geophysics have genuine archaeological significance. Others have proved to be more modern or natural, while the small number of 'blind' trenches (placed in areas of potential but not on any known feature) did not reveal any archaeology. It is, however, a small sample of total Scheme footprint and the results, while informative, allow only an insight. They should not necessarily be seen

⁷ Because of the time required to undertake the specialist examination and laboratory analysis of samples generated by the evaluation, these will be reported in an addendum to this ES. Although the data generated will be important to understanding the date and function of the excavated features, it is not anticipated that they will materially affect the assessment.

as accurately reflecting the type or extent of archaeology that might be encountered during construction.

6.2.4 Summary of baseline data

The following sections give a summary of the baseline data for cultural heritage. Unless otherwise stated, the text refers to sites within the 500m study area around the limit of Scheme construction.

World Heritage Sites

Caernarfon Castle and Town Walls (which comprise one element of the World Heritage Site of Castles and Town Walls of King Edward) are 1.7km to the west of the Scheme, within the built up area of Caernarfon.

Scheduled Ancient Monuments (SAMs)

There are three Scheduled Ancient Monuments (SAMs) within the study area. These comprise CN188 Bryn-Glas Signal Station, CN229 Hut Circle South of Rhyd y Galen, Pont-Rug, and CN400 Caerlan Tibot Defended Enclosure. It is also understood that the enclosure at Hen Gastell, at the extreme south of the study area (PRN 584), is in the process of being scheduled.

Listed Buildings

There are 31 Listed Buildings within the study area. Glan Gwna Hall is listed as Grade II*; all others are Grade II-listed.

Conservation Areas

The Llanwnda conservation area lies within the study area, while Pentre Ucha, south of Bontnewydd, lies just outside its boundary. The Caernarfon conservation area is at a greater distance: just under 1km from the study area, at its nearest point.

Historic Parks and Gardens

There is a single registered Historic Park/Garden within the study area. This is the Grade II Morfa Common Park, on the south-eastern outskirts of Caernarfon.

Historic Landscapes

The study area does not incorporate any historic landscape, as described by the Cadw, CCW and ICOMOS UK Register of Landscapes of Special Historic Interest in Wales or Register of Landscapes of Outstanding Historic Interest in Wales.^{6.28}

The nearest historic landscape is Dinorwig (HLW Gw 6), which envelopes the study area on its eastern and northern sides. The minimum distance between this landscape and the Scheme is 1.5km. Nantlle Valley (HLW Gw 9) lies to the southeast of the Scheme, at a distance of 3.2km.

Non-statutory sites

Within the study area there are 93 sites listed on the HER database and 54 on the NMR database. In addition, the research for this assessment has identified a further 66 sites from historic maps and 90 features or feature groups from the geophysical

survey data. The latter figure omits the numerous anomalies detected by the survey which were obviously natural or man-made but modern. Neither the general walkover nor the analysis of aerial photographs revealed any additional archaeological or historic sites.

Historic boundaries

There are 88 locations where 'historic' boundaries are coincident with the Scheme footprint. For the purposes of this assessment, the term historic is used to refer to any boundary that features on the 1st edition Ordnance Survey maps (late 19th century), or where field visits suggested that it was a well-established feature.

None of these boundaries meets the Archaeology and History criteria for an 'important hedgerow' that are set out in the Hedgerow Regulations 1997.

6.3 Predicted Environmental Effects

6.3.1 Generic effects

Impacts upon the cultural heritage resource are assessed under three basic headings: direct physical (which occur during construction), and indirect physical and non-physical (which arise from long-term operation).

Permanent construction effects on cultural heritage are as follows:

- Intrusive groundworks that extend down to the level of archaeological features and horizons
- Compression of fragile buried archaeological features
- Damage to or destruction of standing heritage features (whether inhabited buildings or non-occupied structures). This may occur either because of deliberate demolition, or unintentional events

Long term operation has the potential to impact upon cultural heritage features within and outside the development footprint. Published non-statutory guidance for Wales usefully characterises most of these impact types as part of the ASIDOHL methodology (Assessment of the Significance of Impact of Development On Historic Landscapes).^{6.29}

Indirect physical effects are categorised as:

- An increased risk of exposure, erosion, disturbance, decay, dereliction or any other detrimental physical change to elements, consequent to development
- related to the above, the likelihood of increased management needs to maintain elements as, for example, through altered habitats, water levels, increased erosion, new access provision, etc., consequent to development
- The severance, fragmentation, dislocation or alteration of the functional connections between related elements, for example, a field system becomes 'severed' from its parent farmstead by an intervening development
- The frustration or cessation of historic land use practices, for example, it becomes more difficult or impossible to manage an area in a traditional manner as a result of development
- The frustration of access leading to decreased opportunities for education, understanding or enjoying the amenity of elements, consequent to development

Indirect non-physical effects are categorised as:

- Visual impact on elements from which a development can be seen (considered up to its maximum height). Impacts can be on 'views to' or 'views from' given elements, and should be assessed with particular reference to key historic viewpoints and essential settings. In some cases, key historic viewpoints may no longer be identifiable, but it may be possible to make reasonable assumptions on the basis of archaeological or historical information. Key viewpoints should also include those that have subsequently become acknowledged as such, for example, as depicted in artists' drawings and paintings, or as features on popular routes or trails
- Impact on the visual connections between related elements, by occlusion, obstruction, etc. For example, what might have been an essential line of sight between historically linked defensive sites becomes blocked or impaired by an intervening development
- Conversely, the creation of inappropriate visual connection between elements not intended to be inter-visible originally, by the removal of intervening structures, barriers, shelters, screening or ground
- Visual impact of the development itself considering: (i) its form – the scale, number, density, massing, distribution, etc. of its constituent features; (ii) its appearance – the size, shape, colour, fabric, etc. of its constituent features, in relation to the existing historic character of the area

Although these are useful criteria, ASIDOHL notably fails to recognise noise as a non-physical form of impact. While using ASIDOHL criteria as a basis, the potential for alteration of setting due to noise effects has also been considered by this assessment. This draws on data generated for Chapter 11 of this Environmental Statement.

6.3.2 Construction impacts

Table 6.3.1 lists the sites that would be impacted upon during construction; the impacts given are those prior to any mitigation.

The assessment includes the entire Scheme footprint for permanent construction. It also includes all areas of temporary land take.

No WHS, SAM, Park and Garden, Conservation Area or historic landscape would be subject to any impact. There is a single impact on a Listed structure, this being a Grade II milestone which lies within the construction corridor (ID 22047; see Figure 6.5).⁸

No NMR site is affected, but a single HER site would be damaged, this being the known stretch of Roman road denoted by PRN 17831 (and probably seen as geophysics anomaly G68). The possibility of there being an impact on the other proposed routes may be discounted. There is no evidence for PRNs 17533, 17563, 17590, 17824 and 17829 – and the lack of any geophysical anomalies where they cross the Scheme alignment would seem to confirm this. PRNs 17554, 17822 and 17833 are proposed to run on the course of the modern A487. Although the Scheme

⁸ For the full description of this object, see Volume 3 Appendix C.1.

crosses the A487, it is assumed that any traces of a Roman route would already have been destroyed at this point.

In addition, and included as a single entry within the table, is the impact on field boundaries of historic age – here defined as featuring on the 1st edition Ordnance Survey map of 1885, and retaining some original elements – as opposed to being a modern replacement of a traditional alignment. In total the Scheme cuts across 88 such boundaries: this amounts to the removal of approximately 7250m of boundary. For individual boundaries, the loss varies from <10m, to a maximum of c. 250m. The assessment considers this fieldscape as a whole. The Moderate adverse score of impact aims to reflect a substantial loss of boundary in absolute terms, and also the severance and fragmentation created by the Scheme's cross-cutting of the landscape. Equally, however, it recognises that no single boundary would be entirely destroyed, and that the fieldscape either side of the Scheme margins would remain unchanged.

For the geophysical features, only an impact magnitude score is usually given. The exceptions are where there is supporting archaeological information, derived from the field evaluation. The impact magnitude is based on the percentage of each feature or feature group that would be destroyed: <25% = Low; 25-50% = Medium; 51-100% = High. No attempt is made to assign impact significance, except where there is supporting archaeological data. However, it is most likely that the more significant impacts will apply to the Type 1, 2, 3 and 4 features, in the northern part of the Scheme corridor, and to the Type 9-12 features which occur along its whole length. Assuming that the Type 5-9 features relate to agriculture and field boundaries (as per the post-survey interpretation) then the significance of any impacts on these will be substantially lower. Similarly, if the Type 13-24 features are indeed either geological or modern, then any impact is irrelevant (i.e. Neutral). Again caution is required here, since the interpretation of one Type 16 feature has already been disproved, a 'pond' being shown by evaluation to be a prehistoric burnt mound (G78).

In terms of determining impact, the depth of the archaeological sites is a critical, but largely unanswered, question. For those sites within areas of the Scheme that are in cutting, construction groundworks would doubtless have a major impact. However, much of the Scheme runs on embankment and here only the topsoil would be stripped, before new material is introduced to raise the ground levels. Arguably, therefore, any archaeological site in the embankment zone that lies below the topsoil would not be impacted. (For this to be true, it also requires that no drainage or services are cut down into subsoil. It also requires that the features would not be of types vulnerable to damage through compression or altered hydrology). Unfortunately, in most cases the depth of the geophysical features is not known, and therefore the impact table adopts a 'worst-case' scenario in its assessment – i.e. that the features are shallow enough to be impacted. The mitigation strategy at Key Stage 6 will address this problem, enabling the investigation of those sites that are at impacted depths, but allowing those unaffected to be preserved *in situ*.

Finally, a comment is necessary in respect of the temporary effects of construction upon the setting of ancient monuments and historic buildings. It is recognised that, in some cases, the 30 month construction phase of the Scheme would bring about an alteration to the visual backdrop of, and/or views from certain sites, and increased noise levels. However, this is a brief and genuinely transitory phase in the lifetime of sites or structures that are all over 100 years in age, and which in certain cases are several thousand years old. Concern therefore rests with the long-term, operational effects on setting: i.e. those that will be permanent. This issue is addressed below, for

those sites where the situation does not return to the status quo after the Scheme's construction (section 6.3.3).

Table 6.3.1 Impacts on known sites: construction

ID	Name/ description	Status	Condition	Value	Impact Magt'de	Impact Sign'ce	Comments/ <i>Scheme element</i>
22047	Milestone	LB II	Intact	B	High	Major	Would be completely destroyed
17831	Roman Road, Segontium to Canovium	None	Near Destroyed	B	Medium	Moderate	200m stretch would be destroyed. See also G68. <i>Scheme at Grade</i>
-	Historic boundaries of late 19th century date or earlier	None	Variable: near destroyed to intact	B	Medium	Moderate	88 boundaries impacted; loss varies from 3m to 257m, with average loss per boundary of 82m
G1	Type 10c feature	None	N/A	None	N/A	Neutral	No feature found by evaluation (Trench 96) <i>Scheme on Embankment.</i>
G4	Type 13 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment</i>
G5	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment</i>
G6	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment</i>
G8	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment</i>
G9	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment</i>
G10	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment</i>
G11	Type 8 feature	None	Near destroyed	None	High	Neutral	100% destroyed. Recent field boundary found by evaluation (Trench 95)
G12	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Within area to be excavated for Attenuation Pond</i>

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ID	Name/ description	Status	Condition	Value	Impact Magt'de	Impact Sign'ce	Comments/ <i>Scheme element</i>
G13	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Within area to be excavated for Attenuation Pond</i>
G14	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Within area to be excavated for Attenuation Pond</i>
G15	Type 9b feature	None	N/A	None	N/A	None	No feature found by evaluation (Trench 94) <i>Scheme on Embankment.</i>
G17	Type 8 features	None	Unknown	Unknown	High	Unknown	75% destroyed <i>Scheme at Grade.</i>
G18	Type 9 feature	None	Unknown	Unknown	Medium	Unknown	50% destroyed. <i>On Scheme margin; possibly running into area of cutting.</i>
G19	Cluster of Type 9g features, and one Type 11 feature	None	Damaged	B	High	Major	75% destroyed. Proven archaeology at topsoil/subsoil interface, c. 0.4m below modern ground surface (Trenches 92, 93). <i>Scheme in Cutting</i>
G20	Type 14 feature	None	Unknown	Unknown	Imper- ceptible	Unknown	<10% destroyed <i>Scheme in Cutting; feature probably lies beyond area of cutting.</i>
G21	Cluster of Type 10c features, aligned NE- SW across c. 250m; one Type 9 feature also present	None	N/A	?D	High	?Minor	75% destroyed. Evaluation suggests some elements may not be archaeological (Trenches 89, 90) Features at 0.65m below modern ground surface. <i>Scheme in Cutting.</i>

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ID	Name/ description	Status	Condition	Value	Impact Magt'de	Impact Sign'ce	Comments/ <i>Scheme element</i>
G22	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment.</i>
G23	Two Type 13 features, aligned N-S; to the S, one Type 11 feature	None	Unknown	Unknown	Imper- ceptible	Unknown	10% destroyed <i>Scheme on Embankment. Feature beyond embankment toe, but possible impact from side drainage.</i>
G24	Three Type 11 features, in a NE-SW alignment across c. 70m	None	Unknown	Unknown	High	Unknown	66% (two of the three features) destroyed. <i>Scheme on Embankment; one feature below embankment; other feature coincident with drainage.</i>
G25	Type 9b feature, curvilinear	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment.</i>
G26	Cluster of three Type 11 features	None	Unknown	Unknown	Medium	Unknown	33% destroyed (only one of the three features impacted) <i>Scheme on Embankment.</i>
G27	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme in Cutting.</i>
G28	Two Type 11 features	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Within area to be excavated for Attenuation Pond.</i>
G29	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment.</i>
G30	Dense cluster of linear features: Types 9f and 12d	None	Unknown	Unknown	Medium	Unknown	<i>Viaduct piers and related construction works</i>
G33	Type 13 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment.</i>
G35	Type 9b feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment.</i>

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ID	Name/ description	Status	Condition	Value	Impact Magt'de	Impact Sign'ce	Comments/ <i>Scheme element</i>
G36	Type 7 feature	None	Unknown	Unknown	Imper- ceptible	Unknown	<10% destroyed. <i>Scheme on Embankment. Feature partly coincides with embankment toe.</i>
G39	Three Type 11 features	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment.</i>
G40	Dense concentration of Type 9e, and Type 11 features, across c. 150m	None	Unknown	Unknown	High	Unknown	75% destroyed <i>Scheme on Embankment.</i>
G41	Type 13 features	None	Damaged	None	High	Neutral	Evaluation suggests modern drainage (Trench 52) <i>Scheme on Embankment.</i>
G42	Type 14 feature	None	Unknown	Unknown	High	Unknown	75% destroyed <i>Scheme on Embankment.</i>
G43	Three short linear Type 9b features	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment and at Grade.</i>
G44	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Within area to be excavated for Attenuation Pond.</i>
G46	Type 8 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme in Cutting.</i>
G47	Type 7 feature	None	Unknown	Unknown	High	Unknown	100% destroyed <i>Scheme on Embankment.</i>
G49	Four Type 11 features	None	Unknown	Unknown	Low	Unknown	25% destroyed (one out of the four features is within Scheme boundary) <i>Feature within area of Scheme cutting.</i>
G51	Type 8 feature	None	Unknown	Unknown	Medium	Unknown	50% destroyed. <i>Scheme at Grade.</i>
G52	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Scheme on Embankment.</i>

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ID	Name/ description	Status	Condition	Value	Impact Magt'de	Impact Sign'ce	Comments/ <i>Scheme element</i>
G53	Type 8 feature	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Scheme on Embankment.</i>
G55	Type 13 feature	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Scheme on Embankment.</i>
G56	Type 8 and Type 13 features.	None	Intact	None	N/A	Neutral	Modern field drains found by evaluation (Trench 37, 38). <i>Scheme in Cutting.</i>
G58	Type 12c features	None	Unknown	Unknown	Low	Unknown	25% destroyed. <i>Scheme in Cutting.</i>
G59	Type 9d feature	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Within area to be excavated for Attenuation Pond.</i>
G60	Type 8 features	None	Unknown	Unknown	High	Unknown	75% destroyed. <i>Scheme in Cutting.</i>
G61	Type 13 feature	None	Unknown	Unknown	Medium	Unknown	50% destroyed. <i>Scheme at Grade.</i>
G64	Type 8 feature	None	Unknown	Unknown	Low	Unknown	25% destroyed. <i>Scheme on Embankment.</i>
G65	Type 7 feature	None	Unknown	Unknown	Medium	Unknown	50% destroyed. <i>Scheme on Embankment.</i>
G66	Type 11 feature	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Scheme on Embankment.</i>
G68	Type 4 feature, in association with two Type 11 features	None	Unknown	B	Medium	Moderate	Probable Roman road. See also 17831. <i>Scheme at Grade.</i>
G73	Group of Type 5 features	None	N/A	None	N/A	Neutral	Evaluation suggests natural. <i>Scheme in Cutting.</i>
G74	Cluster of Type 3, 3a, 5 and 11a features	None	N/A	None	N/A	Neutral	Evaluation suggests natural. <i>Feature group falls within areas of Scheme embankment and cutting.</i>

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ID	Name/ description	Status	Condition	Value	Impact Magt'de	Impact Sign'ce	Comments/ Scheme element
G75	Type 12b features, and one Type 10b feature	None	N/A	None	N/A	Neutral	Evaluation suggests natural. <i>Scheme on Embankment.</i>
G77	Cluster of Type 2 and 2b features.	None	Damaged	Unknown	High	Unknown	75% destroyed. Modern agricultural features found by evaluation, but others possibly archaeological (Trenches 18-21). <i>Scheme in Cutting.</i>
G78	Type 16 feature	None	Intact	B	High	Major	100% destroyed. Prehistoric burnt mound (Trench 18). <i>Scheme on Embankment but this mound is an upstanding feature.</i>
G79	Type 2 feature joining to G77; also possible enclosure at the N end	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Scheme in Cutting.</i>
G80	Curvilinear Type 2 feature	None	Unknown	Unknown	Medium	Unknown	50% destroyed. <i>Scheme in Cutting.</i>
G81	Centrepoint for an extensive area of Type 8 features	None	Unknown	Unknown	High	Unknown	75% destroyed. <i>Scheme in Cutting.</i>
G82	Type 13 feature	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Scheme in Cutting.</i>
G83	Centrepoint for a cluster of Type 9a, 12a and 13 features	None	Unknown	Unknown	High	Unknown	75% destroyed. <i>Scheme in Cutting.</i>
G87	Type 13 feature	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Scheme in Cutting.</i>
G88	Type 13 feature	None	Unknown	Unknown	High	Unknown	100% destroyed. <i>Scheme on Embankment.</i>

ID	Name/ description	Status	Condition	Value	Impact Magt'de	Impact Sign'ce	Comments/ <i>Scheme element</i>
G90	Type 1 features	None	Damaged	B	High	Major	100% destroyed. Cut features, part of a larger enclosure, found by evaluation (Trenches 1-3). <i>Scheme in cutting.</i>

6.3.3 Operational impacts

The ZVI for the Scheme establishes the overall envelope for this assessment (see Volume 2, Figure 7.4). This demonstrates that, because of a combination of topography and local screening elements, the significant changes arising from the Scheme would occur within its immediate vicinity. In many places – particularly in its central-northern parts – the visibility of the Scheme is extremely restricted. And, while there would be longer-distance views of the Scheme from the Llyn Mountains (south-west), Snowdonia Mountains (south-east/east) and Anglesey coast (north-west), it would not be a noticeable change to existing views. None of the many scheduled sites (mostly prehistoric) in these areas would have their setting affected.

The Scheme design includes measures to ameliorate its impacts, both in terms of visual change and noise and vibration. As a general principle an alignment has been chosen which is at a distance from existing properties, while bunds, embankments and cuttings would be planted and/or screened. Lighting is restricted to roundabouts and signage. The road would have a low-noise surface.

The assessment below focuses on those monuments and buildings in the immediate vicinity of the Scheme – i.e. those on which there would be a potential impact. Despite their proximity, the historic settings of some (for example SAMs CN188 and CN229, and the Grand Lodge to Glan Gwna Hall) are not considered to be affected. And, while effects must be acknowledged where they occur, it also needs to be noted that there would be potential benefits elsewhere, particularly in terms of the Listed Buildings within the settlements that are to be bypassed; these would exist in a lower-traffic environment if the Scheme were to be built.

Caernarfon World Heritage Site

During consultation, Cadw requested that the Scheme's potential for impact on the Caernarfon WHS be considered. The ZVI indicates that no part of the WHS would have views of the Scheme. This has been confirmed by visits to the town and castle: even the most elevated points – namely the towers on the castle's eastern and southern sides – do not have views towards the Scheme corridor. And, as noted above, long-distance views towards Caernarfon from the east (i.e. vistas including the WHS) would not be significantly altered by the presence of the Scheme.

Scheduled Ancient Monuments

Of the three SAMs within the 500m study area, two would be unaffected by the Scheme.

Bryn Glas

The faint earthwork at Bryn Glas (CN 188) is 250m from the Scheme and separated from it by two substantial field boundaries: these effectively block southeastern views. The setting of this monument – as far as this attribute applies to a monument with little ‘sense of place’ within a pasture field, whose value is principally archaeological – would be unchanged.

Hut Circle at Rhyd-y-Galen

The hut circle south of Rhyd-y-Galen (CN 229) occupies a low-lying position, on gently sloping pasture, overlooking the Cadnant valley to the northeast (the watercourse being c. 150m distant). Regionally, it is a rare survival of an Iron Age/Roman period domestic settlement in a lowland setting, and the earthwork remains are such that the monument’s form and function are fairly apparent to the visitor.

CN 229’s setting attributes fall mainly in the *topographic* category (see definitions section 6.1.5 above), with its relationship with the Cadnant being particularly important. Its fairly slight earthwork form means it has little *intrinsic visual interest*, except at very close range. Land use setting is less relevant, because the surrounding enclosed pasture fieldscape bears little resemblance to the open landscape the monument originally occupied. Similarly (in the modern day at least) it stands in isolation from any other monuments – thus precluding any group setting.

The Scheme would not influence this setting. On the western side it brings modern infrastructure somewhat closer to the monument (350m distant, where the present road is 470m), but this makes little difference to the immediate views of or from the monument. To the north, the Scheme’s slip road coincides with the present road. Close-range views of the monument would not be altered, while the key topographic connection with the Cadnant would not be affected.

Caerlan Tibot

Caerlan Tibot (CN400) is a monument that has very considerable archaeological importance, but whose setting qualities also contribute substantially to its value. Its earthworks, now standing within a pasture field, are prominent, with the original circular form easily apparent despite the ring of mature trees that now grow on its banks (Volume 2, Figure 6.4). The *intrinsic visual interest* is obvious, particularly from the existing road to the east (Lôn Ffynnon Fair), where the monument can be appreciated in its entirety. Its original open environment is preserved to the east (albeit in much altered-form, as enclosed pasture), making *topography* a second attribute of its setting. It is harder to evaluate the monument’s connections to past land use, as its function is not well-understood. No connections with other above-ground monuments exist, precluding any group setting.

Caerlan Tibot’s formerly open environment is now greatly changed. A large agricultural barn stands immediately to the north, with the main farm complex 50m to the south. A solar farm has recently been constructed in the field to the east. The effect is that the monument is now closed in on its west, north and south sides, leaving the only open vista to the east. Nevertheless, looking from the monument in

this direction, it is possible to understand something of its former setting, across open ground that descends gently to the Cadnant Valley, with panoramic views of Snowdonia beyond.

The Scheme would replace the existing minor road at this location, running at almost exactly the same distance from the monument (60m, as opposed to the present 50m) and on the same north-south alignment. It would be substantially larger than the existing 10m-wide road - its main carriageway, roundabout slip road and the associated cuttings making for a total width of 75m.

The Scheme would be in substantial cutting at this location, and separated from the Caerlan Tibot monument by a 3m-tall hedge. Even high-sided vehicles are unlikely to be visible as they pass the site. This situation is illustrated in Volume 2, Figure 6.4. As a consequence, there would be no adverse change in outward views from the monument: indeed, arguably they would be improved, since through traffic would no longer use the existing road. Traffic volume (and therefore traffic noise) is predicted to increase, but given that the monument's principal setting attributes are visual, this is not considered significant.

Access to the monument would remain possible, via the present road, which would be retained as a route to the adjacent farm, agricultural buildings and solar farm.

The magnitude of impact on Caerlan Tibot's setting is assessed as Imperceptible. This reflects the no-change (possibly improved) effect of the Scheme on the monument's visual relationship with the land to its east, and the fact that public access and viewing opportunities remain possible – even if no more ideal than presently. The overall significance of impact would be Minor.

Listed Buildings

The majority of Listed Buildings are at a sufficient distance from the Scheme, or separated from it by existing screening elements, for there to be no alteration to their existing setting. This includes the only Grade II* listed structure, Glan Gwna Hall, and its associated buildings. In this circumstance, only the setting of a small number of Listed Buildings in the central-southern part of the Scheme requires discussion. All others have been scoped out of this assessment.

Glanrafon Fawr

Glanrafon Fawr, about a kilometre west of Bontnewydd, is a late Georgian three-storey country house (18623). It is suggested to date from 1774, although the present form appears to belong to the early 19th century. The house occupies a slightly elevated position immediately above the Afon Gwyrfa. Its situation within a pastoral fieldscape provides its key, *landuse setting*, while views towards the building have *intrinsic visual interest*. The lack of roads or public rights of way to the east of the building make views of the house difficult to obtain, however.

The Scheme would significantly alter the visual environment of the house on its eastern side. Here, it runs north-south at a distance of c. 200m, across the Gwyrfa floodplain on embankments and a central bridge structure. Views from the property would be altered in this direction, despite there being mature deciduous trees around the edge of the grounds. As a result its landuse setting would be negatively impacted, though not wholly compromised.

The impact is assessed as Medium, with the significance of effect being Moderate.

Bryn Eglwys

The listed structures at Bryn Eglwys comprise the house (22038), stables and coach house (22039) and the wall surrounding the property (22040). It was a mid-nineteenth century creation, intended as a sophisticated, tranquil property for a member of Caernarfon's rising middle class.

The building group would stand c. 210m from the Scheme, but the effects would be limited. The house itself is orientated in the opposite direction, with its frontage towards the minor road on its eastern side – though the house clearly has designed views of and beyond its gardens on the west. Here, there is already extensive, mature tree screening between the house and the Scheme; although deciduous, it provides substantial screening even in mid-winter. At this location, there would also be additional woodland planting on the margins of the Scheme, linking into existing vegetation.

The impact on the setting of this Listed Building complex is assessed as Imperceptible to Low, with the significance of effect being Minor.

Bryn Eden

Bryn Eden (22041) is a mid-nineteenth century house which, like Bryn Eglwys, was built for an affluent member of Caernarfon's middle class. Aesthetics, tranquillity, and separation from the town were all a part of its design intent (Volume 2, Figure 6.5).

The house and its surrounding terrace occupies slightly elevated ground. There are extensive westward views from the property, although these are more restricted in the summer months, due to the deciduous woodland that stands around the house and on surrounding field boundaries. Looking back towards the house from nearby fields (i.e. an eastward view), it may be seen in relation to its immediate surroundings and the Snowdonia Mountains beyond.

The Scheme would alter this situation. It would be located c. 150m to the west of Bryn Eden, running on a substantial embankment. There would be woodland planting on the embankment; this would have no effect in Year 1 after construction, but would be fully mature by Year 15. The planting would ameliorate the change in views from the house to some extent, but not totally. As with the existing vegetation, it would be more effective in summer than winter. In terms of views towards the house, the embankment would block many of the eastward-looking vistas, for example from the public rights of way that lead from the A4085 at Pont Peblig towards the clay pit.

The impact on the setting of this Listed Building is assessed as Medium, with the significance of effect being Moderate.

Grand Lodge to Glan Gwna Hall

This building (22037), as its title suggests, was built as the lodge to the Grade II*-Listed Glan Gwna Hall. Access to the lodge is via a lane leading from the modern A4085, the original access-point directly onto this road seeming to have been stopped up (Volume 2, Figure 6.5).

The lodge would stand c. 250m from the Scheme and there would be views of the new road and its embankment from the rear of this property – though once again these would be planted for screening, tying into existing vegetation. However, the key setting attribute of the lodge lies in its relationship to Glan Gwna Hall; this would be

entirely unaffected by the Scheme, and thus The Scheme's impact is assessed as Neutral.

Registered Parks and Gardens

The Scheme would not be visible from Morfa Common Park, nor would it have an impact on any other registered historic park or garden.

Registered historic landscapes

Dinorwig historic landscape lies beyond the Scheme ZVI and would be entirely unaffected. The north/northwestern fringe of Nantlle historic landscape falls within the ZVI, but the separation between it and the Scheme (3.3km and greater) means that there would be no meaningful change to views of or from this historic landscape.

Conservation Areas

The Scheme would not have an impact on the setting of any Conservation Area.

Table 6.3.2 Impacts on known sites: operation

ID	Name	Status	Condition	Value	Magnitude of impact	Significance of impact
CN400	Caerlan Tibot	SAM	Damaged	High	Imperceptible	Minor
18623	Glanrafon Fawr	LB II	Intact	High	Medium	Moderate
22041	Bryn Eden	LB II	Intact	High	Medium	Moderate
22038, 22039, 22040	Bryn Eglwys: house, stables, boundary	LB II	Intact	High	Imperceptible/ Low	Minor

6.4 Proposed Mitigation

6.4.1 Principles of mitigation

There is a presumption in favour of preservation in situ of nationally important archaeological remains, whether scheduled or not. In some cases, unscheduled remains of local and regional importance will be considered worthy of preservation in situ. In these cases, the results of the assessment should influence the design of the development in order to protect a monument or remains. Proposals for enhancement may also be identified.

Preservation 'by record' may also be considered as an option for mitigation. For buried archaeology this implies excavation, whilst standing features are recorded by a combination of drawn, photographic and written record. Preservation by record is normally considered a less satisfactory outcome for cultural heritage, since it presupposes loss of, or damage to, the feature in question.

The principle of preservation in situ applies as equally to archaeological investigations as it does to construction. Archaeological excavation is a destructive exercise which arguably should only be undertaken when in-situ preservation is not viable. Particularly in commercial contexts (as opposed to precisely-targeted research projects), sites should not be dug simply because an opportunity presents itself. Moreover, investigative and analytical techniques are constantly improving: our ability to extract data from archaeological sites will increase in the future, giving weight to the argument that sites should be preserved for investigation by future generations.

6.4.2 Construction mitigation

Mitigation would comprise a staged approach that would take place both prior to and during construction. It would be followed by an analysis and reporting phase, in which the results would be delivered to Cadw, GAPS and RCAHMS, and published if appropriate.

The scope of the mitigation programme, its methodology and reporting, would be set out within a Written Scheme of Investigation. This document would set out the guiding principles and standards of the mitigation, and outline how the known and potential archaeological sites would be addressed. Ongoing liaison between the Scheme Archaeologist, GAPS and the Contractor would be necessary to ensure that these works are correctly programmed within the broader construction timescale.

In outline, the mitigation would comprise the following:

Relocation of Listed Milestone 22047

This object would be removed from its current position (on the roadside, set in a boundary wall) and placed beyond the Scheme footprint. This shift would only have to be 25m westwards, on the same road to which it belongs. The measurements given by the stone are in whole miles, and such a small change of location would not affect their accuracy. Listed Building Consent would be required for this exercise.

Archaeology

a. Evaluation trenching

As discussed above, the KS3 studies included an evaluation trenching exercise that was only partially completed due to land access arrangements (sections 6.1.6 and 6.2.2). This exercise sought to investigate the features revealed by the geophysical survey, as well as sampling some superficially 'blank' areas.

At the outset of KS6 this exercise would be completed. The primary objective of this evaluation would be to clarify the character and depth of the geophysical features; the findings would inform decisions about whether further mitigation of these sites/areas would be required. It would also flag up areas of risk in terms of constraints to the construction schedule.

b. Excavation

A small number of known archaeological sites/areas that are of demonstrable value would be immediately subject to open-area excavation. This would take place prior to the commencement of construction in the areas concerned. A provisional list is as follows, but this may be added to after the evaluation exercise is completed:

- Site G19, cluster of probable prehistoric features (settlement)

- Roman road, denoted by 17831 and G68
- Area adjacent to Caerlan Tibot, with known and suspected archaeological features denoted by G77, G78, G79 and G80.
- Site G90 (possible enclosure)

c. Strip, Map and Record

This measure would apply to all parts of the Scheme not taken in under item b) above, unless scoped out through consultation with GAPS. It would encompass all areas of permanent and temporary land-take.

Mechanical soil stripping would involve a supervising archaeologist working with a plant operator and banksman. Soil stripping would extend to the depth and footprint required for construction only. If archaeological remains are not revealed at this stage, no further investigative works would be undertaken.

Where archaeological remains are revealed and an impact predicted, these remains would be subject to appropriate investigation, ensuring adequate preservation by record.

d. Watching brief

The excavation of features such as culverts and easements for drains and other services would be observed under a watching brief condition.

Where archaeological remains are revealed, these would be subject to appropriate investigation, ensuring adequate preservation by record.

e. Palaeoenvironmental sampling

Should suitable deposits be encountered, specific palaeoenvironmental sampling and analysis would be carried out.

f. Contingencies for the discovery of archaeology

Should archaeological or artefactual remains be discovered under any circumstance during construction, then these remains would be subject to appropriate investigation, ensuring adequate preservation by record.

g. Analysis and reporting

A full post-excavation analysis and reporting programme would be integral to these on-site works.

Historic boundaries

The removal of existing boundary features on the Scheme route would be an unavoidable requirement for its construction, although some would be translocated. All boundaries features would be recorded prior to the start of construction and the results submitted to the GAT HER. This approach to boundary retention was adopted after discussion with GAPS.

Comments

In putting forward this strategy, several points need to be highlighted:

- The studies undertaken at Key Stage 3 have been an investigative, data-gathering exercise. They do not constitute mitigation.
- Consenting of the Scheme presupposes that all archaeology impacted by construction may be mitigated by 'preservation by record'. Preservation in situ, by re-design of the Scheme, is unlikely to be a viable option.
- Some archaeology *may* exist that has not been identified by the KS3 studies and will also not be revealed by the strip, map and record exercise, because it exists below construction levels. It must be accepted that any such putative archaeology would be sealed beneath the new road.
- While there are obvious 'hot-spots', for example around Caerlan Tibot, 'blank' areas also have the potential to contain significant remains. Field work for other infrastructure projects in the region indicates that not every archaeological feature will have been detected by geophysics, while superficially unpromising anomalies may also mask archaeology of far greater significance.⁹
- The programming of archaeological works will be critical. Sufficient time for adequate investigation is necessary to meet technical standards; it is also essential if there is not to be conflict between the needs of archaeology and the imperatives of the construction programme. Advance-planning is therefore critical, including contingencies for a scenario in which an unexpected archaeological discovery requires a temporary halt in construction at a particular location.

6.4.3 Operational mitigation

The Scheme design already includes a number of measures to lessen its visual impacts through hard and soft landscaping, and through a minimal lighting strategy, in which only roundabouts would be illuminated, using full cut-off lights (i.e. unidirectional and with minimal light spill). These measures have been considered in the assessment of impacts above. No further mitigation is deemed practicable or appropriate.

6.5 Residual Environmental Effects (following mitigation)

6.5.1 Construction impacts

Table 6.6.1 summarises the residual construction impacts of the Scheme. As outlined above, the direct physical impacts of the Scheme would mainly be mitigated via 'preservation by record'. As such, elements of the archaeological resource would be lost, and therefore the mitigation proposed does not totally ameliorate the impact. As for Table 6.4.1 above, at the present time it is not possible to quantify the residual impacts on the geophysical features, except those that were investigated by the evaluation.

⁹ The Neolithic site at Llanfaethlu, Anglesey, noted above in Section 6.1.6, is one example. Another is provided by a sub-Roman period graveyard recently discovered during construction of an Anglesey road scheme, which also went undetected by geophysics. The time and resources required to investigate such features would, self-evidently, be substantial.^{6.30}

Table 6.8.1 Residual impacts: Construction

ID	Name/ Description	Status	Value	Significance of impact (without mitigation)	Significance of impact (after mitigation)
22047	Milestone	LB II	B	Major	Negligible
17831, G68	Roman Road, Segontium to Canovium	None	B	Moderate	Minor
G19	Cluster of features, proven archaeology, probably prehistoric	None	B	Major	Moderate
G21	Cluster of features, some possibly archaeological	None	?D	?Minor	?Negligible
G78	Prehistoric burnt mound	None	B	Major	Moderate
G90	Cut features, part of a larger enclosure	None	B	Major	Moderate
-	Historic boundaries of late 19th century date or earlier	None	B	Moderate	Minor/ Moderate
Geophysics features: uninvestigated G4, G5, G6, G8, G9, G10, G12, G13, G14, G17, G18, G20, G22, G23, G24, G25, G26, G27, G28, G29, G30, G33, G35, G36, G39, G40, G42, G43, G44, G46, G47, G49, G51, G52, G53, G55, G58, G59, G60, G61, G64, G65, G66, G77, G79, G80, G81, G82, G83, G87, G88		None	Unknown	Unknown	Unknown

6.5.2 Operational impacts

The operational impacts of the Scheme upon the setting of cultural heritage assets would not be mitigated, beyond the embedded design measures such as screen planting. As such, the impacts remain as described in section 6.3.3.

Table 6.8.2 Residual impacts: Operation

ID	Name	Status	Value	Significance of impact (without mitigation)	Significance of impact (after mitigation)
CN400	Caerlan Tibot	SAM	High	Imperceptible	Minor
18623	Glanrafon Fawr	LB II	High	Medium	Moderate
22038, 22039, 22040	Bryn Eglwys: house, stables, boundary	LB II	High	Imperceptible/ Low	Minor
22041	Bryn Eden	LB II	High	Medium	Moderate

6.6

Summary and Conclusions

The district around Caernarfon preserves a cultural heritage resource that spans later prehistory to the Post Medieval era. The study area adopted for this assessment is quite typical of Caernarfon's hinterland as a whole, in that the baseline of known sites, prior to detailed investigation, was quite sparse. The investigation undertaken for this Environmental Statement, however, has revealed a greater number of definite and potential archaeological sites. These are distributed along the whole route corridor, but with possible foci at certain locations.

In terms of physical effects, that on the listed milestone near Pont Peblig is potentially serious, but relocation of this object offers a suitable solution. Where archaeology is concerned, the impact of the Scheme is more difficult to quantify with the present data. The Roman road near Bryn Glas would be subject to impact, as would several sites revealed by geophysics and tested through trench evaluation. For these, predictions of the level of residual impact can be made: assuming an adequate programme of excavation, analysis and reporting, these impacts would range from negligible to moderate. However, the majority of the geophysical features have not been investigated. And, while this situation has arisen because of the unavoidable problem of land access, it does nothing to aid the assessment in fully meeting the requirements of Planning Policy Wales, Welsh Office Circular 60/96, UDP Policy B7 and JLDP Policy AT4. All of these require a certain quality of information to be generated about site value and the significance of impact.

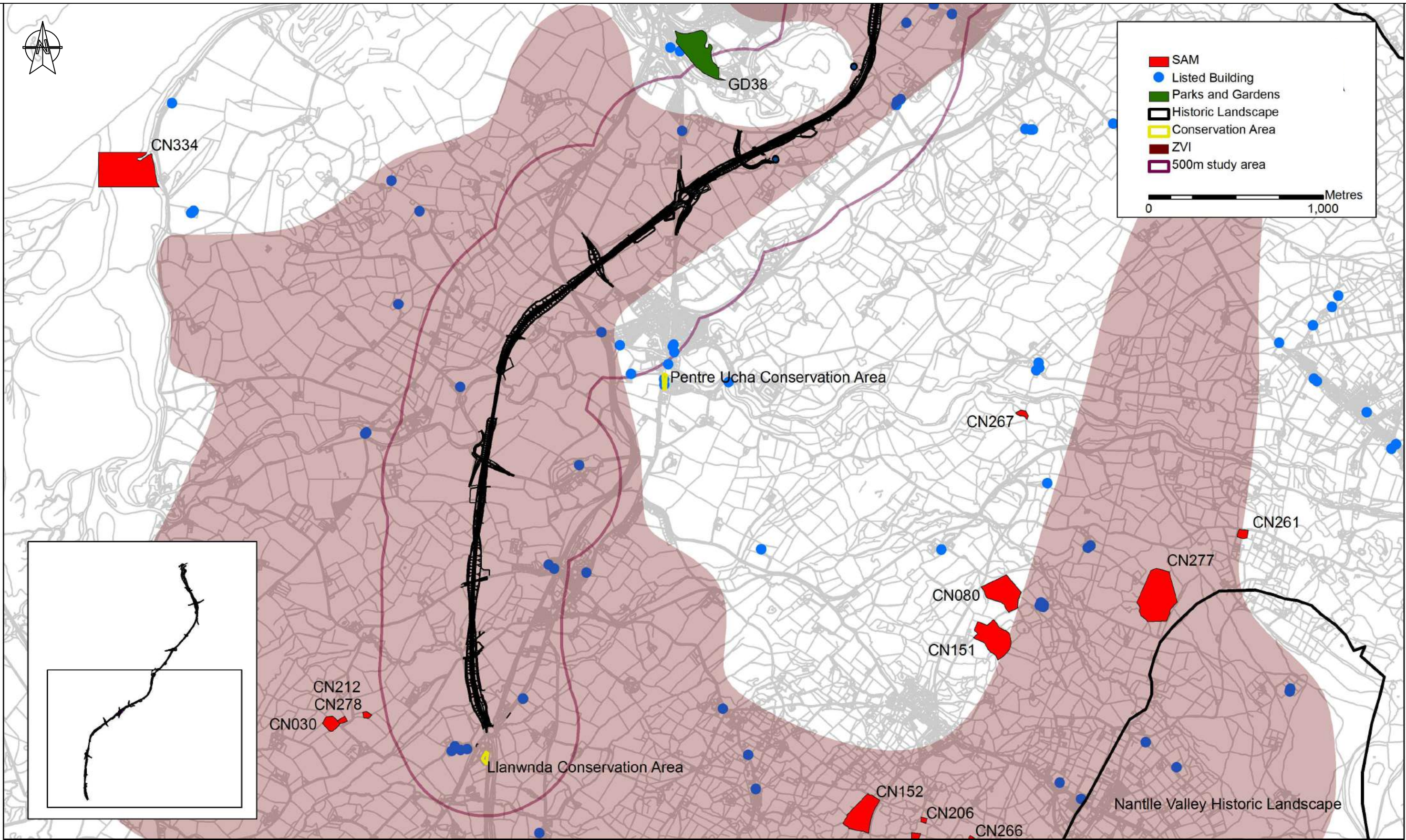
In broad terms, and where archaeological rather than natural, the geophysical features should be of later prehistoric through to modern age and will most probably relate to settlement, agriculture, and perhaps also domestic industry. The results of the field evaluation suggest that many (perhaps the majority) will be comparatively recent and of low value, for example relict field boundaries or drainage features. On the other hand, the evaluation has highlighted that older and more significant archaeology also exists. It is probably quite sparsely distributed, though areas of denser activity – for example around Caerlan Tibot – might also be anticipated. All of these statements are laden with risk, since it cannot be assumed that the limited number of trenches encountered all of the feature-types present in the Scheme

corridor, or give a representative sense of their distribution.¹⁰ If the Scheme were consented, a full programme of archaeological mitigation would be required, alongside an acceptance of the fact that a new discovery could have implications for the construction programme.

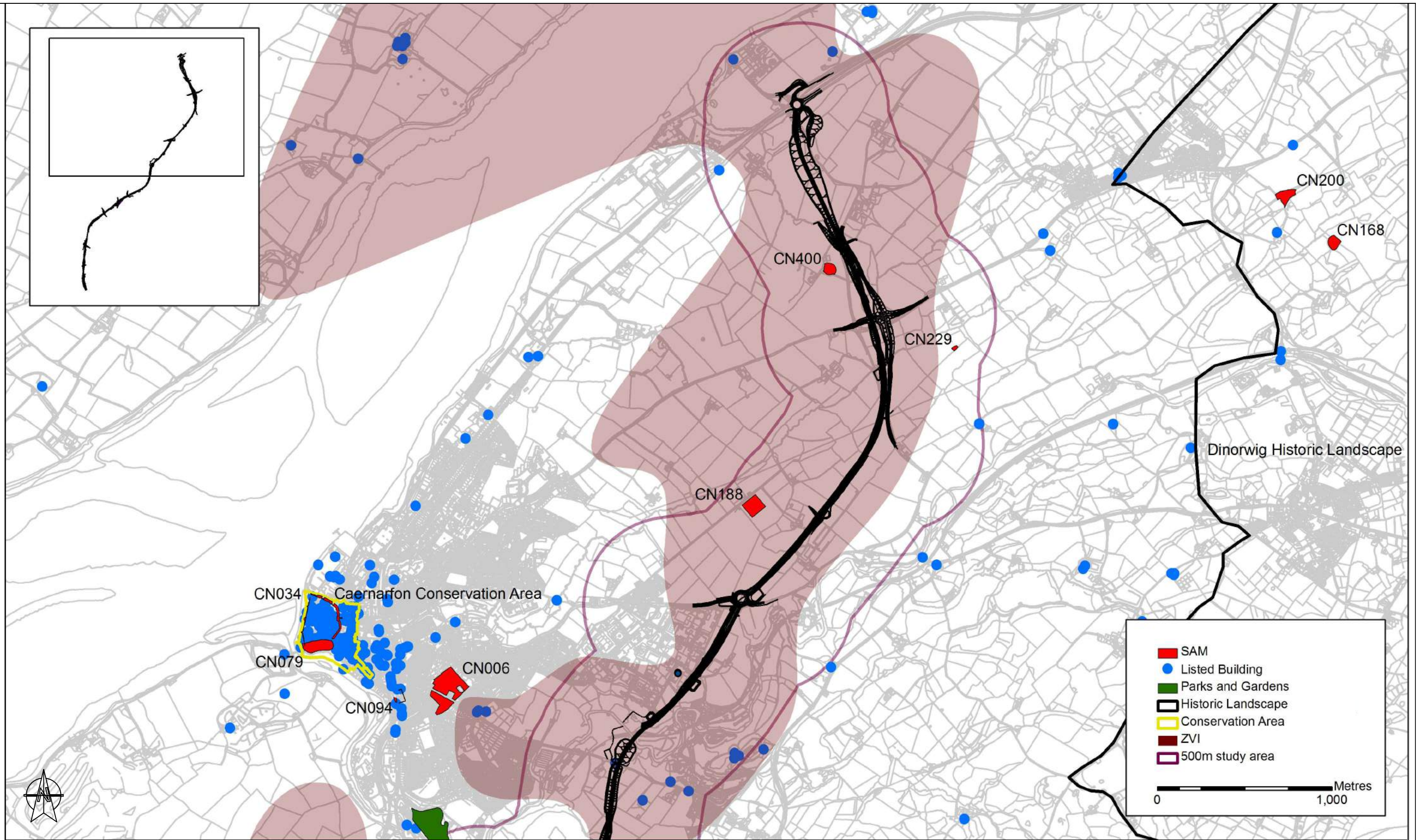
In terms of operational effects, the significant negative impact on the setting of the Listed Buildings of Bryn Eden and Glanrafon Fawr conflicts with both national- and regional-level policy. However, given the ubiquity of Grade II Listed Buildings across lowland Wales, it is likely that any road scheme of this length would have some degree of impact upon the setting of such assets. It is certainly the case that all of the Stage 2 route options for the Caernarfon-Bontnewydd scheme were predicted to have some indirect impact upon historic settings.

In all other respects the Scheme either accords, or does not conflict with, policies for heritage set out at both national and regional level. This includes policies relating to the Caernarfon World Heritage Site, SAMs, Conservation Areas, and to historic landscapes, parks and gardens.

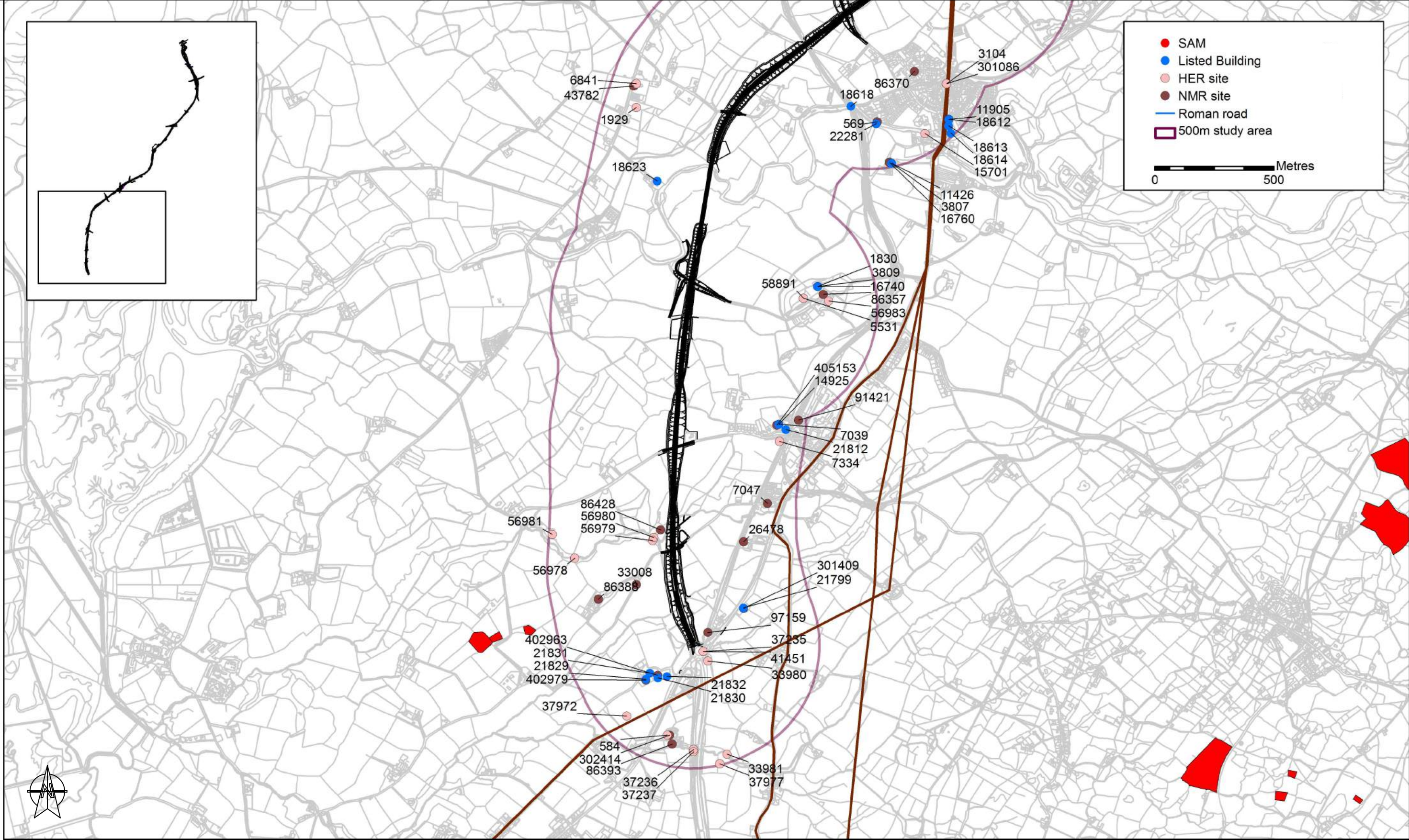
¹⁰ Other field work in the region also points to the same conclusion. Those for linear developments (roads, pipelines) have tended to reveal discrete areas of activity relating to the Neolithic/Bronze Age, Iron Age, Roman and Medieval periods, amidst a more ubiquitous backdrop of Post Medieval agricultural features.^{6,31}



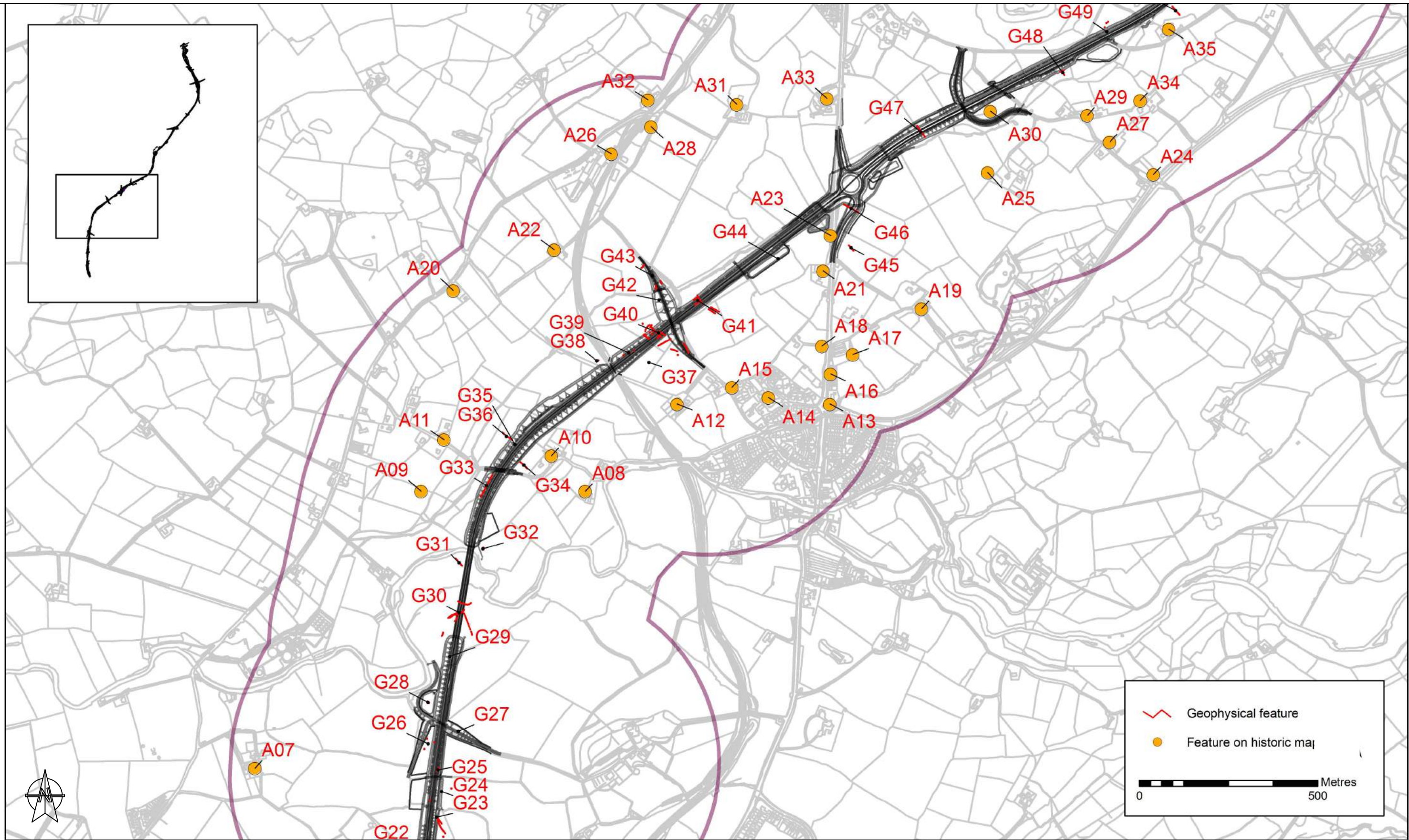
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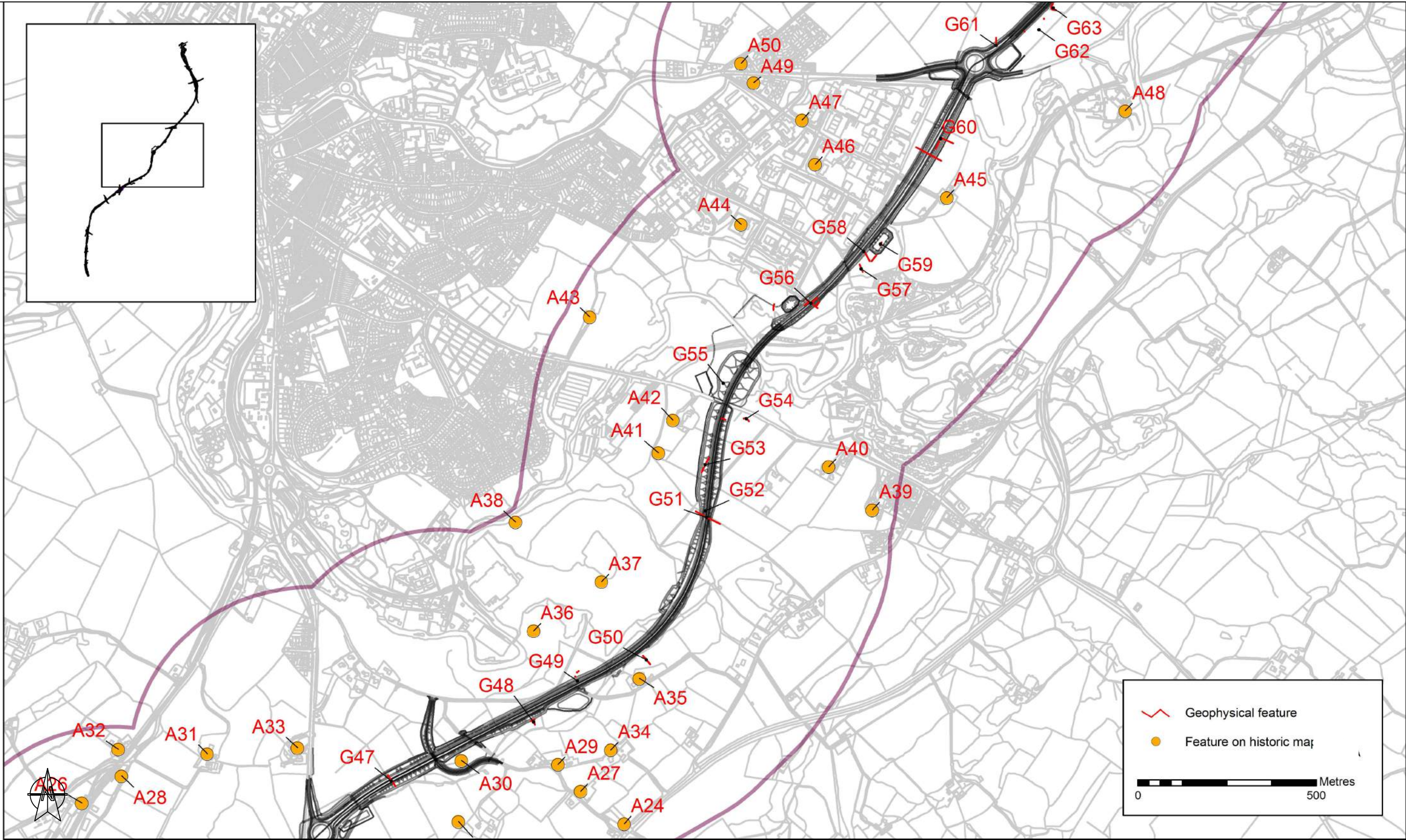
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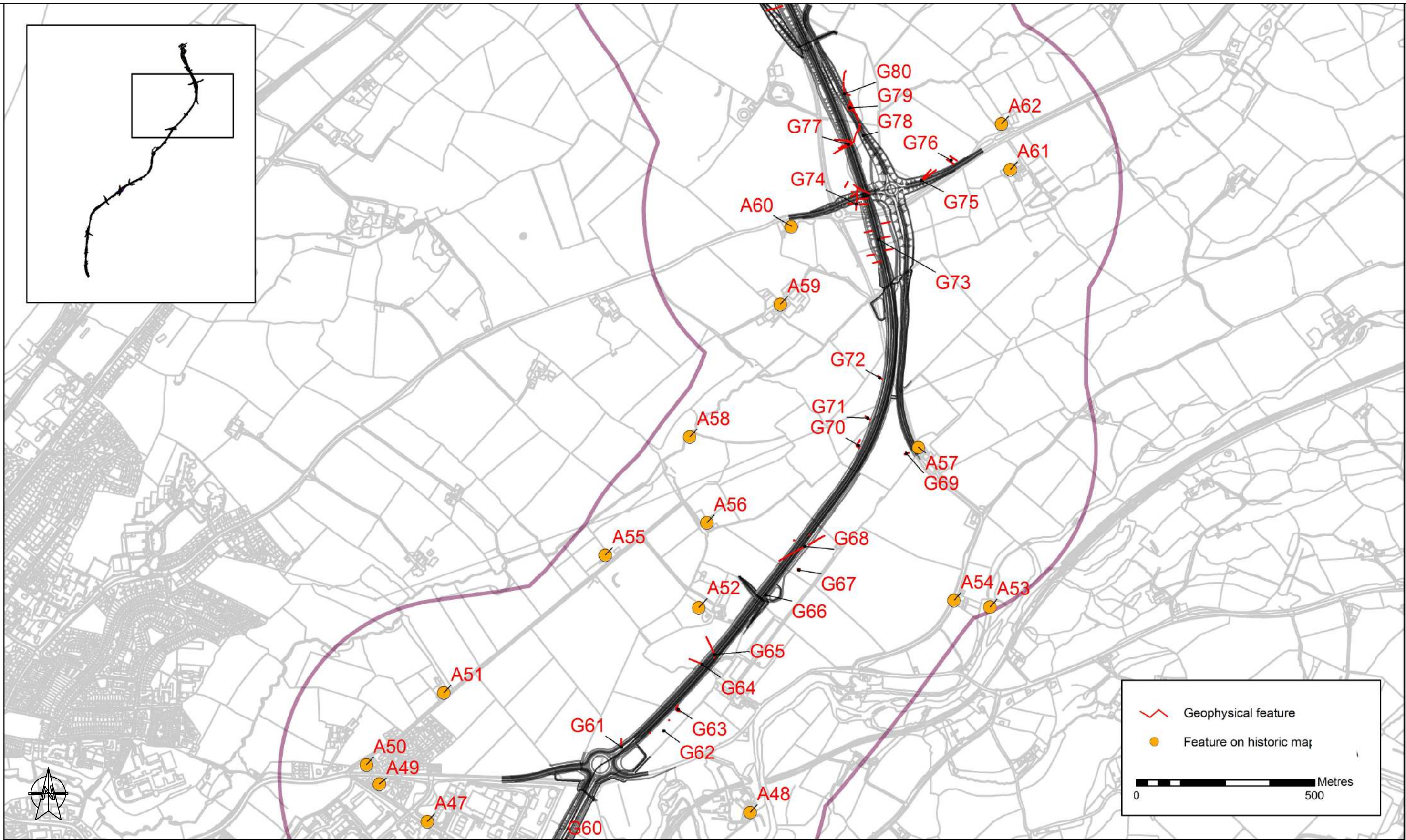
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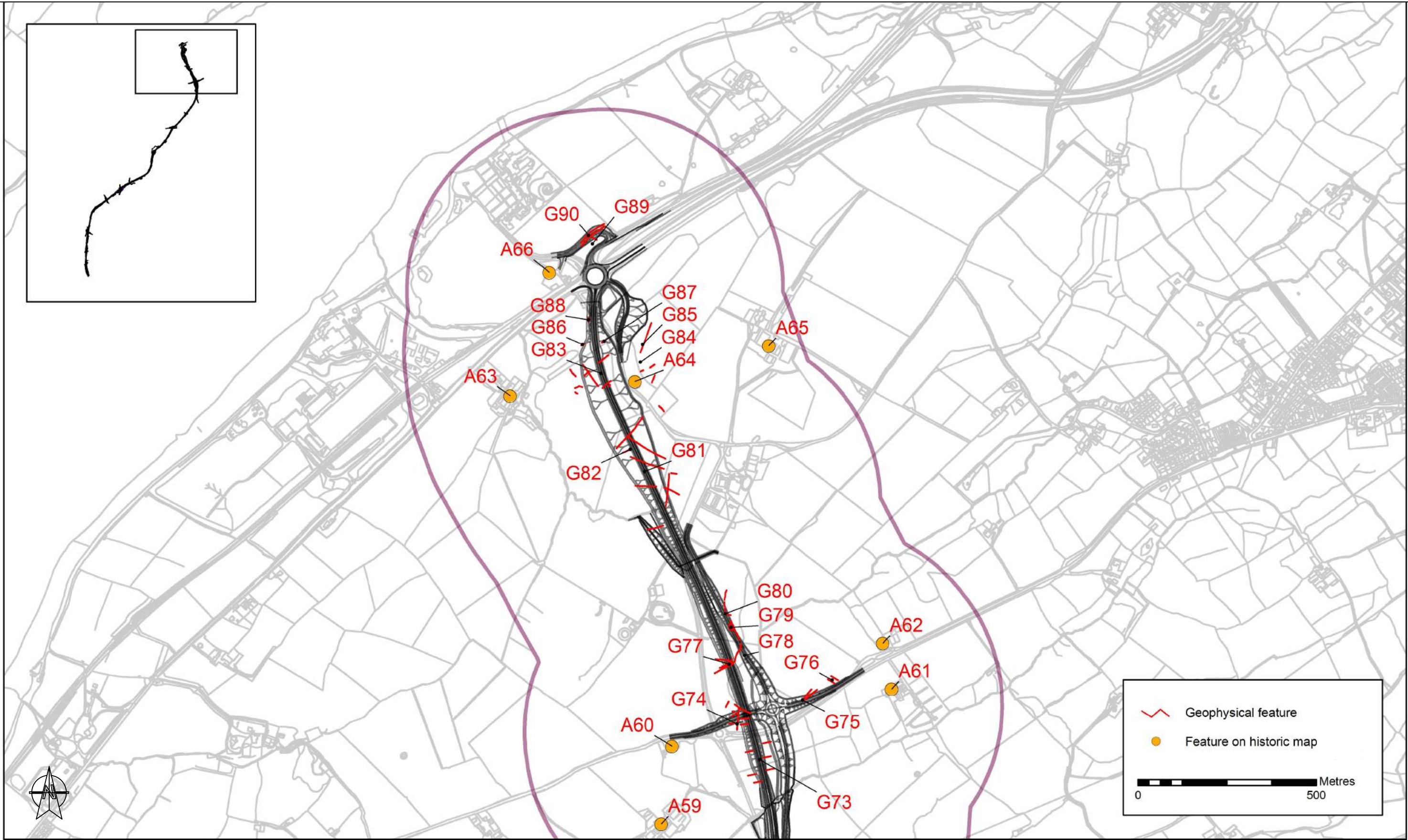
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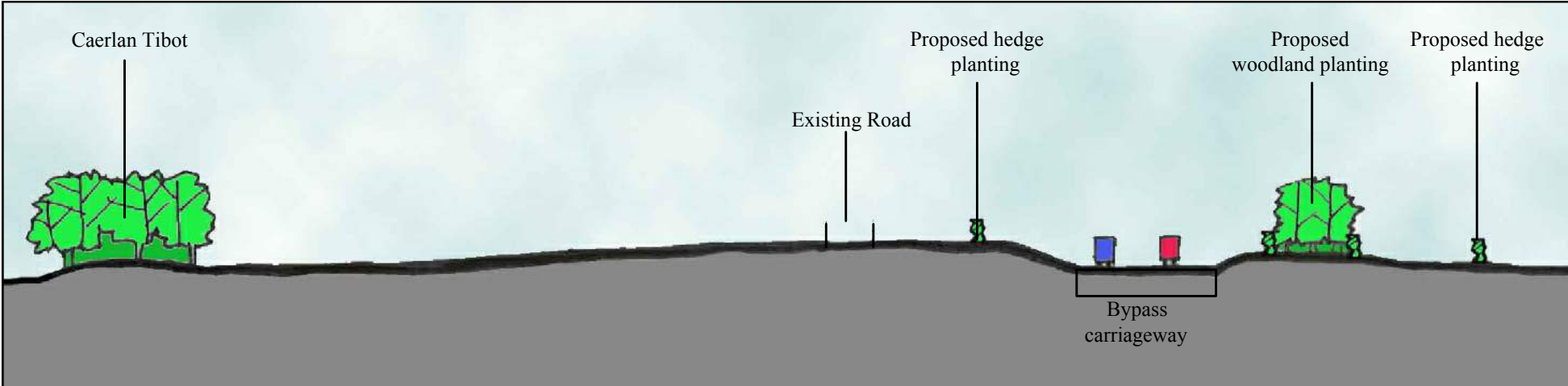

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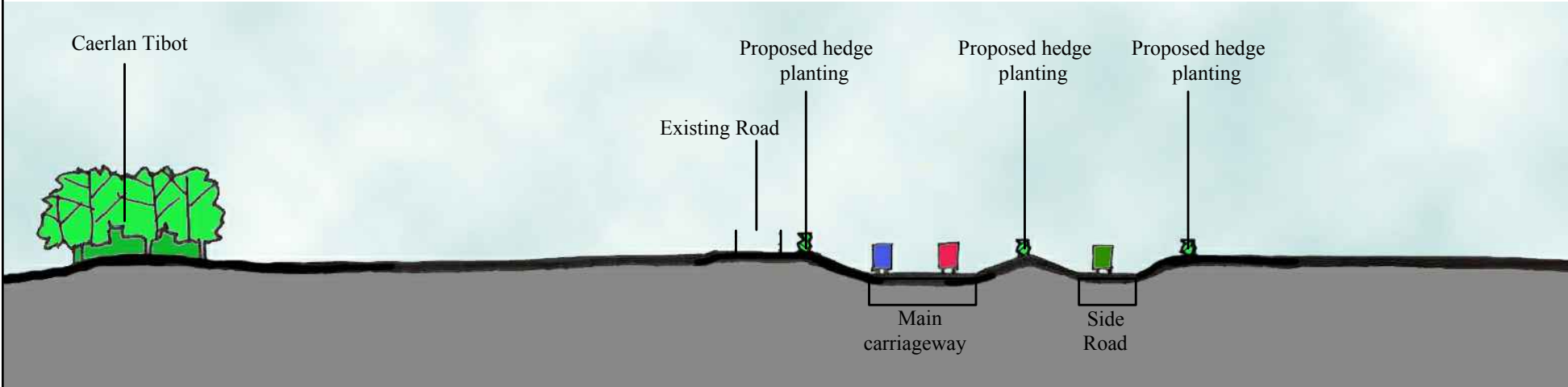
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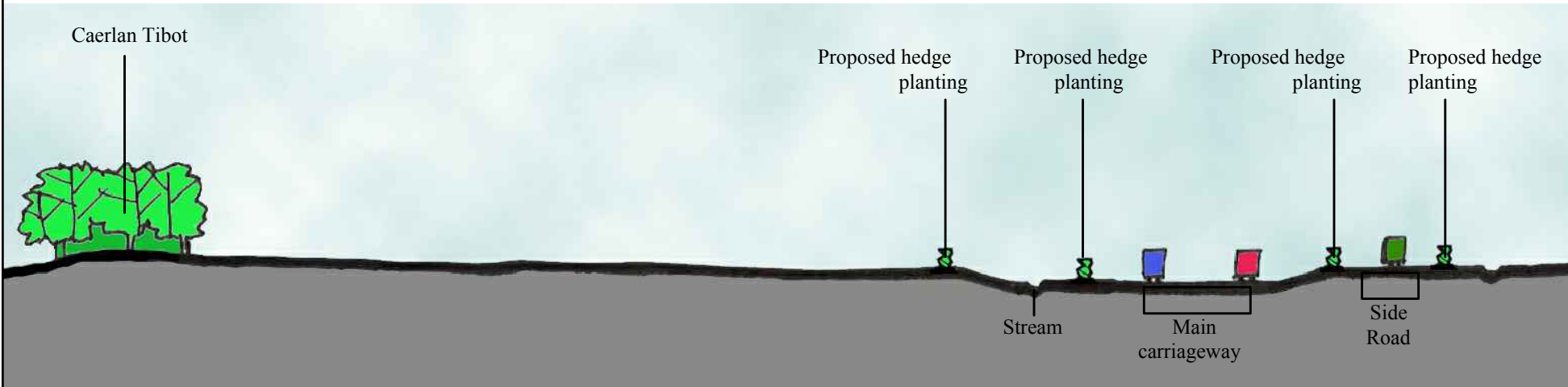
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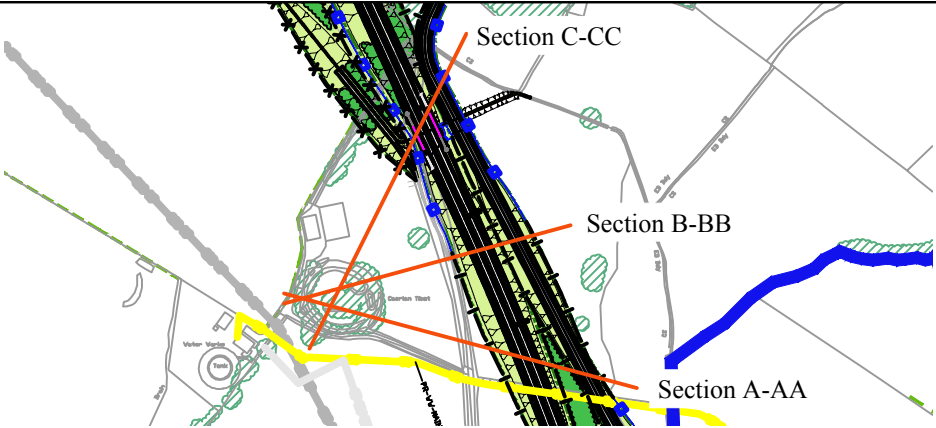
Section A-AA



Section B-BB



Section C-CC



Plan showing section lines from Caerlan Tibot



Caerlan Tibot view South from NGR 250766,364959



Caerlan Tibot view West from NGR 250811, 364780

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